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Gas as a Transport Fuel

Uganda hits threshold with Giraffe discovery
SEC updates reserves reporting regulations
Increased US ethane capacity puts processors at greater risk
Iraqis mending own pipelines

OIL&GAS JOURNAL®

Feb. 16, 2009
Volume 107.7

GAS AS A TRANSPORT FUEL

REGULAR FEATURES

COVER

The technology to turn natural gas into fuel for vehicles has been available since World War II. Yet only 2.2% of the energy consumed in the US goes into gas-fueled cars and trucks. Natural gas vehicles are rapidly increasing worldwide, however, due to high oil prices, the need for energy security, and environmental concerns. Beginning on p. 20, Oil & Gas Journal's special report on Gas as a Transport Fuel examines the emergence of gas-to-liquids technology, the newest of the gas fuel alternatives; as well as the increased use of a proven standby—propane, already the third most popular vehicle fuel in the US after gasoline and diesel. The article also looks at the expanding roles of compressed gas, already popular in South America, and liquefied natural gas in fueling millions of NGVs around the world.

General Interest

Exploration & Development

Drilling & Production

Processing

Transportation

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Feb. 16, 2009

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General Interest — Quick Takes

IEA again cuts 2009 oil demand forecast

In its latest monthly Oil Market Report, the International Energy Agency has revised downward its outlook for 2009 worldwide oil demand.

The Paris-based agency now sees worldwide demand averaging 84.7 million b/d, down 570,000 b/d from its previous projection. The new forecast would mean that demand will decline 1 million b/d from 2008.

The revised outlook puts average 2009 oil demand in the Organization for Economic Cooperation and Development at 46 million b/d, which is 340,000 b/d lower than in IEA's previous forecast. Meanwhile, non-OECD demand is cut 230,000 b/d to 38.7 million b/d.

These demand outlook reductions follow a bleaker economic outlook from the International Monetary Fund, which now forecasts that global growth in gross domestic product will be a measly 0.5% this year. IEA says that widespread financial and economic collapse are now the key brakes on global oil demand.

With 2009 non-OECD oil demand now expected to climb only 500,000 b/d from last year, IEA sees the outlook for Asia and the former Soviet Union as particularly grim.

"Oil demand growth in China is thus expected to be less than a fifth of what was recorded in recent years, while in the rest of Asia and the FSU growth will probably be nil. Only Latin America and the Middle East, partly insulated by price subsidies and, in the case of the Middle East, a strong fiscal position, will be able to sustain relatively strong growth—but at about half the pace of previous years," IEA said.

EIA raises global oil demand decline forecast

Global petroleum demand, according to the US Energy Information Administration, will fall by another 400,000 b/d during 2009 as economic conditions worsen. EIA reported Feb. 10 in its latest short-term energy outlook that it now projects worldwide oil consumption will drop by 1.2 million b/d this year as a deteriorating world economy and a weak oil consumption outlook keep the market well supplied—despite two downward revisions in the last 2 months by the Organization of Petroleum Exporting Countries.

Reduced demand and rising surplus production capacity through at least mid-2009 reduce the possibility for a strong and sustained oil price rebound over that period, the federal energy analysis and forecasting service said.

"OPEC is scheduled to meet in Vienna on Mar. 15, which could lead to another production cut to mitigate some of the slack in the world oil market. However, near-month oil prices will likely be driven primarily by the global economy," it noted.

EIA now assumes that global gross domestic product, weighted according to shares of world oil consumption, will decline by 0.1% in 2009 and rise by 3% in 2010. January's short-term energy outlook assumed 0.6% growth in real GDP in 2009 and 3% growth in 2010.

In the US, EIA expects GDP to fall by 2.7% this year, triggering consumption declines for all major fuels. Retail regular gasoline prices are projected to average $1.95/gal nationwide in 2009 and $2.19/gal in 2010.

Study sees pause in oil sands output growth

The oil price slump will stall for several years but not reverse growth of production from Alberta's deposits of oil sand and heavy oil, says the Canadian Energy Research Institute (CERI).

A report by David McColl, CERI chief economist, forecasts oil sands production of 1.9-2.9 million b/d in 2015 and 3.7-5.4 million b/d in 2030.

Oil sands production in 2007, the last full year for which an annual average is available, was 1.2 million b/d, according to the Canadian Association of Petroleum Producers.

The new CERI projection updates estimates published last June, before crude oil prices fell.

The reference-case forecast at that time was for steady growth of oil sands production to 3.4 million b/d by 2015 and 5 million b/d by 2030.

The new outlook assumes the price of West Texas Intermediate crude stays below $60/bbl for most of 2009 and credit markets continue to lack liquidity. It assumes economic recovery begins in early 2010, with liquidity slowing returning to the economy.

Growth in oil sands output will not resume until 2 years after the economy recovers, McColl says. It initially will be limited to established oil sands projects and others with financing in place before the credit collapse of last year.

The new forecast cuts the estimate for investment in new oil sands production to $218 billion (Can.) from $315 billion in the reference-case outlook last year.

The study assumes that expansion of the oil sands industry requires a WTI price above $70/bbl. ✦

Exploration & Development — Quick Takes

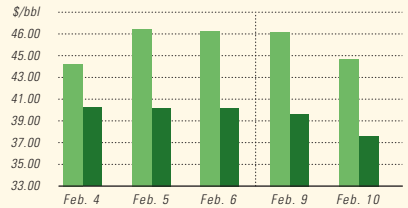
Potential of Israel's Tamar hiked to 5 tcf

Gross mean resource potential at the Tamar gas discovery in the Mediterranean off Israel is a "clearly commercial" 5 tcf, said operator Noble Energy Inc., Houston, after analyzing postdrill and production test data.

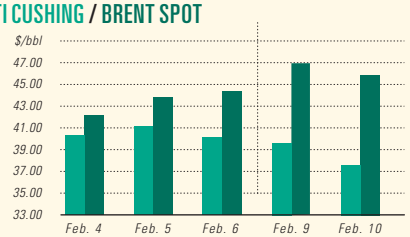
Performance modeling indicates that the discovery well, in

Industry Scoreboard

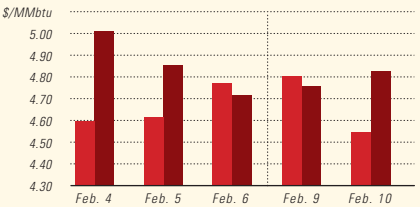
IPE BRENT / NYMEX LIGHT SWEET CRUDE



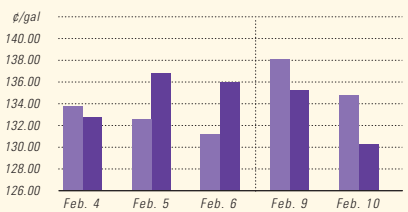
WTI CUSHING / BRENT SPOT



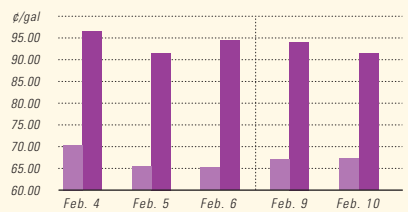
NYMEX NATURAL GAS / SPOT GAS - HENRY HUB



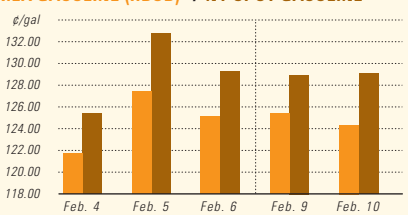
IPE GAS OIL / NYMEX HEATING OIL



PROPANE - MT. BELVIEU / BUTANE - MT. BELVIEU



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



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

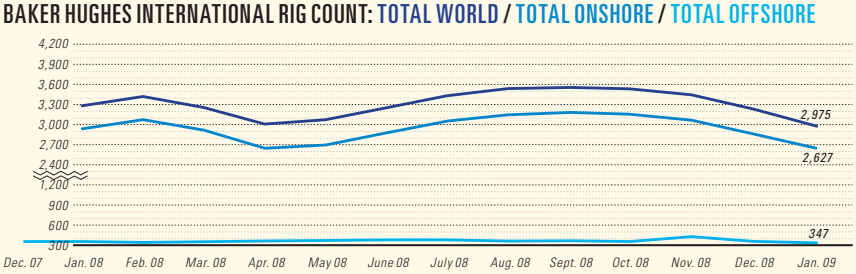
US INDUSTRY SCOREBOARD — 2/16

Latest week 1/30	4 wk. average	4 wk. avg. year ago[1]	Change, %	YTD average[1]	YTD avg. year ago[1]	Change, %
Demand, 1,000 b/d						
Motor gasoline	8,766	8,814	–0.5	8,811	8,814	0.0
Distillate	4,054	4,209	–3.7	4,106	4,209	–2.4
Jet fuel	1,344	1,546	–13.1	1,372	1,546	–11.3
Residual	678	672	0.9	693	672	3.2
Other products	4,707	4,873	–3.4	4,624	4,873	–5.1
TOTAL DEMAND	19,549	20,114	–2.8	19,606	20,114	–2.5
Supply, 1,000 b/d						
Crude production	5,062	5,093	–0.6	5,037	5,093	–1.1
NGL production[2]	2,009	2,123	–5.4	2,272	2,123	7.0
Crude imports	9,835	10,000	–1.7	9,965	10,000	–0.4
Product imports	3,348	3,492	–4.1	3,321	3,492	–4.9
Other supply[3]	1,763	1,504	17.2	1,397	1,056	32.3
TOTAL SUPPLY	22,017	22,212	–0.9	21,992	21,765	1.0
Refining, 1,000 b/d						
Crude runs to stills	14,346	15,299	–6.2	14,346	14,799	–3.1
Input to crude stills	14,764	15,058	–2.0	14,764	15,086	–2.1
% utilization	83.8	85.6	—	83.8	85.8	—

Latest week 1/30	Latest week	Previous week[1]	Change	Same week year ago[1]	Change	Change, %
Stocks, 1,000 bbl						
Crude oil	346,051	338,881	7,170	300,004	46,047	15.3
Motor gasoline	220,221	219,859	362	227,487	-7,266	-3.2
Distillate	142,591	143,952	-1,361	127,139	15,452	12.2
Jet fuel–kerosine	39,478	38,401	1,077	41,166	-1,688	-4.1
Residual	34,569	36,045	-1,476	36,459	-1,890	-5.2
Stock cover (days)[4]			Change, %		Change, %	
Crude	24.2	23.6	2.5	20.3	19.2	
Motor gasoline	25.1	25.1	0.0	25.3	-0.8	
Distillate	35.2	35.3	-0.3	30.0	17.3	
Propane	26.9	30.9	-12.9	22.0	22.3	
Futures prices[5] **2/6**			**Change**		**Change**	**%**
Light sweet crude ($/bbl)	40.50	42.52	-2.02	91.13	-50.63	-55.6
Natural gas, $/MMbtu	4.62	4.49	0.13	7.99	-3.37	-42.2

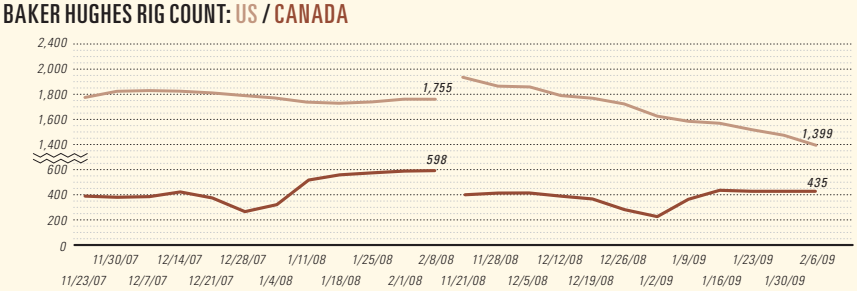
[1]Based on revised figures. [2]Includes adjustments for fuel ethanol and motor gasoline blending components. [3]Includes other hydrocarbons and alcohol, refinery processing gain, and unaccounted for crude oil. [4]Stocks divided by average daily product supplied for the prior 4 weeks. [5]Weekly average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

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



Note: Monthly average count

BAKER HUGHES RIG COUNT: US / CANADA



Note: End of week average count

5,500 ft of water 55 miles off Haifa, can be completed at a producing rate of more than 150 MMcfd, Noble Energy said. The company's predrill estimate of resource potential was 3.1 tcf.

The well tested at 30 MMcfd limited by equipment capacity from a 59-ft interval in the lowermost reservoir. Drilled to 16,076 ft, it cut more than 460 ft of net pay in three high-quality reservoirs.

The group led by Noble Energy will move the Atwood Hunter semisubmersible to drill the Dalit prospect in 4,500 ft of water on the Michal license 28 miles off Haifa. Proposed total depth is 12,500 ft. The rig will then return to the Matan license to drill an appraisal well at Tamar (see map, OGJ, Feb. 2, 2009, p. 39).

Dalit, covered by 3D seismic, has a predrill gross mean resource of 700 bcf with a 40% chance of success, the company said.

California blocks state waters oil project

The California State Lands Commission voted not to approve an extended reach drilling project that would have recovered nearly 100 million bbl of oil and brought as much as $5 billion to the financially insolvent state.

Plains Exploration & Production Co., Houston, had proposed in 2005 to drill 17 wells from shore and from existing Platform Irene to develop the Tranquillon Ridge prospect. Drilling was to start in 2009 and continue 5-6 years, and production would last 14 years.

Lt. Gov. John Garamendi, commission chairman and a former deputy Interior secretary under former US President Bill Clinton, said the plan "would signal that California wants to open offshore drilling." Garamendi also said US House Speaker Nancy Pelosi (D-Calif.) and other members of the California congressional delegation had concerns the lease would have undercut their attempts to reintroduce a federal moratorium on offshore drilling.

In return for being allowed to tap oil in the fractured Miocene Monterey formation 4-6 miles off the northern Santa Barbara County coast, Plains had offered to stop offshore oil drilling by 2022 and shut its oil and gas handling plant at Lompoc. Tranquillon Ridge would have been the first new lease granted in state waters since the 1969 oil spill.

Tom Bjorklund of the University of Houston wrote that the US Minerals Management Service estimates that discovered and undiscovered conventionally recoverable oil and gas resources of the Pacific OCS federal waters range from 14 to 19 billion bbl of oil equivalent. Potential in state waters may reach 3.4 billion boe, he said.

Eni builds energy partnership with Sonangol

Eni SPA will evaluate setting up an onshore electric power plant in Angola that will use associated gas under a new agreement signed with Sonangol to boost that country's energy facilities and industrial activities.

Sonangol and Eni also will conduct a joint study to evaluate highly prospective Angolan onshore basins and their production potential.

According to their third agreement, the companies will focus on educational projects and training of Angolan professionals, Eni said.

These agreements build upon a memorandum of understanding signed in August 2008 when the companies pledged to strengthen their strategic cooperation and for Eni to contribute to Angola's energy, social, industrial, and educational spheres.

Eni has been in Angola since 1980, has equity production of 140,000 boe/d, and operates deepwater Block 15/06. ✦

Drilling & Production — *Quick Takes*

OPEC delays 35 projects due to falling prices

Members of the Organization of Petroleum Exporting Countries, their economies battered by falling oil prices, have delayed 35 of 150 planned oil drilling projects by at least 4 years.

"Current prices threaten the very sustainability of planned investment," said OPEC Sec. Gen. Abdalla Salem El-Badri in a speech at London's Royal Institute for International Affairs (RIIA).

"These projects are on hold…and will continue to be until the [oil] price recovers," El-Badri said, adding that of the 150 projects due to come on line in the next few years, 35 had been set back to after 2013.

"The start-up dates of many other projects are still expected to slip," said El-Badri, who noted that that oil has fallen to $40/bbl from a record near $150/bbl in July, resulting in a loss to OPEC of some $356 billion.

"This year our income will be cut by 50%," he said.

UAE Oil Minister Mohammed al-Hamli, underlining El-Badri's view, said at $40/bbl, the price of crude now is about half that required to attract enough investment in new supply.

"It is clear that if oil prices remain low for much longer, the negative investment trend will increase to such an extent that large supply shortages will develop when the present economic woes are over," al-Hamli told listeners at RIIA.

The UAE oil minister expressed OPEC's worry that low prices could lead to lower future supplies, potentially causing prices to surge when demand eventually does recover.

OPEC's view was met with skepticism from industry analysts.

"They're only hurting themselves," said Phil Flynn, an analyst at Alaron Trading Corp., one of several who warned that taking production projects off line represented short-term thinking on the part of OPEC members.

According to Flynn, any spike in crude prices because of production declines from OPEC members will make it harder for economies to recover and for demand to pick up naturally. Then, he said, when demand does pick up, OPEC members won't have the production capacity to meet it.

Eni to use FPSO concept in Goliat field

Eni Norge AS has chosen to develop its deepwater Goliat oil and gas field in the Barents Sea using Sevan Marine ASA's circular floating production, storage, and offloading vessel.

Sevan Marine's proprietary technology to be used on its 1000 FPSO will include an oil production capacity of 100,000 b/d, gas production of 3.9 MM cu m/day, and oil storage capacity of 1 mil-

lion bbl. It will grant Eni a license to use the FPSO in the field, which is to start production in 2013 and produce for 15-20 years.

It is estimated that the engineering phase, following the front-end engineering and design phase, will be completed during 2009. The estimated value for the contract is 150 million kroner. The plan was for Eni to submit its final plan to the Norwegian authorities by yearend 2008, followed by a Parliament review in the spring session of 2009.

Subsea wells will be linked to the FPSO, with flowlines and risers scheduled to be installed in June-July 2010 and May-August 2011.

Potential bidders, including Sevan Marine's main competitor Aker Kvaerner AS, will have the opportunity to bid on the engineering, procurement, and construction contract for the Goliat FPSO, an Eni Norge spokesman told OGJ.

The company will issue a new tender for the EPC, but it has not yet decided the timetable. "Originally we were going to choose the concept and award the EPC at the same time, but now there is a change in the market as costs are coming down and we could benefit from waiting [to] select the contractor," he explained.

Aker Kvaerner said it would present a competitive delivery model and tender for the EPC contract and will aim to construct the topside and processing modules, as well as the hook up, in Norway.

Eni said it chose the FPSO production concept because it was cheaper, could tie-in future discoveries, and had better environmental advantages than landfall solutions.

Florida's Jay field idle in cost-price squeeze

Quantum Resources Management LLC, Denver, informed interest owners that it had suspended production from giant Jay oil and gas field in the Florida Panhandle on Dec. 22, 2008.

The dramatic decline in oil prices and high operating expenses led to the action, Quantum said, adding that it maintains the capability to reestablish production and is "analyzing alternative production scenarios that might result in improved economics."

Quantum informed royalty owners, including LL&E Royalty Trust, Austin, that it is analyzing all options to reduce operating costs.

Discovered in 1970, Jay field in Santa Rosa County was estimated to have 763 million bbl of original oil in place, of which 458 million bbl was judged recoverable. Jay had produced 369 million bbl through 1990 and was down to about 4,000 b/d of oil and large volumes of water in recent years.

Shell lets contract for Gumusut-Kakap work

Sabah Shell Petroleum Co. Ltd. Sdn. Bhd. awarded JP Kenny Wood Group a contract for subsea integration and follow-up engineering work for the Gumusut-Kakap deepwater development in 1,300 m of water, 120 km off Sabah, Malaysia, on Blocks J and K.

The 4-year contract provides for specialist subsea engineers, engineering studies, design, and follow-up engineering support through the project's fabrication and commissioning phases.

Sabah Shell will operate the development that includes the first deepwater semisubmersible floating production facility off Malaysia. The facility has a design capacity for processing 150,000 bo/d.

Gumusut-Kakap will produce from 19 subsea wells with oil exported via a pipeline to a new oil and gas terminal, planned at Kimanis, Sabah. The project will reinject associated gas into the reservoir to help improve oil recovery. Development drilling commenced in January 2008.

A 2006 unitization and unit operating agreement combined the Gumusut and Kakap fields into a single development.

The semisubmersible is under construction at the Malaysia Marine & Heavy Engineering's fabrication yard in Pasir Gudang, Johor, Malaysia.

Sabah Shell completed the Gumusut discovery well in December 2003 on Block J. The well included a vertical well and two sidetracks. The field extends into Block K on which Murphy operates the Kikeh field. ✦

Processing — *Quick Takes*

Senate urged to deny higher ethanol blending cap

A coalition of associations and organizations asked the US Senate on Feb. 6 not to approve a provision in the economic stimulus bill it is debating that would increase the current ethanol blending cap.

The National Petrochemical & Refiners Association and 18 other groups said that adopting such a provision would short-circuit the Clean Air Act regulatory structure for approving the introduction of new fuels or fuel blends, and would lead to increased air emissions from gasoline-powered engines and potentially endanger consumers.

"In our collective opinion, a decision on whether to permit the use of ethanol concentration in excess of 10% in gasoline (so-called 'midlevel ethanol blends') in motor vehicle and equipment engines must be guided solely by sound, unbiased, and comprehensive science and must hold true to the fundamental purposes of protecting the environment and consumers," they said in a letter to Senate Majority Leader Harry M. Reid (D-Nev.) and Minority Leader Mitch McConnell (R-Ky.)

In addition to NPRA, the coalition included the Alliance of Automobile Manufacturers, American Lung Association, Engine Manufacturers Association, Friends of the Earth, International Snowmobile Manufacturers Association, Natural Resources Defense Council, Outdoor Power Equipment Institute, and Union of Concerned Scientists.

"Collectively, our organizations strongly believe that this issue should not be part of the economic stimulus package currently under consideration by the United States Senate," the letter continued. Before midlevel ethanol blends are allowed, testing by the US Environmental Protection Agency and the Department of Energy should be allowed to continue, and the results must indicate that higher ethanol blends in gasoline-powered engines do not pose a threat to air quality or consumers, it urged.

South Korean refiners eye profits, reduce closures

South Korean refiners, eyeing the possibility of increased overseas sales due to improved margins for fuel products, plan to shut down less capacity during the peak maintenance season this year.

Asian refiners generally perform maintenance and safety checks twice a year: between April and June, ahead of the peak summer driving season, and again in October and November, before a surge in heating fuel demand during winter.

But this year, according to a report by Bloomberg News, South Korean refiners will close just two crude distillation units—totaling 410,000 b/d, or 15% of capacity—in the first half of June. That compares with the closure of 24% of capacity during the same period in 2008.

Jason Lee, a petroleum trading manager at SK Networks Co., explained that profits from exports are better than expected because of reduced run rates among Asian refiners such as Nippon Oil which last month said it would reduce crude throughput by 12% from a year earlier in February.

Bloomberg cited a report by the Bank of America that said the margin for refined products in Singapore was $8.34 in the week ending Jan. 16, a 9% increase over the $7.65 recorded during the same period in 2008.

The plans for closures include:

- SK Energy will close the 240,000 b/d No. 4 crude distillation unit at its Ulsan refinery between Mar. 27 and Apr. 29; the 110,000 b/d No. 2 crude distillation unit June 3-30; and the 60,000 b/d No. 1 crude distillation unit June 19-23.
- GS Caltex Corp. will shut the country's largest crude distillation unit, the 300,000 b/d No. 4 unit at the Yosu refinery, between May 7 and June 8.
- S-Oil Corp. will shut the 93,000 b/d No. 1 crude distillation unit at the Onsan refinery Apr. 1-19.
- Hyundai Oilbank Co. doesn't plan to halt any crude distillation units at its Daesan refinery.

Sudan to launch its first ethanol mill in March

Sudan's state-owned Kenana Sugar Co.'s (KSC) first ethanol mill, built by Brazil's Dedini Industrias de Base, which builds facilities for the sugar and ethanol industries, is set to begin operations at the end of March. Situated within the KSC complex, 250 km south of Khartoum, the mill is expected to produce about 61 million l./year of alcohol from molasses made in the country.

Sudan's ambassador to Brazil, Omer Salih Abubakr, said KSC is contracted to supply 5 million l./year of ethanol to the UK.

Abubakr said about $800 million has been invested in the overall KSC project—largely sugar plantations and sugar mills—with funds coming from several governments, including Sudan, Saudi Arabia, the UAE, Kuwait, and Japan.

