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Trends In Health, Safety, and Environment

Recovery factors leave EOR plenty of room for growth
Shell develops spill-response program for Beaufort work
Corporate culture key to safety performance
Method improves pipeline-spread silt containment

OIL&GAS JOURNAL®

Nov. 12, 2007
Volume 105.42

TRENDS IN HEALTH, SAFETY, AND ENVIRONMENT

REGULAR FEATURES

COVER

Safe and environmentally benign disposal of produced water is a major concern for Petroleum Development Oman (PDO). Started up in 1999, its reed-bed pilot near Nimr field in Oman treats about 20,000 bw/d and has demonstrated that reeds can reduce inorganic and organic contaminant concentration. Planted with a common reed known to tolerate a wide range of water conditions, the beds have reduced average hydrocarbon concentration by an average 96%. OGJ's exclusive special report on health, safety, and environmental issues in oil and natural gas operations begins on p. 18 and includes discussions of Shell's spill-response effort in its Beaufort Sea work, the first satellite-based estimates of flaring from industry operations, and a method to improve containment of pipeline-spread silt. Cover photo by Guntis Moritis. In the photo above, a large, over-the-side, five-brush system, developed in Finland, skims 1,290 bbl/hr from the surface (photo from Lamor Corp. AB).

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General Interest

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Drilling & Production

Processing

Transportation

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General Interest — Quick Takes

Kuwaiti oil minister quits after 8-day tenure

Bader Mishari al-Humaidhi, Kuwait's oil minister, has resigned after only 8 days in office because opposition members of parliament continuously attacked his suitability for the role.

Kuwait's state news agency said the cabinet accepted his resignation. His departure is not expected to affect oil policy, which is set by a supreme council. Humaidhi was given the job following a cabinet reshuffle, leaving his previous role as finance minister for the past 2 years.

Several politicians strongly criticized Humaidhi's appointment saying they felt he was escaping scrutiny in parliament over allegations of financial and administrative irregularities.

Humaidhi's predecessor was Sheikh Ali al-Jarrah al-Sabah, who left the post in June after carrying out the duties for a year. He had little support, and opponents were about to push forward a no-confidence vote.

Kuwait wants to establish 4 million b/d of oil capacity by 2020, but this goal is being thwarted by continuous changes in leadership at the oil ministry and domestic political struggles. Presently, the country produces 2.4 million b/d of oil.

Court backs Anadarko in deepwater lease case

A federal judge in Louisiana has supported Anadarko Petroleum Corp.'s claim that the US Minerals Management Service lacked authority to collect royalty on deepwater leases issued in 1996-2000.

The leases were issued under the Deep Water Royalty Relief Act of 1995, which provides an exclusion from royalty, subject to various limits, for production from leases with specified water depths.

The law made royalty relief automatic for leases issued during 1996-2000 and gave MMS more latitude to change the program for leases issued after 2000.

To ensure collection of federal royalty during periods of elevated oil and gas prices, MMS imposed price thresholds, above which royalty relief expires, for deepwater Outer Continental Shelf leases, including those issued in 1996, 1997, and 2000.

In January 2006, the Department of the Interior, of which MMS is part, ordered Kerr-McGee Oil & Gas Corp., now part of Anadarko, to pay royalty and interest for eight deepwater leases issued in those 3 years.

Kerr-McGee challenged the agency's authority to suspend royalty relief because of high oil and gas prices, citing statutory language about the years prior to 2000.

The US District Court for the Western District of Louisiana, Lake Charles Division, supported the Kerr-McGee-Anadarko claim, saying Interior "exceeded its congressional authority" by requiring Kerr-McGee to pay royalty based on price threshold in the years under dispute.

Deepwater leases issued during 1998 and 1999 contained no price thresholds. The omissions have been controversial.

According to press reports, the MMS might appeal the Louisiana ruling, which throws into question royalties collected on all deepwater leases with price thresholds in the 3 years covered by the Anadarko case.

Diesel spill in Veracruz sparks threat of Pemex ban

Mexico's Petroleos Mexicanos (Pemex) has been warned it may no longer be allowed to operate in the state of Veracruz following criticism for its poor response to recent accidents and oil spills.

Veracruz State Governor Fidel Herrera Beltran launched the criticism, saying Pemex's various accidents this year have caused losses in the state estimated at 8 billion pesos ($750 million).

His remarks followed a pipeline break on Oct. 30 that sent 420,000 gal of diesel fuel into three rivers in the Gulf Coast state, threatening the supply of drinking water for some 600,000 people in the region.

The state's deputy secretary for civil defense, Ranulfo Marquez, said water wells and springs had been polluted by the fuel that spilled late last week into the Coatzacoalcos River and its tributaries, the Jaltepec and the Chiquito.

The rupture occurred Oct. 25 on a subterranean pipeline, but diesel rose to the surface of a creek feeding into the Jaltepec River and from there flowed into the Chiquito and the Coatzacoalcos.

Marquez said some 1,200 people were working to clean up the fuel which, he said, formed a 200 km strip down the three affected rivers. He also said some of the barriers deployed to contain the fuel broke and allowed at least 21,000 gal of diesel to flow into the gulf.

According to a statement by Mexico's environmental enforcement office, Profepa, the spill was brought under control when Pemex stopped pumping fuel through the pipeline 30 minutes after the accident occurred.

Pemex later issued a statement saying it had recovered 80% of the fuel spilled, that the Gulf of Mexico was not contaminated, and that the fuel slick along the rivers was about 12 km long.

It said the damaged pipeline had been repaired and that it expected to complete work on the environmental damage by Nov. 2.

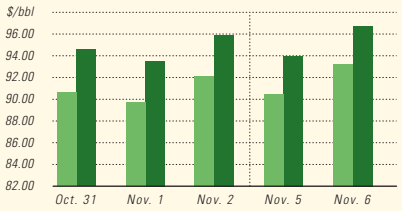
Range Fuels to build cellulosic ethanol plant

Range Fuels Inc. broke ground on what the Broomfield, Colo., company is calling the nation's first commercial cellulosic ethanol plant, which is being constructed in Treutlen County, Ga., near the town of Soperton.

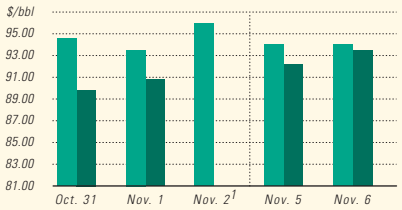
Range Fuels will use wood and wood waste as its feedstock. First phase construction—a 20 million gal/year plant—is sched-

Industry Scoreboard

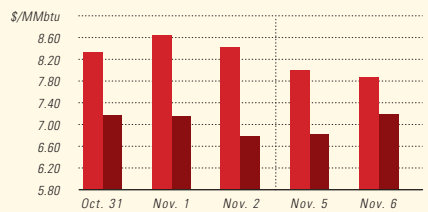
IPE BRENT / NYMEX LIGHT SWEET CRUDE



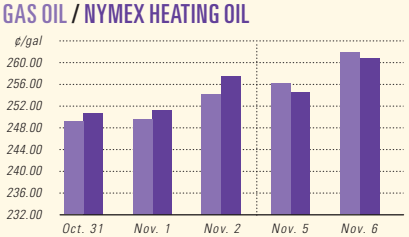
WTI CUSHING / BRENT SPOT



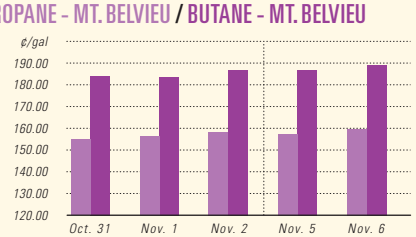
NYMEX NATURAL GAS / SPOT GAS - HENRY HUB



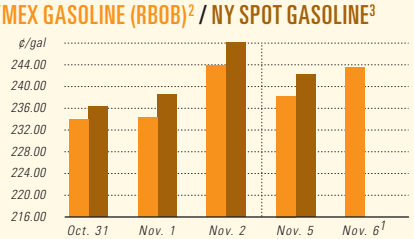
IPE GAS OIL / NYMEX HEATING OIL



PROPANE - MT. BELVIEU / BUTANE - MT. BELVIEU



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



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

US INDUSTRY SCOREBOARD — 11/12

Latest week 10/26	4 wk. average	4 wk. avg. year ago[1]	Change, %	YTD average[1]	YTD avg. year ago[1]	Change, %
Demand, 1,000 b/d						
Motor gasoline	9,295	9,264	0.3	9,307	9,244	0.7
Distillate	4,266	4,296	–0.7	4,214	4,155	1.4
Jet fuel	1,562	1,605	–2.7	1,618	1,636	–1.1
Residual	758	604	25.5	758	702	8.0
Other products	4,841	4,978	–2.8	4,817	4,872	–1.1
TOTAL DEMAND	20,722	20,747	–0.1	20,714	20,676	0.2
Supply, 1,000 b/d						
Crude production	5,099	5,099	—	5,154	5,095	1.2
NGL production[2]	2,489	2,342	6.3	2,382	2,196	8.5
Crude imports	9,690	10,171	–4.7	9,992	10,190	–1.9
Product imports	3,613	3,272	10.4	3,522	3,688	–4.5
Other supply[3]	854	995	–14.2	992	1,082	–8.3
TOTAL SUPPLY	21,745	21,879	–0.6	22,042	22,251	–0.9
Refining, 1,000 b/d						
Crude runs to stills	15,082	15,481	–2.6	15,246	15,250	—
Input to crude stills	15,259	15,375	–0.8	15,485	15,610	–0.8
% utilization	87.5	88.4	—	88.8	89.8	—

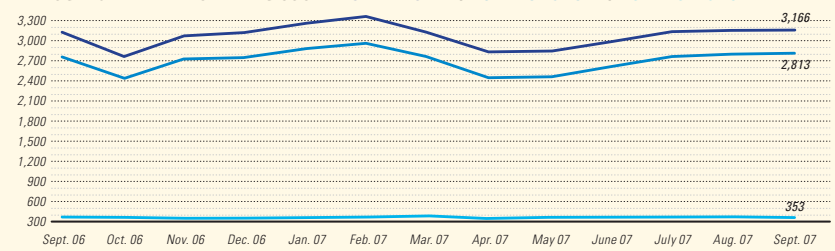
Latest week 10/26	Latest week	Previous week[1]	Change	Same week year ago[1]	Change	Change, %
Stocks, 1,000 bbl						
Crude oil	312,683	316,577	–3,894	334,255	–21,572	–6.5
Motor gasoline	195,132	193,837	1,295	204,617	–9,485	–4.6
Distillate	135,279	134,471	808	141,258	–5,979	–4.2
Jet fuel-kerosine	41,543	41,928	–385	42,143	–600	–1.4
Residual	36,958	36,739	219	42,398	–5,440	–12.8
Stock cover (days)[4]			Change, %		Change, %	
Crude	20.8	21.0	–1.0	22.2	–6.3	
Motor gasoline	21.0	21.3	—	21.8	–3.7	
Distillate	31.7	31.3	1.3	31.9	–0.6	
Propane	55.7	54.9	1.5	63.4	–12.1	

Futures prices[5] 11/2			Change		Change	%
Light sweet crude, $/bbl	93.58	88.67	4.91	58.62	34.96	59.6
Natural gas, $/MMbtu	8.14	7.01	1.13	7.67	0.46	6.0

[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.

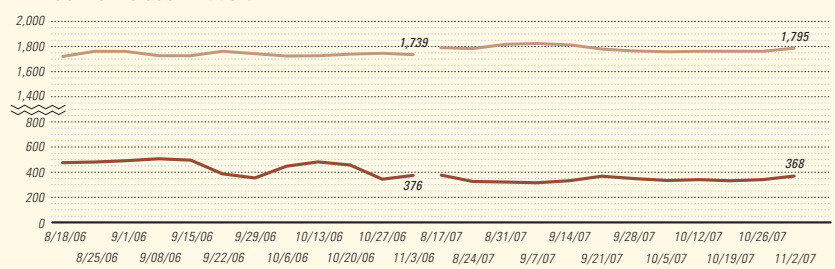
Sources: Energy Information Administration, Wall Street Journal

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

uled for completion in 2008. Plans call for the plant to produce more than 100 million gal/year in about 2011.

US Sec. of Energy Samuel W. Bodman and Georgia Gov. Sonny Perdue attended the groundbreaking. Range Fuels was one of six companies selected by the US Department of Energy for financial support in building a commercial cellulosic ethanol plant.

As part of its $76 million technology investment agreement with DOE, Range Fuels will receive $50 million based upon first-phase construction. The other $26 million will be provided for construction in the project's next phase.

Range Fuels uses a two-step, thermochemical conversion process to turn wood chips, municipal waste, paper pulp, olive pits, and other waste materials into ethanol.

The company is privately held and funded by Khosla Ventures LLC.

Mitch Mandich, Range Fuels chief executive officer, said the company's process for producing cellulosic ethanol will use 25% of the average amount of water required by corn-based ethanol plants.

Grain-based ethanol is produced through fermentation of sugars, distillation, and drying. Corn is low in sugar, but high in carbohydrate cellulose that must be turned into fermentable sugar (OGJ, Aug. 6, 2007, p. 20).

Researchers are working on methods to more efficiently convert cellulose to sugar. Many chemists see biobutanol as a potential game changer for biofuels because of its potential to integrate better than ethanol into the refining and gasoline distribution infrastructure. ✦

Exploration & Development — *Quick Takes*

Devon's Paktoa a giant Beaufort oil find

Devon Canada Corp. discovered 240 million bbl of recoverable oil at the Paktoa C-60 wildcat while exploring for natural gas in the Canadian Beaufort Sea in 2006, the company has revealed.

The well, the Canadian Beaufort's first wildcat in 20 years, won the company a 37,000-acre Significant Discovery License designation from the National Energy Board.

Paktoa C-60 is in EL 411 in 40 ft of water west of Beluga Bay (see map, OGJ, Nov. 3, 2003, p. 42). Devon's interest is 100%.

Devon, with more than 1.3 million net acres, is the largest exploratory leaseholder in the Beaufort Sea-Mackenzie Delta. Affiliates of ExxonMobil Corp. made a work bid earlier this year of $585 million for 507,000-acre EL 446 just north of Paktoa, and Chevron Canada Ltd. bid $1 million in work commitments for 267,000-acre EL 448 just west of Paktoa (OGJ Online, July 19, 2007).

Aurelian discovers gas in Romanian well

Aurelian Oil & Gas PLC, London, has discovered gas in thin Sarmatian (Middle to Upper Miocene) sands in its Boistea 1 well on the Cuejdiu Block in Romania.

Boistea reached a TD of 2,295 m on the eastern part of the block and encountered the gas in an interval of 1,700-1,800 m.

"After electric logging and a series of pressure measurements, it has been decided to complete the well to allow a long term flow test of the interval 1,783-85 m," Aurelian said.

This was the first well drilled on the block.

Aurelian plans to drill deeper targets on the western part of the block following a seismic survey to be shot in 2008.

Partners in the Cuejdiu joint venture are Aurelian 40%, SNGN Romgaz SA 37.5%, Europa Oil & Gas SRL 17.5%, and Millennium International Resources Corp., wholly owned by Aurelian, 5%.

Pacific tests gas in Lower Magdalena basin

The La Creciente-3 well in the Lower Magdalena basin tested gas at extrapolated rates as high as 25 MMcfd and indicated a production potential similar to that measured at the La Creciente-1 discovery well, said Pacific Stratus Energy Ltd., Toronto.

The LCA-3 well, deviated southwest from the discovery well pad on Prospect A of the La Creciente Block, went to TD 12,950 ft MD (10,977 ft TVD subsea). The maximum rate was obtained on a $^{32}/_{64}$-in. choke with 4,453 psi wellhead flowing pressure.

The company cemented production liner and plans to run a vertical seismic profile log and a second drillstem test. It will also compare production results between the two wells.

The Cienaga de Oro reservoir consists of 630 ft (true thickness) of well-sorted coarse to fine-grain sandstones, of which the upper zone consists of 257 ft of gas-bearing sandstones. The interval has 219 ft of net reservoir sandstones, 15.5% average porosity, and 27.3% average water saturation.

The rig moved to Prospect D to spud the LCD-1 well 5.5 km north of the discovery well on Oct. 26. ✦

Drilling & Production — *Quick Takes*

Pemex resumes production as gulf storms end

Mexico's state-owned Petroleos Mexicanos said it has restored all but about 300,000 bbl of oil production halted last weekend when storms hit the Gulf of Mexico.

Pemex had suspended as much as 1.1 million b/d of output on Oct. 30 after oil completely filled storage tanks at three ports—Dos Bocas, Cayo Arcas, and Pajaritos—where inclement weather prevented ships from loading.

Dos Bocas and Cayo Arcas have since reopened, allowing ships to begin loading oil, and more will move as weather clears, said Pemex director Jesus Reyes Heroles.

Meanwhile, Pemex expected to reopen wells Oct. 31 and resume normal production of about 3.1 million b/d, including 1.7 million b/d for export, according to Pemex E&P Director Carlos Morales.

A week of heavy rains caused widespread flooding in southeastern Mexico, killing at least one person and forcing tens of thousands to flee rising waters in Tabasco and Chiapas states.

The flooding was thought to have caused a leak in a 10-in. natu-

ral gas pipeline after soil support was washed away, according to Pemex officials. Tabasco officials said the pipeline had exploded.

Rowan adding nine super class jack ups to fleet

Under a contract worth $700 million, Rowan Cos. Inc. has ordered from Keppel AmFELS Inc. four Super 116E class jack up rigs having the ability to drill to 35,000 ft. Deliveries will begin in the second quarter of 2010 in 4 month intervals.

In addition, Rowan expects to deliver three 240-C rigs, currently under construction, in the third quarters of 2008 and 2009 and will build two additional 240-C class jack ups at its own Vicksburg, Miss., shipyard for delivery in the third quarters of 2010 and 2011 for $400 million. These rigs will be able to drill to 35,000 ft.

"The 240-C was designed to be a significant upgrade of the original 116-C class, which has been the 'workhorse' of the global drilling industry since its introduction in the late 1970s," a Rowan spokesperson said.

A company spokesman told OGJ that it would have 30 rigs in total for its clients by 2011. He said Keppel received the contract because Rowan does not have sufficient capacity in its own shipyards to construct the rigs. "We have started conversations about getting contracts for them and we try to line these up 6 months to 1 year before delivery of the rigs," he added.

Danny McNease, chairman and chief executive of Rowan, said: "Each of these new rigs will employ the latest technology to be able to efficiently drill high-pressure, high-temperature, and extended-reach wells in just about every prominent jack up market throughout the world."

ONGC signs with Ocean Rig for deepwater rigs

Oil & Natural Gas Corp. (ONGC) signed a memorandum of understanding with Ocean Rig ASA to contract two fifth-generation semisubmersible deepwater rigs for 5 years each for $2.07 billion total.

The Leiv Eiriksson was completed in 2001 while the Eirik Raude was completed in 2002, both built to the Bingo 9000 design. The Eirik Raude is under contract with ExxonMobil Corp. in Canada and would be available around August 2008. The Leiv Eriksson is under contract with Royal Dutch Shell PLC in the North Sea and would become available in October 2009.

"Except Ocean Rig, none of the other bidders were in a position to supply rigs within the stipulated time frame," said a senior ONGC official. "In fact, we are anxious to get all the formalities of the signing completed as soon as possible, in the face of the continuing shortage of deepwater drilling rigs." ✦

Processing — *Quick Takes*

Marathon to upgrade, expand Detroit refinery

Marathon Oil Corp. has approved a projected $1.9 billion expansion and heavy oil upgrade project at its 100,000 b/cd refinery in Detroit.

The project will increase the refinery's heavy oil processing capacity, including Canadian bitumen blends, by about 80,000 b/d and will increase its total refining capacity by about 15%, to 115,000 b/d.

When completed in late 2010, the project will add more than 400,000 gpd of clean transportation fuels to the market. Construction is expected to begin in late 2007 or early 2008, subject to regulatory approvals.

The Detroit heavy oil upgrade project will include a 28,000 b/d delayed coker, a 280 tonne/day sulfur recovery complex, and a 33,000 b/d distillate hydrotreater.

In addition, an associated pipeline will be built. Construction on the 29-mile pipeline segment is expected to begin in mid-2009 with completion in 2010.

Marathon completed an expansion at the Detroit refinery in late 2005 that increased crude capacity to its current capacity from 74,000 b/d (OGJ, Online, Sept. 30, 2005).

Gas plants to aid Utah Natural Buttes growth

Anadarko Petroleum Corp.'s midstream unit plans to start up around Dec. 1 the 250 MMcfd Chapita gas processing plant west of Bonanza in giant Natural Buttes gas field in Uintah County in northeastern Utah.

A lateral under construction will transport liquids that the new refrigeration plant extracts from the field's gas to the Mapco natural gas liquids pipeline in western Colorado for shipment to Mont Belvieu, Tex., for fractionation.

Anadarko currently delivers 300 MMcfd from the Uinta basin into various dew point control facilities and plants operated by others. Most of this will be diverted to Chapita when the new plant starts up.

A second 250 MMcfd plant has been ordered. It is in early stages of fabrication and scheduled for delivery in mid-2008 and start-up in first quarter 2009. A third train with a capacity of 250 MMcfd or larger is being considered. The second and third trains will be cryogenic units.

Processed gas from the Chapita plant will move through the 400 MMcfd Kanda lateral, operated by El Paso Western Pipelines and owned by Wyoming Interstate Co., to the Colorado Interstate Gas mainline for transport out of the Rockies, Anadarko said.

Anadarko also is optimizing its Natural Buttes gas gathering system, which consists of 750 miles of pipe with 40 compressors totaling 47,000 hp at 23 sites. More than 1,400 wells are connected, and more than 200/year are being hooked up.

Anadarko's 2007 drilling program alone called for the drilling of 280 development wells in Natural Buttes field, where the company holds 225,000 net acres, has eight operated and three nonoperated rigs running, and has identified nearly 5,000 drillsites. Drilling exploits Cretaceous Mesaverde zones and explores deeper potential.

The Natural Buttes gathering system handled 280 MMcfd of Anadarko gas and 20 MMcfd of third party gas in 2006, and its expansion will allow Anadarko Midstream to aggressively pursue adding third party volumes.

CNPC plans to build refinery in Costa Rica

China National Petroleum Corp. plans to build a refinery in Costa Rica to supply Central American markets, according to Chinese state media.

The official Shanghai Securities News, citing CNPC sources, said the agreement was concluded during a visit of Costa Rica President Oscar Arias Sanchez to China.

Before his trip, Arias told Costa Rica's La Nacion newspaper that one of the most important goals of his visit would be to reach an agreement to a refinery.

Arias said the refinery proposal would allow Costa Rica to meet its own fuel needs and to export products.

The Shanghai Securities News report said the proposed refinery will process heavy oil from Venezuela.

In August 2006, CNPC agreed with Petroleos de Venezuela SA to establish a joint venture to develop a block in the Junin area of the Orinoco heavy oil belt.

Jurong Aromatics lets contract for Singapore plant

Jurong Aromatics Corp. Pte. Ltd. has let a contract to UOP LLC, Des Plaines, Ill., for the technology and basic engineering services and equipment for an aromatics plant to be built on Jurong Island in Singapore.

UOP already is performing basic engineering design, and commissioning of the complex is slated for 2011. When completed, the plant will be one of the largest privately owned petrochemical facilities in Singapore.

Plans call for the plant to produce 800,000 tonnes/year of paraxylene, 200,000 tonnes/year of orthoxylene, and 450,000 tonnes/year of benzene.

The new facility will feature various UOP technologies for removing sulfur and for upgrading distillate materials for the production of clean fuels. ✦

Transportation — *Quick Takes*

SEIC to boost Sakhalin-2 liquefaction capacity

The annual capacity of the Sakhalin-2 liquefaction plant under construction on Sakhalin Island will be increased by 7 million tonnes, said a state official Oct. 18.

Regional Gov. Alexander Khoroshavin said the working group of project operator Sakhalin Energy Investment Co. has begun to draft a plan for the plant's third stage.

The plant currently has two units with a total capacity of 9.6 million tonnes/year of LNG. It is due to be commissioned in 2008 after completion of start-up operations now under way.

SEIC said it received a second shipment of LNG for use in testing and start-up operations at the plant (OGJ Online, Oct. 17, 2007).

Sakhalin-2 is designed to produce LNG at two fields in southern Sakhalin, and the bulk of the LNG has been purchased in advance by US, Japanese, and South Korean companies.

Russia's OAO Gazprom bought a 50% stake plus one share in the project for $7.45 billion in late 2006, leaving Royal Dutch Shell PLC, Mitsui, and Mitsubishi respective stakes of 27.5%, 12.5%, and 10% in the project.

China to start second phase of West-East pipeline

China is likely to start the second phase of the West-East natural gas pipeline project around yearend or early 2008, according to a senior government official.

Chen Deming, vice-chairman of the State Development and Reform Commission, said gas from Xinjiang, the Inner Mongolia Autonomous Region and Shaanxi Province will be transported to the Pearl River Delta through the country's pipeline network after completion of the West-East project.

Chen said more than 12 billion cu m of gas will be supplied to the Yangtze River Delta in 2 years' time, due to increased imports of gas and large-scale gas exploitation in Chongqing Municipality and Sichuan Province.

By then, he said, the urban gas and transportation systems in half the regions of China will gradually have access to clean gas.

Over the last 4 years, China has seen a 62% increase in the growth of its oil and gas pipeline networks, which now extend a total of 48,000 km, according to official figures (OGJ Online, Oct. 10, 2007).

BG Group to submit EIA for Brindisi terminal

BG Group PLC will prepare an environmental impact assessment for its proposed Brindisi regasification terminal to meet the Italian government's new requirements.

Earlier this month the government suspended its decree allowing BG to construct the $720.6 million terminal until the EIA was completed. BG said it was committed to developing the 8 billion cu m/year Brindisi terminal and the authorization given in 2003 was full and valid and did not require an EIA at the time. BG described its change in stance as "a gesture of good faith." It has already invested €200 million in the project.

BG said it was committed to completing the project. "We have reached our decision quickly and have already begun work on the EIA," the company said.

The terminal is expected to begin operating by 2010.

Spectra to build Bronco gas pipeline from Rockies

Spectra Energy is proposing to build a 650-mile natural gas pipeline to connect Rocky Mountain natural gas supplies to Western US markets.

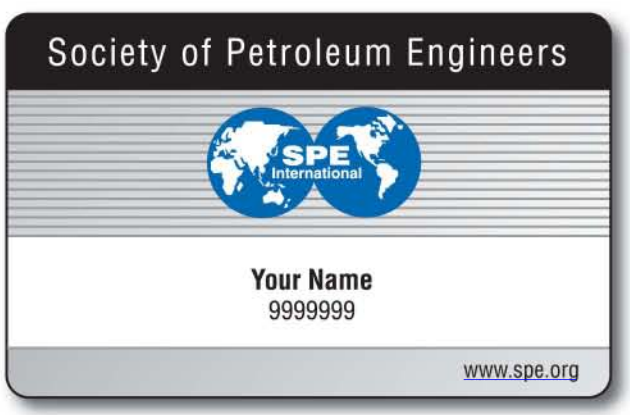
The proposed Bronco Pipeline, with estimated construction costs exceeding $3 billion, will have an initial capacity of more than 1 bcfd.

The pipeline will access existing and growing supply basins in Wyoming, Utah, and Colorado and extend westward, interconnecting with several pipelines en route to its terminus near Malin, Ore.

Based on preliminary market need and assessments, the project is currently planned to be in-service as early as 2011, with completion in 2012.

Spectra said it will hold an open season in the next 3 months to determine final project parameters including route, market, and timing. ✦

Survival necessity.



Career necessity.

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SPE International

Letters

A money game

Eighty-five dollar crude oil is obscene! The traders on the New York Mercantile Exchange are gambling with the economic health of the US and the world.

Crude oil production worldwide is in balance with refining capacity. The Saudis expressed their belief a couple of years ago that the price of crude should be in a range of $28-34/bbl.

When the Department of Energy announces on Wednesday each week inventory at refineries the traders react immediately. Recently, inventories fell by 3.5 million bbl. The market rose to $80/bbl. This is actually a modest amount of crude, about the cargo of two large tankers.

What can the government do in this emergency? We hold approximately 700 million bbl of crude in storage for emergencies. This is an emergency!

When the weekly crude in refining storage falls by say 3.5 million bbl the DOE should release this amount from storage to refiners, keeping the balance at refineries even. This should cool off the enthusiasm of the traders who are making profits and costing the American public unduly.

Most of the traders formerly dealt in pork bellies or soybeans with little or no knowledge of the oil industry. With them it's a money game.

Henry Levkoff
Consultant
New York

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.

2007

NOVEMBER

SPE Annual Technical Conference and Exhibition, Anaheim, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 11-14.

World Energy Congress, Rome, +39 06 8091051, +39

06 80910533 (fax), e-mail: info@micromegas.it, website: www.micromegas.it. 11-15.

API/NPRA Fall Operating Practices Symposium, San Antonio, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 13.

Houston Energy Financial Forum, Houston, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.accessanalyst.net. 13-15.

Turkemenistan International Oil & Gas Conference, Ashgabat, +44 207 596 5016, e-mail: oilgas@ite-exhibitions.com, website: www.ite-exhibitions.com/og. 14-15.

Annual Unconventional Gas Conference, Calgary, Alta., (866) 851-3517, e-mail: conference@emc2events.com, website: www.csugconference.ca. 14-16.

Australian Society of Exploration Geophysicists International Geophysical Conference & Exhibition, Perth, (08) 9427 0838, (08) 9427 0839 (fax), e-mail: secretary@aseg.org.au, website: www.aseg.org.au. 18-22.

ERTC Annual Meeting, Barcelona, 44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 19-21.

Asia Pacific Natural Gas Vehicle Conference & Exhibition, Bangkok, +66 0 2617 1475, +66 0 2271 3223 (fax), e-mail: angva@besallworld.com, website: www.angvaevents.com. 27-29.

DryTree & Riser Forum, Houston, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.drytreeforum.com. 28.

IADC International Well Control Conference & Exhibition, Singapore, (713) 292-1945, (713) 292-1946 (fax), e-mail: info@iadc.org, website: www.iadc.org. 28-29.

DECEMBER

International Oil and Gas Industry Exhibition & Conference, Suntec, +44 (0)20 7840 2100, +44 (0)20 7840 2111 (fax), e-mail: osea@oesallworld.com, website: www.allworldexhibitions.com. 2-5.

Middle East Nondestructive Testing Conference & Exhibition, Bahrain, +973 17 729819, +973 17 729819 (fax), e-mail: bseng@batelco.com.bh, website: www.mohandis.org. 2-5.

International Petroleum Technology Conference, Dubai, +971 4 390 3540, +971 4 366 4648 (fax), e-mail: iptc@iptcnet.org, website: www.iptcnet.org. 4-6.

IADC Drilling Gulf of Mexico Conference & Exhibition, Galveston, Tex., (713) 292-1945, (713) 292-1946 (fax), e-mail: info@iadc.org, website: www.iadc.org. 5-6.

Oil & Gas Maintenance & Technology Conference & Exhibition, Manama, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.oilandgasmaintenance.com. 9-13.

Pipeline Rehabilitation & Maintenance Conference & Exhibition, Manama, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.oilandgasmaintenance.com. 9-13.

PIRA Understanding Global Oil Markets Conference, New York, 212-686-6808, 212-686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 10-11.

2008

JANUARY

Middle East Petrotech Conference and Exhibition, Bahrain, +60 3 4041 0311, +60 3 4043 7241 (fax), e-mail: mep@oesallworld.com, website: www.allworldexhibitions.com/oil. 14-16.

World Future Energy Summit, Abu Dhabi, +971 2 444 6011, +971 2 444 3987 (fax), website: www.wfes08.com. 21-23.

API Exploration & Production Winter Standards Meeting, Ft.Worth, Tex., (202) 682-8000, (202) 682-8222 (fax), website: www.api.org/events. 21-25.

API/AGA Oil & Gas Pipeline Welding Practices Meeting, Ft.Worth, Tex., (202) 682-8000, (202) 682-8222 (fax), website: www.api.org/events. 23-25.

International Forum Process Analytical Technology (IFPAC), Baltimore, (847) 543-6800, (847) 548-1811 (fax), e-mail: info@ifpacnet.org, website: www.ifpac.com. 27-30.

SPE/IADC Managed Pressure Drilling & Underbalanced Operations Conference & Exhibition, Abu Dhabi, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 28-29.

Offshore West Africa Conference & Exhibition, Abuja, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.offshorewestafrica.com. 29-31.

Petroleum Exploration Society of Great Britain Geophysical Seminar, London, +44 (0)20 7408 2000, +44 (0)20 7408 2050 (fax), e-mail: pesgb@pesgb.org.co.uk, website: www.pesgb.org.uk. 30-31.

SIHGAZ International Hydrocarbon and Gas Fair, Hassi Messaoud, Algeria, website: www.sihgaz2008.com. Jan. 30-Feb. 3.

FEBRUARY

Middle East Corrosion Conference, Bahrain, + 973 17 729819, + 973 17 7299819 (fax), e-mail: bseng@batelco.com.bh, website: www.mohandis.org. 3-6.

IADC Health, Safety, Environment & Training Conference & Exhibition, Houston, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 5-6.

SPE Heavy Oil Challenge: Completion Design and Production Management Forum, Sharm El Sheikh, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 9-13.

SPE Unconventional Reservoirs Conference, Keystone, Colo., (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 10-12.

International Pipeline Pigging & Integrity Management Conference & Exhibition, Houston, (713) 521-5929, (713) 521-9255 (fax), e-mail: clarion@clarion.org, website: www.clarion.org. 12-14.

Deep Offshore Technology International Conference & Exhibition, Houston, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.dotinternational.net. 12-14.

SPE International Formation Damage Control Symposium & Exhibition, Lafayette, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 13-15.

Alternative Fuels Technology Conference, Prague, +44 (0) 20 7357 8394, +44 (0) 20 7357 8395 (fax), e-mail: Conferences@EuroPetro.com. website: www.europetro.com. 18.

IPWeek, London, +44 (0)20 7467 7100, +44 (0)20 8561 0131 (fax), e-mail: events@energyinst.org.uk, website: www.ipweek.co.uk. 18-21.

Wildcats making a comeback

Bob Tippee
Editor

You don't encounter "wildcat" much anymore.

The word appears hardly at all in reports from oil and gas companies, especially the small producers that once loved it.

And "rank wildcat"? Forget about it.

Producers still have to explore for oil and gas, of course. But when they drill wells out where the wildcats prowl they call the holes they make "exploratory wells."

So an activity that the oil and gas industry once enshrined with jargon it now hides behind euphemism.

The reason for this retreat from decoration is, of course, risk. Everyone knows exploration is risky. It also requires money in large amounts.

Big companies supply their own drilling capital. Small and medium-size companies, however, must raise capital from outsiders, many of whom find delicious comfort in an aphorism popular since, oh, the oil-price collapse of 1986: The best place to find oil is in an oil field. Investors entranced by this view treat self-proclaimed wildcatters as reckless throwbacks.

Financial metrics

On balance, the industry is surely better for this change. It's oriented more than before to essential financial metrics calibrated to risk and less to finding hydrocarbons every fifth hole or so. Alas, the financial metrics have for many years drawn capital toward acquisitions and development plays at some expense to exploration.

The money migration has solidified the upstream petroleum business financially but deprived it of a certain zest. Without its wildcats and wildcatters, the oil and gas industry lacks something, like a barbeque platter without jalepeno peppers.

Spice, though, might be returning to the menu.

At least one investment analyst sees exploration as—gasp!—emergent opportunity for small producers and their investors.

Edison Investment Research, London, even uses the word "wildcat" in an October report calling exploration "where the upside is today."

Especially in the late 1990s, the firm says, success for small independent producers "was built on acquiring small-sized, low-risk assets in mature areas (generally from majors seeking larger discoveries in frontier regions), developing those assets efficiently, and subsequently benefiting from the increasing oil price."

Uncertain oil prices in that period justified low asset valuations at high discount rates. Investors could buy producing assets and hope for growth without incurring disproportionate risk. Rising oil prices have especially rewarded production-oriented investments in the past 3 years.

But Edison Investment doubts oil prices will rise much more.

"The current stable, high-oil-price environment has made this [production-focused] model difficult to emulate," it says. "Furthermore, the current environment warrants a change in strategy towards companies which instead focus on organic growth via capital-efficient, well-informed, high-reward exploration."

The firm identifies three types of plays able to generate "material returns" in a price regime it sees as dulling the allure of production investments.

One is niche plays, such as heavy oil and revitalization of abandoned fields—relatively low-risk ventures on which companies can profit from special expertise. There's not much exploratory romance here, but Edison Research sees these ventures as something beyond what it calls "pure vanilla E&P plays."