Sudan is one of the leading sugar cane growers on the African continent, producing slightly more than a million tonnes/year. KSC exports most of it to the Middle East.

In July 2008, aiming to diversify its output and export potential, the Sudanese government invited Brazilian ethanol facility contractors such as Dedini SA to build as many as 18 sugarcane ethanol plants in the African country. "We have plans to expand the production of sugar and want Brazil to help us with this," Sudan's vice-secretary for foreign affairs, Mutrif Saddig, told Brazil's state news agency. "We are after Brazilian (ethanol) technology," Saddig said.

At the time, Dedini said it was retrofitting an existing KSC sugar cane milling unit with equipment necessary to make ethanol.

Until recently, about 80% of Dedini's business has been confined to the Brazilian market, where sales have grown steadily at 20-30%/year for the past 5 years. But export markets are beginning to open. In August 2008, Indonesia's Medco Group said it would form a joint venture with Dedini to set up a bioethanol plant in Papua, with production scheduled to begin in 2011.

"The plant will have a production capacity of 30,000 b/d and will require an investment of $200 million," said Arifin Panigoro, Medco's founder. ✦

Transportation — *Quick Takes*

Alaska Gas Pipeline lets gas plant contract

Alaska Gas Pipeline LLC has let a contract to Fluor WorleyParsons Arctic Solutions for the design of the gas treatment plant that will process gas delivered from Alaska through its proposed 4 bcfd pipeline to the Lower 48, Alaskan, and Canadian markets.

Fluor WorleyParsons will do the work under a multimillion preliminary front-end engineering and design (pre-FEED) contract, and this will be the world's largest gas treatment plant with process modules weighing up to 9,000 tons.

The 5 bcfd plant on the North Slope will remove carbon dioxide, water, hydrogen sulfide, and other impurities from the gas. "It will also provide initial gas chilling and compression," Fluor said.

The 2,000-mile, 48-in. Alaskan pipeline is expected to start operations in 2018 and is budgeted to cost $30 billion.

Baraka Petroleum proposes Mauritanian pipeline

Mauritania is considering a proposal submitted by Baraka Petroleum Ltd., Perth, to assist in the development of a proposed Mauritanian oil and gas pipeline system. Such a transportation system would accelerate the development of the country's oil and gas reserves, Baraka said.

The pipeline system envisaged includes a pipeline link from the Taoudeni region in the east to the town of Zouerate in the northwest and another link extending south to Nema and from there, west to the capital Nouakschott on the coast. Spurs could be built to feed other settlements along the route. Nema also could become a hub for a southern link to neighboring Mali.

The proposal was first presented to Mauritanian authorities in 2006 and 2007 and was most recently presented to the current government last November. The proposal is a memorandum of understanding to develop regulations for transporting hydrocarbons in Mauritania and for the development of the oil and gas pipeline system in the country.

The MOU proposes that a new company, sponsored by Baraka in conjunction with the government, would plan and manage suitable regulatory laws and regulations to make it possible for Mauritania to develop the Taoudeni reserves (still to be delineated) through the construction of a pipeline system. ✦

Letters

Hydrogen worth pursuing

In your Jan. 19 issue, Thomas Wyman argues that, because "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 extract hydrogen as a fuel… the pursuit of the hydrogen economy brings to mind the age-old search for the perpetual motion machine" (OGJ, Jan. 19, 2009, p. 14).

Mr. Wyman is ignoring the remainder of the fuel cycle. Obtaining hydrogen from natural gas is 65-75% efficient, so we start by throwing away 25-35% of the energy in the natural gas. For use as a vehicle fuel, both natural gas and hydrogen must be transported and compressed into a high pressure storage tank onboard the vehicle; hydrogen probably will end up the loser here, too, because its low energy density demands a higher storage pressure than natural gas for equal range.

However, the saving grace is hydrogen's end use efficiency onboard the vehicle. The efficiency of a dedicated natural gas vehicle, accounting for both the weight of the storage tanks and the efficiency boost from methane's high octane, is likely to be only slightly better than that of a gasoline vehicle with similar technology. And right here is hydrogen's theoretical potential. If the efficiency of a practical fuel cell system can reach the levels hoped for, it will be more than twice as efficient as an internal-combusion-engine (ICE)-based power train—with zero tailpipe emissions.

Although these results are a bit dated, let me compare total fuel cycle energy use for dedicated natural gas vehicles vs. hydrogen (from natural gas) fuel cell vehicles from the "1.5" version of Argonne National Lab's GREET (fuel cycle) model: The natural gas vehicle uses about 3% more energy than a similar gasoline vehicle; the hydrogen fuel cell vehicle uses 50-60% less energy than a similar gasoline vehicle.

I'd be the first to admit that these values, especially the fuel cell values, are based on assumptions about R&D

success. Also, I believe that future improvements in ICE engines and transmissions will make the energy comparison somewhat less favorable to fuel cells. And there are enormous cost and infrastructure development hurdles to be overcome before hydrogen fuel cell vehicles can compete well with gasoline vehicles.

Nevertheless, a hydrogen economy is no perpetual motion machine; it is an option, one of several, worth pursuing in any drive to reduce US dependence on oil.

Steve Plotkin
Rockville, Md.

Calendar

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

OIL&GAS JOURNAL online

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

2009

FEBRUARY

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.

Calendar

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

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

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

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

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

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

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

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

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

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

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

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

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

APRIL

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MAY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Unconventional Gas International Conference & Exhibition, Fort Worth, Tex., (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.unconventionalgas.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.

Journally Speaking

Marine transfer safety evolves

Paula Dittrick
Senior Staff Writer

The logistics of boarding offshore installations tend to be exciting for journalists who only make such trips infrequently.

My few excursions offshore involved helicopter rides. Other OGJ editors rode baskets in which they stepped onto a flotation ring and hung onto a collapsible rope net.

Industry uses various types of crane-assisted devices for personnel transfers from a crew supply boat. A crane lifts the device off a boat, swings it over the water, and hoists it onto an installation. Some of the latest models have seats or quick-release clips for riders.

In recent years, personnel transfer equipment has evolved while industry has emphasized standardized safety procedures, said Paul Liberato, president of Billy Pugh Co., Corpus Christi, Tex.

Speaking to a recent International Association of Drilling Contractors conference on health, environment, and safety in Houston, Liberato said personnel transfers "are extremely safe" because industry considers "moving people to be a critical operation."

Rite of passage

Liberato rebukes the idea of a rite of passage for a new crew hand, who typically found himself alone on the rope basket for his first "Billy Pugh" ride because veteran crew members conspired with the crane operator to initiate the new guy with a brief dip into the water.

Unlike decades ago, industry avails itself of training schools, videos about operational procedures, preflight safety briefings, and transfer device inspections.

Liberato said the BP PLC-operated Thunder Horse semisubmersible platform reported 280,000 crane-assigned personnel transfers without any incidents. Thunder Horse's quarters, moored on Mississippi Canyon Block 778, can accommodate more than 200 people.

Reflex Marine Ltd., Aberdeen, developed a transfer capsule called the Frog in which riders strap into seats inside a rigid frame. Photo from Reflex Marine.

Another personnel transfer device manufacturer, Reflex Marine Ltd., Aberdeen, noted that statistics on transfer accidents are lacking because no systematic data exist for crane transfers.

"Our feeling is that whilst best practice in marine transfer has improved considerably, it is still not as widespread as it could be," said Philip Strong, Reflex Marine managing director.

From a records search, Reflex Marine assembled global information on 72 crane-transfer incidents associated with 11 deaths and 59 injuries. Of those incidents, most of which occurred since 2000, 49% involved falling, 38% involved lateral impact (swinging), and 32% involved vertical impact (heavy landing).

Strong and Liberato both said careful attention needs to be paid to the vessel choice, the crane operation, the training, and the transfer device itself, but that ultimately the human factor still figures prominently.

Helicopter safety

Although Liberato calls helicopters "the gold standard" in personnel transfer, some Gulf of Mexico operators have experienced fatal helicopter accidents. Recently, a helicopter carrying workers to Shell Oil Co.'s South Timbalier platform crashed into a southern Louisiana marsh, killing both pilots and six of the seven workers.

The National Transportation Safety Board estimates thousands of helicopter flights take off daily to shuttle people to installations off Texas and Louisiana.

Sudden changes in weather always are a risk. In my former days as a wire service reporter, I once sat in a helicopter on an elevated helipad off Texas for an unscheduled weather-related stop. The pilot said the helipad was a fueling station.

I remember how that helipad seemed rather small with nothing in sight except for water. Everything turned out fine. But before we returned to shore, I experienced a growing sense of gratefulness for the pilot's caution and my life jacket. ✦

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Addiction and tyranny

On the hierarchy of political metaphors, oil has fallen another notch. Former President George W. Bush institutionalized disrespect for the substance when, in the 2006 State of the Union address, he diagnosed the US as "addicted to oil." President Barack Obama now has brought his own poetics to the smear campaign. In a Feb. 5 speech at the Department of Energy, he said his economic stimulus proposal, full as it is of spending on nonfossil energy, "will begin to end the tyranny of oil in our time."

The associations are as invalid as they are deliberately dark. If they guide policy-making, they're dangerous. And they are driving policy.

Not addicted

Americans are no more addicted to oil than they are to bread or cotton or thermoplastic resins. They don't use those substances out of dangerous habit. They use them out of economic choice, recognizing benefits net of costs that make the materials superior to competitors.

Nor is oil anything like tyranny. To the contrary, oil liberates people by helping them perform work, move about, and stay comfortable affordably. Tyranny destroys life; oil improves it. So Obama's characterization of oil was as misguided as his predecessor's.

In both cases, the presidents sought to highlight oil's disadvantages and obscure its advantages in order to promote costlier alternatives. In both cases the practice represents cheesy sloganeering that deserves no place in the formulation of energy policy. Moreover, it betrays the dangerously costly presumption that policy should not only promote nonfossil energy forms but also discourage development of oil and gas.

Manifestations of that presumption have appeared with alarming speed in the Obama administration. On Feb. 4, US Sec. of the Interior Ken Salazar ordered the Bureau of Land Management not to accept high bids submitted on 77 tracts in Utah during a lease sale Dec. 18. On Feb. 10, he delayed action on a Bush administration move to accelerate leasing of parts of the Outer Continental Shelf that had been subject to moratoriums for 30 years.

The Interior secretary was wholly unconvincing when he claimed to be imposing deliberation on actions taken in a rush in the closing hours of the Bush years. In fact, the relevant agencies have solicited and received public comments on the leasing moves. There was no "midnight action" to sneak the OCS sale into effect, as Salazar said. There is no absence of information on which to base decisions. Following a familiar pattern, Salazar is stalling to appease environmental extremists intent on blocking leasing as a way to thwart supply and ultimately use of oil and natural gas.

For the US to adopt the extreme antioil agenda—the only agenda truly served by nonsense about addiction and tyranny—would be disastrous. Like the rest of the world, the country will continue to need oil and gas for many years. Policy must accommodate this economic reality.

Nobuo Tanaka, executive director of the International Energy Agency, put oil's role in useful perspective last week at an annual energy conference in Houston by Cambridge Energy Research Associates. Using data from IEA's World Energy Outlook, Tanaka sketched two scenarios for future reduction in emissions of greenhouse gases. Even under the most aggressive assumptions about emissions cuts, global oil use projected for 2030 exceeds the level of 2007.

Overwhelming benefits

Oil will continue to be used in large amounts because it offers overwhelming benefits of form and cost that policy-makers ignore at great economic peril. Governance based on contrary assumptions will fail. Economies subject to governance of that type will suffer.

The Obama administration should orient policy toward a future in which nonfossil energy forms develop technically, economically, and with government help, along with—as opposed to instead of—oil and gas supply. To do otherwise would impose costs and forgo wealth creation at a moment in history when mistakes like that would be ruinous. If tyranny plays a role in any of this, it takes the form not of oil but of the chance that the government will impose economic pain Americans shouldn't have to endure. ✦

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Natural gas vehicles gain in global markets

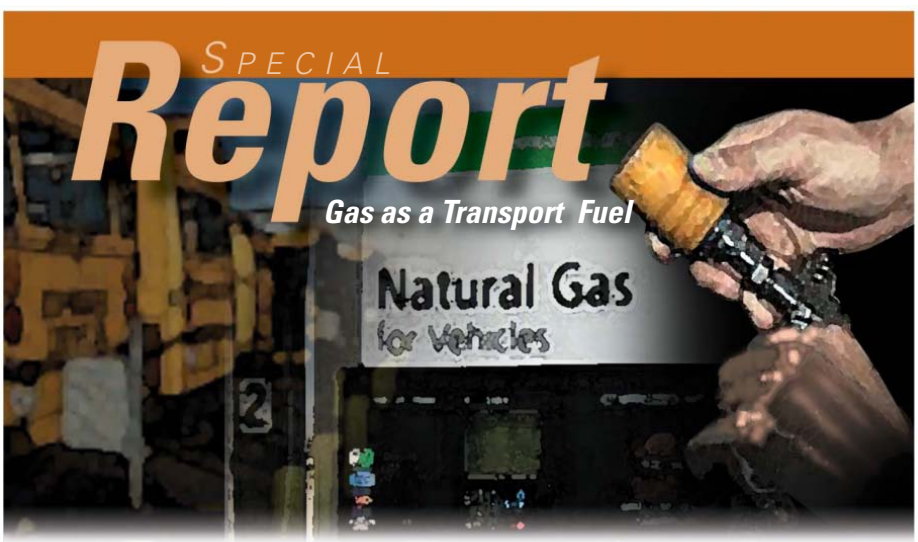
Sam Fletcher
Senior Writer

Natural gas, one of Earth's cleanest, most abundant resources, accounts for 22% of total US energy use but only 2.2% of the energy used in the US for transportation, although the technology for natural gas vehicles (NGVs) has been available since World War II.

"It took 60 years to grow the worldwide NGV population to only 1.7 million vehicles by 2001," said John Lyon, president and CEO of FuelMaker Corp. and former president of the International Association for Natural Gas Vehicles, at the group's June meeting in Rio de Janeiro.

Since then, he said, "Something happened to drive the NGV population to over 7 million vehicles, an astounding annual growth rate of 26%." NGVs have increased rapidly in Europe and South America primarily because of environmental concerns and rising prices for crude, gasoline, and diesel.

At a conservative annual growth of 18%, Lyon said, "There will be 65 million NGVs by 2020, representing 9% of the world's vehicle population and reducing oil demand by 7 million b/d." He added, "Many gas producing and gas delivery companies are now recognizing that by 2020 NGVs will represent a 400 billion cu m/year market (16% of today's total world gas demand)."



The US Department of Energy expects alternative-fueled vehicles to account for 10% of the US automobile market by 2020 when more than 286 million vehicles will be on US roads.

To reach that goal, the US government is offering incentives, including fuel excise tax credits of 50¢/gal for equivalent compressed natural gas (CNG) and liquefied natural gas (LNG) fuels. It also offers tax credits for 30% of infrastructure costs; up to $1,000 for home refueling appliance or as much as $30,000 for a commercial project.

In an October study, DOE found, "Alternative fuel prices relative to conventional fuels vary, with some (biodiesel, propane) higher and some (Ethylene 85 and CNG) lower. CNG is about $1.03 less than gasoline on an energy-equivalent basis, while E85 is about 22¢/gal less than gasoline." Although the average US retail price of propane was 34¢/gal higher than the average price for gasoline, propane prices were "generally favorable" in the West, DOE said.

It reported, "Prices for the alternative fuels in terms of cost per gallon equivalent are generally higher than their cost per gallon because of their lower energy content per gallon. It has been seen, however, that consumer interest in alternative fuels increases as the price differential per gallon increases, even if that differential does not directly translate to savings on an energy-equivalent basis." Federal officials also noted extreme weather anywhere in the US can increase natural gas prices.

NGVs cost more due to the need for special fuel tanks and engine modifications. Heavy duty NGVs, such as trucks and buses, typically use LNG rather than CNG for their bigger engines. The most established US niche market for gas as

a transportation fuel is gas-powered transit bus systems. In 2006, 15% of US transit vehicles were powered by natural gas, replacing 109 million gal of diesel.

Propane

Some 20 years ago when the Department of Transportation began mandating service signs for alternative fuel outlets along interstate highways, the first such sign erected in Houston and other sections of the US was for propane.

Propane or LPG has been an alternative fuel for spark ignition engines since the 1940s. It is the third most popular vehicle fuel in the US after gasoline and diesel, and its distribution system is widespread compared with other gas alternatives. The National Propane Gas Association (NPGA) counts 13,500 retail propane outlets, but DOE lists some 2,500 propane fueling stations for automobiles, the largest system of any alternative fuel in the US but still far fewer than gasoline or diesel stations.

DOE estimates that there are more than 270,000 on-road propane vehicles in the US and more than 10 million worldwide. Exact counts are difficult, however, because the designation of propane-fueled vehicles may include off-road and industrial equipment such as forklifts, while some propane fueling stations may be small outlets fueling barbecue grills. Still, many converted propane vehicles have provisions for topping off from "barbecue bottles."

Although the capital structure for production, storage, and bulk distribution of propane already exists, additional investment will be required to accommodate higher throughput for automotive use. Existing service station facilities designed for gasoline and diesel can be modified to dispense propane. The World LP Gas Association said installation costs for equipment to dispense propane is two-thirds less than that for CNG.

Propane can deliver up to 90% of gasoline's miles per gallon with less pollution. Its energy density and fuel efficiency relative to gasoline surpasses those of all other alternative fuels—70% for ethanol, 54% for methanol, and 21% for CNG. Moreover, many governments impose less tax on propane than on gasoline and diesel, so it is usually more cost effective, proponents claim.

Propane's high octane rating… and low carbon and oil contamination…resulted in documented engine life of up to three times that of gasoline or diesel engines.

The fuel is a gas at normal temperatures and pressures, but in a vehicle fuel tank, it is pressurized to 300 psi—"about twice the pressure as an inflated truck tire," said DOE officials—making it a liquid with an energy density 270 times greater than its gaseous form. It returns to a gas before it is burned in an internal combustion engine, so the engine runs more efficiently in low-speed, light-throttle conditions. Propane's high octane rating (104-112 compared with 87-92 for gasoline) and low carbon and oil contamination characteristics have resulted in documented engine life of up to three times that of gasoline or diesel engines, NPGA said.

The Battelle Memorial Institute reported that propane is the most economical alternative fuel per mile for fleets when operating, ownership, and infrastructure costs are all taken into consideration. NPGA said operating costs for propane fleets are typically 5-30% less than those of gasoline fleets.

The Propane Education & Research Council (PERC) is expanding its commercialization strategy to help manufacturers bring to market new propane-fueled vehicles and equipment and to engage the industry in building markets for new end-use technology. Late last year, PERC approved a multiyear $4.7 million project with Roush Industries, Livonia, Mich., to produce and certify a series of propane-fueled Ford trucks and conversion kits, dependent upon Roush's obtaining emissions certification from the California Air Resources Board.

CNG

CNG vehicles can use the fuel as either a liquid or a gas, but most use the gaseous form compressed at 3,000-3,600 psi to less than 1% of its volume at standard atmospheric pres-

CNG, LNG FUELING STATIONS

State	CNG	LNG
Alabama	3 (2)*	—
Alaska	1	—
Arizona	40 (8)	5
Arkansas	3	—
California	218 (111)	27 (20)
Colorado	18 (14)	—
Connecticut	9 (2)	—
Delaware	1 (1)	—
District of Columbia	1	—
Florida	15	—
Georgia	18 (1)	—
Idaho	8 (7)	1
Illinois	24 (1)	—
Indiana	14 (8)	—
Kansas	2 (2)	—
Louisiana	5 (2)	—
Maine	1 (1)	—
Maryland	13 (7)	—
Massachusetts	11 (10)	—
Michigan	13 (11)	—
Minnesota	1	—
Mississippi	2	—
Missouri	7	—
Montana	3 (2)	—
Nebraska	1	—
Nevada	12 (5)	—
New Hampshire	3 (1)	—
New Jersey	11	—
New York	92 (27)	—
New Mexico	11 (4)	—
North Carolina	12 (8)	—
North Dakota	2 (2)	—
Ohio	8 (3)	—
Oklahoma	49 (23)	—
Oregon	12 (3)	—
Pennsylvania	26 (6)	—
Rhode Island	5 (3)	—
South Carolina	4 (1)	—
Tennessee	3	—
Texas	18 (15)	4
Utah	60 (24)	—
Vermont	1	—
Virginia	11 (4)	—
Washington	14 (4)	—
West Virginia	1	—
Wisconsin	18 (13)	—
Wyoming	8 (3)	—
Total	**775 (339)**	**37 (20)**

*Parenthetical numbers represent the number of fueling stations open to the public. There are no CNG or LNG fueling facilities in Hawaii, Iowa, Kentucky, and South Dakota.
Source: US Department of Energy's Alternative Fuels Data Center

sure. That compares with a household gas pipe pressure of 1-2 psi. Because it is not liquefied, CNG's volumetric energy density is estimated at 42% of LNG and 25% of diesel.

According to DOE, the equivalent energy of 1 gal of gasoline is 118 scf of CNG or 1.6 gal of LNG. The energy equivalent of 1 gal of diesel is 130 scf of CNG or 1.7 gal of LNG.

In October the DOE found CNG was priced lower than gasoline in all surveyed regions, with the largest difference—$1.88/gal of gas equivalent—in the Rocky Mountain region. On average, CNG cost $1.03 less than gasoline on a per gallon of gas equivalent basis. The variability of CNG prices was higher than the variability of gasoline prices, based on a standard deviation analysis.

Because it does not require super cooling and cryogenic tanks, CNG has lower production and storage costs than LNG. It does require high pressure and a larger volume of storage than the same mass of gasoline or diesel, but proponents say it is safer than other fuels in the event of a spill, as natural gas disperses quickly when released.

CNG is used primarily in converted gasoline engines, but it also can be used in modified diesel cycle engines in light-duty passenger vehicles and pickup trucks, medium-duty delivery trucks, and mass transit and school buses. A few railroads have converted train engines to CNG, including the Napa Valley wine train.

CNG refueling stations are less readily available outside California, so corporate fleets build their own fueling systems. One study by the Washington Metro Area Transit Authority found operating costs increased by 3-8¢/mile with CNG. A separate UPS study found operating costs increased 19% in one CNG fleet, but were down 2% compared with diesel in another fleet.

DOE reported 120,500 NGVs on US roads in 2004, including 98,300 in private use, mostly through corporate fleets; 10,700 in state fleets, and 11,400 in federal fleets. A 2007 study found 15% of the stations pumped 65% of the CNG sold; Another 75% of the stations were responsible for 34% of the sales, while 10% of the stations move just 1% of the market. Many of the "dormant or grossly underutilized" stations have little chance of increasing throughput. Many are in need of large investments to become viable, and additional attrition of some stations is likely.

CNG has lower production and storage costs than LNG… and proponents say [CNG] is safer than other fuels in the event of a spill, as natural gas disperses quickly when released.

Some CNG outlets listed by the Alternative Fuels Data Center as open to the public are on military bases or at regional airports where the general public may not have unrestricted access. There are no CNG or LNG fueling facilities in Hawaii, Iowa, Kentucky, and South Dakota. However, Iowa, the major US producer of corn, has 107 E85 fueling outlets (see table).

Of the total CNG automobiles around the globe, 48% are in South America. Argentina and Brazil have the largest fleets of CNG vehicles. NGVs commonly serve as taxicabs in major cities.

Argentina has 1.69 million NGVs—15% of the world's total—and 1,767 CNG stations. Brazil has 1.56 million retrofitted vehicles, 5% of the world's fleet of CNG light vehicles, with 1,585 fueling stations. In addition, a network of CNG stations is being developed along major highways of South America's Southern Cone (including Chile and Bolivia) to encourage CNG use for long-haul transportation.

In Europe, Italy has the most CNG vehicles and is in fourth place worldwide. CNG also fuels automobiles in Iran, Pakistan, Bangladesh, and India.