The firm's second appealing play is "high-impact, wildcat frontier exploration." Now they're talking. This area, Edison Research says, "is where we believe the greatest potential for value creation and high returns exists."

The third play on Edison Research's list encompasses high-impact opportunities in mature areas, the type of strategy that yielded EnCana Corp.'s 2001 discovery of 500 million boe Buzzard oil and gas field now on production in the UK North Sea.

The firm favors the "upside" provided by exploration in contrast to the producing and development investments that probably have reached peak value.

"We instead believe that a high oil price environment and the associated potential for high reward have created the ideal environment for investment in high risk-high reward exploration," it says.

Edison Research likes producers that not only orient themselves to exploration but that also understand the subsurface, use capital efficiently, balance risk and reward, and focus on drilling.

Managing risk

In Edison Research's view, then, successful producers not only take but also manage risk. They do so by employing skillful geoscientists and engineers, working through partnerships, keeping exposure to the cost of failure below rewards available from success, and staying busy.

Edison Research calls all this "derisking." Some might call it sensible caution, a trait common to wildcatters who've been in business long enough to reminisce about the good old days. ✦

Editorial

The curse of $95 oil

For reasons that will prove to have been fleeting, the price of crude oil exceeds $95/bbl at this writing and is flirting with the $100/bbl landmark. While market fundamentals account for some of the buoyancy, they don't explain the seeming imminence of a triple-digit crude price. Neither will they explain a possibly sudden price correction about which there can be only one question: When?

For the oil and gas industry, the self-levitating crude price is regrettable, as refiners already know. Producers will regret it when they discover how quickly extraordinary revenue can vanish but how slowly, by comparison, swollen cost structures react. If commercial costs, such as those of oil field services and supplies, were all that had risen lately, the problem would be manageable. Political costs are another, troubling matter.

Unusual pressures

The potential for a price slump rests on two unusual price pressures. One is historic weakness of the US dollar. Some analysts say the puny dollar accounts for $12-15/bbl of the crude price; some say more. The price influence, whatever its measure, is amplified to some controversial degree by the increased activity of nonphysical traders, some of whom apparently see oil as a haven for money fleeing turmoil in credit markets.

Market experts disagree over the net effects of all this. What's important for oil and gas companies is the work of unusual upward forces on the price of crude—forces that will subside at some point, perhaps suddenly, in response to changes in markets related only indirectly to petroleum. This is a prediction not of a price crash but rather of a possibly quick correction when—not if—the dollar recovers and credit markets stabilize. With demand still growing, albeit at a diminishing rate, and some inventories unseasonably low, oil won't shed all its dollar-denominated value anytime soon—just, probably, some of it. The important question for oil and gas companies is by how much costs—commercial and political—will rise in the meantime.

Predictably, the commercial costs of oil and gas operations are rising as activity stimulated by rising commodity prices intensifies competition for services, supplies, and equipment. Just as predictably, governments are increasing their claims on wealth generated by oil and gas production under their jurisdictions. Government money grabs have been as brazen as the asset expropriations of Russia and Venezuela and as benign, by comparison, as royalty increases by Alberta and the US Minerals Management Service. They haven't run their course. Legislation in a US Congress embittered by high oil prices and related profits would pummel oil companies with taxes to fund government programs.

Governments raising royalties, taxes, or production shares always point to elevated oil prices and insist oil companies can carry a greater load. But load-carrying capacity depends not on prices but on profits, which inevitably are eroding now as competition raises operating costs. Cash-hungry governments notice only the profit gains that immediately follow a spike in the crude price, never the shrinking margins that follow as costs catch up.

Oil and gas companies are by no means suffering hardship. Because costs are rising for both competitive and political reasons, however, they must confront an imminent crude-price downturn with newly lifted thresholds of financial distress. Just as cost bases shrunken by many years of frugality leveraged profit jumps when oil prices finally recovered, swelling costs of the present will produce losses for some projects and some companies at oil prices that not long ago seemed high.

Uneven adjustments

The commercial dimension of the industry's new cost base will adjust to the coming price correction as it always does, perhaps faster than anyone expects. Adjustment of the political dimension will require much more time. Governments don't lower taxes and otherwise improve terms of participation for operators in anticipation of diminished activity; they wait until torpor makes the need for fiscal relief painfully evident.

Crude prices above $95/bbl are destined not to last. Political costs that rise with oil prices, however, will sully the industry's fiscal landscape for many years. ✦

Sustainability reports address safety, environmental issues

Paula Dittrick
Senior Staff Writer

Environmental stewardship and employee safety ranked high among issues major oil companies addressed in the lengthy, nonfinancial disclosures for 2006 that some companies call sustainability reports and others, corporate social responsibility reports.

Companies issue these reports in response to demand for information on corporate governance and risk-mitigation. Content varies considerably between companies and also between countries (OGJ, Oct. 1, 2007, p. 20).

Nonfinancial reporting across much of the world lacks the hard rules that governments typically provide for financial reports. Oil companies hire outside auditing firms to provide assurance on the information.

The International Petroleum Industry Environmental Conservation Association and the American Petroleum Institute jointly issued a voluntary framework in 2005. Oil companies use the IPIECA-API framework and the Global Reporting Initiative (GRI) reporting guidelines.

GRI was developed by the US-based Coalition for Environmentally Responsible Economies and the United Nations Environment Program. GRI guidelines initially were released in 2002; the latest update came in October 2006.

The following summaries show the variety of information major oil companies are reporting.

BP notes difficulties

John Brown, BP PLC chief executive until May 1, 2007, wrote an introduction to the 2006 report in which he said, "The past 2 years have been difficult for BP."

He referred to the March 2005 blast at the Texas City, Tex., refinery as well as oil spills and pipeline corrosion problems in Prudhoe Bay, Alas.

"This year, BP's performance on key sustainability issues related to our operations has been under intense scrutiny from governments, investors, civil society, and the media," the report said.

During 2006, BP created two senior management subcommittees: the group operations risk committee and the group financial risk committee. The company also conducted a series of "town hall" meetings throughout BP to discuss its management framework.

"There is no sense of complacency in BP," Brown said. "The tragic events of Texas City reminded us all of the physical danger associated with the commodities with which we work and the need for the strongest processes, matched by a universal sense of personal responsibility, in the management of risk in all our operations."

The company plans to invest an average of $1.7 billion/year on integrity and reliability across its five US refineries during 2007-10, compared with $1.2 billion in 2005.

In Alaska, BP committed to invest more than $550 million on integrity management during 2007-08. It hired 12 additional permanent employees to support integrity-related activities and boosted the number of contractor workers for inspections and repairs.

Companywide, BP reported that the overall number of spills of 1 bbl of oil or more during 2006 decreased to 417 from 541 in 2005. The volume of oil spilled was 2.2 million l., of which

400,000 l. was unrecovered. That compared with the 2005 total of 4.4 million l. spilled, of which 1.2 million l. was unrecovered.

BP reported seven fatalities during 2006 compared with 27 fatalities during 2005. The 2006 figure was the lowest level in nearly 20 years of reporting. All seven deaths involved contractor employees.

The reported recordable injuries for 2006 fell to 0.47/200,000 hr worked, marking the lowest in the company's recorded history.

ExxonMobil cuts emissions

ExxonMobil Corp.'s report emphasized its reduced greenhouse gas (GHG) emissions from operations and improved operating efficiencies, upstream and downstream.

It reported GHG emissions of 146 million tonnes during 2006, up 5.4% from 2005. The increase stemmed from the company's increased oil production in Africa and increased LNG production in the Middle East.

Operations consumed 1.475 quadrillion btu of energy last year. Since 2000, ExxonMobil estimates energy efficiency savings of $750 million/year in its refining and chemical businesses.

The firm aims to improve energy efficiency across its US refining operations by 10% in 2012 as compared with 2002.

As of 2006 compared with 2003, ExxonMobil reduced air emissions from operations for sulfur dioxide, nitrogen oxides, and volatile organic compounds (VOCs) by 11-20% (Fig. 1).

Total air emissions from the Beaumont, Tex., refining complex decreased 65% in 2005 from 2000 levels. The company plans to reduce emissions a further 25% by 2008.

Developers are careful with sensitive ecosystems, the company noted. In the Golden Pass LNG project in Sabine Pass, Tex., 20 acres of wetlands will be preserved by using horizontal drilling to install pipelines under—instead of across—water and wetlands.

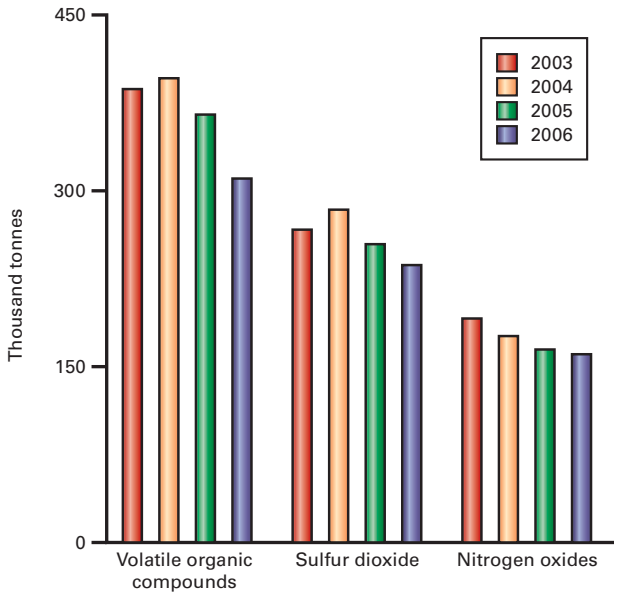
ExxonMobil reported 10 fatalities in 2006, including three employees and seven contractors. Four fatalities involved operations, three resulted from acts of violence, and three resulted from vehicle accidents.

For its total workforce last year, including employees and contractors, the total recordable incident rate was 0.377, and the lost-time incident rate was 0.049. These rates are the number of incidents per 200,000 work hours. Both were record lows.

ExxonMobil invested over $82 billion for energy production and technology on six continents over 5 years, including nearly $20 billion in 2006. Downstream, the company invests primarily in capacity expansions.

"We have effectively added a new industry average-size refinery to our portfolio every 3 years and an average-size conversion unit every year at a fraction of new facility construction costs," ExxonMobil said.

EXXONMOBIL'S AIR EMISSIONS FROM OPERATIONS Fig. 1



Source: ExxonMobil Corp.

Total's safety culture

"Forging a strong safety culture is the critical focus of all group action plans, and a number of safety behavior initiatives have been undertaken," Total SA said.

Total's petrochemical plants launched a safety program under the guidance of Marcel Simard, professor of industrial sociology at the University of Montreal. The program is based on management commitment and employee participation.

"Now available to all operational managers, dedicated HSE training programs facilitate experience sharing on both technical and HR (human resources) matters," Total said. "A shared safety culture is gradually developing in all areas."

The company reported 18 fatalities during 2006. Eight deaths involved operations, nine involved product transportation by road and loading, and one involved personal travel by road.

All but one of the fatalities involved contract employees, said Total, which said it places "the same importance to contractor employees as we do to our own employees."

For oil, gas, and petrochemical activities, the total recordable injury rate (TRIR) per million hours worked averaged 3.4 during 2006. This included Total employees and contract employees (Fig. 2).

Shell reports deaths

Royal Dutch Shell PLC reported the deaths of two employees and 35 contractors for a total of 37 during 2006, one more than in 2005. During 2006, 17 deaths happened in Nigeria, where nine resulted from kidnappings or assaults.

"Recently, more fatalities have been occurring away from our operations and outside working hours, where we have less oversight," Shell said. "The number of fatal assaults, drownings,

and road accidents all rose in 2006. These three causes accounted for more than 75% of lives lost."

As a result of higher fatalities from these causes, Shell's fatal accident rate (fatalities per 100 million working hr) did not significantly change in 2006. Shell reported its fatal accident rate has improved by more than 50% since 1997.

Efforts to change behavior and strengthen safety culture are working, Shell said. The injury rate for staff and contractors has improved by 45% since 1997. Injuries at work declined again in 2006, beating Shell's target.

Shell also is looking to improve process safety to ensure that facilities are well designed, operated within design limits, and well maintained.

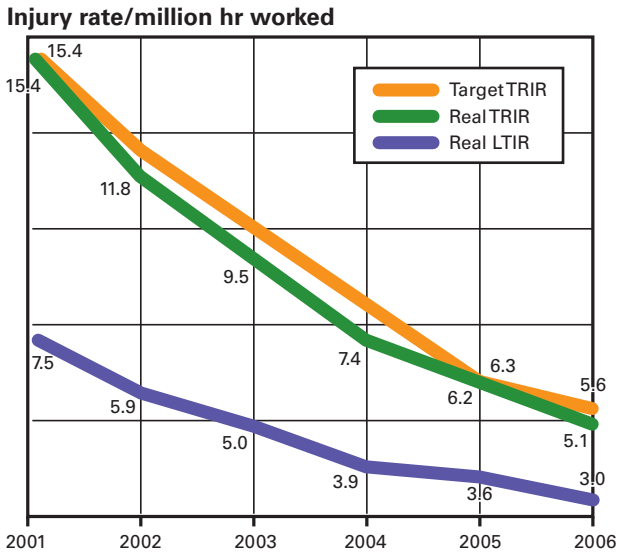
"Our exploration and production business intends to increase spending on asset integrity," Shell said. "Over the last 3 years, nearly two thirds of our investment in the downstream business went to maintaining the reliability and safety of our existing facilities."

Shell's environmental accomplishments included the start-up of two monopods in the North Sea during 2006. These are natural gas production platforms powered by wind and solar electricity.

The lightweight, low-cost, zero-emission platforms stand on one leg and are based on the design used for offshore wind turbines. Each platform uses 1.2 kw/d, compared with 30 kw/d for a traditional unmanned platform or the 40 Mw/d for a full-size, manned platform.

TOTAL'S INJURY RATE*

Fig. 2



*Total group employees and contractor employees. TRIR is total recordable injury rate for workplace accidents with and without lost time. LTIR is lost time injury rate.
Source: Total SA

Statoil notes emissions

Statoil ASA's 2006 report was its last one before the merger with the oil and gas division of Norsk Hydro ASA to form StatoilHydro (OGJ, July 23, 2007, p. 34).

Helge Lund, while chief executive of the former Statoil, said the public's concern about global warming is likely to result in tougher demands on oil and gas companies. He believes carbon emissions and global warming overshadow all environmental concerns.

The oil industry's contribution can be technology development, he said.

During 2006, Statoil constructed the Mongstad combined heat and power station and collaborated with Shell to inject carbon dioxide in Heidrun and Draugen fields for enhanced oil recovery.

Statoil reported no fatalities during 2006. Regarding operating incidents, Statoil shut down the Visund platform in the northern North Sea for 4 months following a Jan. 19, 2006, gas leak that stemmed from a design fault on a knock-out drum (OGJ, Mar. 13, 2006, Newsletter).

Company-wide production in 2006 averaged 1.135 million boed, a decline of 34,000 boed from 2005. The company plans to accelerate exploration to boost its reserve replacement rates.

"To maintain our competitiveness, we must work constantly on productivity improvements and secure long-term growth in production and reserves," Statoil said. "Our average reserve replacement rate was 94% in 2004-06. This is not satisfactory for securing long-term growth."

Lund noted that the energy industry faces growing demands about ethics "not only because the world has generally become more concerned with such issues, but also because people are investing more and more of their assets in pension funds.

"They want to know what they're putting their money into. This means we've got to show that there's quality and coherence between what we say and what we do." ✦

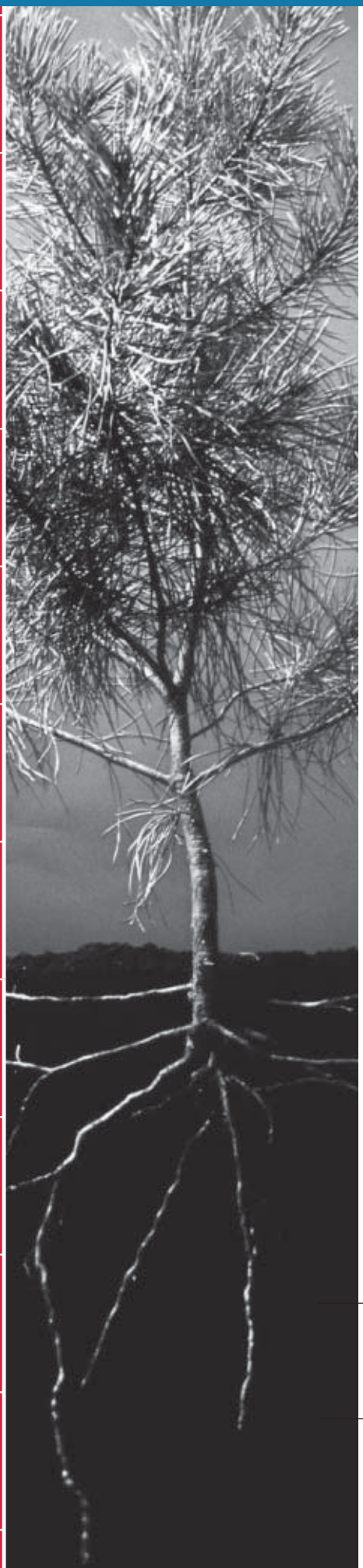
Onshore drilling threatens environment, House panel told

Nick Snow
Washington Editor

Onshore oil and gas activity in the Rocky Mountains is threatening public health and the environment in producing areas, witnesses told a US House committee on Oct. 31.

State and federal government officials countered that current regulations are being enforced, and they balance the need to develop more domestic energy with adequate environmental protection.

Their observations came as the House Oversight and Government Affairs Committee examined oil and gas exemptions to federal environmental



safeguards that chairman Henry A. Waxman (D-Calif.) characterized as loopholes.

"As children, we all learned about basic fairness. We know that it's not fair when someone gets to play by different rules than the rest of us. But as we will learn today, there is one set of environmental rules for the oil and gas industry and a different set of rules for the rest of America," he said in his opening statement.

Specifically, said Waxman, the Safe Drinking Water Act makes it illegal to inject toxic chemicals into underground aquifers and the Clean Water Act requires companies and individual homeowners to control erosion while a property is under construction. Neither provision applies to oil and gas producers, he said.

"Even the Clean Air Act dropped a key pollutant emitted by oil and gas operations from the list of regulated, hazardous air pollutants, though it did give [the US Environmental Protection Agency] authority to add the chemical to the list," Waxman said.

Limited information

Several witnesses complained that producers and oilfield service companies are not required to provide enough information about hydraulic fracturing fluids that could contain hazardous chemicals. Meanwhile, energy exploration and development in the Rockies has grown dramatically, they said. "The oil and gas industry has become the biggest land developer in the Intermountain West," observed Kendrick Neubecker, vice-president of Trout Unlimited's Colorado state council.

Daniel Thau Teitelbaum, a medical toxicologist in Denver, added, "Despite the extraction activity under way, the toxic impact on the human and animal populations of the resource areas is underevaluated. There is no public health oversight. There is no database of those exposed at work or residents. No surveillance of the health impact of the activities on worker families and other resident populations near the extraction and processing sites is under way or planned," he said.

Theo Colburn, president of The Endocrine Disruption Exchange (TEDX) in Paonia, Colo., said, "It is impossible to provide quantitative information about what is being used at any stage of developing natural gas because much of this information is proprietary. For example, in what quantities and mixtures are the products being used? How much water or other fluids are used to attain the million gallons needed to fracture a well?"

Asked by committee member Christopher Shays (R-Conn.) if water pollution is the single biggest problem, Colburn replied, "Air emissions are contributing too, particularly volatile organic compounds released during well operations."

Amy Mall, a senior policy analyst at the Natural Resources Defense Council, said, "Decades of deal-making by the industry, Congress, and regulatory offices have resulted in exemptions for the oil and gas industry" from protections under the CWA; SWDA; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, more commonly known as the Superfund law); and the Community Right-to-Know Act.

"Despite readily available and often economical technological solutions capable of controlling hazardous pollution such as air emission controls and nontoxic or less toxic chemical alternatives, the industry as a whole has failed to take reasonable steps needed to protect families, communities, and the environment," Mall charged.

Two other witnesses described significant health problems they or their family members endured soon after oil and gas activity began near where they lived.

No conclusive impacts

But state and federal regulators said available evidence shows no conclusive health or environmental impacts from hydraulic fracturing or storm water runoff during well construction, both of which are covered by provisions in the 2005 Energy Policy Act.

"Make no mistake: We in the US are the best-regulated oil and natural gas regime in the world," said David E. Bolin, deputy director of Alabama's state oil and gas board, who testified on behalf of the Interstate Oil and Gas Compact Commission. "No other country operates under stricter environmental, health, and safety regulatory oversight. Elimination of Sections 327 and 382 of EPACT would not make production of oil and gas in the US one iota safer but could substantially increase domestic oil and gas production costs and thereby decrease domestic supply."

Asked by committee member Chris Cannon (R-Utah) if coalbed methane (CBM) operations, which are shallow relative to other oil and gas activities, are likelier to jeopardize drinking water supplies, Bolin replied, "Typically, drinking water wells are 50-100 ft deep. We work to make sure hydraulic fracturing fluids don't make their way to shallower levels."

Benjamin H. Grumbles, assistant administrator for water at EPA, said the agency uses every tool available to do its job. EPA also recognizes that environmental protection strategies must evolve as characteristics of US industries and their operations change, and it works with regulated entities to improve performance by addressing specific industries' unique issues and challenges, he said.

He noted that EPA and the nation's three biggest oilfield service companies (BJ Services, Halliburton, and Schlumberger) voluntarily agreed to quit using diesel fuel in their fracturing fluids in 2004 after a study by EPA, the US Department of Energy, US Geological Survey, and several states found that diesel posed the only significant health risk in CBM fracking operations. EPACT specifically exempted hydraulic fracking of CBM from SDWA regulation as long as diesel fuel was not used, Grumbles added.

He said EPA has information about fracking fluid ingredients but was not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WATCHING GOVERNMENT

Nick Snow, Washington Editor

API donation turns political

Several people in Washington, DC, believe the oil and gas industry should pay more taxes and royalties. In one case, however, the industry may have trouble simply giving its money away.

As first reported Nov. 3 in the Washington Post, two regents at the Smithsonian Institution have questioned whether it would be appropriate for the national museum to accept $5 million the American Petroleum Institute has offered to become a major underwriter of the Ocean Initiative.

The program would include a $49 million Ocean Hall in the Museum of American History and a web site devoted to marine research.

Roger W. Sant, a cofounder of AES Corp. and a former chairman of the World Wildlife Fund, raised the point at a Sept. 17 regents meeting and was joined by another regent, US Sen. Patrick J. Leahey (D-Vt.). They objected to the donation and requested more information, which was delivered in time for a conference call on Oct. 15.

At that time, the Post article continued, US Supreme Court Chief Justice John G. Roberts, who also is the Smithsonian's chancellor and presides at regents meetings, requested a motion on the donation. When he did not receive one, the matter was tabled until the next meeting on Nov. 19.

$10 million donor

A Smithsonian spokeswoman verified the information. She told me that Sant, who is chairman of the natural history museum, and his wife have donated $10 million to the Ocean Initiative and that Sant has recused himself from the Nov. 19 regents' vote.

"The oil and natural gas industry has unparalleled experience working in the world's oceans, and we are looking forward to becoming a partner with the Smithsonian in this worthwhile project. The gift is offered in the spirit of encouraging education," API spokeswoman Karen Matusik said.

There's at least one irony in all this. AES, Sant's former company, has constructed several major electric power projects overseas but currently faces opposition to LNG terminals it wants to build near Baltimore and in New England. It's also a member of API.

Active in projects

Sant, online sources show, has been interested in the ocean environment for some time. The Summit Foundation, which he founded in 1991 and continues to chair, works in reef preservation and other projects.

The Post article indicated that while he thinks oil and gas industry support may not be appropriate in this case, it would be worthwhile in other Smithsonian programs. It also suggested that his concern may arise more from oil tanker spills than from offshore exploration and production.

Coincidentally, 2 weeks after the Smithsonian regents delayed their vote, the US Supreme Court, which Roberts heads, agreed to hear ExxonMobil Corp.'s appeal of the $2.5 billion punitive damages award stemming from the 1989 grounding of the tanker Exxon Valdez and subsequent spill in Alaska's Prince William Sound. ✦

certain if it's complete. "Based on information from this hearing, we're going to coordinate with state drinking water councils, the IOGCC, and others to get more information about components besides BTEX [benzene, toluene, ethylbenzene, and xylene] which could pose health problems in drinking water," Grumbles said.

Categorical exclusions

Robert Anderson, deputy assistant director for minerals, royalty, and resource protection at the US Bureau of Land Management, said categorical exclusions authorized under EPACT have let the Department of the Interior agency's employees spend more time inspecting operations and processing drilling permit applications.

But Waxman complained that DOI has not complied with an EPACT provision requiring a study of CBM production impacts on surface and ground water in certain western states. "The statutorily mandated study is now 14 months late and has not yet been started. Moreover, documents the Oversight Committee has obtained from the BLM indicate that . . . BLM is planning to ask the National Academy [of Sciences] to conduct a public meeting, not a study as required by law," he said in an Oct. 31 letter to US Interior Secretary Dirk A. Kempthorne.

When the committee chairman asked Anderson about it, the BLM official said the meeting next spring with EPA and NAS will attempt to determine if earlier studies produced information that can be used. "There were 11 other sections of EPACT that directed us to do studies. None was funded by Congress," he pointed out.

"Congress passed a law requiring this study. If you didn't have funds, why didn't you ask us for them?" Waxman said.

Some Republicans on the committee questioned the motives behind this hearing and one scheduled next week on coal-fired power plants. "Although the background materials describe environmental impacts as 'potential,'

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it appears pretty clearly that those on the other side already have their minds made up," said ranking minority member Thomas M. Davis III (R-Va.) in his opening statement.

Rep. Darrell E. Issa (R-Calif.) said that while EPACT made minor changes in federal environmental laws, "for the most part, we are talking about practices that have been around and codified for decades. What the oil and gas industry does not need is a congressional signal that the rules will be changed retroactively."

Davis suggested that a sensible energy policy should focus on both securing additional sources of domestically produced energy and reducing carbon emissions, while ensuring that environmental protection regulations are sensible, complete, and enforceable.

"What we can't do now is take potential sources off the table. I worry that this is the subtext of this hearing. I worry again about poking small holes in the bottom of the boat," he said. ✦

Bingaman says energy bill needs more time

Nick Snow
Washington Editor

US Senate Energy and Natural Resources Committee Chairman Jeff Bingaman (D-NM) said he does not expect to see a reworked 2007 federal energy bill to appear before the Senate takes its Thanksgiving recess in 2 weeks.

Bingaman said US House Speaker Nancy Pelosi (D-Calif.) and Senate Majority Leader Harry M. Reid (D-Nev.) would make the final decision on bringing the bill back before Congress. "But given the amount of time and competition from other issues, I don't think it looks likely," he told reporters at a Nov. 5 breakfast briefing sponsored by Energy Daily and the American Gas Association.

Committee chairs and majority staff members have been meeting for weeks to reconcile differences between energy bills passed by the House and Senate earlier this year. Bingaman said the staffs have made progress in resolving questions involving the bills' energy efficiency and public lands provisions.

Resolution of tax questions is less clear, but the Senate Finance and House Ways and Means committees' staffs are working hard, he indicated. "The House's tax package was substantially smaller than the Senate Finance Committee's. I think both staffs are looking at all possible offsets but haven't settled on which will be in the final bill," Bingaman said.

He rejected the idea advanced by Republicans and some trade associations that 2007 federal energy legislation will have no provisions designed to increase domestic production. "Most of those charges have no basis in fact. There are incentives to produce more biofuels. I think most of this criticism is directed toward provisions in the House bill. I don't think they'd have much impact," he said.

He also said he thinks enough congressional Republicans will support the reworked energy bill for it to pass despite Senate Minority Leader Mitch McConnell (R-Ky.) voting against the earlier Senate bill. Bingaman said he does not see President George W. Bush's veto threats as much of an obstacle but added, "I don't think there's been a lot of forward-leaning by the administration to get Republican members to support energy legislation."

Congressional Democrats also are waiting to see how the Bush administration responds to last week's federal appeals court decision in Kerr-McGee's challenge of efforts to collect additional deepwater royalties (OGJ Online, Nov. 1, 2007).

"It's a case of a company asserting its legal rights. But I think the government needs to get a reasonable return on public resources. Some of the actions we've seen by the administration suggest that it believes companies haven't been paying their fair share. I was particularly encouraged last week when the [US Minerals Management Service] announced it will collect 18.75% in royalties from new production in the Gulf of Mexico," Bingaman said (OGJ, Nov. 5, 2007, Newsletter). ✦

IEA warns of coal's comeback in energy mix by 2030

Uchenna Izundu
International Editor

China and India are expected to continue using coal as a major source of energy supplies, which would greatly increase the world's carbon emissions, with drastic consequences for climate change, the International Energy Agency warned in a bleak picture looking at energy supply and demand until 2030.

In absolute terms, coal demand is forecast to soar by 73% during 2005-30, with China and India representing over four fifths of the increase in its use to 2030, according to World Energy Outlook (WEO) 2007—China and India Insights. Currently the two nations account for 45% of world coal use.

Fatih Birol, IEA's chief economist, told reporters Nov. 7 in London that the growth in coal use was due to major, ongoing economic developments in both countries, which, on average, is

expected to rise by 6%/year until 2030. He told OGJ that coal's use in fuelling power plants was largely responsible for its rise in the energy mix, and that not all power plants being built are using technologies that increase efficiency and reduce emissions. Domestic incentives are needed to encourage developers to use noncoal solutions that are more expensive, he added.

Birol said coal use is also growing in the US and Europe because of high gas prices, which are linked to oil prices.

All energy use rising

Total energy use will increase by 55% by 2030, led by China, if alternative methods are not implemented.

In IEA's reference scenario, oil will continue to be the biggest fossil fuel in the primary energy mix, with demand reaching 116 million b/d in 2030—a 32% increase over 2006. Its share in demand, however, is expected to drop to 32% from 35%. Natural gas demand, in contrast, will rise to 22% from 21% globally.

China and India are phasing out fuel subsidies, which should dampen oil demand. The two countries spend £15 billion on subsidies for oil products. "It will take time to remove them," said IEA Deputy Executive Director William Ramsey. He said the governments are aware of the need to remove subsidies to ease the burden on governmental budgets and to stimulate efficiency. Ramsey said IEA would discuss with the governments their schedules for reducing the subsidies.

Current energy policies of various governments are not sustainable because oil and gas imports are set to rise relentlessly to 2030, if not even faster than anticipated in the last WEO, IEA warned.

Oil production

The Middle East and Russia will dominate oil production, according to the WEO. But timely investment is needed to guarantee that supplies come to market, particularly if the world is to avoid a supply crunch by 2015, Birol emphasized. Investment needed for basic energy facilities would need to increase to $22 trillion, he said, because of cost inflation.

"We are not running out of energy or money, but time," Birol said. "It is the next 10 years that are very important because of the implications this has for climate change."

OPEC's role as an oil supplier is critical, the report emphasized, as its share of production is expected to rise to 52% by 2030 from 42% today. Non-OPEC production rises only slowly to 2030, says the report, with most of the increase coming from nonconventional sources—primarily Canadian oil sands—as conventional output levels off around 47 million b/d by mid-2010.

For every $4 spent on upstream activities in the oil

and gas chain, $1 goes towards meeting oil demand, while the other $3 is spent on offsetting declines from the fields, Birol said.

"Although production capacity at new fields is expected to increase over the next 5 years, it is uncertain whether it will be sufficient to compensate for the decline in output at existing fields and meet the projected increase in demand," IEA stressed. "A supply-side crunch in the period to 2015 involving an abrupt escalation in oil prices cannot be ruled out."

In its reference scenario, China and India alone will have net oil imports jump to 19.1 million b/d in 2030 from 5.4 million b/d in 2006, which would be more than the US and Japan together today. China's transportation sector is a key driver behind growth in oil demand.

Alternative policies

IEA called on governments to implement policies that promote energy efficiency and conservation to help curb energy demand and reduce greenhouse gases. "Global oil demand would be 14 million b/d lower, a saving equal to the entire current output of the US, Canada, and Mexico combined," it said.

"China has some ambitious plans for energy efficiency, and it is quite aware of the global context," the new IEA Executive Director Nobuo Tanaka told reporters. "It is aware of its decision and is forthcoming on energy efficiency and security and hopes to deal with climate change." ✦

New refining capacity totaling 13 million b/d seen by 2012

Uchenna Izundu
International Editor

Wood Mackenzie Ltd., Edinburgh, expects 13 million b/d of crude distillation capacity to be built within the next 5 years out of the 20 million b/d proposed worldwide.

Lindsay Sword, who managed WoodMac's study entitled Global Refinery View, told reporters Oct. 25 that most of the capacity would be built in the Asia-Pacific area. "The grassroots projects are in China and India. China is growing capacity to meet demand, but India has expressed an aspiration to become the largest exporter in the region."

The Middle East is the second major growth region, with most of the projects proposed in Iran.

"The grassroots project in Kuwait is likely to start in 2013," Sword said. "The Al Zour refinery was estimated to cost $10 billion originally, but now Kuwait is expecting it to cost $14 billion in a retender."

Kuwait National Petroleum Co. has invited 17 companies to bid to construct the 615,000 b/d Al Zour refinery after finding that initial submissions cost more than it had expected. KNPC expects to award five engineering, procurement, and construction contracts. Those that have been selected to bid include Italy's Snamprogetti SPA and South Korea's Hyundai Engineering & Construction Co. Ltd., a consortium of Japan's JGC Corp. and Korea's GS Engineering & Construction Corp., and a consortium of Technip Italy SPA, Foster & Wheeler Corp., and Korea's SK Engineering & Construction Co. Ltd.

Cost inflation and biofuels legislation are the main problems facing refinery proposals in the Middle East and North America, respectively. In Europe, capacity expansions for Italy and Spain have been proposed.

Sword told OGJ that WoodMac ranked as "weak" the three proposals to build a refinery in Ceyhan, Turkey, saying these would be unlikely to happen by 2012.

Calik Enerji AS of Turkey, JSC NC KazMunaiGaz, and Indian Oil Corp. plan to build a $4.9 billion refinery with a capacity of 15 million tonnes/year. Turkish company Turcas Petrol AS and the State Oil Co. of Azerbaijan (Socar) have also applied to build a 10 million tonne/year refinery. Separately, OMV AG and Turkish company Petroil Offici have announced plans to build 10 million-tonne/year refinery.

"Europe does not actually need more crude capacity—there is not too much capacity, just the wrong type, so adding additional capacity is not really aligned with the supply-demand fundamentals in the region. The capability of each of the sponsors in each project to build a new grassroots refinery is questionable; they have not done this before, certainly not recently," Sword said. "Lukoil, who had announced plans to build a refinery at Ceyhan has since, as we understand, canceled this and decided instead to concentrate investment in their refinery in Bulgaria. Getting permits to build new refineries in Turkey is very difficult."

Sword said, "National oil companies dominate the refining expansion picture with only limited investments in new capacity planned by the international oil companies." He said, "The IOCs feel they can make better use of their capital elsewhere."

John Waterlow, principal analyst for oil demand at WoodMac, told OGJ that the consultancy does not expect oil prices to hit $100/bbl because there is too much speculation around the factors underpinning that price. "The supply and demand fundamentals don't show that," he said.

According to Waterlow, global demand has been resilient to high oil prices for a number of reasons. One is that developing economies have subsidized oil prices. Where governments have reduced support and populations have been exposed to market prices, oil demand growth has slowed.

"In developed economies, companies can change to other fuels in power plants when the prices become too high," he said. ✦

WATCHING THE WORLD

Eric Watkins, Senior Correspondent

Keeping a grip on Sudan's oil

For the oil industry, the news from Sudan is anything but good. Indeed, while using the Darfur problem to keep his grip on the country's oil-rich south, Sudanese President Omar al-Bashir blames the US, the UK, and France for his problems.

"What we suffer here and in Darfur in particular and the problems in Sudan in general are caused by these three powers: Britain, France, and the United States," al-Bashir said in an interview with Britain's Guardian newspaper.

That's more than a bit ironic since the US Department of Justice at the moment is applying Bush administration pressure on Congress to reject legislation designed to slash US and foreign investment in Sudan due to the Darfur violence.

The law would punish US or foreign entities for investing in Sudan as long as militias aligned with al-Bashir's government wage a terror campaign in the Darfur region.

Bush objections

The Bush administration objects to the bill because it wants to ensure that state and local governments do not engage in divestment activity that, "however well-intentioned, would jeopardize United States foreign policy on Sudan and potentially other issues."

People who want the law to be passed point to the promises made to southern Sudan which have yet to be kept.