US federal tax credits are available for buying new CNG vehicles, and there are tax credits of up to 50% of the costs of auto conversions and installation of CNG home filling stations. Fueling CNG vehicles from fuel lines in home garages is on the rise in the US, particularly in California and New York, and tax credits are available for installing the necessary appliance. However, overnight-fueling from residential gas lines is forbidden in some countries.

Because of state government subsidies, Utah—with 60 CNG fueling stations, including 24 open to the public—has the third largest US network of CNG fueling stations behind California (218, with 111 public) and New York (92, of which 27 have public access). However, Proposition 10, a $5 billion bond measure that would have provided rebates to state residents for purchases of CNG vehicles, was defeated by California voters, 59.8% to 40.2%, in 2008.

LNG

Because it is less polluting and the cost relatively low compared with diesel, LNG is on the rise in the US transportation fuels market. It is produced in a liquefaction process when natural gas is cooled to –259° F. Due to the necessary special equipment, an average NGL station would cost $1 million.

Because of its higher storage density, proponents claim LNG is a more viable alternative to diesel fuel than CNG. Moreover, they say LNG in heavy-duty natural gas engines achieves significantly lower NOx and particulate emission levels than diesel.

Because of LNG's increased driving range, it is used in heavy-duty vehicles, typically vehicles with gross weights of 33,000-80,000 lb.

In some regards, industry experts said, LNG is safer than propane or gasoline because it is flammable only within a narrow range of fuel:air ratio. It is less

subject to accidental fire if vapors come into contact with a spark or flame, and, in the event of an accidental fire, methane tends to burn along a flame front rather than explode. Being lighter than air, methane generally rises and dissipates instead of accumulating at dangerous concentrations the way gasoline and propane vapors do.

Still, fires and explosions can occur under certain conditions. Furthermore, LNG is stored as a pressurized liquid at very low temperatures below –200° F., so handling and use are subject to the general risks associated with any cryogenic fuel, including the risk of skin and eye burns on contact.

Clean Energy Fuels Corp., formerly Pickens Fuel Corp. founded by entrepreneur T. Boone Pickens, is the largest provider of CNG and LNG, fueling thousands of vehicles. In late November, it started up the largest LNG production plant in the Southwest and the first large-scale plant in California to produce up to 160,000 gal/day of LNG for Clean Energy's new LNG truck fueling station in Carson, Calif. The station provides fuel for trucks serving the ports of Los Angeles and Long Beach.

DOE said the two ports are the largest source of air pollution in the greater Los Angeles area. The ports created a Clean Truck Program as part of their 2006 Clean Air Action Plan to alleviate the pollution. That program, which took effect Oct. 1, 2008, immediately banned from the ports 2,000 trucks built before 1989, the first year for pollution controls on diesel-fueled trucks. By 2012, the program will bar any trucks not complying with the cleanest 2007 emission standards. "Right now, that adds up to another 14,000 trucks," port officials said.

The Clean Energy LNG plant in Boron, Calif., 125 miles northeast of Los Angeles, is designed to expand production to as much as 240,000 gpd of LNG as demand increases. The company has begun construction of a second regional LNG truck fueling station, which is scheduled for completion in March.

GTL

Gas-to-liquids (GTL) is the newest of the gas fuel alternatives. From natural gas the technology produces clean-burning liquids such as diesel fuel, LPG, and naphtha that meet the most stringent environmental requirements.

That market is rapidly developing. A little more than a year ago, an Airbus A380 became the first commercial airliner to fly with GTL-based fuel. In 2008, an Audi powered by GTL diesel won the 24-hr Le Mans race in France for the third consecutive year.

Like LNG, GTL provides a means of developing and commercializing isolated gas fields, creating an international market for gas similar to that for oil. Natural gas has a far wider market in liquid form because it is easier to transport. With GTL processes, refineries can convert some gaseous waste products into valuable fuel oil virtually free of sulfur, nitrogen, and aromatics.

Dutch Shell PLC, a pioneer in GTL, said the fuel is essential to production of a more advanced diesel grade specifically designed to help diesel engines deliver more power for a longer period. The company has operated a medium-scale GTL plant at Bintulu, Malaysia, since 1993, with a current capacity of 14,700 b/d. Diesel containing Shell GTL is marketed in nine European countries plus Thailand and the UK.

Compared with diesel, LNG is less polluting, and the cost relatively low.

Shell is in the process of building a world scale, 140,000 b/d GTL plant in Qatar that is to be operational by the end of the decade. It will be fully integrated with the development of offshore gas from North field.

A third-party study concluded that, on a life-cycle analysis basis, a Shell GTL system, compared with a conventional oil refinery, has no greater influence on global warming, but it lowers the formation of acid air and smog and reduces emissions of particulate matter.

Chevron Corp. also is developing a GTL business in several countries and has partnered with Nigerian National Petroleum Corp. to build a GTL plant to convert 320 MMcfd of gas to 34,000 b/d of liquids—primarily synthetic diesel for the European market. GTL diesel delivers higher performance and less pollution than conventional diesel, and refiners can blend the two, increasing the supply of fuel that meets stringent air-quality rules.

Chevron has invested in research and development to streamline the GTL process, making it more economical by reducing front-end costs.

A new generation of compression ignition engines is expected to expand the market for GTL, which also is well adapted for use as a liquid hydrocarbon fuel for fuel cells, said Chevron officials.

Because GTL fuel is compatible with existing diesel engines and the diesel distribution system, it is more cost-effective to introduce into markets than CNG. An independent study by the California Energy Commission concluded that GTL fuel is the most cost-effective alternative fuel for reducing emissions.

Proponents claim that GTL fuel will enable the use of ultraefficient exhaust filter devices and that it can be used in diesel-electric hybrids. Major automotive industry players are optimistic GTL's unique properties can be used to develop more-efficient internal combustion engines.

Some see GTL technology as a platform for development of biomass-to-liquids and coal-to-liquids products with identical chemical composition.

ExxonMobil Corp. developed a new chemical method, based on the Fischer-Tropsch process, to synthesize diesel fuel from natural gas. ExxonMobil claims that better catalysts and improved oxygen-extraction technologies have reduced the capital cost of the process, and the company is vigorously marketing the process internationally.

Sasol Chevron and Qatar Petroleum

completed construction of the 34,000 b/d Oryx GTL facility in Ras Laffan, Qatar, in mid-2006. The facility will use 300 MMscf of gas from North field. Construction of the other large GTL facility in Qatar, the 140,000 b/d Shell-Qatar Petroleum Pearl plant, continues despite major cost overruns. It is slated for start-up this year.

However analysts said that cost escalations have caused the cancellation or postponement of a number of proposed GTL projects until improvements occur in financial markets and product demand ✦

CERAWeek: BP investing for future despite economy

Paula Dittrick
Senior Staff Writer

The oil and gas industry needs to continue investing in technology to achieve greater energy efficiency and to commercialize new energy sources, said Tony Hayward, BP PLC chief executive.

Speaking Feb. 10 in Houston at the opening address to the Cambridge Energy Research Associates annual executive conference, Hayward said industry planners are responsible to look beyond the immediate economic slump.

"The long-term trend is this: The world economy will recover. The future is not cancelled," Hayward said. "We have the natural, human, and financial resources to meet the world's growing need for energy."

He said the world has produced about 1 trillion bbl of oil and has 1 trillion bbl of proved reserves. An additional 1 trillion bbl is known to exist but is not yet commercially viable.

BP plans to invest an average of $6 billion/year during the next decade in the US, he said.

"Over the last 5 years, BP has invested over $30 billion in the United States to find and develop new sources of oil and gas, extend production from existing fields, improve the reliability of our US refineries, expand our wind and solar businesses, create better biofuels, and develop new, low-carbon technologies."

Tony Hayward
BP PLC chief executive

BP suggests policy

Hayward noted that energy companies and governments must have confidence in each other before industry will be willing to make the necessary massive investments to meet expected growth in energy demand over 20 years.

He offered seven policy suggestions for governments worldwide. These are:

- Provide stable, enduring fiscal and regulatory policies.
- Ensure a free, open energy market because this is the best guarantee of energy security worldwide.
- Energy efficiency and energy conservation must be made a priority.
- Begin to address the climate change by pricing carbon to make energy conservation more attractive and to make wind, nuclear, and solar more cost-competitive.
- Support development of hydrocarbon resources in the US and worldwide.
- Provide transitional incentives to make low-carbon energy competitive with other energy sources.
- Cooperate with businesses to reach workable fiscal, regulatory, and climate change regimes.

"We know the aims—a stable energy supply and a sustainable planet—and we are all signed up to them," Hayward said. "In years to come, when we gather for this and similar conventions, I hope we will look back on this one as a turning point," he said. ✦

CERAWeek: Oil companies vow to maintain exploration

Paula Dittrick
Senior Staff Writer

Oil companies must resist slashing exploration and development activities during the economic downturn if industry expects to supply energy to meet projected long-term demand, chief executives said Feb. 10 during an energy conference in Houston.

Various speakers at the Cambridge Energy Research Associates annual conference said their current business strategy involves avoiding the mistakes of past downturns. They referred to the 1980s when industry cut budgets and drilling activity to the point that consumers faced tight oil and gas supply after the economy recovered.

Jeroen Van der Veer, chief executive of Royal Dutch Shell PLC, said Shell believes it's important to keep investing in projects and to retain its workers rather than to make sweeping layoffs such as the industry has done previously when oil prices slumped.

"Keep investing through the cycle," Van der Veer said. "Keep your professional base, your people" to maintain operating stability when the economy recovers. He believes the industry still faces strong long-term fundamentals.

Shell is investing in technology to

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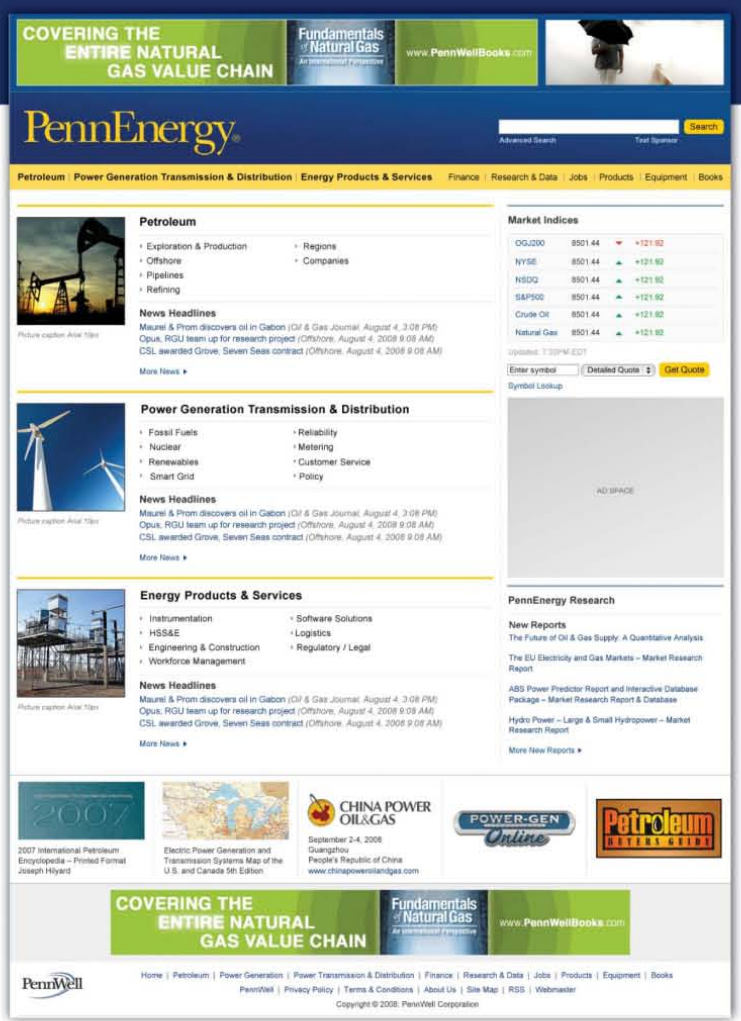

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become more efficient, lower costs, and achieve operational excellence, he said.

"I think international oil companies are very well placed," Van der Veer said in response to a question about how international oil companies (IOCs) will respond to a growing emphasis about lowering carbon emissions by using clean-burning natural gas.

Mexico oil production

Petroleos Mexicanos is focused on a long-term strategy that includes plans to begin oil production from the deepwater Gulf of Mexico by 2015, said Pemex Chief Executive Officer Jesus Reyes Heroles.

Pemex is committed to spend at least $2 billion/year on exploration to counter declining production from its mature fields, he said.

"I'm here to underscore that Pemex is fully on board…[in] saying that we have to avoid the stop-and-go behavior," Reyes Heroles said.

Unlike many oil companies that are announcing budget cuts, Pemex plans to increase capital expenditures by 8.3% from last year to $19.5 billion this year and said it also might invest another $59.6 billion through 2012.

Reyes Heroles said discoveries in the onshore Chicontepec region might help offset declining production at Cantarell field in the southern Gulf of Mexico. Between January and October 2008, Cantarell produced 1.04 million b/d, down 31% from the same period in 2007. The Chicontepec region spans 3,815 sq km in the states of Veracruz, Puebla, and Hidalgo.

By the second quarter, Mexico's government could be in talks with companies based outside Mexico regarding a revised framework for oil services contracts, Reyes Heroles told reporters. The new service contract framework stems from energy reform laws approved last year.

The flexibility authorized by the reform will provide more flexibility for Pemex and for outside companies interested in doing business with Pemex, Reyes Heroles said.

CNPC seeks partners

Jiping Zou, vice-president of China National Petroleum Corp. and president of PetroChina Corp. Ltd., said CNPC wants to work with both IOCs and national oil companies (NOCs).

"We remain open for cooperation in the area of exploration, production, refining, petrochemicals, and pipeline construction," he said of Chinese projects, noting that CNPC also is willing to invest and participate in projects outside of China.

Andrew Gould, Schlumberger Ltd. chairman and chief executive officer, said new exploration must continue if industry is going to meet projected energy demands.

"It's very easy to focus only on demand weakness," Gould said. "But I would say that focusing on supply is going to be just as important."

Schlumberger will not reduce spending on research or development efforts, he said, noting, "We have all seen the effects of uneven management in past downturns." ✦

CERAWeek: Wintershall head guarantees Nord Stream

Christopher E. Smith
Pipeline Editor

Wintershall Chairman Reinier Zwitserloot, speaking Feb. 10 in Houston during a Q&A session following a Eurasia Transportation session at Cambridge Energy Research Associates' annual executive conference, placed the likelihood of completing the trans-Baltic Nord Stream natural gas pipeline at "100.00%." The 762-mile, 48-in. Nord Stream would connect Russia directly to Germany. His remarks were made in reaction to earlier descriptions of Nord Stream as an alternative path for gas deliveries to Europe.

Zwitserloot explained that by 2020 Europe will produce 100 billion cu m/year less gas than it currently does. At the same time, regardless of which studies one looks at and no matter how much alternative energy comes on line, demand for gas in Europe will continue to grow, Zwitserloot said. "In all the studies—green, greener, not so green—European demand for gas is going up." Combining these factors, a gap of 150-200 billion cu/m year emerges between European supply and demand by 2020 according to Zwitserloot.

Europe has a major natural gas advantage over the Far East and the US, Zwitserloot said: It is within pipeline distance of most of the world's gas reserves. LNG "is not the silver bullet" for Europe, said Zwitserloot, it being more likely to go to the US long term and the Far East short term, with availability to Europe limited. Similarly, plentiful North African gas exists "only in [our] dreams," according to Zwitserloot, with real development in places like Libya still practically nonexistent.

Two alternative supply sources remain, he explained: the Caspian and more gas from Russia. The Nabucco pipeline could be built, Zwitserloot allowed, but the only realistic supply source is Iran. Gas from Turkmenistan is not crossing the Caspian, he said. It will go instead either to Russia or Iran. Azerbaijani supplies could reach Europe, but that is by no means certain; "so, your choices for gas from the region are either Iraq or Iran," Zwitserloot said.

Additional gas from Russia will have to be part of the path forward and will require additional infrastructure. "The Yamal system is full, full, full," said Zwitserloot. "The system through the Ukraine is in very bad condition even without the political problems and will require large investments just to keep capacity from shrinking year by year." Nord Stream should therefore be seen

not as an alternative or bypass route but as a needed additional path for energy supplies to reach Europe, he said.

BASF oil and gas division Wintershall holds a 20% stake in Nord Stream, with partners Gazprom holding 51%, E.On Ruhrgas 20%, and NV Nederlandse Gasunie 9%. The twin pipeline system between Vyborg, Russia, and Greifswald, Germany, is scheduled to come online in two steps: the first line is to enter service in 2011 and the second in 2012. Total capacity will be 55 billion cu m/year (OGJ, Feb. 9, 2008, p. 60). ✦

CERAWeek: Al-Naimi urges 'inclusive energy strategy'

Calling for an "inclusive energy strategy," the Saudi Arabia minister of petroleum and mineral resources listed factors of price volatility among "newly emerging challenges" facing the oil and gas industry.

At a Cambridge Energy Research Associates conference in Houston, Ali I. Al-Naimi said those challenges include globalized capital markets, emergence of energy as an asset class, and climate change.

Governments hoping to stabilize markets have been slow to respond to the new speed, scope, and complexity of capital markets, Al-Naimi said.

At the same time, investors' strategies for oil have become increasingly sophisticated and oriented to trading against other commodities and hedging against the value of the dollar.

"There is no doubt in my mind that increased speculative interest in oil contributed to the extreme price volatility of the past few years," Al-Naimi said.

"Market psychology" exaggerated last summer's oil-price surge and is exaggerating the current price slump, he said.

Al-Naimi said climate change will more profoundly redefine the role of governments and governmental intervention in energy markets than will the economic crisis.

He called on the oil industry to lead efforts to improve energy efficiency and "provide consumers with a wide range of affordable, cleaner energy choices."

He said an oil price high enough to encourage production from marginal oil fields, unconventional resources, and renewable energy sources is one of four conditions of a stable oil market.

Oil prices also should be low enough to facilitate economic growth and high enough to provide returns to producers that allow for timely investment and to encourage consumers to use oil efficiently.

Al-Naimi described an "inclusive energy strategy" as one that recognizes risks and uncertainties, emphasizes cost-effective solutions, and "does not presuppose where we will find the solutions to the challenges we face."

Policy should be robust and flexible, he said. "We can only do this by separating what is theoretically possible from what is realistic and by examining the real economic costs and benefits of various policy approaches." ✦

Obama: Energy an essential part of economic recovery plan

Nick Snow
Washington Editor

Energy components are essential parts of a strong economic recovery plan because they would begin to reduce reliance on imported oil, US President Barack H. Obama told Department of Energy employees on Feb. 5.

"Your mission is so important and will only grow as we seek to transform the ways we produce and use energy for the sake of our environment, our security, and our economy," Obama said in a joint appearance with US Energy Secretary Steven Chu.

Congress should not be afraid to take the necessary dramatic steps, Obama maintained, "because we know that if we don't act, a bad situation will become dramatically worse." He said, "Crisis could turn into catastrophe for families and businesses across our country."

Obama said, in the past few days he'd seen proposals from some members of Congress "that you may not have read, but would be very familiar to you." He said, "They're rooted in the idea that tax cuts alone can solve our problems, that half-measures and tinkering are somehow enough [and] that we can afford to ignore our most fundamental economic challenges: the crushing cost of health care, the inadequate state of so many schools, and our dangerous dependence on foreign oil."

Obama said his economic plan would create or save more than 3 million jobs; put people to work rebuilding roads, bridges, and levees; modernize the nation's health care system; provide middle-class tax relief and jobless benefits and continued health insurance for the unemployed; and help states and communities maintain their police, firefighting, and teaching workforces.

'The tyranny of oil'

The president said, "Finally, this plan will begin to end the tyranny of oil in our time. After decades of dragging our feet, this plan will finally spark the creation of a clean energy industry that

WATCHING GOVERNMENT

Nick Snow, Washington Editor

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OCS takes center stage

When the US House Natural Resources Committee held the first of three scheduled hearings on offshore oil and gas leasing on Feb. 11, it marked the first opportunity for the 111th Congress to discuss the issue. House members haven't been silent on the matter, however. Led by Reps. Kevin P. Brady (R-Tex.) and John M. Shimkus (R-Ill.), Minority Leader John A. Boehner (R-Ohio) and 67 other House Republicans asked US President Barack H. Obama not to close Outer Continental Shelf areas months after congressional leasing moratoriums expired.

"As you know, at the height of our nation's energy crisis last year, the American people spoke with one voice to express their outrage when they saw that not only were we dependent upon foreign oil, but furthermore, that energy resources located within American territory were locked away and could not be developed," lawmakers told Obama in a Feb. 4 letter, which also went to US Interior Secretary Ken Salazar.

"Our national vulnerability was on plain display for the American public last summer because we lacked a coherent energy policy to allow for responsible energy exploration and development," they added.

Jobs and revenue

House Republicans said policy changes that would further eliminate jobs or stifle their creation, especially in the current economic downturn, would be a mistake. They cited ICF International's recent study concluding that developing untapped US offshore energy resources would create more than 160,000 jobs by 2030. The federal government could raise $1.7 trillion of revenue by tapping more oil and natural gas off the US coast, they added.

"Our country needs to remain on the path to American energy independence, and we believe this is a critical and achievable goal. Energy exploration means more jobs and stronger national security; nothing less is at stake," the House Republicans said. Salazar announced on Feb. 10 that he was extending the public comment period on a new 5-year OCS plan by 180 days beyond its current Mar. 23 deadline. He also plans to have the US Minerals Management Service and US Geological Survey prepare a report on conventional and renewable offshore resources within 45 days as an early step in developing a comprehensive strategy.

Online support

On Feb. 3, the Institute for Energy Research began to collect comments supporting the MMS's new 5-year OCS plan online. It noted that the plan, which contains 31 lease sales in 12 offshore planning areas, would be the first time in more than 25 years that many potentially energy-rich tracts would be considered.

"Unlike many of the make-work jobs the economic stimulus plan purports to create, greater domestic energy production creates real jobs. I can think of no better or more immediate way to invigorate this nation's economy," IER Pres. Thomas J. Pyle said.

As of Feb. 9, according to an IER spokeswoman, the group's web site received more than 6,500 comments supporting more OCS leasing. ✦

will create hundreds of thousands of jobs over the next few years, manufacturing wind turbines and solar cells for example, and millions more after that. These jobs and these investments will double our capacity to generate renewable electricity over the next few years."

He said his economic plan would fund construction of a better, smarter national electrical grid and train workers to build it, and "lead a revolution in energy efficiency," which would modernize more than 75% of federal buildings and improve more than 2 million homes' energy efficiency.

"In fact, as part of this effort, today I've signed a presidential memorandum requesting that [DOE] set new efficiency standards for common household appliances. This will save consumers money. This will spur innovation. And this will conserve tremendous amounts of energy. We'll save through these simple steps over the next 30 years the amount of energy produced over a 2-year period by all the coal-fired power plants in America," Obama said.

Investments in mass transit systems to increase capacity, in roads to reduce congestion and in technologies, which will accelerate development of plug-in hybrid vehicles and other innovations would be "a significant down payment on a cleaner and more independent energy future," he added.

Critics have ridiculed the idea that part of the economic stimulus should be used to modernize the entire federal motor vehicle fleet to take advantage of state-of-the-art fuel efficiency, Obama continued. "They call it pork. You know the truth. It will not only save the government significant money over time, it will not only create jobs manufacturing these vehicles [but] it will set a standard for private industry to match," he said.

Inaction isn't an option

"For the last few years, I've talked about these issues with Americans from one end of this country to another. Washington may not be ready to get serious about energy independence, but I am. So are you. And so are the Ameri-

can people. Inaction is not an option that's acceptable to me and it's certainly not acceptable to the American people. Not on energy, not on the economy, and not at this critical moment," Obama maintained.

He called on all members of Congress, Democrats and Republicans, to rise to the moment. "No plan is perfect, and there have been constructive changes made to this one over the last month. There may be more today. But the scale and scope of this plan is right. It's what America needs, and we need to move forward today," he said.