An example of that took place last week, when a senior government official said the Sudanese army has until Dec. 15 to pull out from the oil-rich, semiautonomous south after failing to meet an initial July deadline.

According to some reports, the new deadline came amid a crisis sparked by the withdrawal of the Sudan People's Liberation Movement from the unity government after it accused al-Bashir's government of failing to implement a 2005 peace deal.

Grip on oil

Sudan's Ceasefire Political Committee, charged with overseeing the pullout of troops under the 2005 agreement, last week gave the Sudanese army up to Dec. 15 to withdraw from the southern region.

"And the [Southern People's Liberation Army] has the same deadline to redeploy from southern Kordofan," said Major General Elias Waya, a top SPLA commander in the committee.

Although the peace deal directed both sides to redeploy from the other's territories, the Sudanese army—citing fears of insecurity posed by the Darfur conflict—has vowed to remain in the oil fields.

That's a wonderfully convenient solution for the Khartoum regime, especially when al-Bashir can also blame the US, UK, and France for the insecurity in Darfur.

Meanwhile, negotiations between the Sudanese government and the Darfur rebels have been postponed until December—a convenient date that coincides with the government's plan to hold on to the south's oil. Qui bono? Al-Bashir & Co., that's who. ✦

Producers urged to double oil recovery efficiency worldwide

Producers should seek to double oil recovery efficiency worldwide and pursue the target through effective use of technology and wise management, says a former head of reservoir management at Saudi Aramco.

Global cumulative production is 1 trillion bbl from a conventional resource of 7-8 trillion bbl, noted Nansen Saleri, now president and chief executive officer of Quantum Reservoir Impact. With unconventional hydrocarbons, the total resource is 14-17 trillion bbl.

"We have a lot more trillions to go," Nansen told the RMI Oilfield Breakfast Forum in Houston Nov. 1

Saleri used experience with Saudi Arabia's Ghawar oil field, the world's largest, to show how technology improves reservoir performance.

In the field's southern area, called Haradh, Aramco raised production in three increments starting in 1996. The first step involved vertical wells; the second, starting in 2003, involved horizontal wells; and the third, starting in 2006 involved maximum reservoir contact wells, smart, completions, and instrumentation.

The advance of technology, Saleri said, yielded a five-fold increase in added production between the first and third increments.

In addition, real-time pressure monitoring helped Aramco keep several wells from prematurely watering out. Haradh production is 900,000 b/d.

Worldwide, Saleri said, recovery efficiency is 30-35% but could be 60-75%.

"That's where the challenges lie," he said.

Saleri questioned the oil industry assumption that production from oil fields inevitably rises to a peak then declines irreversibly.

"There's no reason we can't extend the period of robustness for a long

time," he said.

He stressed the importance of understanding reservoir fundamentals, verifying that understanding, and having the capacity to implement an optimum program.

He said international and national oil companies, especially the former, are "more short-sighted vis-a-vis the reservoir."

In other presentations at the forum:

• G. Allen Brooks, managing director of the energy investment banker Parks Paton Hoepfl & Brown, cited global warming and peaking oil production as two new variables that oil industry planners should consider in their forecasts.

• Tim Probert, senior vice-president of drilling and evaluation for Halliburton, presented a list of top technology challenges: reduced uncertainty in smaller, more complex hydrocarbon accumulations; well placement, drainage, and control to improve recovery factors; making unconventional resources conventional; reliable access to deeply buried reservoirs; and competitive efficiency models.

• David Holt, executive director of the Consumer Energy Alliance, a group formed last year to encourage development of all US energy sources, said, "The general tenor in Washington is not friendly" to the oil and gas industry and called for "a renewed emphasis on a balanced, inclusive energy policy." ✦

Former US senator sees drawbacks in royalty measure

Nick Snow
Washington Editor

A former US senator who helped formulate federal deepwater leasing incentives in the early 1990s warned that imposing price thresholds now on 1998-99 Gulf of Mexico leases could create major legal problems, delay further leasing, and encourage other countries to break agreements with US producers.

"I hope that Congress will not adopt punitive legislation and thus put existing production at risk, put US investment abroad at risk, or create huge liabilities from the government's contract breach and taking of property without just compensation," said John B. Breaux in a Nov. 6 letter to current Senate Energy Committee Chairman Max Baucus (D-Mont.) and Ranking Minority Member Charles E. Grassley (R-Iowa) on behalf of the Ad Hoc Deep Water Exploration and Production Coalition.

Breaux, who became senior counsel in Patton Boggs LLP's Washington office in 2005 after three Senate terms as a Democrat from Louisiana, noted that a federal district court confirmed last week in Kerr-McGee Corp.'s lawsuit that for federal deepwater leases issued during 1996-2000, "companies finding commercial quantities of oil or gas could produce up to a specified volume free of royalties."

The court also ruled that Congress did not authorize the US Department of the Interior to make prices remaining below explicit price thresholds for existing leases a condition for royalty relief, he added.

Producers paid about $1.5 billion in premiums as bonus bids for the 1998-99 deepwater leases because they did not have price thresholds, according to Breaux. "In addition, companies buying leases in the open market paid substantially more to acquire them from third parties," he said in his letter. "The industry has since invested tens of billions of dollars in exploration and production efforts based on economic models relying on the availability of royalty relief."

Range of consequences

Passing legislation now that would directly or indirectly impose price thresholds on those leases would result in legal challenges as an unconstitutional taking without just compensation under the US Constitution's Fifth Amendment as well as a breach of contract, Breaux warned.

"An adverse ruling could subject the government to injunctive and declaratory relief, and billions of compensatory damages. Given the court's decision for summary judgment in the Kerr-McGee litigation, Congress should know that a lawsuit is likely," he said.

Punitive royalty recovery legislation also could halt new leasing activity until legal challenges are resolved, he continued. "Injunctive relief could block all further leasing in the Gulf until the constitutional issues are resolved. Cessation of leasing and the loss of future revenues is not in our national interest now," he said.

Finally, Breaux said, enactment of such legislation could embolden resource-rich foreign countries to break similar contracts that companies have relied upon to invest hundreds of billions of dollars to explore in new regions. "In fact, we've already seen that happen in Venezuela and Nigeria," he said. "This will ultimately put US investments abroad at greater risk." ✦

US House members trade charges as oil price climbs towards $100/bbl

Nick Snow
Washington Editor

US House Democratic and Republican leaders accused each other of inaction as oil prices climbed toward $100/bbl.

Democrats remain committed to sweeping legislation that would encourage more domestic biofuels production and reduce US dependence on imported oil, Speaker Nancy Pelosi said on Nov. 7. But the bill simply will make

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GENERAL INTEREST

matters worse, Minority Whip Roy Blunt (R-Mo.) said a day earlier.

"For the nearly 7 years of the Bush administration, the rising cost of gas and home heating oil has been a major economic stress on millions of American families. The response from President Bush has been to promote new benefits and tax breaks for an industry already enjoying record profits. The American people, not the oil industry, need help from their government," Pelosi said.

Democrats are negotiating final details in energy legislation to invest in domestic biofuels to strengthen national security, lower energy prices, create jobs, promote energy efficiency, and reduce the global warming threat, she maintained. "We will vote soon to pass this bill and send it to the president for his signature," she said.

Blunt said Americans want a bill that makes use of already available resources and technology to deliver affordable energy. "That means unlocking new supplies, encouraging conservation, and promoting the research and innovation we'll need to adapt to the future," he said.

Instead, he continued, Democrats are writing a bill in secret that could restrict access to domestic supplies further and impose more taxes on production, which effectively would raise prices and increase dependence on imports.

"For every 25¢ increase in the price of gasoline, it's estimated that $100 million a day is taken out of our economy. If you're counting at home, gas has gone up more than 70¢ since Democrats took control in January. And if they're successful in passing their no-energy bill this winter, it'll go up a whole lot more than that," Blunt said. ✦

GLOBAL OIL RESERVES—2

Recovery factors leave EOR plenty of room for growth

Ivan Sandrea
StatoilHydro
Oslo

Rafael Sandrea
IPC Petroleum Consultants Inc.
Broken Arrow, Okla.

Within a broad context, the applicability of the assortment of improved oil recovery and enhanced oil recovery technologies depends by and large on two factors: the API gravity of the oils and the depth of the reservoirs.

This second of two parts summarizes the reserves classifications and discusses EOR's potential production growth.

In reality, the proper technical selection parameters are the oil viscosity and the reservoir pressure. These, however, are related empirically to oil gravity and reservoir depth, respectively.

World oil reserves were sorted by API gravity and depth. The gravity classifications are: light (>35°), medium (26-35°), heavy (10°-<26°) and extraheavy (≤10°). The upper tiers for heavy and medium gravity oils were changed slightly from the official definitions to better reflect limits of successful field EOR projects.

The same is true for the depth classifications selected: shallow (<3,500 ft), intermediate (3,500-10,000 ft), and deep (>10,000 ft). Tables 3 and 4 summarize the results of both sorts. These groupings provide a convenient core for classifying the coupled resource base.

Fig. 1 illustrates the gravity distribution of the world's total oil resources of 12.8 trillion bbl. Light and medium gravity oils make up two thirds of the total resources while heavy and extraheavy oils make up the other third.

Fig. 2 shows the depth distribution of the oil resources. Roughly one third of the total resources are located at shallow depths, which as expected matches the volumes of heavy and extraheavy oils. A similar correspondence is observed between medium gravity oils (44%) and reservoirs at intermediate depths (45%), also between light oils (22%) and deep reservoirs (21%).

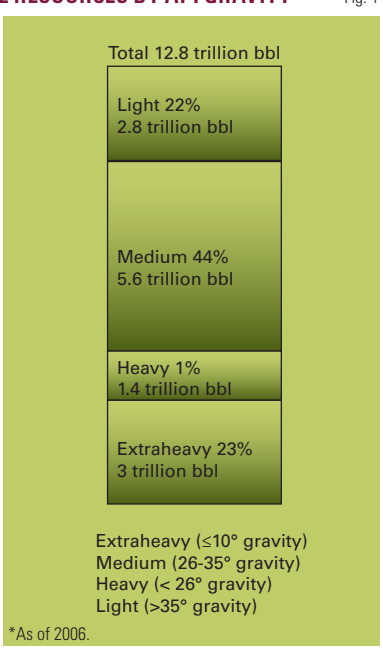
Shallow reservoirs with heavy and extraheavy oils are the best disposed to steam injection processes. Intermediate and deep reservoirs with oils above 30° are the ones best adapted to miscible CO_2 injection.

Other miscible processes with N_2, HC gases, and flue gases require reservoirs deeper than 5,000 ft. Polymer and other chemical processes are limited mostly by temperatures, usually intermediate depth reservoirs with oils in the range of 15-30° gravity. In situ combustion has no depth restriction, but oils below 30° gravity are preferable.

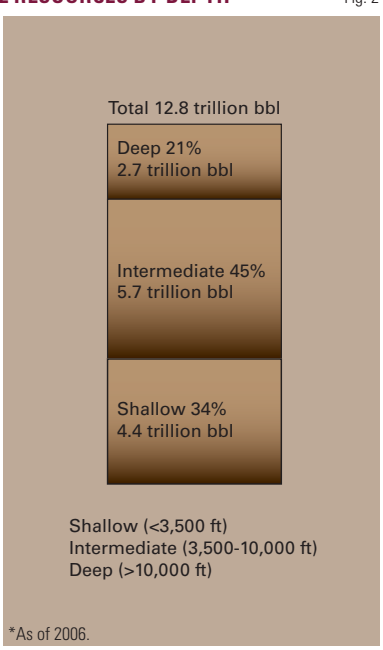
EOR and future production

According to the Oil & Gas Journal's Worldwide EOR Surveys, the volume of oil produced by EOR meth-

OIL RESOURCES BY API GRAVITY* Fig. 1



OIL RESOURCES BY DEPTH* Fig. 2



DISTRIBUTION OF GLOBAL OIL RESERVES BY API GRAVITY

Table 3

	Remaining reserves (1P), 2006 — Conventional — Billion bbl of oil	%	– Nonconventional – Billion bbl of oil	%
Light (>35°)	332	29	—	—
Medium (26–35°)	653	57	—	—
Heavy (<26°)	162	14	—	—
Extraheavy (≤10°)	—	—	*293	100
World	**1,147**	**100**	**293**	**100**

*Canadian (165 billion bbl of oil; 8-14° gravity; 4.8% sulfur) and Orinoco oil sands (128 billion bbl of oil; 8.5-9.3° gravity; 2.5-4% sulfur).
Sources: IHS, Eni, Repsol YPF, Credit Suisse

DISTRIBUTION OF GLOBAL OIL RESERVES BY DEPTH

Table 4

	Remaining reserves (1P), 2006 — Conventional — Billion bbl of oil	%	– Nonconventional – Billion bbl of oil	%
Shallow, <3,500 ft	163	14	293	100
Intermediate, 3,500-10,000 ft	663	58	—	—
Deep, >10,000 ft	321	28	—	—
World	**1,147**	**100**	**293**	**100**

Sources: IHS, Credit Suisse

ods doubled from 1982 to 1990 (1.2 million b/d) and doubled again to 2.5 million b/d in 2006.

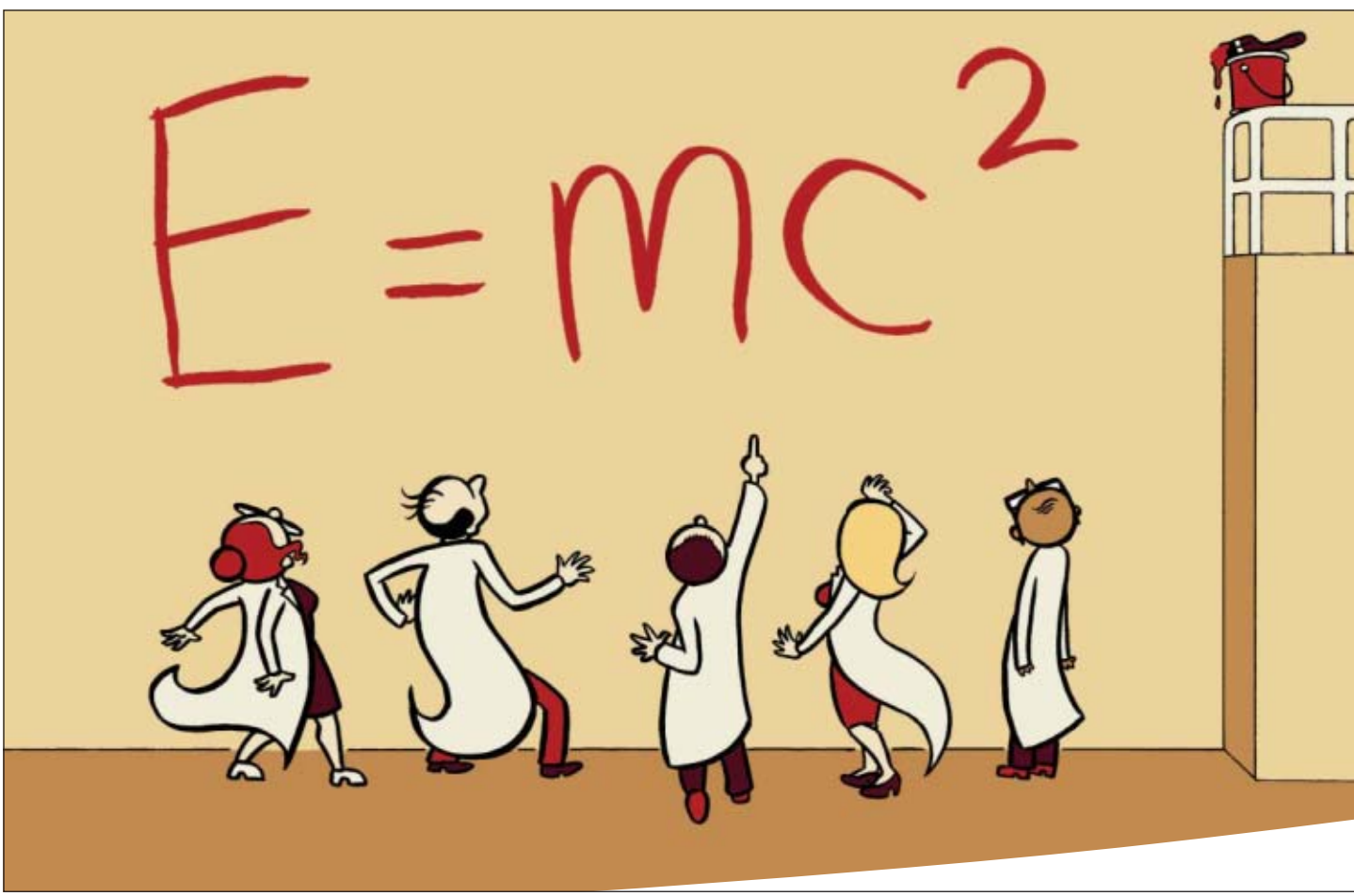
US EOR production is 649,000 b/d, roughly 14% of total US production. Worldwide, OGJ found 303 active EOR projects,[16] and the single largest project, the Duri field steamflood in Indonesia, produces 220,000 b/d.

Four countries—the US (153), Canada (45), Venezuela (41), and China (39)—account for 92% of the total number of projects. Table 5 gives an overview of the general characteristics of these field projects: number of projects by type, minimum and maximum EOR production rates, depth, and API gravity ranges. Twenty-nine new projects (CO_2, 16; steam, 6; polymer, 4; and combustion, 4) were planned for 2006-07.

A 1% increase in global recovery efficiency would bring forth 88 billion bbl of expanded conventional oil reserves, sufficient to replace 3 years of world production at the current rate of 27 billion bbl/year.

The contribution of unconventional resources is not included because these are new—so far less than 7 billion bbl (~0.2%) have been produced.

Large-scale application of conventional EOR will impact the production profile of the world very much in the same way it has been until now, adding more production and easing the decline of mature fields. It would throw in roughly 1 million b/d for every 10 bil-



lion bbl of added reserves.

The EOR capex required to develop 88 billion bbl of added reserves is estimated to be about $190 billion, roughly 80% of the global E&P capex for 2006. A well-timed disposition to make outlays of this magnitude will eventually determine the impact of EOR on future global supplies. The oil potential is there.

Characteristics of active EOR projects

Table 5

Type	No of projects	Production, b/d	Depth, ft	API gravity, °
Steam	119	76-220,000	350-5,740	8-26
CO_2	94	100-35,000	1,900-10,900	19-43
HC^2 gases	38	10-80,000	4,040-14,500	15-45
Combustion	21	100-8,100	1,640-9,500	18-38
Polymer	20	53-4,900	1,063-4,626	21-34
Nitrogen	5	*1,000-500,000	4,600-15,400	16-51

*Estimated for the Cantarell project.
Source: OGJ Worldwide EOR Survey, 2006

Final remarks

Now that oil prices are soaring and have the long-term prospect of staying much higher than historical levels, cash flow is at a high which is good for EOR.

EOR can unlock already discovered, remaining buried resources in existing fields which are estimated at 11.8 trillion bbl worldwide. All resource holders should consider the benefits of this new and growing opportunity.

The recovery factor for the bulk of the world's conventional reserves is around 22%, so there is plenty of room for growth. For nonconventional extra-heavy oils, the current recovery factor is 10%; an additional 10-15% is possible for both the Canadian and Orinoco sands. Cumulative production to date is still insignificant, barely 2% of reserves.

The North Sea fields have the best overall record of recovery, averaging 46%. The US follows with 39%. Oil fields with top recovery factors are Statfjord (North Sea) and Prudhoe Bay (US) with 66% and 47%, respectively.

Worldwide, a 1% increase in the global recovery factor represents 88 billion bbl of added conventional reserves, equivalent to the replacement of 3 years of global production. The estimated capex required to develop these reserves is roughly $190 billion, corresponding to 80% of the global E&P capex outlays ($236 billion) in 2006. The impact of EOR on future global oil supplies depends on the disposition to make significant investments over the long term.

Successful IOR/EOR projects are long-lived, manpower intensive, may need long lead times to do the R&D vital to the tailoring of the processes, and require constant sophisticated engineering monitoring. Two thirds of the world's resource base is located in

countries that have strong NOCs and-or policies with restrictive access to IOCs which have some of the best EOR technologies.

Offshore, with a resource base of 2.7 trillion bbl, has its own complexities that make difficult the application of EOR techniques. Reservoirs can be deep (wellbores as long as 40,000 ft), drilling infill wells is costly, and the number of wells per platform is usually fixed. In other words, EOR should be incorporated early in the master plan of offshore fields for maximum results.

EOR's role is primarily one of realizing the last technically extractable drop of oil from the reservoir while extending the economic life of the abundant mature oil fields. Its contribution will be crucial for the continued expansion of world oil production. EOR is quite a challenge, both technologically and economically, but it is worth pursuing. ✦

References

1. "Facing the Hard Truths about Energy," NPC Report, July 18, 2007.
2. "World Oil Outlook through 2030," OPEC Report, June 26, 2007.
3. Moritis, Guntis, "Upstream Production Capacities to Advance in many Countries," OGJ, July 23, 2007, p. 43.
4. Sandrea, Ivan, and Sandrea, Rafael, "Global Offshore Oil—Growth expected in global offshore crude oil supplies," OGJ, Mar. 5 & 12, 2007.
5. Dittrick, Paula, "Worldwide E&P spending reaches record," OGJ, Sept. 3, 2007.
6. Goldman Sachs Global Energy Report, Feb. 20, 2007.
7. Editorial, Oil & Gas Financial Journal, April 2007.
8. Lake, Larry W., Schmidt, Raymond L., and Venuto, Paul B., "A Niche for Enhanced Oil Recovery in the 1990s," Schlumberger Oilfield Review, January 1992.
9. "China Nanpu Oil Find Shows Pitfalls of Estimating Reserves," Rigzone News, Aug. 17, 2007.
10. Verma, M.K., "The Significance of Field Growth and the Role of Enhanced Oil Recovery," USGS Report, 2000 (www.pubs.usgs.gov).
11. Technical Updates, US DOE, March, 2006.
12. Saleri, N.G., OGJ, Oct. 4, 2004, p. 25.
13. Sandrea, R., "What About Deffeyes' Prediction that Oil will Peak in 2005?," Middle East Economic Survey, Vol. 48, No. 37, Sept. 12, 2005.
14. "Highlighting Heavy Oil," Schlumberger Oilfield Review, Summer, 2006.
15. AAPG Hedberg Conference," Nov. 12-17, 2006, Colorado Springs, Colo.
16. "Worldwide EOR Survey," OGJ, Apr. 17, 2006.

New Zealand

L&M Petroleum Ltd., Wellington, NZ, took a farmout on PEP 38521 in the Westland basin of New Zealand's nonproducing South Island.

The 336 sq km block contains the Fireball Creek and Pounamu prospects and several leads.

L&M will be appointed operator and will earn 32.5% interest by funding 65% of the cost to drill a well to no more than 500 m to test the Fireball Creek Prospect. Two nearby wells drilled in the 1940s blew out while drilling and flowed gas (OGJ Online, Feb. 28, 2006).

The agreement gives L&M an option to increase its equity to 48.75% in exchange for funding the farmor's share of the cost of undertaking unspecified exploration before March 2009.

Block interests after the farmout are L&M 32.5%, Pacrim Energy Ltd. 35%, and McKenzie Petroleum Ltd., E.F. Durkee & Associates, Gallagher Research & Development Co., and Labrador Energy Inc. 8.125% each.

Philippines

A group led by PearlOil (Ragay) Ltd. plans to spud a wildcat in December 2007 on the Monte Cristo Reef prospect in the offshore 10,800 sq km SC 43 block in the Southeast Luzon basin southeast of Manila.

The well will be deviated from a land location to a projected TD of 2,255 m.

PearlOil, a subsidiary of Aabar Petroleum Investments Co. PJSC of Abu Dhabi, became operator of the Ragay Gulf service contract earlier this month with 64% interest. Premier has 21%, and PNOC Exploration Corp. has 15%.

Pearl is to carry Premier's costs for the well, which targets oil in the Oligo-Miocene Panaon limestone. Little offshore exploration has occurred in the area despite available data that show several interesting trap types and a working hydrocarbon system, said Premier, which acquired the acreage several years ago (OGJ Online, Jan. 14, 2004).

PNOC said the contract area has numerous prospects in 50-150 m of water within 20 km of shore.

Illinois

BPI Energy Inc., Cleveland, said it sold 185.3 MMcf of coalbed methane from its Illinois basin properties in the fiscal year ended July 31, up 37% on the year.

The company has completed and tied in 30 wells in addition to the 91 that were producing gas as of July 31, when it reported reserves of 16.2 bcf.

The typical well at the company's 10,000-acre Delta field in Saline County, Ill., costs $186,000 for 185 MMcf of gross reserves. The coals are less than 500 ft deep. The received gas price fell 22% to $6.50/Mcf in the fiscal year ended July 31.

Installation of a new compressor at Delta increased capacity to 1.5 MMcfd. At the end of October 2007 production was 900 Mcfd and sales were 750 Mcfd.

The company also has a 10-well pilot in Macoupin County.

BPI Energy, with 512,000 acres, controls the dominant acreage position in the 60,000 sq mile Illinois basin.

Shell develops spill-response program for Beaufort work

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Spiltec
Woodinville, Wash.

David F. Dickins
DF Dickins Associates Ltd.
La Jolla, Calif.

Susan M. Moore
Shell
Anchorage

Designing contingency measures for potential accidents is particularly important in remote environments.

This article discusses Shell's oil spill response planning for exploration in the Alaskan Beaufort Sea, focusing on how the company will protect the Arctic environment. With carefully planned operations, properly equipped vessels, redundant equipment sets, and numerous other safeguards, Shell is prepared to handle any potential spill.

More than 140 wells have been drilled in the Canadian and US Beaufort and Chukchi Seas, with no well blow-outs. The US incident command system (ICS) for emergency management organizes spill plans according to a tiered response system, progressing from Tier 1 (small, locally significant), Tier 2 (medium, regionally significant), to Tier 3 (large, nationally significant). This article focuses on strategies that can quickly remove large volumes of oil if ice precludes an effective Tier 3 worst-case discharge response based solely on mechanical recovery systems.

The scope of this discussion includes technical, planning, and operational considerations for implementing specific offshore recovery and removal strategies in which ice dictates the appropriate choice of spill-response tactics.

Many important response topics are more fully described in Shell's regional exploration oil-discharge prevention and contingency plan, submitted to the US Dept. of Energy's Minerals Management Service in January 2007. That document includes details of community and agency notification, environmental impact assessment, wildlife rescue and rehabilitation, shoreline protection, communications, reporting, and spill-management systems.

Shell's offshore drilling program involves two floating drilling systems (OGJ, Oct. 1, 2007, p. 40) supported by nine vessels (including four polar icebreakers). The support vessels carry fuel and supplies, transport personnel and equipment, provide anchor-handling, ice management, and oil spill response services, including the ability to store recovered products.

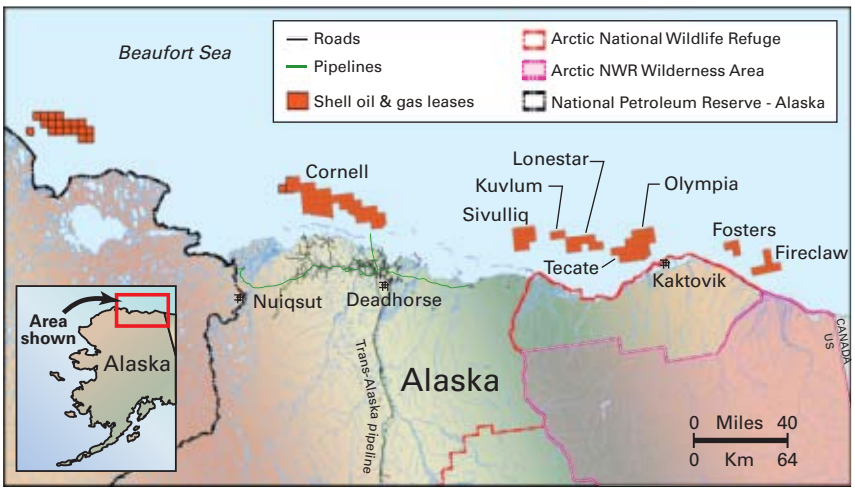
The plans include offshore activities over 4 months, July-October, in water about 100 ft deep, about 15 miles offshore (Fig. 1). The drilling program is planned to begin after the nearshore fast ice has broken up and drilling will proceed in predominantly open water conditions from early August on. Because of the possibility of ice incursions during the open water period, however, and the natural variability of the timing and duration of freeze-up, Shell's oil spill response strategies and tactics are designed to cover a wide range of open water and ice conditions (Fig. 2).

Planning, resources

Based on previous exploration programs in the Chukchi and Beaufort Sea regions, Shell has the experience to drill in extreme arctic conditions. Shell's goals are to prevent oil spills, protect the environment, and work with local communities to understand and preserve their cultural needs. Proper planning, selecting advanced ice-capable vessels and equipment, continually training on location, and relying on local knowledge help create a reliable oil spill prevention and control program for the Beaufort Sea.

BEAUFORT SEA LOCATION

Fig. 1



Steps taken by Shell include:

• Developing a comprehensive Beaufort Sea regional exploration oil-discharge prevention and contingency plan reviewed and approved by state and federal agencies.

• Developing a critical operations and curtailment plan specifying strict procedures to monitor weather and hazardous ice conditions.

• Chartering capable vessels and equipment that can be activated immediately and could operate for extended periods in open water and broken ice conditions, to mechanically contain and recover spilled oil or eliminate oil using controlled burning.

• Conducting studies and ongoing field surveys of the marine operating environment (ice, weather, and sea conditions) in the Beaufort Sea.

• Preparing a comprehensive assessment and continually reevaluating countermeasures (mechanical removal, burning, dispersant application, and tracking) for their appropriateness and reliability in extremely cold climates.

• Identifying specific response strategies and developing tactics that could be implemented safely and effectively in a broad range of conditions including:

drifting ice floes at breakup, open water, summer ice incursions, and new ice at freeze-up.

Operating environment

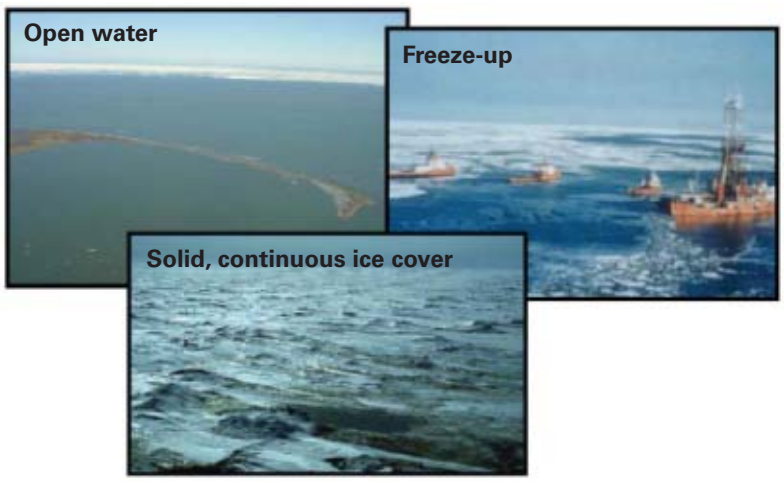
Shell and its response contractors are aware that traditional containment and recovery operations, while most effective during the open water period, may be interrupted by ice at the end of breakup (early August), during summer ice pack incursions, and during early freeze-up (late October).

Late in the drilling season, marine operators face additional difficulties imposed by increasingly low temperatures and rapidly diminishing daylight.

Shell's team selected response tactics while aware of the constraints imposed by the unpredictable and dynamic environmental conditions. The company has examined and prepared for various wind and sea conditions, types and amount of ice, reduced visibility, and other conditions that influence selection of appropriate oil-spill response countermeasures.

WATER, ICE CONDITIONS

Fig. 2



Response strategies

Shell's offshore and nearshore spill response plans include keeping dedicated personnel and equipment in constant

readiness. The staff is drawn from Alaska Clean Seas (ACS), ASRC Energy Services Response Operations LLC, consultants, and Shell personnel, supported by an ice-capable marine fleet supplied by Edison Chouest Offshore LLC and Crowley Maritime Corp. (Fig. 3).

Response systems are maintained ready for immediate deployment with trained personnel from vessels and barges on site and close to the drilling rigs. The ice-strengthened vessels and barges carry high-volume-throughput skimming systems that can recover oil and emulsions at rates that are several times the worst-case discharge planning standards required by federal and state regulations.

Two large skimming vessels, each with two Lamor 5-brush skimmers, permit several ways to use these systems downstream of a blowout. One configuration involves recovery of oil downstream of an open-apex, oil-deflection system with one oil-spill response vessel, while the other vessel moves to a backup storage tanker to unload its recovered oil emulsion (Fig. 4).

The presence of cold water and ice can actually enhance response effectiveness by limiting oil spreading and slowing the weathering processes that can make oil more difficult to recover or burn. By working with the natural environment as much as possible (e.g., allowing oil to be contained by ice), responders can often increase the response window-of-opportunity and improve the effectiveness of mechanical recovery and in situ burning techniques.

Deliberate ice management (breaking large floes and moving or deflecting ice) can be used in some situations to extend the operating window for booms and skimmers (Fig. 5). The goal is to have access to a range of response options that provide the greatest flexibility in being able to deal with rapidly changing offshore environments.

As ice concentrations progress from open drift to heavier pack ice conditions, mechanical recovery systems experience progressively lower oil encounter rates (are less effective) because crews must shift from large open-apex boom configurations to individual, over-the-side skimmers. Operating with smaller, more maneuverable skimmers, responders can reach pockets of oil trapped against or between ice cakes and floes or in leads. These pockets of oil may also be accessible with over-the-side skimmers deployed from the larger response vessels.

As the effectiveness of mechanical recovery declines in expanding ice coverage, Shell would work closely with the unified command and the Alaska regional response team to assess continually the potential for controlled burning. Once authorized, Shell would refocus the primary response effort toward burning the oil contained naturally by the ice. Ignition during such operations normally involves use of a helitorch, an aerial ignition device hung from a helicopter, to set fire to the oil safely and reliably.

Combustion may also play an important immediate role for safety reasons in the unlikely case of a blowout. Because of the potential for large quantities of natural gas and vapors from the surfacing oil directly over the blowout, it is likely that a decision would be made to ignite the gas as soon as the drilling rig moves off location. This action would eliminate the risk of a dangerous accidental ignition when vessels are close to the blowout, and under certain conditions the burning of the gas cloud could eliminate a significant percentage of the surfacing oil as well.

Because of the importance of controlled burning as a rapid and effective means of eliminating large volumes of oil quickly with and without ice, Shell has purchased and trained with state-of-the-art equipment (i.e., fire boom, helitorches, hand-held igniters, etc.) for the burning of oil in place under a wide range of environmental conditions (Fig. 6).

If the oil is properly contained (by fire booms or ice), burning even relatively thin layers only a few millimeters thick can be 50-70% efficient. Thicker oil layers commonly achieved in booms or wind-herded against ice or a shoreline can easily support removal efficiencies exceeding 90%. With burns potentially eliminating about 1,000 bbl oil/hr over a burn area only 100 ft diameter, the combustion of oil holds promise for a spill source that has a fixed location, is relatively localized on the sea surface, and consists of highly flammable, fresh oil.

The burn strategies described in Shell's oil spill contingency plan include realistic assessments of the constraints in burning of oil on water. For example, many oils that are emulsified beyond 25% (water-in-oil) are difficult to ignite; and, should winds exceed about 20 knots, it may also be difficult to burn. All burning must be approved and carried out according to key safety issues, including avoiding other flammable slicks close to the controlled burn, completing all burning safely away from any vessels or facilities, and planning the burn so that the products of combustion (primarily the visible smoke plume) do not impact communities and other sensitive resources downwind.

The controlled, in situ burning of oil, especially during extreme operating conditions that could reduce the efficiency or the safety associated with physical removal techniques, often provides a highly effective alternative response option. Controlled burning, especially in cold climates (with or without ice present) is a proven method to eliminate large quantities of oil with minimal logistics and without the need to store massive quantities of recovered oil.