Congressional Republicans remained skeptical as the Senate debated the bill on Feb. 5. Minority Leader Mitch McConnell (Ky.) said, "Apparently, the authors of this bill just couldn't resist inserting scores of long-cherished pet projects. That's how you end up with $70 million for climate research, tens of millions to spruce up government office buildings here in Washington, and $20 million for the removal of fish passage barriers in a stimulus package that was supposed to be timely, targeted, and temporary."

US House Republican Conference Chairman Mike Pence (Ind.) said, as debate continued in the Senate: "While some say the problems with the so-called stimulus bill amount to less than 1% of the bill, the American people know this legislation goes 100% in the wrong direction."

Pence said, "Democrats in Congress are exploiting a national economic crisis to fund a wish list of tired, liberal spending priorities that have little to do with creating jobs. We cannot borrow and spend our way back to a growing economy." ✦

Salazar scraps predecessor's 5-year OCS plan

Nick Snow
Washington Editor

Calling it "a headlong rush of the worst kind," US Interior Secretary Ken Salazar said on Feb. 10 that he was delaying a 5-year Outer Continental Shelf leasing plan, which his predecessor launched last summer.

"To establish an orderly process that allows us to make wise decisions based on sound information, we need to set aside the Bush administration's midnight timetable for its OCS drilling plan and create our own timeline," he told reporters at DOI headquarters.

He said he would add 180 days to the public comment period on the plan, which the US Minerals Management Service's OCS Planning Committee approved on Dec. 10, 2008, so coastal states and communities would have more time to study it. The original deadline was Mar. 23.

Salazar also said he was ordering the US Geological Survey and US Minerals Management Service to prepare an evaluation of US offshore conventional and alternative resource potential within 45 days. Based on that report, he said that DOI would then determine which areas need more information and would create a plan to gather it.

The secretary said it would hold four regional meetings after USGS and MMS complete their study to discuss findings affecting the Atlantic, Pacific, Gulf of Mexico, and Alaskan OCS areas. He also said he intends to issue a final rulemaking for renewable energy on the OCS within the next few months.

A seat at the table

"To those of you from the oil and gas industry, I pledge that you will have a seat at the table in this administration. I assure you that you will play an important role in helping us meet our nation's energy needs," Salazar said.

But he added that US President Barack H. Obama and he agree that a new comprehensive energy plan "that takes us to the new energy frontier and secures our energy independence" must be developed. "A drill-only approach, onshore or offshore, is not enough," the secretary said.

The chairmen of two major congressional committees dealing with energy applauded Salazar's action. House Natural Resources Committee Chairman Nick J. Rahall (D-W.Va.) said that it gives the nation an opportunity to take a more reasoned and responsible approach to ensure a fair return to taxpayers. Senate Energy and Natural Resources Committee Chairman Jeff Bingaman (D-NM) said that Salazar's strategy was thoughtful and balanced, and that his plan to hold regional conferences makes sense.

Oil and gas associations were critical, however. American Petroleum Institute Pres. Jack N. Gerard said the OCS plan that Salazar placed on hold received a record 187,000 comments from states, environmental groups, industry, labor groups, and the general public, "with 87,000 of those comments supporting expanded and expeditious development.

"Congress made the American people wait nearly 30 years to address our immediate energy challenges. Secretary Salazar today told the American people they must continue to wait, even though more than two thirds of them want to tap our vast domestic resources for the benefit of all Americans," Gerard said.

Lengthy, deliberate

Independent Petroleum Association of America Pres. Barry Russell also disputed Salazar's assessment that the new 5-year OCS plan was developed in a hurry. "The public comment period is by both nature and design a lengthy and deliberate process, and thousands of Americans have made their voices heard. Poll after poll confirms that the American people understand the imperative of producing more of our

energy resources right here at home, support it, and are prepared to take the steps necessary to ensure it remains a top national priority," he said.

Salazar said his action does not rule out additional OCS leasing. "There may be areas where we welcome new oil and gas development," he said. But they need to be identified and leased as part of a more comprehensive approach that includes renewable and alternative energy technologies, he added.

That would differ from the Bush administration, which he said was so intent on opening new offshore oil and gas areas "that it torpedoed offshore renewable energy efforts."

Salazar said that the 2005 Energy Policy Act contained a provision that required DOI to issue rules and regulations within 90 days of its enactment on Aug. 8 of that year to guide development of wind, wave, and tidal power resources offshore.

"Yet it took 3 years for the Bush administration to prepare a proposed rule for offshore renewable energy development. They left office without putting any final regulations because it was not their priority, notwithstanding the requirement of the law. For them, it was oil and gas or nothing," he said.

Opportunity

Salazar said that he will take a different approach. "Offshore renewable energy creates a tremendous opportunity for the United States to become a technology leader. I intend to issue a final rulemaking in the coming months so that potential developers know the rules of the road," he said.

Identifying new OCS areas where oil and gas can be responsibly developed will take longer, he said. "In the biggest area that the Bush administration's draft OCS plan proposes for oil and gas drilling—the Atlantic seaboard from Maine to Florida—our data on available resources is very thin, and what little we have is 20-30 years old. We shouldn't make a decision to sell off taxpayer resources based on old information," Salazar said.

He said USGS and MMS in their initial report would assemble all the information DOI has on offshore resources, both conventional and renewable, along with the potential impacts of their development. The study's primary purpose will be to identify areas where more information is needed and to start gathering it, he continued. "We need a definition of what we don't know," he said.

The examination is not likely to impact OCS lease sales off Alaska and Virginia, which are part of the current 5-year plan running through 2012, he emphasized, adding that the study could produce information that affects how they are conducted.

"The oil and gas industry should not see the Obama administration as its enemy. It should recognize that we intend to take a comprehensive approach to energy. The previous administration dragged its feet on renewable offshore energy resources after Congress passed the Energy Policy Act in 2005. We plan to correct this," Salazar said. ✦

Utah congressional delegation blasts Salazar order

Nick Snow
Washington Editor

Republicans in Utah's congressional delegation angrily responded to US Interior Secretary Ken Salazar's order to cancel 77 federal oil and gas leases in the state that were sold in December.

"Here we are trying to work through a terrible economic downturn, and the recently empowered liberal elitists decide to officially begin their war on US energy security," US Sen. Orrin G. Hatch said after Salazar announced on Feb. 4 that he would order the US Bureau of Land Management to reject 77 leases auctioned on Dec. 18 because they were too close to Arches National Park, Dinosaur National Monument and Nine-Mile Canyon.

"The argument that these leases have been canceled to protect our national parks is a fairy tale conjured up to win public support for what is actually a very dangerous anti-oil agenda," said Hatch, the state's senior US senator.

US Sen. Robert B. Bennett and Reps. Rob Bishop and Jason Chaffetz also condemned Salazar's action. Jim Matheson, the delegation's only Democrat, did not have a statement posted at his online website.

"These leases would have been subject to the most stringent environmental protections BLM has ever implemented in Utah, and each of these parcels had been approved by the National Park Service. I am concerned that today's announcement was motivated more by political reasons than for environmental reasons, and I hope this is not a preview of what is to come for Utah in the Obama administration," Bennett said.

Noting that 97% of the US transportation sector relies on oil, Hatch said that many federal lawmakers are trying to change that by providing appropriate incentives for wind, geothermal and solar power.

At serious risk

"But when it comes to vehicles, we're just simply stuck with oil for the near future. It's not a fact I am comfortable with, but it's still a fact. And every year, we rely more and more on unfriendly foreign governments for that oil. Once the global economy begins to recover and energy demand goes up, the anti-oil agenda now being pushed by President [Barack] Obama will put our nation at serious risk and lead us back to outrageous energy prices," he continued.

"Frankly, I'm astounded at the timing of this decision," said Bishop. "At the very time our nation is debating legislation to create jobs and shore up our economy, the Department of the Interior is taking steps to kill jobs and economic development in my home state. This sale would have expanded employment and stimulated the economy of Utah. Secretary Salazar's decision today has robbed taxpayers of millions of dollars of royalties and tax payments."

Chaffetz said he had been cautious in his initial assessments of Obama and Salazar because he hoped they would both recognize the Intermountain West's important role in supplying domestic energy. "Today's action, by executive fiat, is a cruel kick to an already downtrodden economy. It deprives Utah and the US treasury of needed income during a time of severe economic recession, and it deprives the rural parts of my state of the best paying and most stable jobs out there," he indicated.

"It also deprives all Americans of valuable American-made energy resources. It's hard not to be cynical when the Democratic administration, drunk with its new-found power, makes such irresponsible decisions," Chaffetz added.

On a key committee

Bishop and Chaffetz are both members of the House Natural Resources Committee and are likely to press Salazar on his decision when the secretary appears before the committee in another few weeks to discuss DOI's proposed fiscal 2010 budget. They also are part of the congressional Western Caucus, a 40-member group established in 1992 which advocates responsible energy and economic development in the West and throughout the country.

Other members of that group also criticized Salazar's action. "Congress and the administration should embrace energy policies that promote conservation, encourage renewable energy

Hu eyes African oil

The oil and gas industry has no doubt why Chinese President Hu Jintao visited Saudi Arabia last week. But his presence in four small African countries—Senegal, Mali, Mauritius, and Tanzania—was another matter.

Hu's visit to the four African countries supposedly had little, if anything, to do with his country's interests in oil or gas or, for that matter, any commodity.

"Perhaps everybody thinks that on President Hu's visit to Africa he'll sign this or that deal or contact about energy or mining," Assistant Foreign Minister Zhai Jun told a news conference.

"Of the five countries on the itinerary for Hu's trip this time, apart from Saudi Arabia, the four African nations are not rich in energy or resources," he said. Huh? That doesn't jibe with Western reports.

Zeus speaks

"From Senegal around the Cape of Good Hope to Tanzania, investors are developing reserves to supply power producers in need of cheaper fuel as well as international LNG and chemical markets suffering from supply shortages," said Bob Nimocks, chief executive officer of Zeus Development Corp., Houston.

Senegal? Houston-based Fortesa International is aiming to discover oil and more condensate, targeting the Albian, Aptian, and Turonian formations in and beyond its gas producing Gadiaga block.

Mali? Eni SPA last month said it plans to commence a five-well drilling campaign in Mali's Taoudeni basin in the second quarter.

Mauritius? While no oil or gas has yet been produced on or offshore the tiny island nation, it is a regional hub for the industry as evidenced by the number of firms registered there: Ind-Oil Overseas Ltd., Libya Oil Holdings Ltd., Sohi Oil & Gas, and Swiss Oil.

Location, location, location

The operative word in Mauritius is: Location, location, location. That is especially true for the Chinese. After all, Mauritius is close to Madagascar where several Chinese oil firms already are at work (OGJ, Feb. 2, 2009, p. 34).

That proximity to Madagascar is key, according to Ken Poonoosamy, senior manager at Mauritius' board of investment: "A lot of the Chinese operators who would want to go to Madagascar…would prefer to have their administrative offices" in the Shanxi Tianli Enterprises business park, a $730 investment project funded by the Chinese government.

Tanzania? Well, just ahead of Hu's visit allegations emerged that Tanzania Petroleum Development Corp. offered the China's Sonangol International rights for exploration in western Tanzania "outside" the normal tendering process.

In return, local media reported, the Chinese injected $21 million dollars into Air Tanzania Corp., which was used to help purchase two used Bombardier 70-seater Dash 8 Q400 turboprop aircraft from Bombardier Aerospace Inc. of Canada.

Believe it or not, Hu, the oil and gas industry really does operate in those four "resource-poor" African countries you visited. ✦

development and increase our domestic oil supplies in an environmentally safe manner. Closing access to domestic energy hurts our economy, deprives our nation of revenues and places our long-term energy security in jeopardy. It is disappointing that Secretary Salazar, who is from the West, has decided to side with East Coast environmental interests," said Rep. Dean Heller (R-Nev.), the caucus's policy chairman.

"Taking more land out of production puts us further at the mercy of nations hostile to the United States. It also is a body blow to American consumers just when our country needs to create more jobs. It is odd that the Obama administration would talk about stimulating jobs on one hand and make life more difficult for consumers and working families on the other," said Rep. Doug Lamborn (R-Colo.).

"The Obama administration is now attacking Americans," asserted Rep. John Shadegg (R-Ariz.). "Simply put, Secretary Salazar's action today will cost Americans jobs. America has energy resources which need to be developed and it is insane to outsource these jobs to energy industry workers in Saudi Arabia, Russia and Venezuela." ✦

Study sees continued deepwater expenditure growth

Despite lower expected expenditures during 2009 and 2010 relative to 2008, a study forecasts that the petroleum industry's deepwater expenditures will trend upward and reach $35 billion by 2013.

In addition, the Douglas-Westwood study, The World Deepwater Market Report 2009-13, expects deepwater project expenditures to total $162 billion in the 2009-13 period.

Most of the study's foreseen expenditures relate to pipelines, drilling and completion of development wells, and platforms. It breaks down the spending during the period analyzed as:

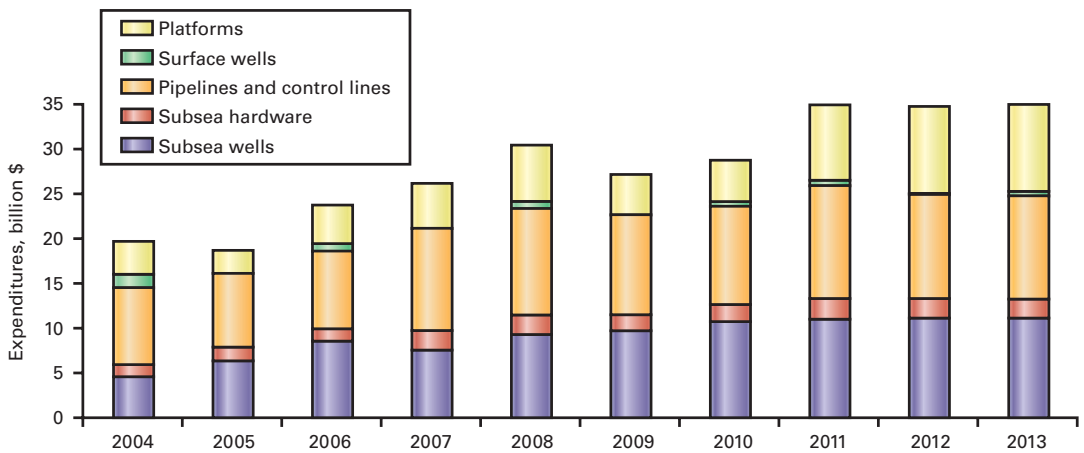
- $57.7 billion for satellite fields and deepwater hubs as companies develop reserves further from the coast.
- $53.8 billion for drilling and completing subsea development wells.
- $38.2 billion for 86 deepwater floating production platforms.

Its breakdown for four regions is $60 billion off Africa, $29.3 billion off North America (mostly in the US Gulf of Mexico), $29 billion off Latin America (mostly off Brazil), and $14.6 billion off Asia.

Steve Robertson, Douglas-Westwood's oil and gas manager, expects major oil companies and well-placed national oil companies (NOCs) to make the bulk of the deepwater expenditures because the economic downturn and turmoil in the debt markets is less likely to affect these companies than smaller companies. He adds that companies may delay some projects that rely on external project finance.

Robertson says most deepwater operators surveyed indicate that they are planning against conservative assumptions and expect oil prices to recover to $50-70/bbl in the medium term. ✦

WORLDWIDE DEEPWATER MARKET EXPENDITURES



Source: Douglas-Westwood

Uganda hits threshold with Giraffe discovery

Sufficient recoverable oil has been discovered in Uganda's Albert basin to exceed the commercial threshold for development, said Heritage Oil Corp., Calgary. The advance came with a discovery at Giraffe, structurally connected to the Buffalo discovery announced in December 2008.

The Buffalo-Giraffe complex is mapped at 18.5 sq miles with more than 400 million bbl recoverable. If it extends farther north and east and includes the Buffalo East prospect, the structure could cover nearly 35 sq miles, Heritage said.

The Giraffe discovery on Block 1 went to TD 705 m and cut a gross oil-bearing interval of 89 m with 38 m of net oil pay.

"Downhole pressure testing and sampling have confirmed the presence of movable oil that was recovered to surface and log interpretation indicates excellent reservoir quality with porosities of up to 30%," Heritage said.

The combined Buffalo-Giraffe complex has an oil column of 140 m.

Block 1 contains numerous other prospects and leads mapped from more than 600 line-km of seismic data shot in the past 18 months, and the block could hold "additional substantial quantities of oil," Heritage said. "All these prospects and leads are characterized by similarly encouraging seismic amplitude anomalies as those seen over the successful Warthog, Buffalo, and Giraffe discoveries."

Heritage suspended Giraffe as a future production well and plans more drilling on Block 1 this year.

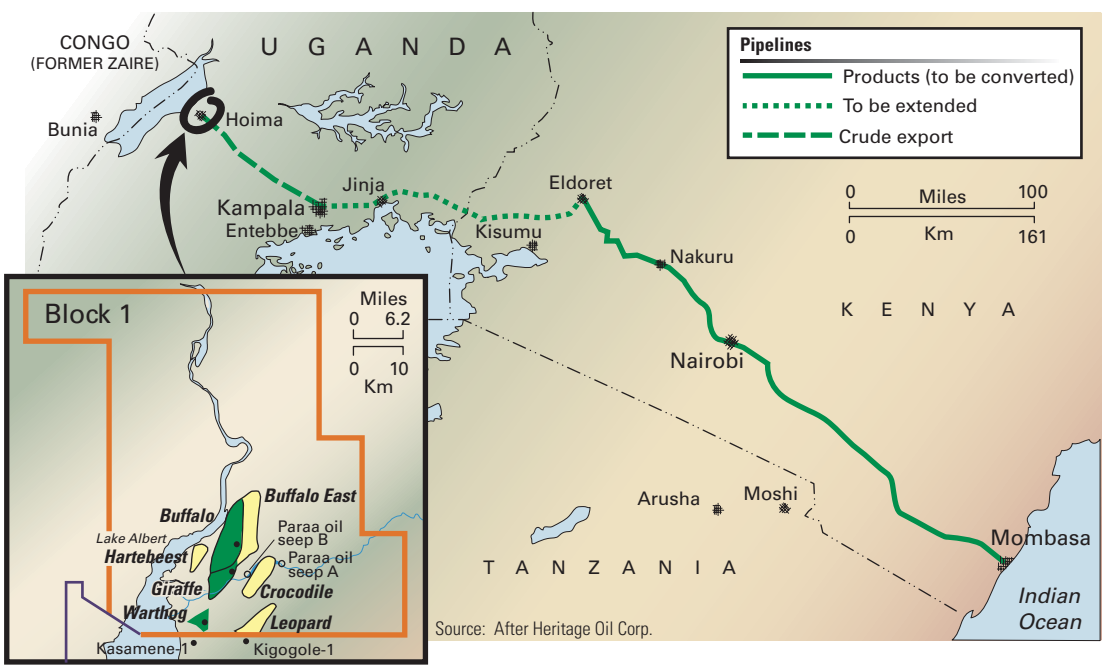
Heritage is operator of blocks 3A and 1 with 50% equity interest, and Tullow Oil PLC has the other 50%.

Eventual plans call for developing a pipeline to export crude oil through the port of Mombasa, Kenya, on the Indian Ocean.

Tony Buckingham, Heritage chief executive officer, said, "The large Buffalo-Giraffe structure is a world-class discovery which could prove to be substantially more extensive than currently outlined, unlocking the multibillion barrel potential of Block 1."

Heritage, which was awarded the first license in the Albert basin in 1997, plans to enter the development phase of the project in 2009 while continuing to appraise its discoveries and further explore its acreage. ✦

UGANDA DEVELOPMENT LAYOUT



Operators report string of Gulf of Mexico discoveries

Operators in the Gulf of Mexico reported a string of discoveries in late January and early February 2009.

The discoveries took place on prospects in the Lower Tertiary and Middle Miocene trends, in deep water, and on a deep prospect on the gulf shelf.

Keathley Buckskin

A group led by operator Repsol YPF SA found more than 300 ft of net pay in Lower Tertiary at the Buckskin No. 1 well 190 miles southeast of Houston in Keathley Canyon Block 872.

Chevron Corp., a 55% interest holder, said Buckskin is 44 miles west of its 2004 Jack discovery, also a Lower Tertiary discovery. Buckskin went to TD 29,404 ft in 6,920 ft of water.

More study is under way on data gathered from the well, and further work is needed to determine the extent and commercial viability of the discovery, the company said.

Repsol YPF SA, with a 12.5% working interest in the prospect, operated the Buckskin discovery well, but Chevron will become operator and conduct all future work. Other Buckskin coowners are Maersk Oil America 20% and Samson Offshore Co. 12.5%.

Walker Ridge Shenandoah

Another Lower Tertiary oil discovery is Shenandoah by Anadarko Petroleum Corp. and partners in Walker Ridge Block 52.

The well, which encountered net oil pay approaching 300 ft in the Wilcox formation, was drilled in 5,750 ft of water to a TD of 30,000 ft.

Anadarko and its partners are evaluating the well's results and assessing the next steps toward future appraisal activity.

"Initial data indicates the Shenandoah discovery has reservoir properties that appear to be of much higher quality than industry has seen previously in the emerging Lower Tertiary play," said Bob Daniels, Anadarko senior vice-president, worldwide exploration.

Anadarko operates Shenandoah with a 30% working interest. Partners include ConocoPhillips 40%, private Cobalt International Energy LP 20%, and Marathon Oil Corp. 10%.

Green Canyon Heidelberg

Another group led by Anadarko gauged Anadarko's seventh discovery since 2005 in the Middle Miocene Trend.

The Heidelberg prospect in 5,000 ft of water in Green Canyon Block 859 cut more than 200 ft of net oil pay in several high-quality Miocene sands. TD is 28,500 ft.

Heidelberg encountered the same-age sands and reservoir characteristics similar to the Caesar-Tonga discoveries 7-14 miles north, and each of the seven discoveries targeted a resource of more than 100 million bbl, Anadarko said.

Heidelberg is 18 miles southeast of Anadarko's 100% owned Constitution spar, allowing multiple development options after further appraisal, which Anadarko plans to conduct in the second half of 2009.

Anadarko operates GC859 with 44.25% working interest. Partners in the discovery include Mariner Energy Inc. and Eni SPA 12.5% each, Statoil-Hydro 12%, and ExxonMobil Corp. and Cobalt International 9.375% each.

Cobalt said Heidelberg is adjacent to four 100% Cobalt working interest leases acquired in the March 2008 lease sale for a combined $127.6 million. They are blocks 813, 814, 858, and 902. Cobalt, formed in 2005, has a working interest in 142 gulf leases.

Anadarko's next prospect is Vito, a 30,500-ft Miocene test in 4,000 ft of water in Mississippi Canyon Block 984 on trend with the Kodiak and Freedom discoveries. Anadarko operates Vito with 20% working interest.

Anadarko plans to spud the Samurai Middle and Lower Miocene prospect in Green Canyon Block 432 in the first quarter of 2009. Anadarko is operator with 33.33% working interest.

Garden Banks Bushwood

Mariner Energy is operator of the Bushwood and Smoothie discoveries.

Bushwood-1, formerly Geaux-pher-3, is a conventional deepwater amplitude prospect. Drilled to a TD of nearly 25,300 ft in 2,700 ft of water in Garden Banks Block 463, it logged more than 260 ft true vertical thickness (TVT) of net gas pay in multiple sands, with more than 150 ft TVT of net gas pay found in the deeper exploratory section.

Mariner is operator with 30% working interest. Partners are Energy Resource Technology GoM Inc., a subsidiary of Helix Energy Solutions Group Inc., 35%, Apache Corp. 20%, Deep Gulf Energy II LLC 10%, and Deep Gulf Energy LP 5%.

Mariner's 100% owned Smoothie-2, a deep shelf prospect in 60 ft of water in South Timbalier Block 49, went to TD of more than 20,100 ft and logged more than 200 ft TVT of net gas pay in multiple zones.

Friesian confirmed

Plains Exploration & Production Co., Houston, confirmed the Friesian deepwater discovery and plans to deepen the well to 32,500 ft to test sands that flowed at high rates at the giant Tahiti structure two blocks west.