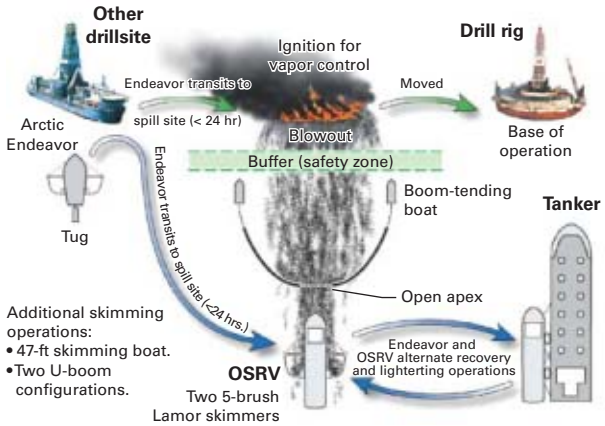
By working closely with regulatory agencies and carefully monitoring the trajectory of the smoke, Shell can ensure oil is burned with minimal environmental impact. Oil burns can be limited to sites that are a safe distance, generally 3 or more miles downwind of people and carried out in full compliance with federal

SHELL'S MARINE FLEET, BEAUFORT SEA

Fig. 3

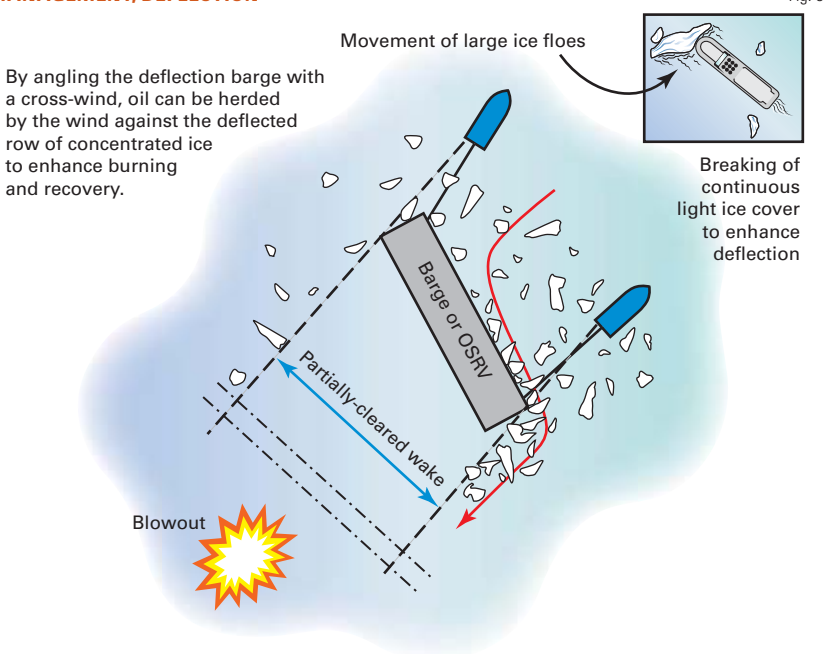
PRIMARY RESPONSE TO AN OFFSHORE BLOWOUT

Fig. 4



ICE MANAGEMENT, DEFLECTION

Fig. 5



and state guidelines.

Shell also recognizes the potential for dispersant application in certain environments where wind and sea conditions may preclude or seriously reduce the safe and effective use of booms and skimmers. This involves use of fixed-wing aircraft or helicopters to apply chemical dispersants. There are also times when dispersant use might be considered to enhance elimination of oil that has escaped mechanical cleanup and controlled burning operations.

While the use of chemical dispersants is not proposed in Shell's current oil spill contingency plan, it is clear that progress is being made to understand better the full potential for dispersant use even in very cold climates. With sufficient mixing energy and water depth for safe and effective dispersion, there could be situations in which the net environmental benefits for dispersant use far outweigh any potential negative impacts.

For this reason, Shell has arranged for personnel and equipment to be available on short notice following any major spill just in case there is a request by the unified command to consider dispersant use.

Key planning

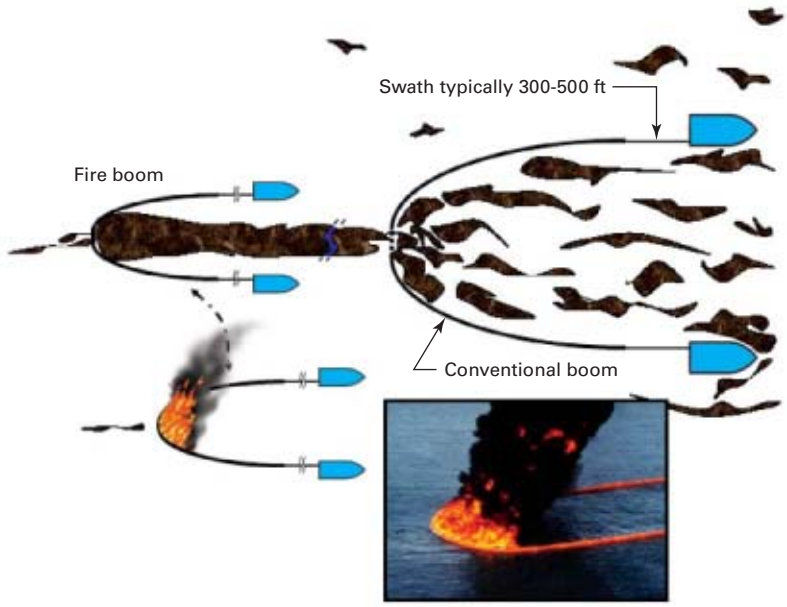
Shell, together with its highly trained primary response contractors, ASRC Energy Services (AES) response operations and Alaska Clean Seas (ACS), has developed a comprehensive oil-spill response program for its Arctic exploration program in the Alaskan Beaufort Sea.

In the remote event of a major spill, Shell's response team will be ready, on location, to recover and eliminate as much oil as possible, and to minimize environmental impacts.

Shell's conventional open-water containment and recovery systems are capable of dealing with discharge volumes more than four times greater than the federally or state mandated worst-case discharge in open water (less than 10% ice concentration) and potentially at a reduced capacity over a range of open drift conditions (10-60% ice concentration, depending on the ice distribution and floe size). In a typical year, these conventional systems apply through most of the drilling season from early August to mid-October or later. In more severe ice concentrations (drifting floes at breakup, heavy ice incursions in summer and new ice at freeze-up), the effectiveness of mechanical recovery systems (with or without booms) drops

Containment and relocation for burn

Fig. 6



sharply enough that response strategies need to include burning of oil to achieve high oil removal rates.

Controlled burning is a proven arctic response strategy developed in more than 30 years of experience incorporating extensive lab and tank testing, large-scale field trials, and actual incidents. Established guidelines are in place to allow in situ burning to take place with scientifically monitored safeguards to protect responders, the environment, and local populations.

The physical characteristics associated with Shell's worst-case spill scenario (i.e., the nature of the release and environmental conditions) support the choice of burning as an effective response option in any significant ice cover. Key considerations in support of this position include:

- The fresh nature of oil released to the surface.
- Limited oil spreading due to reduced temperatures.
- Slower weathering rates related to thicker films and lower wave energy.
- A high potential for effective oil containment with ice in any close pack condition.
- Moderate sea states commonly associated with any significant ice cover.

At an operational level, by having vessels and critical resources at or near the drilling locations, responders are able to access the oil quickly and implement the most appropriate response strategy according to conditions at the time. The availability of four highly capable support icebreakers, including the latest generation of vessels with azimuthing (rotating) drives, provides an opportunity to effectively to manage the ice for spill response through such measures as ice deflection, flushing trapped oil from beneath small floes, and breaking down large floes to expose oil for burning or recovery.

Important issues and uncertainties affecting the success of a spill response in ice involve the unpredictable and dynamic nature of the offshore environment and challenges of operating late in the season with freezing temperatures and darkness.

Fortunately, at that time the ice acts as an effective containment mechanism, minimizing the contaminated area and maintaining thick oil films for burning through aerial ignition (reducing the exposure of responders on the surface to extreme conditions). In the case of a late-season incident, proven techniques are available to track oiled ice for extended periods and to take advantage of opportunities to access the oil with helicopter-transported crews as the ice develops. ✦

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Satellite data estimate worldwide flared gas volumes

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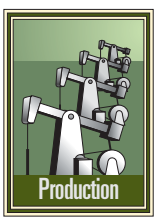

For the past several years, a study led by the National Oceanic and Atmospheric Administration (NOAA) has developed procedures for independent estimation of flared gas volumes worldwide using satellite remote sensing.

None of the currently available earth observation sensors is designed or flown specifically for observing gas flaring, although several satellite systems can detect gas flares based on the radiative emissions from the flames.

Oil producers often flare associated gas because an area has no infrastructure for marketing or using the gas. Venting the gas, without combustion, is another alternative used in these production areas without infrastructures.

While producers keep reasonable records on the quantities of oil and natural gas brought to market, the quantities of natural gas flared are much less known.

Gas flaring wastes an energy resource, is a source of local pollution due to trace chemicals in the gas, and adds to the carbon burden in the global atmosphere.

In recent years many companies, governments, and international groups have sought to reduce gas flaring. The World Bank's global gas flaring reduction (GGFR) initiative has published gas flaring estimates for 20 countries and has worked with individual countries to encourage alternatives to gas flaring.

Because there are no requirements for reporting gas flaring volumes, it is difficult to know whether these efforts are succeeding in reducing gas flaring.

Satellite systems

Satellite systems vary substantially in terms of their spatial resolution, repeat cycle, and collection-processing cost.

High spatial-resolution imaging systems enables the detection and accounting of the number of individual gas flares at a site. The Google Earth (GE) system provides access to a substantial quantity of high spatial-resolution satellite imagery for sites around the world acquired by the Digital Globe Corp. If one knows where to look in GE, it is possible to find active gas flares.

Fig. 1 shows a set of nine gas flares at three closely spaced sites located in GE. The Digital Globe imagery on the left was collected on Aug. 21, 2003. As a comparison, a newer image, on the right, collected by Digital Globe on Sept. 24, 2007, found only one of the nine flares active.

The loss of eight gas flares could indicate that gas flaring was reduced, or it might be chance that the other eight were not active at the time of the second image collection. The observations clearly require a larger number of observations to document a reduction in gas flaring.

The slow revisit rate and high cost of acquiring and analyzing high-resolution imagery makes it impractical to consider global monitoring of gas flares with these sources. The alternative is to monitor gas flaring with meteorological or environmental satellite data having coarser spatial resolution, global coverageand higher temporal frequency.

Global map

To find the gas flares in Fig. 1, we required prior knowledge of gas flaring locations and zoomed in on these gas flares with a global map of gas flares generated with coarse spatial resolution

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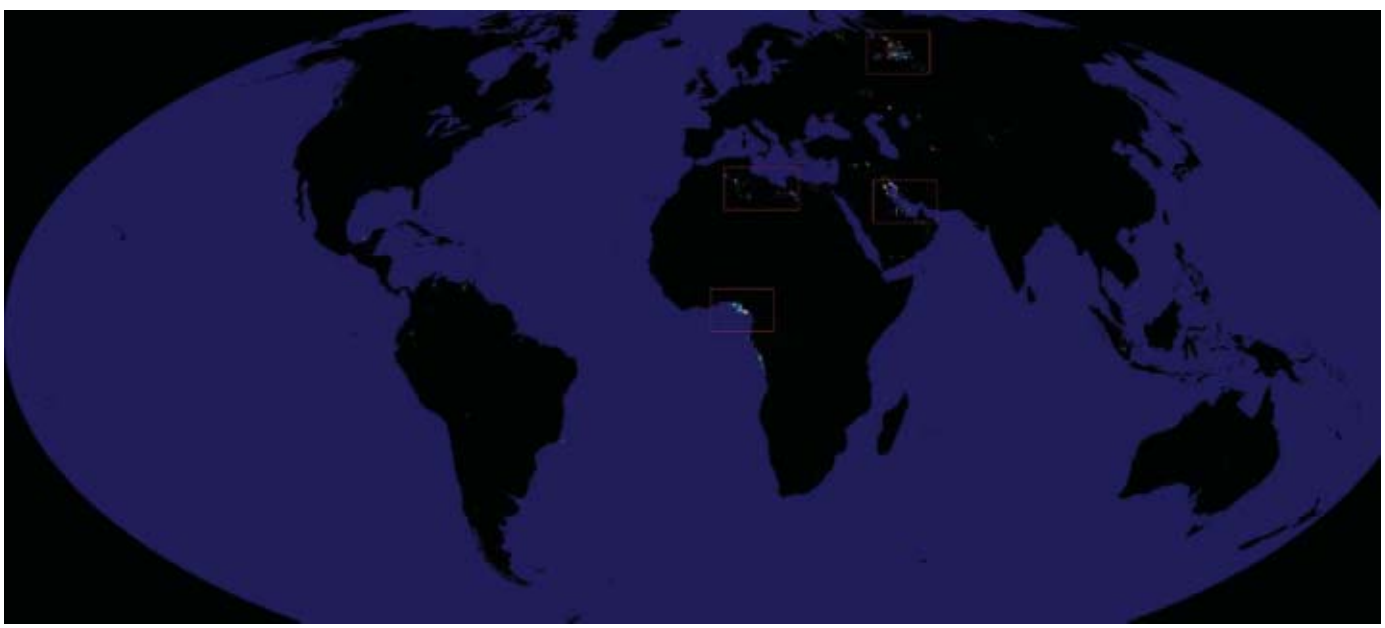
The image on the left shows nine individual flares on Aug. 21, 2003, while in the image on the right only the ninth flare was active at the site on Sept. 24, 2007 (Fig. 1).



This image shows gas flaring regions of the world in a Mollweide 1-km equal area projection. The images are color composites made with the annual data from 1992 (blue), 2000 (green) and 2006 (red). Note that the colors of the flares indicate their activity patterns during the 3 years used in the color composite. Flares active in 2006 but not in 2000 or 1992 are red. Those active in 2006 and 2000 are yellow. Those active in 2000 but not in 1992 or 2006 are green. Those active in 1992 but not in 2000 or 2006 are blue (Fig. 2).

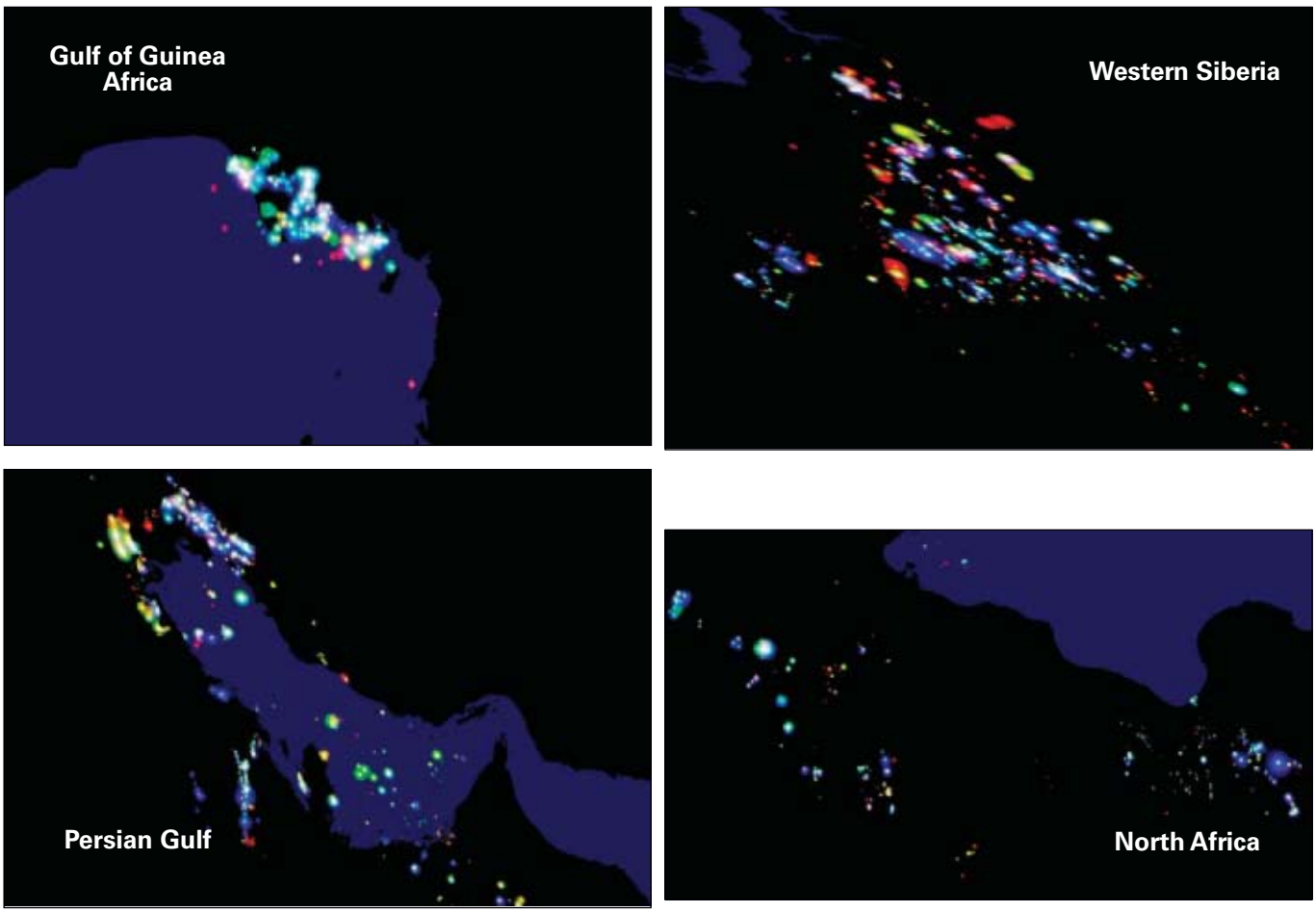
(>1 sq km) high-temporal-frequency satellite imagery acquired by the US Air Force defense meteorological satellite program (DMSP) operational line-scan system (OLS).

OLS collects global cloud imagery with a pair of broad spectral bands placed in the visible and thermal ranges. One benefit of working with data sources such as OLS is that it collects many observations every year.

The DMSP satellites are in polar orbits and each collects images from 14 orbits/day. With a 3,000 km swath width, each OLS can collect a complete set of global nighttime images in 24 hr. At night, a photomultiplier tube (PMT) intensifies the visible band signal, enabling OLS to detect moonlit clouds.

The boost in gain enables the detection of lights present at the earth's surface. Most lights are from outdoor lighting in cities and towns. The OLS sensor can also detect wildfires and agricultural burning, but these are short-lived. It also can detect light from gas flares, which can be identified easily when they are offshore or in isolated areas not affected by urban lighting.

The study involved the processing of a time-series of annual cloud-free composites of OLS nighttime lights span-



Four major gas flaring regions of the world in a Mollweide 1-km equal area projection are the Gulf of Guinea region of Africa, Western Siberia, Persian Gulf (third image), and North Africa. The images are color composites made with the annual data from 1992 (blue), 2000 (green), and 2006 (red) (Fig. 3).

ning 1992 through 2006. Gas flares were identified visually in the nighttime lights composites based on three characteristics:

1. Because gas flares are bright point sources of light with no shielding to the sky, they tend to form circular lighting features with a bright center and wide rims.