Shell Offshore Inc. cut more than 120 ft of net oil pay at the Friesian-1 discovery well in Green Canyon Block 599 in November 2006. TD is 29,414 ft.

The Plains-operated Friesian-2 confirmation well in Block 643 at 3,300 ft south of the discovery well is at 28,989 ft and cut 389 net ft of oil-saturated Miocene sands. It encountered 219 net ft of high-quality oil pay in three main sand lobes totaling more than 210 ft

thick and a fourth sand lobe with 179 ft of oil pay that wasn't fully evaluated.

The four pay sands, all full to base with oil, are the uppermost field pays at Tahiti field 8 miles west across the basin syncline. Existing data show strong geologic and pressure correlation with the initial Miocene field pay sands at Tahiti.

Plains and its partners plan to deepen Friesian-2 to test the main equivalent sands at Tahiti such as the M15, M18, M21A, and M21B, several of which flow-tested at more than 25,000 b/d of oil. The Ocean Monarch semisubmersible is expected to arrive in March to deepen Friesian-2.

Early stage commercialization initiatives for Friesian production are under study with multiple parties to target initial output by 2012, Plains said. ✦

Colombia

BHP Billiton Petroleum Corp. assigned a 25% stake in the Fuerte North and Fuerte Sur blocks off northwestern Colombia to state company Ecopetrol SA.

The assignment gives the two companies 50-50 interests in the blocks, in the Caribbean north of Panama.

BHP Billiton signed contracts for the blocks in April 2006, and Colombia's National Hydrocarbons Agency executed joint operating agreements in June 2007.

Each block covers 1.2 million acres in 50-2,700 m of water in the Sinu basin west and southwest of Cartagena. There is no oil or gas production in the areas. BHP shot 3D seismic surveys in the area.

Liberia

Anadarko Petroleum Corp. began shooting 4,700 sq km of 3D seismic on blocks 15, 16, and 17 in the Atlantic off Liberia.

The shoot is to be used to develop deepwater Cretaceous fan prospects on the frontier basin.

Anadarko operates the blocks with 40% working interest, and the 3D survey is the largest in the company's history.

Vietnam

Neon Energy, private Perth explorer, signed a production sharing contract with PetroVietnam on Block 120 in the South China Sea southeast of Da Nang.

The block covers 8,500 sq km in 50-1,000 m of water in the southern Song Hong basin.

Neon is operator with 100% participating interest. The work program is to shoot 2D seismic and drill one exploration well within 4 years.

The block is 260 km or more north of oil and gas fields in the Mekong and Nam Con Son basins.

Colorado

Eden Energy Corp., Vancouver, BC, was producing 1.24 MMcfd of gas from eight wells in White River Dome field in Colorado's Piceance basin as of Jan. 28, 2009.

Sales are still to begin at several wells, and the time to install gathering lines and commence sales has exceeded estimates. The company doesn't plan to drill more wells in 2009 as plunging gas prices have severely reduced cash flow.

Eden is earning interests from EnCana Oil & Gas (USA), operator of the 20,000-acre Ant Hill Federal Unit southwest of Craig in Rio Blanco County on the east side of the field. Primary reservoirs are the Cameo coal and Williams Fork sandstones of the Cretaceous Mesaverde Group at an average of 8,100 ft.

Louisiana

Petrohawk Energy Corp., Houston, reported having replaced 419% of its production in 2008, mainly from North Louisiana shale and tight gas fields where 80% of its proved reserves are located. The yearend 2008 reserves figures for Louisiana are Elm Grove field 685 bcfe, the Haynesville shale 163 bcfe, and Terryville field 112 bcfe.

The company also had 173 bcfe of proved reserves in the Fayetteville shale in Arkansas.

Texas

Gulf Coast

Dual lateral Austin chalk gas wells in Giddings field are "highly economical" even at present drilling costs and commodity prices, said GeoResources Inc., Houston.

Having operated 10 successful wells to date in Grimes County, Tex., the company is moving to drill its sixth dual lateral well, Hoke Cole 1-H.

Hurst Bay 1-H, its fifth dual-leg well, is to be on production by mid-February. It went to 14,500 ft true vertical depth, has one lateral of 7,692 ft, and has a second leg kicked off 1,000 ft into the first lateral and drilled 5,253 ft.

The previously reported Bax 1-H dual lateral well's initial production rate exceeded 21 MMcfd on Nov. 20, 2008. It is now at 13 MMcfd and produced 1 bcf of gas in its first 60 days.

GeoResources, with 15 more locations to drill, plans to spud a new well every 60-75 days and will consider adding a second rig as drilling costs fall.

Wyoming

Anadarko Petroleum Corp.'s total operated and nonoperated gross sales reached 827 MMcfd of coalbed methane from the Powder River basin in late 2008.

The volumes were up 7% from the quarter ended Sept. 30 and up 33% from the last quarter of 2007. Gross operated sales hit a single-day high of 482 MMcfd in late 2008.

Fourth quarter well spuds totaled 372 operated and nonoperated wells in Powder River and 101 operated and 30 nonoperated wells at Atlantic Rim for all of 2008.

SEC updates reserves reporting regulations

Guntis Moritis
Production Editor

The recently updated US Securities and Exchange Commission reserves reporting requirements for oil and natural gas companies attempt to provide investors with more meaningful and comparable disclosures.

The updated rules will come into effect for filings after Jan. 1, 2010, unless SEC delays the date.

This update modifies oil and gas reporting disclosures adopted in 1978 and 1982 based on Regulation S-K and Regulation S-X under the Securities Act of 1933 and the Securities Exchange Act of 1934, as well as Industry Guide 2.

SEC says, "The revisions are intended to provide investors with a more meaningful and comprehensive understanding of oil and gas reserves, which should help investors evaluate the relative value of oil and gas companies."

It adds, "The amendments concurrently align the full-cost accounting rules with the revised disclosures. The amendments also codify and revise Industry Guide 2 in Regulation S-K. In addition, they harmonize oil and gas disclosures by foreign private issuers with the disclosures for domestic issuers."

Most definitions in the updated rules are consistent with the Petroleum Resource Management System published in 2007 and developed by the Society of Petroleum Engineers, World Petroleum Council, American Association of Petroleum Geologists, and Society of Petroleum Evaluation Engineers.

Fig. 1 shows the PRMS reserves classification. The SEC rules cover disclosure of economic producible reserves, which SEC says unlike commercial reserves do not include factoring in the rate of return required by a particular company.

The new rules require companies to disclose proved developed reserves and proved undeveloped reserves (PUDs) and to make optional the disclosure of probable developed reserves, probable undeveloped reserves, and possible undeveloped reserves.

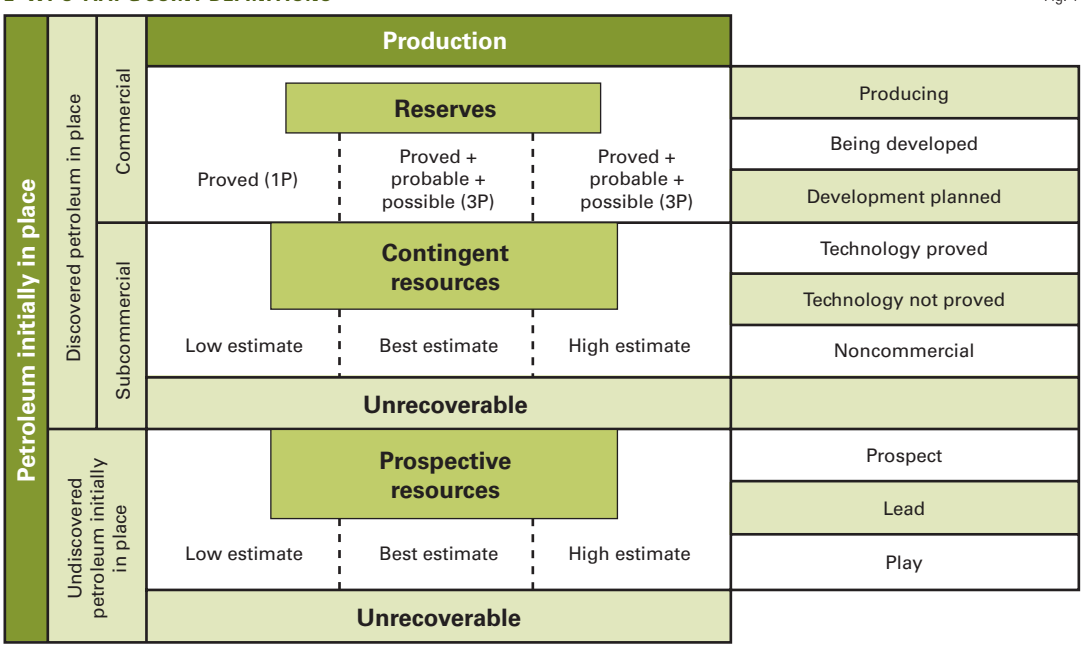
The rules continue to prohibit disclosure of oil or gas resources other than reserves in filings with the SEC unless a foreign or state law requires disclosing such information.

The updated rules in particular eliminate:

- Single-day yearend pricing for determining economically producible reserves.
- Exclusion for extraction of bitumen and other nontraditional resources from the definition of oil and gas producing activities.
- Limitations on technologies for determining reserves classification.

SPE-WPC-AAPG JOINT DEFINITIONS

Fig. 1



OIL AND GAS RESERVES SUMMARY

Fig. 2

	Reserves				
	Oil	Natural gas	Synthetic oil	Synthetic gas	Product A
Reserves category	Million bbl	MMcf	Million bbl	MMcf	Measure
Proved					
Developed					
Continent A					
Continent B					
Country A					
Country B					
Other countries in Continent B					
Undeveloped					
Continent A					
Continent B					
Country A					
Country B					
Other countries in Continent B					
Total proved					
Probable					
Developed					

• Restrictions for disclosing crude classifications other than proved reserves.

Yearend pricing

The update removes the yearend price. Instead, companies will need to determine economically producing reserves with a 12-month average price based on each month's closing prices on the first day of each month or prices defined in existing contracts.

For instance, a recent ConocoPhillip news release said that based on the Dec. 31, 2008, prices, it expects to have to remove reserves from the proved category associated with investments that remain an important part of the company's upstream portfolio.

On the other hand, if the 12-month-average pricing were already in effect, without considering other changes in the new SEC rules, ConocoPhillips would expect to have minimal reserves changes.

SEC notes that its "objective of reserves estimation is to provide the public with comparable information about volumes, not fair value, of a company's reserves available to enable investors to compare the business prospects of different companies. The use of a 12-month average historical price to determine the economic producibility of reserves quantities increases comparability between companies' oil and gas reserve disclosures, while mitigating any additional variability that a single-day price may have on reserve estimates."

SEC revised both its disclosure rules and its full-cost accounting rules related to oil and gas reserves to use a single price based on a 12-month average. It also will coordinate the changes with the staff of the Financial Accounting Standards Board (FASB) and will consider delay of the compliance date if necessary.

Nontraditional resources

The update eliminates the exclusion of oil and gas producing activities from nontraditional or unconventional sources such as bitumen extracted from oil sands and oil and gas extracted from coal and shales.

The new rules allow a company to include in reserves coal and oil shale intended for conversion into oil and gas. SEC prohibits companies from including these resources if they will not be converted into oil or gas, such as when these resources are converted directly into electricity.

Because of their higher production costs and greater sensitivity to economic conditions, SEC will require companies to list these nontraditional reserves separately from conventional oil and gas reserves, as shown in Fig. 2.

SEC also revised its definition of oil and gas producing activities to include processing or upgrading of natural resources from which synthetic oil or gas can be extracted. It, however, excluded from the definition:

• Transporting, refining, processing (other than field processing of gas to extract liquid hydrocarbons and the upgrading of natural resources extracted other than oil or gas into synthetic oil or gas) or marketing oil and gas.

• Production of natural resources other than oil, gas, or natural resources from which synthetic oil and gas can be extracted.

• Production of geothermal steam.

Technology

SEC's new rules allow companies to use new reliable technologies for establishing reasonable certainty of proved reserves. The definition of proved oil and gas reserves also includes provisions for establishing levels of lowest known hydrocarbons and highest known oil through reliable technology other than well penetrations.

SEC says it recognizes that "technologies have developed and will continue to develop, improving the quality of information that can be obtained from existing tests and creating entirely new tests that we cannot yet envision. Thus, the new definition of the term 'reliable technology' permits the use of technology (including computational methods) that has been field tested and has demonstrated consistency and repeatability in the formation being evaluated or in an analogous formation."

This new standard permits use of a new technology or combination of technologies once a company can establish and document the reliability

of that technology or combination of technologies.

The new rules require companies to disclose in a concise summary the technologies used to create the reserves estimate, although they will not require companies from disclosing proprietary technologies at a level that would cause competitive harm.

Reserve classification

The new rules define proved developed oil and gas reserves as those that can be recovered through existing wells with existing equipment and operating methods or that can be recovered in other ways through extraction technology installed and operational at the time of the reserves estimate.

The final rule also allows reserves to be classified as developed if the cost of any required equipment is relatively minor compared to the cost of a new well.

For undeveloped oil and gas reserves, the new rules will permit companies to claim proved reserves beyond spacing areas immediate adjacent to developed areas if the company establishes with reasonable certainty that these reserves are producible economically.

SEC adopted the definition of "reasonable certainty" that permits use of both deterministic methods and probabilistic methods for estimating reserves.

The new rules also allow companies to include in proved undeveloped reserves quantities that can be recovered through improved recovery projects.

The new rules contain the option for companies to disclose probable and possible reserves.

The final rules define the term reserves "as the estimated remaining quantities of oil and gas and related substances anticipated to be economically producible, as of a given date, by application of development projects to known accumulations. In addition, there must exist, or there must be a reasonable expectation that there will exist, the legal right to produce or a revenue interest in the production of oil and gas, installed means of delivering oil and gas or related substances to market, and all permits and financing required to implement the project."

SEC also notes that companies should not assign reserves "to adjacent reservoirs isolated by major, potentially sealing, faults until those reservoirs are penetrated and evaluated as economically producible and that reserves should not be assigned to areas that are clearly separated from a known accumulation by a nonproductive reservoir."

The new rules require companies to disclose reserves by appropriate geographic area under a company's particular circumstances such as individual country, groups of countries within a continent; or within a continent.

The final rules require disclosure of production in each country or field containing 15% or more of the company's proved reserves unless prohibited by the country in which the reserves are located. The 15% threshold is based on the company's total global oil and gas proved reserves, rather than on individual products.

Also to avoid compelling a company to provide, in effect, field disclosure, the rule does not require disclosure of reserves in a country containing 15% of the company's reserves if that country prohibits disclosure of reserves in a particular field and disclosure of reserves in that country would have the effect of disclosing reserves in particular fields. ✦

Oil price drop unevenly affects floating production projects

Jim McCaul
International Maritime Associates Inc.
Washington, DC

The recent $100 oil price drop, closure of financing windows, and general aversion to investment risk will affect in the near-term new floater projects. But as discussed in the latest International Maritime Associates study,[1] the effect likely will be uneven and short-term.

Assessing the near-term effect of the current turmoil requires viewing the market in four subsegments: large projects, Brazil, marginal projects, and speculative units. Each has its own unique outlook.

Large projects

Most large floater projects planned by major operators off West Africa, in the Gulf of Mexico, and elsewhere are insulated from the current turmoil. Floater projects such as Clov offshore Nigeria, Block 32 off Angola, and Jack-St. Malo in the Gulf of Mexico likely will move forward in the current circumstances.

These projects have a long gestation period and are part of an investment portfolio designed to provide future output to replace depleting reserves. The long-term economic outlook justifies these investments. A short-term oil price collapse will not jeopardize the projects' long-term commercial viability.

Of course, if the price collapse begins to look likely to continue long-term, then companies could delay or possibly shelve investments.

But this seems unlikely, judging from both the oil futures market and many analysts who believe that the current price collapse is short-term.

Brazil

The Brazilian market segment is insulated somewhat from current short-term conditions. The presalt finds off Brazil are major new oil sources, and there are no indications of a slowdown for exploiting this large resource.

Some analysts question the feasibility of developing the presalt finds in the current pricing environment. They believe development projects, such as Tupi, require $50-70/bbl oil to break even. This, of course, is less than the current spot price. But we believe Petrobras and other concession holders in Brazil will proceed aggressively with their presalt projects, with the longer term economics in view.

Other analysts question the financing capacity of Petroleo Brasileiro SA (Petrobras) to undertake the investment, given its free cash flow and indebtedness capacity. But we believe that external financing will flow into Brazil as necessary to support the funding needs for presalt development. China, for example, is said to be ready to invest $10 billion to help develop Brazil's new oil fields.

But some slowdown could occur in developing heavy oil finds in the current pricing environment and possibly delay new projects such as Royal Dutch Shell PLC's Oliva discovery on BS-4.

Also, Brazil may have to loosen local sourcing requirements that it imposed to reduce capital expenditures for new projects. Among other things, this could jeopardize plans to build FPSO hulls locally.

Marginal projects

Floater projects involving small reservoirs and small operators are a different matter. The current situation has hammered these projects.

A combination of oil prices that are 30-35% of the prices 4 months ago and an inability to access new capital has put the brakes on new projects.

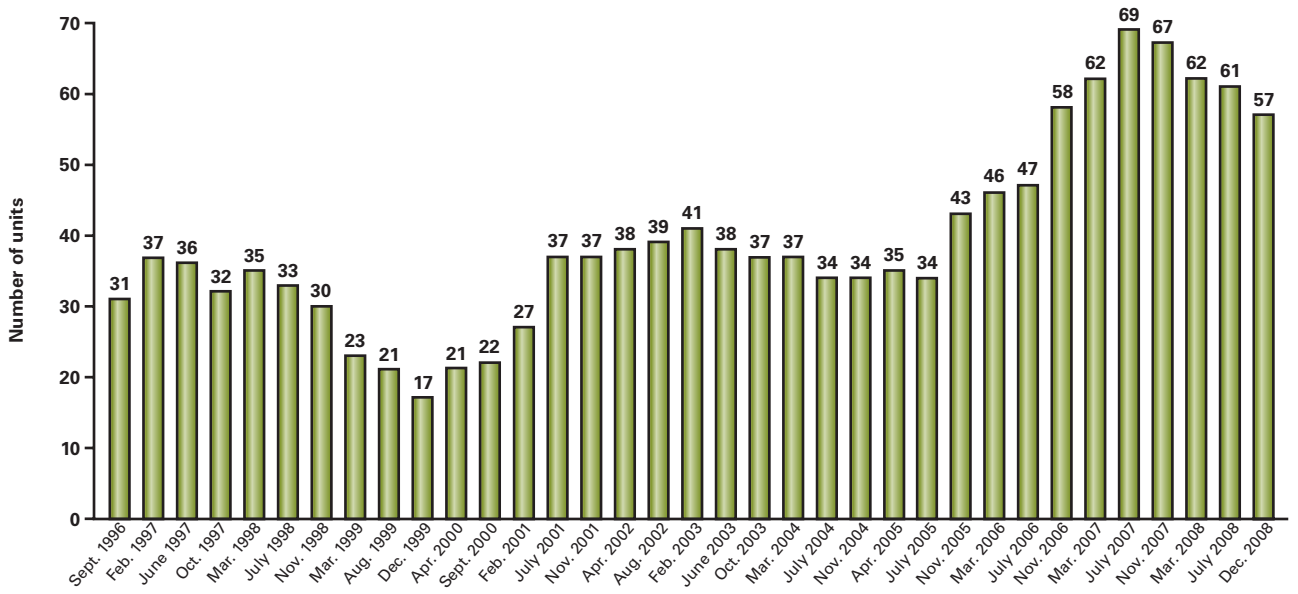
Particularly small planned projects in the North Sea, Southeast Asia-Pacific, and West Africa are susceptible to current pricing and financing conditions.

Projects such as Huntington and Kraken in the North Sea, Ande Ande Lumut off Indonesia, Malampaya off the Philippines, and Ebok off Nigeria are in this category.

It is not surprising that tentative agreements for four floating production, storage, and offloading (FPSO) vessels recently failed to be converted to firm contracts. These were on marginal

FLOATING PRODUCTION SYSTEM ORDER BACKLOG

Fig. 1



Note: Excludes storage-only units and jack up mobile offshore production units (MOPUs).

projects off Australia (Crux and Basker-Manta-Gummy), off Gabon (East Oro-vinyare), and in the North Sea (Athena).

Speculative units

Until mid-2006, most production floaters ordered had field contracts. Then companies placed a spurt of speculative contracts, quickly producing a backlog of a dozen speculative production floaters.

With the price collapse and financing windows closed, some of these projects have encountered serious headwind. Companies recently cancelled or likely will cancel contracts on three speculatively ordered FPSOs, and we see further difficulty in this portion of the market.

The accompanying figure shows that orders for new units have decreased since reaching a high of 69 in mid-2007.

Sevan Marine ASA has two and maybe three speculative FPSOs on order and the company's ability to access financing may be limited by the current liquidity constraints.

FPSOcean AS, which cancelled its second speculative FPSO, still needs to raise at least $70 million financing to complete the first unit.

It is possible that Petrobras could soak up the speculative units still on order for use off Brazil. Petrobras may be in the market for any production unit capable of use on its presalt finds. But certainly for the foreseeable future, we see no further speculative orders for FPSOs until the market clears.

Long-term view

For the long-term view, nothing really has changed. Forecasts still expect demand for oil to grow at a strong pace during the next several decades, oil supply will become increasingly tight, and pressure for higher oil prices will grow.

The International Energy Agency (IEA) in its 2008 World Energy Outlook forecasts demand for oil will increase to 106 million b/d in 2030 from 85 million b/d now. While this is 10 million b/d less growth than IEA projected last year, it still is 21 million b/d more than current consumption.

The US Energy Information Administration, in its 2008 International Energy Outlook, forecasts world liquid fuel consumption will increase to 112.5 million boe/d by 2030, an increase of about 25 million boe/d during the next 22 years.

The Organization of Petroleum Exporting Countries in its 2008 World Oil Outlook, predicts world oil demand to grow to 113.3 million b/d by 2030, an increase of about 27 million b/d.

ExxonMobil Corp. sees world energy demand growing to 310 million boe/d in 2030 from 229 million boe/d in 2005.

The world needs new oil to meet the expected growing demand and to offset decreasing production as fields deplete. As IEA points out, even if oil demand remains flat until 2030, the world would need 45 million b/d of new production to offset lower production in depleting fields. The additional production needed is four times the current production capacity of Saudi Arabia.

The average production weighted decline rate of worldwide oil fields is now about 6.7% and analysts expect this to increase to 8.6% in 2030 as production shifts to smaller oil fields.

Price pressures will result inevitably from the divergence in demand and supply. There is no question that oil

prices will increase in the long-term. Finding and lifting costs also will increase with the need to tap more difficult sources of new oil.

Some evidence of this appears in the futures market. While the spot price at mid-December 2008 was $40-45/bbl, the futures market had placed a price of $74/bbl on crude for delivery 5 years out and $80/bbl for delivery 9 years out.

In the long-term, a widely held consensus is that the world will have a pressing need to find new oil sources. Another consensus is that the deepwater frontier, which requires floating production systems for projects, represents one of the best opportunities for finding new large sources of oil. ✦

Reference

1. Floating production systems assessment of the outlook for FPSOs, Semis, TLPs, Spars and FSOs, International Maritime Associates, Washington DC, December 2008.

The author

James R. McCaul (imaassoc@msn.com) is president of International Maritime Associates Inc. He established IMA in 1973. Before forming IMA, he was a member of the faculty of Webb Institute of Naval Architecture. McCaul has a PhD in economics from the University of Maryland, an MS in business administration from Pennsylvania State University, and a BS in marine science from the State University of New York.

US ETHANE OUTLOOK—1

Increased US ethane capacity puts processors at greater risk

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*En*Vantage Inc.*
Houston

Over the past 2 years, En*Vantage has been warning US gas processors that the rapid expansion of processing capacity will create a surplus of ethane extraction capacity.

The main concern then and now is that US gas processors are incurring more economic risks by increasing their leverage to ethane, unless ethane demand increases. Yet, our analysis indicates that the US petrochemical industry is not planning to expand ethylene capacity.

Additionally, existing ethylene plants are limited in consuming or cracking substantially more ethane because adequate ethane pipeline capacity to a number of ethylene facilities is lacking, and some heavy-feedstock plants need to be retooled to crack more ethane.

The current economic recession has only exacerbated ethane oversupply and has actually caused the shakeout of some marginal US ethylene capacity. When the economy recovers, these structural changes in supply and demand for ethane will mute any substantial or prolonged recovery in ethane-extraction economics.

It will take a great deal of cooperation and planning between the US gas processing and petrochemical industries to see if ethane demand can be increased.

To describe ethane's current and future market environment in more detail, this discussion is divided into two parts. The first part this week examines the fundamentals that drive US ethane balances, details market forces driving the expansion of US gas processing capacity, and forecasts how these expansions will increase the capability of the US processing industry to extract ethane.

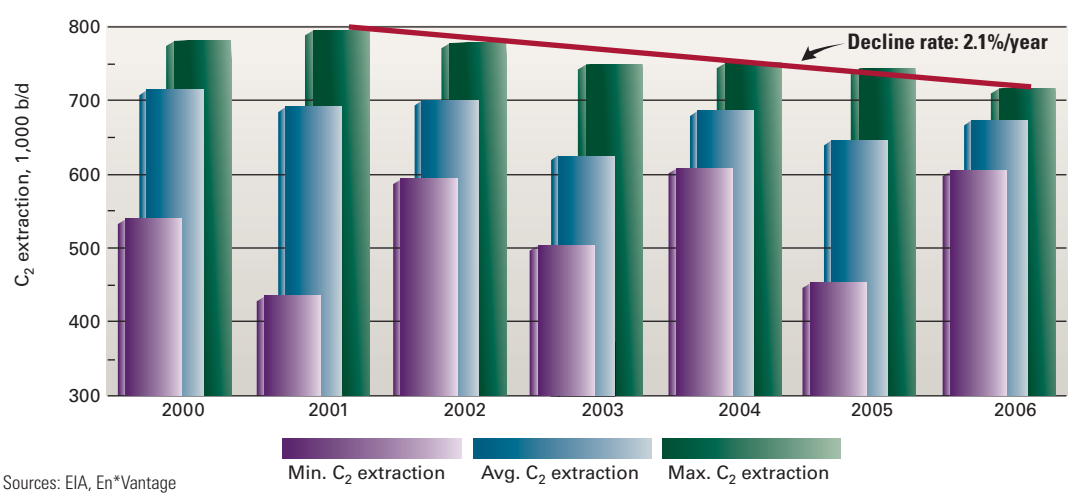
The conclusion (OGJ, Feb. 23, 2009) examines the changes occurring in the US ethylene industry, its capability to absorb additional ethane supplies, and how this will affect ethane balances and the relative value of ethane in the future. That article will provide the strategic implications of ethane's future for gas producers, gas processors, downstream midstream players, and petrochemical companies.

Background

Ethane can be the most important NGL for US gas processors and for those midstream companies that transport, store, and fractionate NGLs. It constitutes about 40% of the average NGL barrel extracted from natural gas in the

RANGE OF US ETHANE EXTRACTION

Fig. 1



Sources: EIA, En*Vantage

US. Ethane is the most economically sensitive NGL, however, and its supply and demand can substantially swing with changes in the economy

Despite ethane's inherent volatility, many gas processors and midstream companies have recently been making a significant bet on ethane's future viability. Over the past several years, companies have committed considerable investment to recover, transport, and fractionate NGLs with ethane contents of at least 40%. And these projects have been coming online and will continue to do so through 2010.

By the end of the construction boom, total US gas processing capacity will have been expanded by 11%, or 6.8 bcfd, over 2006 levels to process new gas plays in Texas, Oklahoma, and the Rockies. All of this new processing capacity is cryogenic with deep ethane extraction capability.

Less than a year ago, the huge bet on more cryogenic processing capacity and downstream NGL infrastructure seemed smart. From 2006 through August of 2008, ethane prices and frac spreads (the market value of ethane less the market value of natural gas) were climbing and reached record highs the past summer.

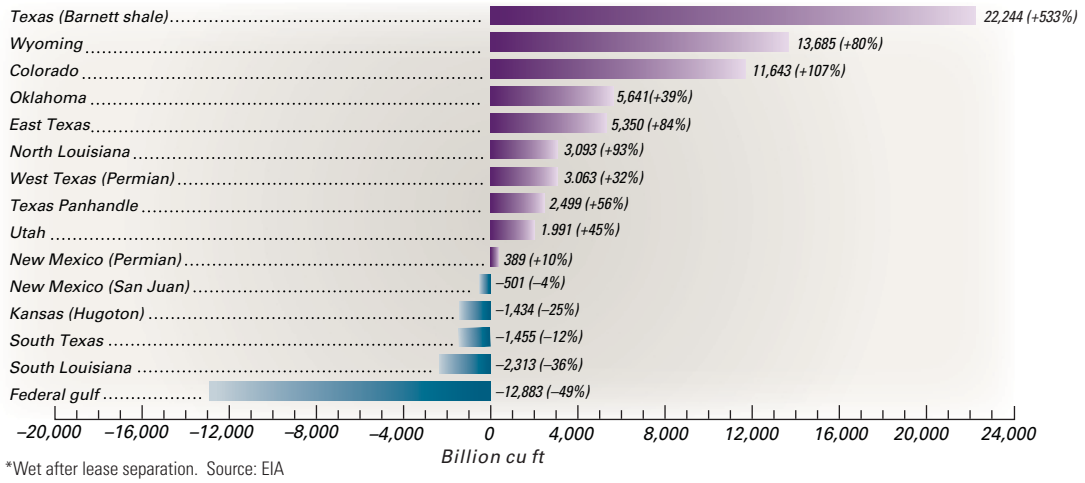
US gas processing had never been so profitable, ethane extraction was being maximized, and the cyclicality inherent in this business seemed remote. Many industry participants took for granted that the good times would last for ethane and that the US petrochemical industry, the only major market for ethane, would always have a growing appetite for the NGL.

True to its cyclical nature, ethane fundamentals cratered in a matter of a few weeks in late 2008. The economic recession and resulting collapse in crude oil prices has gas processors facing historically low ethane margins. Many in the industry are comparing the current environment for ethane extraction with 2003 when gas processors experienced dismal ethane extraction economics. There are expectations that these economics will bounce back when the economy recovers and crude prices resume their upward climb, just as they did 5 years ago.

Gas processors and midstream companies operating NGL assets should not, however, get their hopes too high. This business being cyclical does not mean that processing margins for ethane extraction will follow the same road back to the record high levels experienced in 2007-08.

MAJOR CHANGES IN REGIONAL PROVED RESERVES: 2000-07*

Fig. 2



*Wet after lease separation. Source: EIA

Ethane: supply, demand, pricing

US ethane balances can appear simple, but complex forces drive the supply, demand, and pricing of ethane. Over a 5-year period 2003-07, the US market for ethane averaged around 750,000 b/d (Table 1).

Almost 90% of US ethane supplies comes from the processing of natural gas. Gas processors have considerable discretion to recover ethane or leave it in the gas stream depending on the economic incentive to extract ethane.

The refining industry also produces an ethane-ethylene stream as a by-product of processing crude oil into refined products. The equivalent amount of ethane from this stream represents the remaining ethane supplied to the market. Because it is a by-product of refinery operations, equivalent ethane supplies from crude oil refining remain fairly stable.

It is important to note that US ethane supplies come only from US gas processors and refiners and that ethane is a self-contained market in the US. Overland imports or exports of ethane are nonexistent because there are no NGL pipelines capable of transporting ethane into or out of the country. Further, waterborne imports or exports of ethane on a standalone basis

US ETHANE SUPPLY, DEMAND: 2003-07*

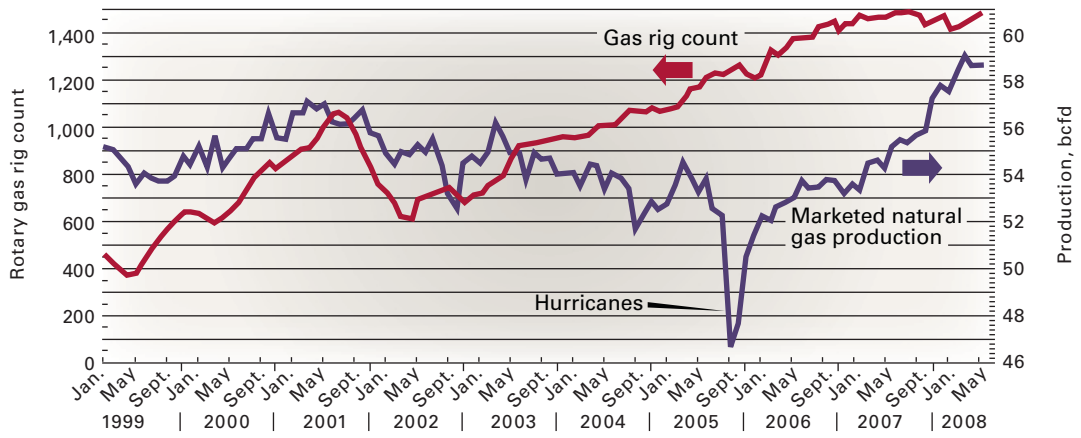
Table 1

Supply			Demand		
Source	1,000 b/d	%	End use	1,000 b/d	%
Processing	667	89	Ethylene	737	98
Refining	83	11	Blending into propane	13	2
Total	**750**	**100**	**Total**	**750**	**100**

*5-year average.

US RIG COUNT TRENDS: 1999-2008*

Fig. 3



*Avg. monthly rig count. Sources: Baker Hughes Rig Count, EIA

are also nonexistent due to the cost of shipping ethane in liquefied form.

Rich or "hot" LNG (LNG with high heat content), however, will have ethane entrained but requires an extraction facility at a LNG receiving terminal to separate ethane from the LNG stream. There is only one US LNG receiving terminal that will have that capability to extract ethane from hot LNG, discussed later.

As previously stated, the production of ethylene represents the only major end-use for US ethane. (Very minor end uses for ethane include blending into propane for fuel uses and directly as a fuel.) The feedstock flexibility of the US ethylene industry forces ethane to compete with other NGLs and petroleum-derived feedstocks from crude oil refining, mainly naphtha and gas oil.

Since crude oil prices are a major determinant of the price of the ethylene feedstocks that compete with ethane, it stands to reason that there is a relationship between ethane's market value and the price of crude oil. The btu value of ethane or its cost basis is determined by the market value of natural gas where the natural gas is produced.

The discretionary nature of ethane extraction from gas processing and the flexibility of the US ethylene industry to crack ethane makes the range for ethane demand quite wide. Within the most recent 5-year timeframe, it has swung as low as 475,000 b/d and as high as 850,000 b/d around the average of 750,000 b/d. The volatility in ethane supply and demand can be due to complex factors.

Supply of ethane from gas processing can be influenced by:

- Ethane frac spreads.
- Gas processing contracts.
- Type of processing plant.
- Plant location.
- Gas quantity and quality.

The following factors can influence the demand for ethane as an ethylene feedstock:

- Ethylene business cycles.
- Ethylene plant (steam cracker) capacities and feedstock capabilities.
- Competing ethylene feedstocks.
- Ethylene coproducts.
- Ethylene derivative imports/exports.

Benchmarks

To simplify the analysis of these complex factors that drive the supply and demand of ethane, En*Vantage focused on a few benchmarks as described below. Note that these benchmarks must be analyzed simultaneously to obtain the most complete picture of what is happening to ethane supply, demand, and prices.

- *Natural gas to crude price ratio (Henry Hub gas price to WTI price on a thermal basis).* Because ethane's floor value is set by natural gas and its market value is largely determined by crude prices, the gas-to-crude price ratio is a good directional, inverse benchmark for ethane's frac spread and the economic attractiveness of ethane as an ethylene feedstock.

The lower the gas-to-crude price ratio, the better the environment for ethane's frac spreads and its attractiveness as an ethylene feedstock.

- *Absolute value of WTI.* Rising crude prices typically imply higher prices for

KEY PRICING BENCHMARKS FOR ETHANE

Table 2

	Gas-to-crude ratio (btu basis), %	WTI price, $/bbl	Gas btu discount to WTI, $/MMbtu	Ethane-to-crude ratio (volume basis), %	Ethane price, $/gal	Ethane frac spread, $/MMbtu
1998	87.6	14.4	0.32	54.3	0.19	0.644
1999	71.8	19.2	1.00	61.3	0.28	1.884
2000	81.3	30.3	0.96	55.9	0.40	1,808
2001	87.3	25.9	0.47	53.3	0.33	1.056
2002	74.2	26.1	1.14	42.0	0.26	0.583
2003	102.0	31.1	–0.11	53.8	0.40	0.534
2004	83.6	41.3	1.26	51.0	0.50	1.697
2005	89.6	56.4	0.89	46.2	0.62	0.578
2006	59.2	66.1	4.71	41.4	0.65	3.165
2007	57.6	72.5	5.53	45.6	0.79	4.992
[1]2008	50.3	114.4	9.80	40.0	1.08	6.371
10-yr avg.[2]	79.4	38.34	1.62	50.5	0.44	1.694

[1]Jan.-Aug. 2008. [2]1998-2007.

ethane, assuming ethane's value to crude has not deteriorated, and rising crude prices result in wider ethane frac spreads, assuming gas-to-crude ratios remain fairly stable.

• *Ethane to crude price ratio (Mt. Belvieu ethane price to WTI price, $/bbl).* Ethane's price relationship to crude is a good measure in determining how well ethane fundamentals are doing. When ethane balances are tight, ethane typically sells at a relationship to crude that is higher than its historical average of 50%.

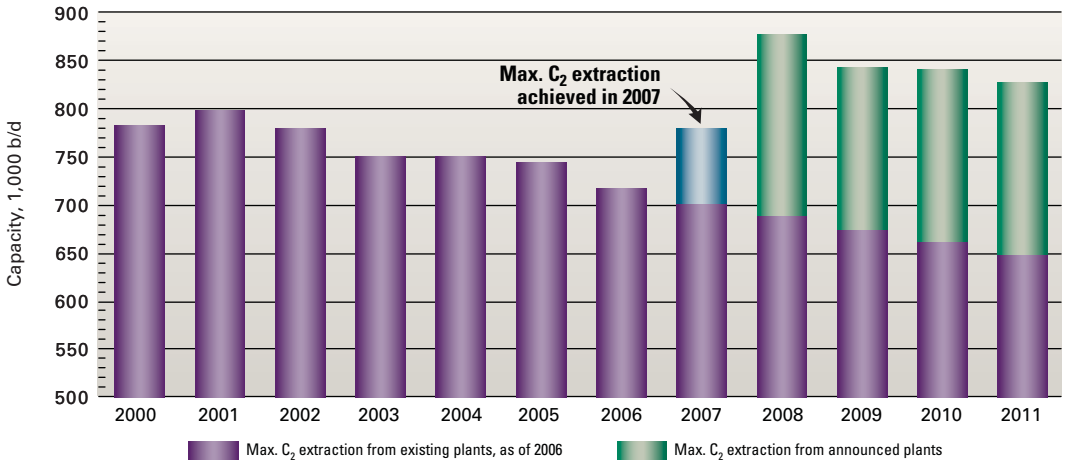
• *Ethane frac spread (Mt. Belvieu ethane price less Henry Hub gas price).* Ethane's frac spread measures the economic incentive to extract ethane for gas producers and those processors with "keep-whole" processing contracts (replacing plant fuel and shrinkage).

• *Natural gas production and gas quality.* If gas production is rising and is of sufficient quality to process and recover ethane, then it is highly probable that new processing capacity will be added and that existing capacity will probably extract more NGLs.

• *US ethylene production and industry configuration.* The types of US ethylene plants operating and the amount ethylene produced to meet demand greatly influence the amount of ethane cracked or consumed as a feedstock.

US ETHANE EXTRACTION CAPABILITY: FORECAST

Fig. 4



Ethane 2006-08

An examination of the key pricing drivers for ethane 2006-08 illustrates the extraordinary period for ethane prices and frac spreads compared to previous years and the 10-year average (Table 2).

In a 32-month period from 2006 to August of 2008, conditions were perfect for gas processors to maximize ethane profitability whether processors had keep-whole or percent of liquid proceeds (POP) contracts. Low gas-to-crude price ratios, high crude prices, and reasonable ethane values relative to crude, all combined to make the perfect recipe for extremely attractive ethane frac spreads for those processors with keep-whole contracts and record high ethane prices for those processors with POP contracts.

The ethane frac spreads achieved during this period are so remarkable because the long-term average for the spread is only $1.69/MMbtu. More sobering is the fact that since 1991 ethane frac spreads have traded 66% of the time below $1.50/MMbtu, and 33% of the time below $0.75/MMbtu. Based on history alone, odds were that ethane frac spreads could not sustain these lofty levels.

Also, two very important points to consider during this 32-month period:

1. Additional ethane from newly constructed processing plants had not fully affected the market yet.

2. Record high ethane prices and frac spreads would not have been possible if the US ethylene industry was doing poorly.

New plants, supplies

At the end of 2006, LPG Almanac reported about 490 gas processing plants operating in the US with an inlet-gas capacity of about 64 bcfd. During that year, 43 bcfd, or 81%, of US marketable natural gas production was processed, an operating rate of 66%.

This may seem an unusually low utilization rate compared with the relatively higher operating rates typically seen in refining and petrochemical operations. But it is quite normal for US gas processing to operate at utilization rates of less than 70% because processing plants generally outlive the local or regional gas production that originally fed the plants due to production declines. This is particularly the case for Gulf Coast processing plants where Gulf of Mexico gas production has been in decline.

From 2001 to the end of 2006, EIA reported US marketable gas production was declining at a little more than 1%/year. During this period En*Vantage analyzed EIA monthly natural gas plant field production data for each processing region to determine the effects of declining natural gas production on NGL extraction volumes, in particular ethane.

Our analysis revealed that during any given year, ethane extraction can swing over a wide range. These swings can

ADDITIONS TO US GAS PROCESSING CAPACITY AND NGL PRODUCTION CAPABILITY*

Table 3

Region	Year	Processing capacity, MMcfd	NGL production Capability, 1,000 b/d	Ethane extraction Capability, 1,000 b/d
Rockies	2007	1,100	52	26
Texas inland	2007	825	51	20
Midcontinent	2007	—	—	—
Gulf Coast	2007	—	—	—
Total		**1,925**	**103**	**46**
Rockies	2008	1,520	71	35
Texas inland	2008	510	34	13
Midcontinent	2008	360	28	11
Gulf Coast	2008	295	17	7
Total		**2,685**	**106**	**67**
Rockies	2009	700	33	16
Texas inland	2009	655	48	19
Midcontinent	2009	380	31	16
Gulf Coast	2009	100	7	3
Total		**1,385**	**58**	**54**
Rockies	2010	350	30	15
Texas inland	2010	—	—	—
Midcontinent	2010	—	—	—
Gulf Coast	2010	—	—	—
Total		**350**	**30**	**15**
Rockies total, 2007-10		3,670	185	93
Texas inland total, 2007-10		1,990	132	53
Midcontinent total, 2007-10		740	59	27
Gulf Coast total, 2007-10		395	24	10
Grand total		**6,795**	**401**	**182**

*Assumes 100% utilization rates.

be driven by such factors as extraction economics, variations in gas production, plant maintenance, NGL take-away problems, and weather events. Examining only annual average extraction volumes makes it difficult to determine underlying trends over time because of the amount of "noise" that can be imbedded in the averages.

To determine ethane extraction trends, En*Vantage tabulated the maximum amount of ethane recovered in each processing region within a given year. The regional maximum extraction levels should better reflect the actual capability to extract ethane within that region when operating and economic conditions are more favorable. Totaling the regional maximum volumes gives an indication of the US processing industry's capability to extract ethane in that particular year.

Before the current boom in gas plant construction started in 2007, US ethane extraction was declining at 2.1%/year, as measured by the maximum ethane volumes extracted by gas processors 2001-06 (Fig. 1). As a side note, a similar analysis of total NGL extraction shows a decline of 2.4%/year during this period. Our analysis revealed the decline in NGL extraction, including ethane, was caused by natural gas production declines and to some extent leaner natural gas.

While ethane extraction was declining along with natural gas production, innovative drilling and stimulation technologies were sparking interest in new and emerging gas plays, both conventional and unconventional, in the Texas, Midcontinent, and Rocky Mountain producing regions. Consequently there was a renaissance in proved natural gas reserves in these regions compared with mature areas along the Gulf Coast and offshore Gulf of Mexico (Fig. 2). Much of these new gas reserves additions have relatively high liquid content, ranging between 2 and 5 gal/Mcf (GPM).

It is no surprise that, as gas drilling picked up in 2007 with the upward climb in crude oil and natural gas prices, US natural gas production began to increase dramatically and is up 11% since 2006 (Fig. 3).

In anticipation of the need to serve rising gas production, gas processors began aggressively to announce new processing plants (Table 3). All of these new plants are cryogenic to maximize ethane recoveries, and many producers insisted that gas processors build cryogenic plants to capture the huge economic uplift that ethane offered.

A survey of each new announcement by En*Vantage revealed that in 2007, a little more than 1.9 bcfd of gas processing capacity was completed. In 2008, about 2.7 bcfd of additional processing capacity was to be operational; another 1.8 bcfd in 2009; and another 350 MMcfd in 2010.

In total, 6.8 bcfd of gas processing capacity should be added in 2007-10, with 54% of this capacity in the Rockies, 29% in Texas inland basins, 11% in Midcontinent mainly in Oklahoma, and 6% along the Gulf Coast. En*Vantage estimates that this new capacity, if it were to operate full out, would be able to extract 401,000 b/d of NGL mix, of which 182,000 b/d would be ethane.

Of course, it is not realistic to expect these new processing plants will be operating at 100% of capacity when they are completed. To estimate a more realistic operating schedule for these plants, En*Vantage made the following assumptions:

- 50% load factor during the first quarter of operation.
- 65% load factor in second quarter.
- 75% load factor in third quarter.
- 80% load factor in fourth quarter.
- After 1 full year at 80% load factor, plant inlet volumes would decline at 2%/year.

We also estimated NGL recoveries for each new announced plant based on the estimated gas quality in the producing basin feeding the plant. For each new plant, ethane was assumed to constitute 40% of the NGL stream recovered except in cases where En*Vantage had information that ethane recoveries would be higher for a particular plant. For any plant built before 2007, we assumed a maximum ability to extract ethane would continue to decline at 2%/year.

Adding our estimated ethane extraction from new plants to the ethane extracted from existing plants shows

that US processing will be able to extract more than 800,000 b/d for the next several years (Fig. 4). Actual data for 2007 showed that US processing hit a maximum ethane extraction level of 778,000 b/d, and it appears that in 2008, that level reached 810,000 b/d before Hurricanes Gustav and Ike hit the Louisiana and Texas Gulf Coasts, respectively.

In addition to the new gas processing plants that are coming online, Trunkline LNG is installing infrastructure at its Lake Charles LNG terminal to allow for ambient-air vaporization of LNG and extraction of NGLs from the LNG. The extraction plant will be able to process 1.050 bcfd of LNG and be in service in second-quarter 2009. The NGLs that are entrained in LNG are mostly ethane with some propane and butanes.

Depending on the heat content of the LNG being imported, 18,000-48,000 b/d of ethane could be extracted. En*Vantage estimates that the Trunkline LNG terminal could process LNG with an average heat content of 1,150 (±25)/std. cu ft. That would imply an NGL recovery rate of at least 39,000 b/d, with ethane extraction about 24,000 b/d.

One note of caution regarding Trunkline's Lake Charles LNG terminal: There is no certainty that NGLs will be extracted daily. Extraction will depend on the need to import LNG, the amount and quality of the LNG being brought to the terminal, and whether there is an economic justification to extract the ethane. If ethane frac spreads are any where near levels seen in 2007 or first-half 2008, it is very likely ethane extraction will occur. And, because the volume of ethane extracted at the Trunkline LNG processing plant can be quite large, it can have an immediate capping effect on ethane frac spreads and cause havoc to ethane balances on the Gulf Coast.

Even without ethane extraction at Trunkline, US gas processing is on a path of overbuilding ethane extraction capability. Unless projects that have been announced for 2009 are delayed or canceled by the current economic recession, En*Vantage expects industry will be able to extract 800,000-850,000 b/d of ethane. The Trunkline terminal will only add to this capability, if and when it starts extracting ethane from LNG.

The key questions are whether the US ethylene industry can absorb this additional ethane and how will this impact ethane balances and the relative value of ethane. The concluding article in this series analyzes these concerns and implications for gas producers, gas processors, and ethylene producers. ✦

The author

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Iraqis mending own pipelines

Kevin Ross
Gary Vogler
Multi-National Force, Energy Fusion Cell
Baghdad

Most of the pipelines damaged during the war in Iraq are domestic crude or domestic product pipelines belonging to and repaired by the Oil Pipeline Co. (OPC) of the Ministry of Oil. OPC repair crews carried out the bulk of the work to keep oil flowing through these pipelines; extinguishing fires, cleaning up the mess, and repairing the pipelines (Fig. 1).

This article examines OPC's organization, providing a sense of the work accomplished under extreme hardship and of the sacrifices made by people working in a small part of the Iraq oil sector.

3,000 hits

OPC successfully repaired 767 hits—damage to the pipeline such as an illegal hot tap, bullet holes, grinder holes, or explosions—on 7,200 km of pipeline during the 5 years ending May 2008 (Fig. 2). Seldom did a day pass without report of a new hit on a pipeline somewhere in Iraq. OPC prioritized and repaired these hits to keep oil flowing through pipelines in relatively less dangerous areas first, with hits in extremely dangerous locations left until security was restored.

Improved security since May 2008 has allowed OPC to access all its product pipelines and determine the total damage caused by more than 3 years of attacks and looting. OPC has identified or repaired more than 2,300 additional hits in that time and the number continues to grow as repair teams start pressure testing the lines. Explosions cause the most damage and are most difficult to repair, typically requiring replacement of one or several joints and several days' work (Fig. 3).

All repairs before May 2008 occurred while the repair teams were under threat of attacks either directly to the workers or on the workers' families. Pipeline repair work is dangerous even in a benign environment any place in the world. Unfortunately, 30 OPC employees died over the past 5 years while trying to do their jobs. Most of these casualties occurred as the security situation deteriorated 2004-07.

On two different occasions, OPC employees were kidnapped while on repair jobs. Their kidnappers released them but kept their equipment. Kidnappers still hold another OPC employee, having killed the passenger in his vehicle. Repair teams did not use security when responding to jobs in 2003-04 because they did not see the necessity. They quickly learned to use some type of security force for almost all jobs and refused to accept jobs in the most dangerous areas. Repair teams still require security guards from the Iraqi Army before attempting a job, but the environment is much better today and work can progress more quickly.

Iraqi Oil Pipeline Co. repair crews assess a damaged line. OPC is responsible for the maintenance and operation of Iraq's domestic pipelines (Fig. 1).

IRAQI OIL, GAS INFRASTRUCTURE

Fig. 2

Difficult repairs

The highest priority and most difficult repair completed by OPC over the last few years was fixing the 14-in. OD LPG pipeline running from just south of Baghdad to the west of Baghdad and ending at the Taji LPG bottling plant north of the city. This pipeline provides more than 1,000 tonnes/day of LPG from production and import facilities in the south, crossing some of the most hostile areas near Baghdad, most notably the so-called triangle of death southwest of the city. Working in this area became very dangerous in 2004, with security continuing to decline until 2007.

Bottled LPG is the principal cooking fuel in Iraq and was in critically short supply in Baghdad 2005-08. Taji is the largest LPG bottling facility in the country, filling several thousand bottles per day. Repairing the 14-in. pipeline would allow cooking fuel to reach the people of Baghdad, improving their quality of life. Cooking fuel became so scarce in late 2006 that the black market price rose to about 10 times the official government price.

During the pipeline outage LPG trucks loaded at a facility about 1 hour south of Baghdad in Hilla drove to Taji, providing less than 25% of typical supplies. OPC operated like this for more than 2 years, before linking up with both US-led coalition forces and Iraqi Army security teams in a coordinated effort to fix and secure the line. Late-2007 repairs took about 2 weeks once security for the teams and the pipeline was established. Reopening the pipeline was a victory for OPC and its security partners in the Iraqi Army and the coalition's Energy Fusion Cell.

Repair of the Zekerton Canal crossing close to Kirkuk in northern Iraq was also difficult. Eight product and crude oil pipelines crossed the canal in a bundle design that created an easy and high-value target. A hit on these lines in October 2005 created a horrific fire

An Iraqi pipeline valve station burns prior to OPC extinguishing the blaze and beginning repairs (Fig. 3).

and environmental disaster. The canal provides fresh water to several local farms and residents. Repair crews spent several days trying to extinguish the fire and control the spill before starting necessary repairs. Further cleanup followed the pipeline repairs.

Another unforgettable repair job took place north of Baghdad in the Thar Thar Canal close to Samarra. This area became very dangerous in 2004 and attacks became common on the product and crude pipelines moving oil south from Bayji to Baghdad, eventually making the pipelines unusable.

Attackers hit a bundle of nine pipelines in February 2006 at an irrigation canal crossing 7 km south of Mushada depot. An explosion and heavy smoke accompanied pollution of fresh water in the canal. The military provided a strong perimeter defense while helicopters lifted repair equipment over the canal and into position to make the repairs. The canals provided a natural barrier, making it very difficult to access and repair the damaged pipe.

Next priority

The pipeline corridor from Mosul to Baghdad is the current focus of repair. Two pipelines supply natural gas and products from Bayji to Mosul. Several pipelines lie south of Bayji in the corridor between Bayji and Baghdad; supplying crude oil, natural gas, LPG, and products to Baghdad. The corridor passes several cities considered very dangerous before 2008, including Tikrit and Samarra. Many attacks occurred on these pipes between 2004 and 2008.

All repair work in the corridor stopped once the area became too dangerous and the number of hits too great. Improved security now allows OPC to perform inspections of the damaged pipelines and assess requirements to get them operational. Most of the 2,250 hits detected since May 2008 occurred in this corridor.

OPC's first priority is repairing the 16-in. OD natural gas pipeline supplying fuel to the Taji power plant. Baghdad is short of electric power and Taji provides over 100 Mw to the Baghdad area.

Exclusion zones

Pipeline Exclusion Zones (PEZ) help secure critical pipeline corridors in the northern part of the country. PEZ are a fortified lateral zone measuring roughly 200 m across. Fortifications normally consist of a ditch, dirt mound, a fence, and roving patrols (Fig. 4).

A PEZ completed between Kirkuk and Bayji in late 2007 proved to be an important enabler for securing crude pipelines expected to export crude through Turkey. OPC and US forces are building the Bayji to Baghdad PEZ, which has already been beneficial in providing security while OPC teams work in the area. Future construction of new pipeline will also be much easier. Plans already exist for a new crude line from Bayji to Baghdad as a replacement for the two 12-in. OD pipelines built in the early 1950s.

Future objectives

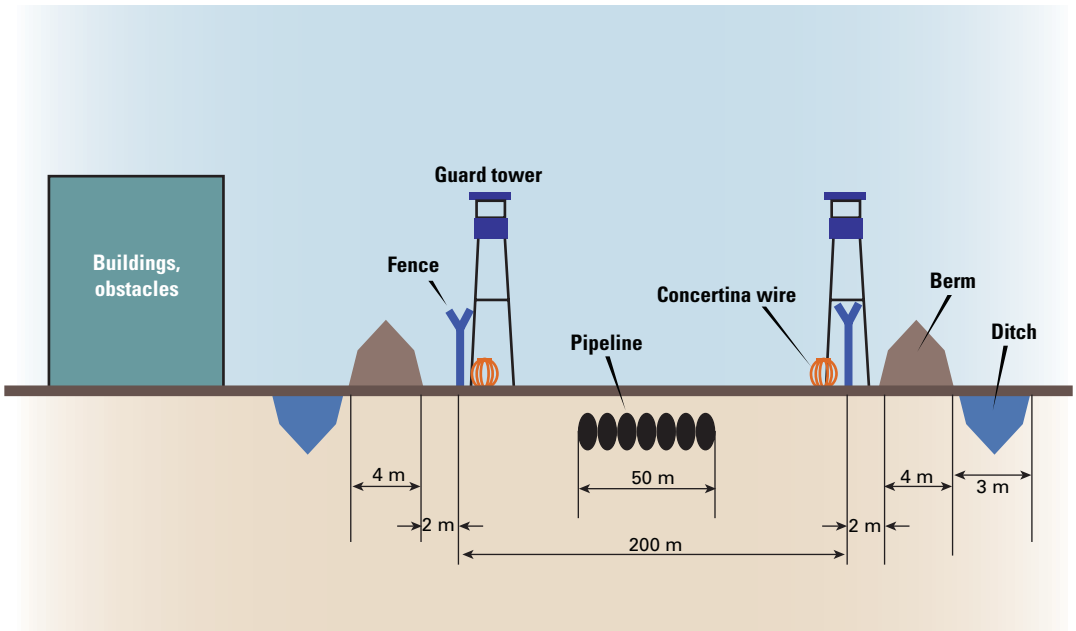
As the workload for repairing pipelines decreases in the near future, other priorities will emerge. OPC has installed new meters at all its facilities over the last 2 years. It has completed most of the work, with a few crude and HFO pipelines delivering to power plants still waiting. It also has plans for a product tank data system and new pipelines to replace old and deteriorating lines now in use.

Cathodic protection has not oper-

ated for years and soil conditions in many areas are very corrosive, raising the importance of future maintenance plans. An inspection program under development will lead to regular pigging of all lines. Pigging inspection has nearly halted since 1991 because of UN sanctions and the poor security situation. Specific plans do not exist, but OPC would like to install a modern supervisory control and data acquisition (SCADA) system for the country's product pipeline network. The current system is strictly manual.

Pipeline exclusion zone

Fig. 4



Organization

OPC is headquartered in the Daura area of Baghdad adjacent to the Daura refinery and has offices throughout the country. It has 3,700 full time employees and another 1,300 temporary workers, operating 12 depots with 120 storage tanks, and normally has about 1 billion l. of product in its system. Kerosine has seasonal storage volume because it is the primary heating fuel in the country. The Ministry of Oil's target inventory for kerosine on hand before winter measures about 400 million l./year.

OPC's 7,200 km of pipeline consist of 2,800 km light products, 1,435 km LPG, 211 km heavy fuel oil, 979 km domestic crude oil, and 1,775 km natural gas. Before 2003 the pipeline network operated at a rate of 5.6 billion cu m-km of crude and products. Current utilization is about 2.4 billion cu m-km (assuming a 1,000:1 gas-to-liquid ratio).

Five Fast Repair Teams accomplished almost all emergency pipeline repairs. Each team consists of about 20 employees with proper experience and training in repairing pipelines in accordance with industry standards. They normally deploy for 15 days to camps close to the repair area before returning for a break. Their equipment consists of an excavator, shovel, crane, welding machine, and cutting machine. The continuous nature of the work makes equipment maintenance and supply difficult.

OPC's success required courageous leadership. OPC Director Gen. Salah Aziz, reporting to Deputy Minister of Oil Mo'Tasam, has provided this leadership. Aziz was director general of North Gas Co. in March 2003. When coalition forces arrived in Kirkuk, he and his team ignored evacuation orders, continuing to sweeten the very dangerous gas in the north that has high concentrations of H_2S. Pentagon prewar planners had expressed concern that Saddam Hussein might use the unsweetened gas as a weapon against US forces coming into Kirkuk. Aziz returned to Baghdad as director general of OPC in July 2003, despite personal risk to himself and his family. ✦

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Gary Vogler (anne.morris@iraq.centcom.mil) is senior oil consultant to the Energy Fusion Cell. He is a graduate of the US Military Academy (1973) with 21 years' experience at Mobil Oil and ExxonMobil, ending in early 2002. He is also a retired US Army Reserve officer. Vogler was senior oil advisor under ORHA and then deputy senior oil advisor during CPA in 2003 and 7 months into 2004. He returned to Baghdad in December 2006 as a contractor to assist with the oil reconstruction program under the Gulf Region Division of the US Army Corps of Engineers.

New downhole fluid measurements

The new InSitu Family of wireline services provides quantitative fluid measurements at reservoir conditions, in real time.

These measurements are acquired with the InSitu Fluid Analyzer system, which delivers the next generation of measurements for real-time downhole fluid analysis (DFA).

The InSitu Family portfolio consists of seven measurement services:

- InSitu Composition hydrocarbon fluid composition measurement.
- InSitu GOR reservoir fluid gas/oil ratio measurement.
- InSitu CO_2 reservoir fluid CO_2 measurement.
- InSitu Density reservoir fluid density measurement.
- InSitu Color reservoir fluid color measurement.
- InSitu Fluorescence reservoir fluid fluorescence measurement.
- InSitu pH reservoir fluid pH measurement.

The company says that quantitative fluid measurements previously unachievable from wireline technology are now possible downhole and in real time. By investigating fluids at the reservoir, a deeper insight to fluid composition and distribution is gained for improved reservoir understanding, the firm notes.

Operators no longer have to wait for samples to be returned to the surface for analysis, the firm says. This real-time information helps operators confirm assumptions on reservoir compartmentalization and make informed decisions on completion and surface facility design.

Fluid Profiling analysis with InSitu Family measurements gives further insight to reservoir fluid distribution and variation. This is made possible with the Quicksilver Probe focused fluid extraction tool that acquires reservoir fluid with ultralow or no contamination for InSitu Fluid Analyzer DFA. Characterization of the reservoir fluid system is extended from a single well to multiple-well (field-based) applications, such as quantifying compositional gradients and identifying zonal connectivity.

Source: **Schlumberger,** 300 Schlumberger Drive, Sugar Land, TX 77478.

New corrosion assessment technology

A new technology that measures corrosion is suited for use where crude oil, oil fractions, and chemicals can affect pipelines, refineries, and chemical plants. The novel technology is used to assess the corrosive properties of fluids on metal and provides insights that will help to minimize corrosion. Based upon proprietary Nanoflow technology, the new tool allows the quantitative analysis of corrosion of liquids on metals.

The most distinctive feature of the firm's corrosion measurement equipment is that it combines the use of a short residence time of the liquid at elevated temperatures with a closed loop system.

Source: **Avantium Technologies,** Zekeringstraat 29, 1014 BV Amsterdam, Netherlands.

Knight Oil Tools,

Lafayette, La., has named Phillip Thomas Mitchell general manager of its Knight Manufacturing division. He will manage Knight's manufacturing division and focus on developing its workforce. Mitchell previously worked as an engineering manager, product line engineering manager, and a QHSSE manager with a major service provider in the UK, Houston, and Lafayette. He has a mechanical engineering degree from Robert Gordon University in Aberdeen.


Mitchell

Knight also has announced that Douglas W. Smith will join the firm's corporate sales team in its Houston office. He has worked as a sales manager for other fishing and rental tools companies and has been in the oil and gas industry for more than 30 years. Smith received a bachelor's degree from the University of Houston and is a member of the American Petroleum Institute, American Association of Drilling Engineers, and Society of Petroleum Engineers.


Smith

Knight Oil Tools is the largest privately held rental and fishing tools business in the oil and gas industry and includes Knight Fishing Services, Knight Well Services, and Knight Manufacturing.

KBC Advanced Technologies PLC,

London and Houston, has appointed Karl Bartholomew principal consultant of its Strategic Consulting Group. Formerly president and managing director of Pace Consultants Inc. (now Jacobs Consultancy Inc.), he is a widely recognized expert in the economics of technical planning, management, and valuation of refining, petrochemicals, raw materials, and natural gas operations. With 30 years of industry experience, Bartholomew has served as an expert technical witness before the Federal Energy Regulatory Commission in energy litigation and has provided support on behalf of others for numerous regulatory and arbitration panels, including various property tax venues in appraisal negotiations and insurance industry negotiations. Bartholomew has an MBA from Houston Baptist University and a BS in chemical engineering from the University of South Carolina. He is also a registered professional engineer in the state of Texas and certified as an accredited senior appraiser with the American Society of Appraisers. In addition, Bartholomew is a member of the Royal Institute of Chartered Surveyors, certified in business/technical valuation.

For more than 30 years, KBC consultants have provided independent advice and expertise to enable leading companies in the global energy business and other processing industries manage risk while maximizing the value from their assets.

Knowledge Reservoir and Ingrain,

both of Houston, have announced a strategic alliance designed to accelerate the use of Ingrain's technical breakthroughs in the area of digital rock physics. Ingrain's digital rock physics labs use advanced 3D imaging technology and patented computational methods to rapidly and accurately determine the physical properties and fluid flow characteristics of reservoir rocks. Ingrain's digital process works equally well on core samples and drill cuttings and dramatically decreases turnaround time compared with physical core analysis. Knowledge Reservoir plans to develop enhanced reservoir modeling workflows around the wealth of data generated by Ingrain's technology and will support clients in the application and interpretation of the data. The alliance means that Knowledge Reservoir's consulting teams can help oil and gas companies maximize the value of their investment in Ingrain's advanced rock properties data—such as porosity, elastic properties, and relative permeability, each computed in three directions.

Knowledge Reservoir is a leading global energy consulting firm, providing geoscience and engineering consulting and resource solutions to clients worldwide.

Ingrain was formed in 2007 to bring the petrophysical innovations of founders Dr. Amos Nur and Dr. Henrique Tono to the oil and gas industry.

AMEC PLC,

London, has acquired Aberdeen-based consultancy Performance Improvements Group Ltd. The purchase follows four other acquisitions in AMEC's Natural Resources division over the last 18 months. AMEC has a history of working with PI, the two companies having collaborated on major gas compressor station contracts for National Grid in the UK. AMEC has growth plans for PI and expects to be actively recruiting for the new business over the next few months for expansion of its services internationally.

AMEC provides consultancy, engineering, and project management services to the world's energy, power, and process industries. The Natural Resources division covers AMEC's activities in oil and gas services, oil sands, and mining.

PI is a leading engineering consultancy focusing on delivering operational excellence in the North Sea. It was formed in 1997 to provide multi-discipline engineering expertise to the international oil and gas industry to help maximize uptime, efficiency, and performance of existing installations.

Subsea 7,

Aberdeen, and Technip, Paris, have agreed to dissolve their joint venture, Technip Subsea 7 Asia Pacific (TS7), once all its existing projects and tendered work have been completed. With the expected continued growth of the deepwater subsea construction market in the region, the parties now wish to pursue separate strategic development opportunities, but this does not exclude working together on a case-by-case basis on future projects. Technip and Subsea 7 worked together on significant projects in the Asia Pacific region for several years. In September 2005, Subsea 7 and Technip signed a memorandum of understanding to form a JV for the provision of subsea offshore activities in the Asia Pacific region (excluding India and Middle-East). In May 2006 the parties signed the final agreement to form the JV, which began operations on July 1, 2006.

Subsea 7 is one of the world's leading subsea engineering and construction companies, offering all the expertise and assets that make SURF (subsea umbilical, riser, and flowline) field development possible. Subsea 7 has a fleet of dynamically posi-

tioned ships capable of reeled and flexible pipelay, subsea construction, and saturation diving, and a portfolio of pipeline construction yards worldwide.

Technip is a world leader in project management, engineering, and construction for the oil and gas industry. It has integrated capabilities and proven expertise in underwater infrastructures, offshore facilities, and large processing units and plants on land. Technip operates its own fleet of specialized vessels for pipeline installation and subsea construction.

SIXNET,

Clifton Park, NY, has named Hilton Nicholson president and CEO. He succeeds former CEO Steve Schoenberg, who will continue to serve on the company's board of directors. Nicholson has more than 25 years of management experience with networking and telecommunications equipment manufacturers. He was most recently president of ADC's network solutions business unit. Prior to joining ADC, he was senior vice-president of product operations at 3Com and vice-president and general manager of Lucent Technologies' core switching and routing division. Nicholson has also held a variety of technical, marketing, strategic planning, and new business development positions at AT&T. He holds a BSEE from Louisiana Tech University, an MSEE from Clemson University, and an MBA from Duke University.


Nicholson

Founded in 1976, SIXNET is a privately held leader in innovative, open, industrial data products.

IDS,

Kuala Lumpur, has completed the rollout of its DataNet2 web-based oil and gas reporting system among three major clients in Malaysia: Talisman Energy Inc., Carigali Hess Operating Co., and Petrofac. DataNet2 utilizes the technological advances of rich Internet applications and the Web2 environment to bring upstream reporting to a new level.

Meanwhile, IDS has launched its new website at www.idsdatanet.com. The new site includes more extensive information on how the DataNet2 suite of products works in practice and how WITSML is being utilized to increase the ease and speed of use for clients.

IDS provides intuitive, end-to-end, web-delivered, upstream reporting services, with full support around the clock. IDS supports the drilling project life cycle from initial concept to final decommissioning.

Sensornet,

Elstree, UK, has announced Pacific Ex as its downstream process agent for Australia. Pacific Ex will represent Sensornet's digital pipeline monitoring solutions, including pipeline leak detection and pipeline integrity monitoring technology, across Australia. The partnership will further strengthen Sensornet's position in the region as the industry-leading supplier of fiber optic monitoring products and services.

Launched in 1998, Sensornet provides advanced asset monitoring solutions, using real-time distributed temperature and strain measuring systems.

Pacific Automation, the parent company of Pacific Ex, has been an Australian industry specialist since 1969. The company is connected to leading global manufacturers to provide complete solutions for industrial automation and control.

Noble Denton,

London, has doubled the size of its detail design engineering office in Sharjah. The expansion was necessitated by the growth of the company's Sharjah staff to more than 80, accommodating a significant recent expansion of business in the past year. The office is responsible for taking a client's base vessel design concept, customizing it, and ensuring that the project is feasible and built to specification. The office employs a wide rage of engineers, including naval architects and structural, mechanical, piping, electrical, and instrumentation engineers.

With a long established presence in the major oil and gas markets worldwide, Noble Denton provides life-cycle marine and offshore engineering services to the oil and gas and renewable industries.

Seismic Micro-Technology,

Houston, has announced the first sale of the company's KINGDOM 1D Forward Modeling (1DFM) software, to Seismic Ventures Inc., Stafford, Tex. The software interactively models lithologic and reservoir fluid properties to show the effect on seismic traces and tie geology and seismic. This module, fully integrated with KINGDOM, is the first major offering to provide easy-to-use AVO modeling and fluid workshop capabilities in one place. Seismic Venture's use of 1DFM will enable the company to further enhance its modeling services and provide clients a comparison of real and synthetic seismic data to make geological inferences from the data. The resulting model from this analysis can be iteratively changed to accurately match real seismic data.

Seismic Micro-Technology is a market leader for Windows-based geoscientific interpretation systems. Its software enables intuitive interpretation, validation, risk reduction, and data management in one integrated executable

Seismic Ventures, founded in 1994, reduces exploration risk by providing innovative seismic services to the global oil and gas exploration industry. Seismic Ventures offers seismic data processing solutions, AVO, and direct hydrocarbon analysis and modeling, as well as frequency and amplitude-based attributes.

InterMoor do Brasil Ltda.,

Rio de Janeiro, has named Osvaldo Lorca project director. Previously, he worked for InterMoor for 2 years as a senior engineer, serving as project engineer and project manager for the Shell BC-10 and Repsol BM-S-48 projects. He also served as a mooring installation engineer and supervisor. Lorca previously was a senior project engineer with Petrobras, working on MODU mooring design and installation, as well as on various floating production, storage, and offloading vessel installations that used torpedo piles.

InterMoor, an Acteon company, is a leading supplier of mooring technology, providing solutions for rig moves and mooring services, including engineering and design, fabrication, and subsea installation.

Acteon is a group of specialist engineering companies serving the global oil and gas industry.

Imports of crude and products

	Districts 1–4 1–30 2009	Districts 1–4 1–23 2009	District 5 1–30 2009	District 5 1–23 2009	Total US 1–30 2009	Total US 1–23 2009	*2-1 2008
	1,000 b/d						
Total motor gasoline	765	1,097	64	57	829	1,154	1,144
Mo. gas. blending comp.	579	790	6	53	585	843	641
Distillate	171	264	6	0	177	264	371
Residual	524	429	14	95	538	524	295
Jet fuel–kerosine	12	78	4	23	16	101	209
Propane–propylene	205	212	50	61	255	273	261
Other	516	401	169	26	685	427	1,295
Total products	**2,772**	**3,271**	**313**	**315**	**3,085**	**3,586**	**4,216**
Total crude	**8,656**	**8,861**	**1,381**	**847**	**10,037**	**9,708**	**10,514**
Total imports	**11,428**	**12,132**	**1,694**	**1,162**	**13,122**	**13,294**	**14,730**

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

Purvin & Gertz LNG netbacks—Feb. 6, 2009

Receiving terminal	Liquefaction plant: Algeria	Malaysia	Nigeria	Austr. NW Shelf	Qatar	Trinidad
	$/MMbtu					
Barcelona	11.42	9.06	10.27	8.96	9.61	10.20
Everett	4.52	2.75	4.22	2.86	3.21	4.76
Isle of Grain	7.50	5.58	6.94	5.49	6.09	6.96
Lake Charles	2.45	0.91	2.27	1.05	1.21	2.94
Sodegaura	5.72	9.09	5.99	7.41	6.82	5.20
Zeebrugge	8.55	6.28	7.69	6.19	6.82	7.74

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

Crude and product stocks

District	Crude oil	Motor gasoline: Total	Motor gasoline: Blending comp.[1]	Jet fuel, kerosine	Fuel oils: Distillate	Fuel oils: Residual	Propane–propylene
	1,000 bbl						
PADD 1	14,059	61,840	39,475	9,390	53,097	12,143	2,417
PADD 2	84,560	52,507	19,335	7,592	34,820	1,184	13,152
PADD 3	177,817	71,774	39,796	13,052	38,703	15,308	27,691
PADD 4	13,750	6,396	2,050	430	3,192	280	[1]1,428
PADD 5	55,865	27,704	22,698	9,014	12,779	5,654	—
Jan. 30, 2009	**346,051**	**220,221**	**123,354**	**39,478**	**142,591**	**34,569**	**44,688**
Jan. 23, 2009	**338,881**	**219,859**	**121,376**	**38,401**	**143,952**	**36,045**	**47,487**
Feb. 1, 2008[2]	**300,004**	**227,487**	**112,804**	**41,166**	**127,139**	**36,459**	**38,493**

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

Refinery report—Jan. 30, 2009

District	Refinery operations: Gross inputs	Refinery operations: Crude oil inputs	Refinery output: Total motor gasoline	Refinery output: Jet fuel, kerosine	Refinery output: Fuel oils: Distillate	Refinery output: Fuel oils: Residual	Refinery output: Propane–propylene
	1,000 b/d		1,000 b/d				
PADD 1	1,392	1,388	2,230	89	417	98	69
PADD 2	3,152	3,122	2,105	207	996	59	190
PADD 3	6,999	6,836	2,629	699	2,114	285	614
PADD 4	556	550	313	29	180	12	[1]188
PADD 5	2,612	2,445	1,402	439	462	171	—
Jan. 30, 2009	**14,711**	**14,341**	**8,679**	**1,463**	**4,169**	**625**	**1,061**
Jan. 23, 2009	**14,531**	**14,136**	**8,660**	**1,385**	**4,170**	**529**	**1,103**
Feb. 1, 2008[2]	**14,705**	**14,492**	**8,739**	**1,495**	**4,037**	**663**	**1,091**
	17,621 Operable capacity		**83.5% 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.

OGJ crack spread

	*2–6–09	*2–8–08	Change	Change, %
	$/bbl			
SPOT PRICES				
Product value	54.14	97.52	–43.38	–44.5
Brent crude	43.68	91.48	–47.80	–52.3
Crack spread	10.46	6.04	4.42	73.2
FUTURES MARKET PRICES				
One month				
Product value	53.13	99.20	–46.07	–46.4
Light sweet crude	40.50	89.09	–48.59	–54.5
Crack spread	12.62	10.11	2.52	24.9
Six month				
Product value	57.81	102.19	–44.38	–43.4
Light sweet crude	50.99	88.60	–37.61	–42.4
Crack spread	6.82	13.59	–6.77	–49.8

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

OGJ GASOLINE PRICES

	Price ex tax 2-4-09	Pump price* 2-4-09	Pump price 2-6-08
	¢/gal		
(Approx. prices for self-service unleaded gasoline)			
Atlanta	135.8	182.3	308.3
Baltimore	138.2	180.1	295.6
Boston	138.0	179.9	304.9
Buffalo	123.9	184.8	328.1
Miami	131.3	182.9	322.5
Newark	141.2	173.8	291.1
New York	129.0	189.9	304.8
Norfolk	135.4	173.8	289.2
Philadelphia	138.2	188.9	309.8
Pittsburgh	147.1	197.8	306.5
Wash., DC	160.5	198.9	306.3
PAD I avg	138.0	184.8	306.1
Chicago	149.3	213.7	338.7
Cleveland	151.6	198.0	297.7
Des Moines	149.0	189.4	295.5
Detroit	137.3	196.7	302.9
Indianapolis	136.3	195.7	300.3
Kansas City	147.4	183.4	287.4
Louisville	150.5	191.4	301.8
Memphis	141.9	181.7	288.5
Milwaukee	142.4	193.7	298.5
Minn.-St. Paul	143.4	187.4	294.6
Oklahoma City	136.2	171.6	283.2
Omaha	137.6	182.9	298.6
St. Louis	145.1	181.1	278.6
Tulsa	139.7	175.1	284.2
Wichita	136.4	179.8	281.8
PAD II avg	143.0	188.1	295.5
Albuquerque	145.0	181.4	290.9
Birmingham	140.1	179.4	295.4
Dallas-Fort Worth	138.4	176.8	287.8
Houston	133.9	172.3	291.4
Little Rock	143.2	183.4	288.1
New Orleans	141.0	179.4	292.9
San Antonio	139.0	177.4	287.2
PAD III avg	140.1	178.6	290.5
Cheyenne	125.0	157.4	276.9
Denver	133.9	174.3	288.8
Salt Lake City	129.5	172.4	297.3
PAD IV avg	129.5	168.1	287.6
Los Angeles	136.0	203.1	309.6
Phoenix	146.3	183.7	286.5
Portland	165.3	208.7	299.5
San Diego	147.6	214.7	316.4
San Francisco	152.5	219.6	341.2
Seattle	150.8	206.7	310.0
PAD V avg	149.8	206.1	310.5
Week's avg.	**141.2**	**186.8**	**299.0**
Jan. avg.	**131.5**	**177.1**	**304.5**
Dec. avg.	**125.5**	**171.1**	**300.6**
2009 to date	**133.4**	**179.0**	--
2008 to date	**260.0**	**303.6**	--

*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

	1-30-09 ¢/gal		1-30-09 ¢/gal
Spot market product prices			
Motor gasoline (Conventional-regular)		Heating oil No. 2	
New York Harbor	130.95	New York Harbor	143.72
Gulf Coast	128.20	Gulf Coast	138.62
Los Angeles	166.95	Gas oil	
Amsterdam-Rotterdam-Antwerp (ARA)	119.68	ARA	142.17
Singapore	141.45	Singapore	130.88
Motor gasoline (Reformulated-regular)		Residual fuel oil	
New York Harbor	126.20	New York Harbor	91.74
Gulf Coast	127.45	Gulf Coast	112.21
Los Angeles	160.95	Los Angeles	114.96
		ARA	91.11
		Singapore	99.97

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

BAKER HUGHES RIG COUNT

	2-6-09	2-8-08
Alabama	2	3
Alaska	9	7
Arkansas	50	41
California	27	33
Land	26	32
Offshore	1	1
Colorado	73	114
Florida	1	0
Illinois	0	0
Indiana	3	1
Kansas	16	10
Kentucky	11	8
Louisiana	171	140
N. Land	89	45
S. Inland waters	7	18
S. Land	21	29
Offshore	54	48
Maryland	0	0
Michigan	0	0
Mississippi	12	11
Montana	4	11
Nebraska	0	0
New Mexico	53	69
New York	2	6
North Dakota	66	53
Ohio	8	11
Oklahoma	135	190
Pennsylvania	22	18
South Dakota	0	1
Texas	612	872
Offshore	6	7
Inland waters	0	4
Dist. 1	8	21
Dist. 2	33	32
Dist. 3	45	68
Dist. 4	55	93
Dist. 5	134	182
Dist. 6	102	124
Dist. 7B	16	33
Dist. 7C	41	45
Dist. 8	74	126
Dist. 8A	19	16
Dist. 9	32	45
Dist. 10	47	76
Utah	23	43
West Virginia	27	28
Wyoming	56	72
Others—NV-6; TN-4; VA-4; WA-2	16	13
Total US	**1,399**	**1,755**
Total Canada	**435**	**598**
Grand total	**1,834**	**2,353**
US Oil rigs	283	324
US Gas rigs	1,104	1,424
Total US offshore	62	56
Total US cum. avg. YTD	**1,623**	**1,753**

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

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

SMITH RIG COUNT

Proposed depth, ft	Rig count	2-6-09 Percent footage*	Rig count	2-8-08 Percent footage*
0-2,500	57	—	68	5.8
2,501-5,000	69	50.7	102	50.9
5,001-7,500	187	24.0	223	23.7
7,501-10,000	295	3.0	439	3.8
10,001-12,500	280	2.1	443	3.8
12,501-15,000	275	0.3	299	0.3
15,001-17,500	151	—	93	—
17,501-20,000	69	—	76	—
20,001-over	40	—	34	—
Total	**1,423**	**6.7**	**1,777**	**8.1**
INLAND	18		36	
LAND	1,421		1,676	
OFFSHORE	52		49	

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

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

OGJ PRODUCTION REPORT

	[1]2-6-09	[2]2-8-08
	1,000 b/d	
(Crude oil and lease condensate)		
Alabama	22	21
Alaska	729	709
California	664	654
Colorado	65	66
Florida	7	6
Illinois	28	25
Kansas	105	108
Louisiana	1,230	1,265
Michigan	16	15
Mississippi	62	58
Montana	95	87
New Mexico	167	162
North Dakota	178	136
Oklahoma	177	171
Texas	1,350	1,326
Utah	54	54
Wyoming	151	147
All others	68	70
Total	**5,168**	**5,080**

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

US CRUDE PRICES

	2-6-09 $/bbl*
Alaska-North Slope 27°	33.47
South Louisiana Sweet	40.00
California-Kern River 13°	28.35
Lost Hills 30°	37.20
Wyoming Sweet	25.67
East Texas Sweet	36.25
West Texas Sour 34°	29.00
West Texas Intermediate	36.75
Oklahoma Sweet	36.75
Texas Upper Gulf Coast	30.75
Michigan Sour	29.75
Kansas Common	35.50
North Dakota Sweet	28.25

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

WORLD CRUDE PRICES

$/bbl[1]	1-30-09
United Kingdom-Brent 38°	43.80
Russia-Urals 32°	42.90
Saudi Light 34°	40.09
Dubai Fateh 32°	42.46
Algeria Saharan 44°	45.02
Nigeria-Bonny Light 37°	47.44
Indonesia-Minas 34°	44.58
Venezuela-Tia Juana Light 31°	41.46
Mexico-Isthmus 33°	41.35
OPEC basket	43.29
Total OPEC[2]	41.86
Total non-OPEC[2]	42.35
Total world[2]	42.07
US imports[3]	40.60

[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]

	1-30-09	1-23-09	1-30-08	Change, %
	bcf			
Producing region	758	808	684	**10.8**
Consuming region east	1,087	1,212	1,172	**–7.3**
Consuming region west	334	354	263	**27.0**
Total US	**2,179**	**2,374**	**2,119**	**2.8**
	Nov. 08	**Nov. 07**	**Change, %**	
Total US[2]	**3,346**	**3,442**	**–2.8**	

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

Statistics

International rig count

Region	Jan. 2009 Land	Jan. 2009 Off.	Jan. 2009 Total	Jan. 08 Total
WESTERN HEMISPHERE				
Argentina	66	1	67	82
Bolivia	2	0	2	0
Brazil	30	29	59	45
Canada	375	2	377	494
Chile	3	0	3	1
Colombia	34	0	34	37
Ecuador	10	0	10	7
Mexico	94	31	125	97
Peru	2	2	4	8
Trinidad	0	2	2	5
United States	1487	66	1553	1749
Venezuela	63	11	74	81
Other	1	0	1	2
Subtotal	**2,167**	**144**	**2,312**	**2,608**
ASIA-PACIFIC				
Australia	14	8	22	25
Brunei	1	3	4	4
China-offshore	0	23	23	21
India	54	26	80	85
Indonesia	51	14	65	64
Japan	1	0	1	2
Malaysia	0	12	12	12
Myanmar	2	1	3	8
New Zealand	4	1	5	6
Papua New Guinea	3	0	3	3
Philippines	3	0	3	1
Taiwan	0	0	0	0
Thailand	3	7	10	12
Vietnam	0	7	7	6
Other	0	0	0	3
Subtotal	**136**	**102**	**238**	**252**
AFRICA				
Algeria	24	0	24	27
Angola	0	5	5	5
Congo	2	1	3	3
Gabon	1	0	1	1
Kenya	0	0	0	0
Libya	15	1	16	14
Nigeria	2	3	5	11
South Africa	0	0	0	0
Tunisia	2	1	3	4
Other	0	1	1	3
Subtotal	**46**	**12**	**58**	**68**
MIDDLE EAST				
Abu Dhabi	8	4	12	12
Dubai	2	0	2	1
Egypt	42	12	54	52
Iran	0	0	0	0
Iraq	0	0	0	0
Jordan	2	0	2	0
Kuwait	12	0	12	12
Oman	52	0	52	55
Pakistan	22	0	22	20
Qatar	1	8	9	11
Saudi Arabia	63	11	74	77
Sudan	0	0	0	0
Syria	22	0	22	19
Yemen	12	0	12	15
Other	1	0	1	1
Subtotal	**239**	**35**	**274**	**275**
EUROPE				
Croatia	0	0	0	1
Denmark	0	3	3	2
France	1	0	1	1
Germany	8	0	8	7
Hungary	3	0	3	2
Italy	4	0	4	6
Netherlands	0	2	2	2
Norway	0	25	25	17
Poland	1	0	1	2
Romania	12	2	14	20
Turkey	5	0	5	5
UK	1	22	23	20
Other	4	0	4	8
Subtotal	**39**	**54**	**93**	**93**
Total	**2,627**	**347**	**2,975**	**3,296**

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	2.46
Caribbean	Houston	Resid.	380	113	1.45
Caribbean	Houston	Resid.	500	98	1.26
N. Europe	New York	Dist.	200	144	2.66
N. Europe	Houston	Crude	400	106	2.85
W. Africa	Houston	Crude	910	89	2.75
Persian Gulf	Houston	Crude	1,900	47	2.69
W. Africa	N. Europe	Crude	910	87	1.98
Persian Gulf	N. Europe	Crude	1,900	66	2.72
Persian Gulf	Japan	Crude	1,750	56	1.89

*Jan. 2009 average.
Source: Drewry Shipping Consultants Ltd. Data available in OGJ Online Research Center.

Waterborne Energy Inc. US LNG imports

Country	Jan. 2009	Dec. 2008	Jan. 2008	Change from a year ago, %
	MMcf			
Algeria	0	0	0	—
Egypt	6,060	5,820	2,960	104.7
Equatorial Guinea	0	0	0	—
Nigeria	0	0	0	—
Norway	2,980	2,980	0	—
Qatar	0	0	0	—
Trinidad and Tobago	25,400	22,590	22,570	12.5
Total	**34,440**	**31,390**	**25,530**	**34.9**

Source: Waterborne Energy Inc.
Data available in OGJ Online Research Center.

Propane prices

	Dec. 2008	Jan. 2009	Dec. 2007	Jan. 2008
	¢/gal			
Mont Belvieu	61.03	72.71	152.95	150.58
Conway	70.62	80.11	151.69	146.37
Northwest Europe	69.55	83.62	175.08	171.87

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					
Jan. 2009						
Product revenues	55.02	52.46	54.82	60.15	54.16	52.34
Feedstock costs	–44.64	–45.74	–42.49	–35.36	–43.50	–45.10
Gross margin	10.38	6.72	12.33	24.79	10.66	7.24
Fixed costs	–2.12	–2.45	–2.38	–2.78	–2.38	–1.85
Variable costs	–1.59	–1.15	–1.43	–2.42	–1.77	–0.71
Cash operating margin	**6.67**	**3.12**	**8.52**	**19.59**	**6.51**	**4.68**
Dec. 2008	2.94	–0.30	5.45	11.60	4.62	3.77
YTD avg.	6.67	3.12	8.52	19.59	6.51	4.68
2008 avg.	9.09	3.05	11.53	13.28	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

Source: Muse, Stancil & Co. See OGJ, Jan. 15, 2001, p. 46
Data available in OGJ Online Research Center.

Muse, Stancil & Co. gasoline marketing margins

Dec. 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**
Nov. 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		
Jan. 2009			
Product revenues	38.32	59.21	67.50
Feedstock costs	–15.18	–41.57	–59.39
Gross margin	23.14	17.64	8.11
Fixed costs	–5.38	–6.36	–7.19
Variable costs	–4.25	–4.99	–6.65
Cash operating margin	**13.51**	**6.29**	**–5.73**
Dec. 2008	10.89	10.78	7.81
YTD avg.	13.51	6.29	–5.73
2008 avg.	20.99	22.72	–6.11
2007 avg.	14.41	14.14	–7.42
2006 avg.	19.53	22.44	1.34

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

Jan. 2009	Gulf Coast	Mid-continent
	$/Mcf	
Gross revenue		
Gas	5.06	3.56
Liquids	0.71	2.00
Gas purchase cost	5.64	4.78
Operating costs	0.07	0.15
Cash operating margin	**0.07**	**0.63**
Dec. 2009	-0.10	-0.09
YTD avg.	0.07	0.63
2008 avg.	0.45	1.61
2007 avg.	0.44	1.47
2006 avg.	0.26	0.97
Breakeven producer payment, % of liquids	86%	66%

Source: Muse, Stancil & Co. See OGJ, May 21, 2001, p. 54.
Data available in OGJ Online Research Center.

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Economy in peril no reason to stoop to politics of fear

The Editor's Perspective

by Bob Tippee, Editor

The scariest part of the economic crisis is the US government's wild resort to the politics of fear.

"A failure to act, and act now, will turn crisis into a catastrophe and guarantee a longer recession, a less robust recovery, and a more uncertain future," declared President Barack Obama on Feb. 4. "Millions more jobs will be lost. More businesses will be shuttered. More dreams will be deferred."

He was, of course, pitching his economic stimulus package, details of which he left to the House of Representatives to work out.

His message: Congress must pass something, anything, because something, anything, is better than nothing.

Is that true?

The House obliged Obama by passing an $825 billion agglomeration of spending measures, tax breaks, and political favors, the economic misdirection of which is manifest in a "buy America" initiative that made trading partners discuss retaliation.

When the Senate began work on its version of "stimulus," the price tag jumped to $900 billion. Whether the Senate would follow the House lead and opportunistically incorporate health-care reform and other items of Democratic aspiration was, at this writing, unclear.

The priority seems to be immediate commitment to mammoth, miscellaneous spending, to be elaborated on web sites dedicated to "transparency" only after the fiscal jeopardy has been rendered inescapable. This is insane. With the government acting this way, can there be any question why businesses are expecting the worst and shedding workers?

Of course the economy needs stimulus. Of course the government has a role.

Yet it's painfully clear that the government has no clue about what that role should be—other than to try to frighten Americans into believing that it must do something, anything, right now and not a day later.

It's too late to raise the question, but could inaction be that much worse than a frantic disgorgement of borrowed billions, the stimulative effects of which are questionable?

It's definitely not too late for Americans to tell their leaders to quit trying to scare them into support for fiscal recklessness.

Economic peril warrants urgency. But panic makes serious problems, including sloppy governance, worse.

(Online Feb. 6, 2009; author's e-mail: bobt@ogjonline.com)

Market Journal

by Sam Fletcher, Senior Writer

Industry in survival mode

A recent survey of 60 producers and service company executives confirmed the upstream oil and gas industry is in a survival mode, said analysts in the Houston office of Raymond James & Associates Inc.

Those executives exhibited "a profound sense of near-term caution with [exploration and production] price expectations well below current strip pricing." They said, "The survey suggested that industry insiders are expecting 2009 oil and gas prices to average roughly 20% lower than Wall Street expectations—the first year executives have been more bearish relative to the Street since we have started this survey. Already, budgets and costs are coming down, and both are likely to continue declining through 2009. Producers are now far more focused on rates of return, especially in the face of an oversupplied gas market and potential forced production shut-ins this summer." Raymond James analysts noted, "While the mergers and acquisitions market has been hamstrung by the credit crisis, many of the larger E&P companies with healthy balance sheets and free cash flow potential will have opportunities to rake in attractive assets at 'fire sale' prices."

Price estimates among the executives averaged $4.84/Mcf for natural gas in 2009, 25% below the Wall Street consensus; and $48.28/bbl for oil, 17% below consensus. Raymond James' current forecasts are $5/Mcf and $60/bbl; however, analysts said, "Our confidence level in a global economic rebound in the back half of this year remains low."

Budget cuts

Falling commodity prices triggered major budget cuts in the fourth quarter. Drilling budgets announced by November were tracking more than 20% below 2008 levels. "The realization that additional rounds of capex cuts were coming (more rigs needed to be laid down) became even more apparent as both the oil and gas strip prices continued to drift lower—now nearly 20% below November levels," the analysts said. Raymond James officials reported, "Our updated 2009 E&P capital spending survey—now with over 60% of our E&P coverage universe having announced their 2009 budgets, comprising about 75% of total spending—points to an aggregate cutback in the range of 35-40%. For our coverage universe as a whole, we are currently projecting a 33% spending drop for 2009. A handful of companies are ramping down spending by as much as 70%." However, they said, "Even assuming these large cuts, total spending would still exceed what it was in 2006, when both oil and gas prices were considerably higher."

They said, "Unfortunately, we believe that spending plans must fall even further." Anecdotal evidence from conversations with industry executives suggested drilling costs will likely fall 30-40% this year with lower pipe and stimulation prices leading the largest share of the cost reductions. "If that type of well cost savings actually plays out, then a 35% reduction in E&P spending would result in only a modest reduction in drilling activity," the analysts said. Meanwhile, oil and gas executives said their moves to conserve capital are exacerbated by the nearly frozen capital markets. "With less access to financing, at least at a reasonable cost, companies are instead looking to shore up their balance sheets or simply return capital to shareholders through share repurchases (especially at these depressed levels) or dividends," analysts said. "This financial flexibility also creates the opportunity for a few of the free cash flow-generating independents, along with the even more cash-rich integrated majors, to rake in assets at deep discounts."

Several executives indicated that they hope within 18 months to be positioned to act as "buyer of last resort" of increasingly more distressed sales of assets.

Analysts said, "With budget cuts for the most part already in place, the 'threshold of pain' discussion now revolves around the following question: At what gas price level do companies shut in production? While it was difficult to draw management teams into giving an exact figure, the overarching theme is that the majority of producers anticipate their competitors will have to shut in first."

They said, "Reading between the lines, it was fairly apparent that gas prices would need to fall to $3/Mcf (or even $2) at some point this summer before the operators that we spoke with would be willing to shut in production. Furthermore, active hedging programs may allow some of the larger gas producers to keep rigs running long after spot pricing would have made a play uneconomic. A final theme that emerged was that a number of E&P companies' budgets will be determined by the drilling needed to hold leases acquired during the resource play land grabs over the past few years."

(Online Feb. 9, 2009; author's e-mail: samf@ogjonline.com)

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