2. Most gas flares are active for a period of years, but a few gas flares persist with little change in intensity for a decade. Thus many gas flares exhibit color in color-composite images made with data from the beginning, middle, and end of the nighttime lights time series.

3. Gas flares tend to be in remote locations, outside of urban centers. Offshore gas flares are easy to identify. For onshore gas flares, the study reviewed a US Department of Energy population density grid to evaluate lights identified as potential gas flares. Vector polygons were created to outline and identify gas flares for individual countries. The study found gas flaring in 60 countries.

By combining the polygons for all of the countries, the study extracted a global map of gas flaring as observed by the OLS for each year from 1992 to 2006. Fig. 2 is a colorized version of the global map of gas flaring made with flaring from 1992 as blue, 2000 as green and 2006 as red. This global map is available at http://www.ngdc.noaa.gov/dmsp/interest/gas_flares.html.

Areas with many gas flares include the Gulf of Guinea, North Africa, Persian Gulf, and Western Siberia (Fig. 3).

Estimated volumes

The study developed a method for estimating gas flaring volumes for individual countries based on a "sum-of-lights index" and a set of reported gas flaring volumes for countries (from the GGFR) and individual flares.

The "sum-of-lights" index values are the tallies of the digital number values extracted for the gas flares of a particular country or an individual flare. The values are intercalibrated so that the data from each year can be pooled and quantitatively compared. Note that the study was unable adequately to intercalibrate the data from the early part of the OLS record (1992-94).

The steps in developing the calibration included removal of outliers, regression modeling, and establishing

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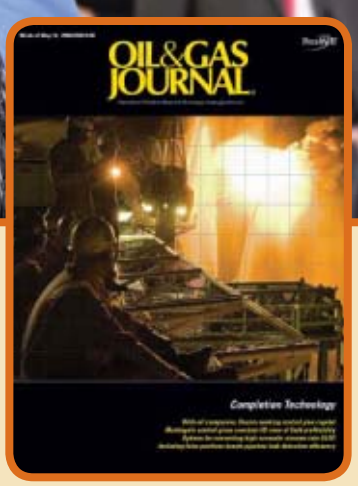

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[1] *Signet Readership Survey (February 2007)*

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the prediction interval of the model (Fig. 4).

Following is the model:

Volume in billion cu m = 0.00002646 × Sum of lights index

$R^2 = 0.978$

P-value <2.2e-16

The study used this model to estimate the billion cu m of flared gas for the individual countries with a 90% prediction interval. The prediction interval of the regression model is about 1.61 billion cu m, which defines the upper and lower bound for the volume estimates as a form of an error bar for each estimate.

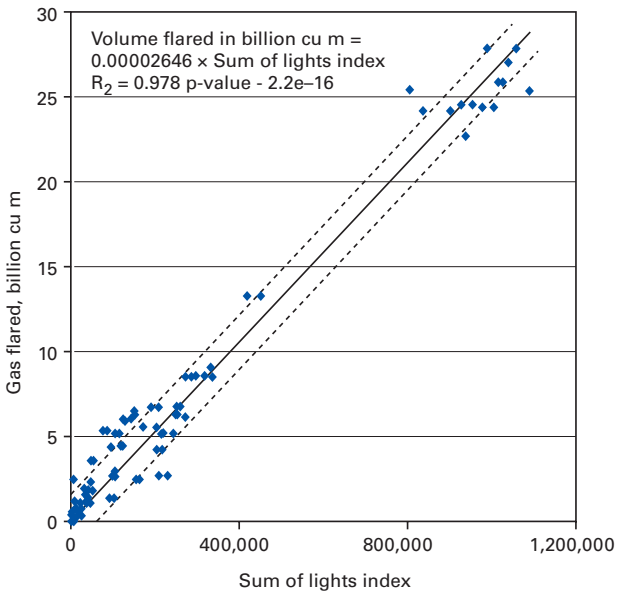
Gas flaring volume estimates for individual countries were based on the sum of lights index values. Fig. 5 shows the estimates for individual countries or areas for 2004. The estimates for Russia are broken out for the autonomous territory of Khanty-Mansiysk and the rest of Russia.

The combined estimates indicate that gas flared in Russia was about twice as much as in Nigeria.

The combined volume estimates for all countries provides an estimate of global gas flaring (Fig. 6).

GAS FLARING VOLUME CALIBRATION

Fig. 4

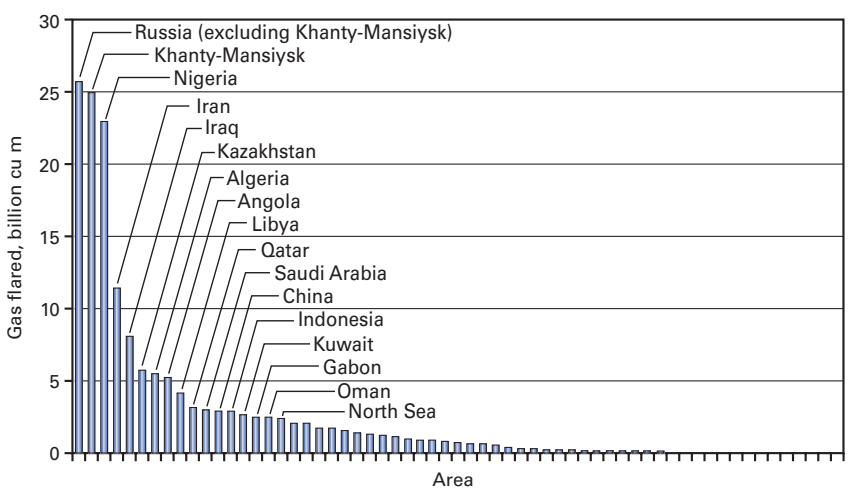


Note: Regression line is solid while dashed lines show the 90% prediction interval.

The figure indicates that overall flaring from 1995 to 2006 has remained largely stable at 150-170 billion cu m. There were dips in gas flaring in 1999 and 2002. Gas flaring increased by more than 10 billion cu m 2002-03 and then declined for 2 years after that before increasing again in 2006.

2004 GAS FLARING ESTIMATE

Fig. 5



Study results

The study provides gas flaring estimates for 60 countries or areas, tripling the number listed by GGFR.

While Nigeria has been widely reported as the country with the largest volume of gas flaring, satellite data indicate that Russia flares twice as much gas as Nigeria.

Global gas flaring has remained largely stable for the past 12 years, remaining in the range of 150 to 170 billion cu m.

The global gas flaring estimate for the year 2004 is 160 billion cu m, slightly higher than the GGFR estimate of 150 billion cu m. The DMSP estimate of 160 billion cu m of flaring in 2004 is 25% of the US natural gas consumption that year and represents an added carbon dioxide emission burden to the atmosphere of 400 million tonnes.

It should be noted that the study could not address several areas of uncertainty, including possible errors in the reported gas flaring volumes used in the calibration and environmental effects on flare size and brightness in the OLS data.

We fully expect gas flaring volumes estimates will improve in the future through the inclusion of multiple satellite data sources. It is also clear that improvements in satellite estimates of gas flaring will require reliable sources of in situ measurements of gas flaring volumes for calibration.

The independent estimates of gas flaring volumes from satellite observations will play a key role in guiding efforts to reduce gas flaring. In many cases national governments responsible for establishing the regulatory framework for resource extraction have not known the magnitude of the flaring.

Companies engaged in building infrastructure for using or marketing associated gas may also find the estimates useful. Also with the data,

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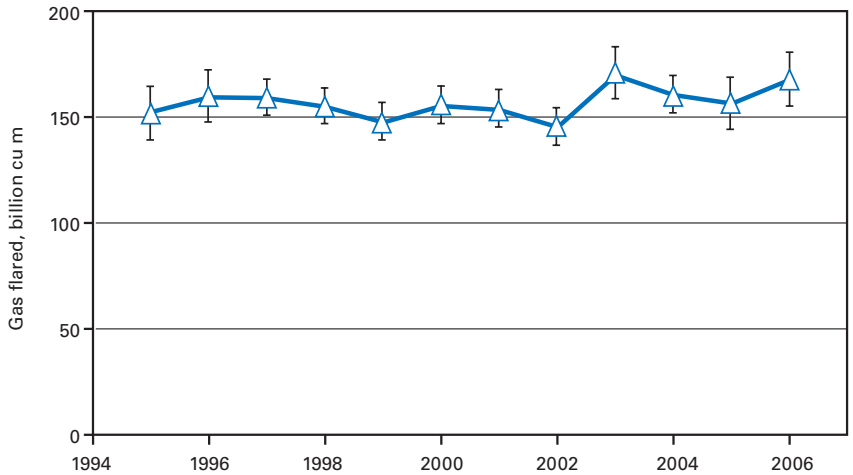
GLOBAL ESTIMATE FROM DMSP DATA

Fig. 6



international petroleum companies can assess the efficacy of efforts made to reduce gas flaring in remote locations under the direction of their subsidiaries and contractors.

Satellite remote sensing has moved from a curiosity to an operational and vital capability in the effort to reduce and ultimately eliminate most gas flaring.

Acknowledgment

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CONDENSATE EAST OF SUEZ: NGL and its Naphtha Impacts in Asia Pacific and Mideast Gulf

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This report explains how the protean nature of condensate allows it to be used in a wide range of sectors: as a refinery slate component; in specialized distillation towers called condensate splitters; in direct feed to ethylene crackers; in gasoline blending and as a substitute for gas in turbine power generation. It can be defined as a base material, a blending component, a feedstock or a boiler feed.

See website for Table of Contents and sample tables, charts and graphs.

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Corporate culture key to safety performance

David N. Nakamura
Refining/Petrochemical Editor

A company's safety performance and avoidance of catastrophic events is a direct result of the organization's corporate culture, according to Carolyn Merritt, Former Chairman of the US Chemical Safety Board (CSB).

Speaking at the National Petrochemical & Refiners Association Q&A and Technology Forum, Oct. 10, in Austin, Merritt discussed corporate safety cultures, and their relation to catastrophic events, including the BP Texas City explosion (OGJ, Jan. 23, 2006, p. 51), the space shuttle Columbia disaster, and the Bhopal incident.

According to Merritt, a company's culture is really reflected in the bonus and promotion structure.

"If your bonus and promotion structure is based only on cutting costs and maintaining cost levels, then there's a problem. If it's only [based] on production and not worrying about quality, it's a problem," she said. "There are some long-term, short-term messages. You know that there are times that you have to operate under short term. When that short-term operating process becomes your long-term process, that's when you have a problem."

> *"Corporate cultures do not want to address problems and therefore they choose not to do the process safety implementation that would prevent catastrophic events from happening."*

Layers of protection

Merritt discussed safety in the context of the "layers of protection" model. Layers of protection between employees and potential risk or harm will decrease the risk of an accident.

"The problem is people are very good at bypassing, or putting holes in those layers of protection. If they put enough [holes] in there, you're going to have a hit somewhere along the line," she said. "But there is another potential removal of a layer of protection that has a much greater risk than what the individual can do. And that is a corporate culture."

Downsizing, combining of departments, and budget cuts severely affect the infrastructure, training, hiring, and placement of people. This results in the removal of whole layers, not just poking holes in them.

Merritt said that companies must pay attention to the commonalities between past catastrophic events.

"It's the culture that...allowed these accidents to happen. And that culture exists in all the catastrophic accidents," she said.

Columbia disaster

Merritt discussed the events and investigation findings behind the space shuttle Columbia disaster.

"The first thing that the accident investigation board found was that this accident was not an anomalous random event," she said. "That means that it was predictable and preventable."

The organizational findings that the investigation board found, according to Merritt, were:

- Management was rewarded for budgeting and scheduling goals, and ignored employee concerns.
- There were communication silos.

"If you have a culture where no bad news is really wanted, then you have a culture that sets the stage for a catastrophic event," Merritt said.

• Inaction to warning events. There were 107 space shuttle launches before the Columbia accident in which spalling of material occurred. But nothing bad had ever happened as a result of this. The management began to believe that nothing bad could happen. When employees said this was a problem, they were disregarded because nothing bad had ever happened before, according to Merritt.

• There was reliance on safety history rather than good engineering analysis. And there was a loss of knowledge and experience. Challenger had happened almost 17 years to the day from the Columbia accident investigation. Many people who had direct learning experience with the accident had moved into other jobs, other positions, or left the organization.

• Management complacency to inherent risk.

"NASA will lose more shuttles and astronauts unless it transforms not its engineering, but its broken safety culture," Merritt said.

Bhopal

Merritt said that the cause of the Bhopal accident was due to "a failure to respond to known risk, drastic cost cutting, warnings were not investigated or addressed, emergency safety equipment wasn't working, poor maintenance of critical equipment, qualified supervision had been reduced, worker training was inadequate, and there was a slow response to increasing risk."

Union Carbide had identified the potential problems at this facility and had decided to shut it down, according to Merritt. The company was convinced by the Indian government to keep it open because they needed jobs.

"That change in priority was very dangerous," she said. "And they were actually going to shut it down because of known risks."

BP Texas City

Merritt discussed the key findings of the CSB's investigation of the BP Texas City explosion:

• There was a failure to assess the effect of drastic cost cutting. "Cost cutting occurred throughout all of BP's operations, including Alaska pipeline operations, which also had problems in recent years," she said.

• Failure to respond to internal audit warnings. There were multiple internal surveys, both from a facility and a corporate level, which BP did not respond to. How they responded to warnings was a greater emphasis on personal safety and a drive to reduce lost-time incident rates.

• Reliance on presumed past performance.

• Abnormal situations were not reported or corrected.

• There was a known unsafe design even in BP's own policies. "They were going to replace these blowdown drums," she said. "Blowdown drums had been replaced throughout the industry and BP, when it came time to make that decision, made it based on budgets rather than known design problems and known safety hazards."

• Supervisors and operators were not adequately trained. There was no recognition of human factors.

• There was a lack of regulatory oversight.

• There was an overall complacency to risk.

> *"Corporate culture is the intentional management of the potential impact of unintended business decision consequences. Companies do not intend to kill people. You have to believe that because the alternative is unthinkable."*

Corporate culture

Merritt listed the common elements that the CSB has found in every investigation:

• The process safety management rules for hazard awareness identification were not fully implemented.

• Written procedures were either nonexistent or so poor that they did not reflect how to operate a process safely.

• Training was either nonexistent or so poor that it did not allow operators to understand how to operate when things were not only going well, but when things were going very badly.

• Maintenance and management of change were poor.

• Emergency preparedness is important, but what the CSB found in many of the investigations is that even for small releases, operations emergency preparedness did not exist.

• Community responders and people in the community did not know what to do in the event of a release.

• Incident investigations. Near misses are supposed to be investigated, corrected, and reported; however, many were not.

• Most facilities perform some kind of auditing. Most of the audits done were either not responded to, not corrected, or they didn't recognize a growing risk path to a catastrophe.

"Operations cultures and corporate cultures do not want to address these problems," Merritt said. "And therefore they choose not to do the process safety implementation that would prevent these catastrophic events from happening."

Unintended consequences

Corporate culture is "the intentional management of the potential impact of unintended business decision consequences," said Merritt. "Companies do not intend to kill people. You have to believe that because the alternative is unthinkable."

The commonalities in many of the

events, according to Merritt, include the failure to recognize, investigate, and correct warning events; reduction in well-trained personnel and qualified, experienced management; loss of sound engineering, safety practices, maintenance, and mechanical integrity; significant impact of cost cutting on safety, revealed by audits possibly; and escalating risk, which is reported to and denied by executive management.

Merritt said that companies must understand the difference between risk blindness and risk denial.

"Risk blindness is not knowing that a hazard exists," she said. "Risk denial is that you know that a hazard exists, and you may even know that it's growing, but you accept the fact that you're going to live with that risk because you don't think anything bad is going to happen on your watch."

Hazard management has to begin with hazard recognition. "If there was one thing you could change, it would be tearing down barriers for people reporting catastrophic or even minor upsets without retribution," she said.

"Companies must pay attention to the commonalities between past catastrophic events."

According to Merritt, the documentation exists that could prevent many of the catastrophic events from happening—letters to management, committee reports, requests by safety officers, budget proposals, insurance inspectors comments, engineering recommendations, and vendor recommendations.

The BP accident had these unintended consequences, according to Merritt:

- Lost reputation, goodwill, and corporate image.
- Lost earnings and production.
- Diminished stock price vs. its competitors.
- Fund managers have been seeking resignations and retribution and been getting them.
- BP has spent $2 billion in litigation and there are still 1,700 cases still pending.
- The company has been before congress three times in the past year.
- There's international scrutiny in all their operations.
- The organization has been restructured and there has been the loss of executive management. ✦

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8:15 – 9:45 am	Session 1 & Live Webcast
9:45 – 10:00 am	Coffee Break
10:00 – 11:30 am	Session 2 & Live Webcast
11:30 – 12:30 pm	Lunch
12:30 – 2:00 pm	Session 3 (closed session)
2:00 – 2:15 pm	Coffee Break
2:15 – 3:45 pm	Session 4 (closed session)
3:45 – 4:00 pm	Closing Remarks
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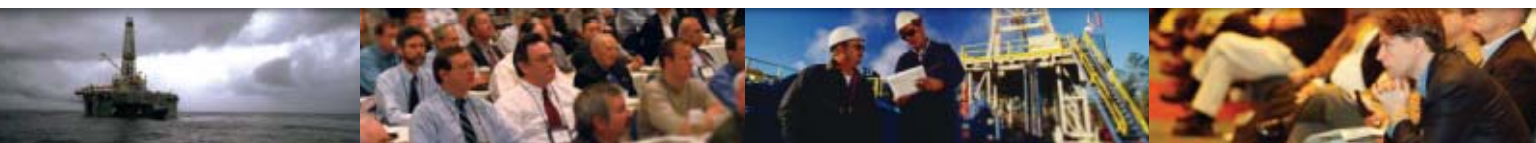

Method improves pipeline-spread silt containment

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Researchers have developed an effective silt fence and mechanized installation system ideally suited for pipeline construction. Field testing of the system has shown it to be effective on slopes up to 20%.

Observational survey results for conventional silt fence in use for boundary sediment-control range between poor at best and outright failure.

Preliminary results from field testing show Failure Avoidance Effective Silt Fence Technology is more effective and durable than conventional silt fence for sediment control. Progress toward developing automated manufacturing and installation equipment is under way, with the objective of beginning commercial production in the near future.

Background

The configuration of pipeline and other linear construction sites creates erosion and sediment control problems not typically seen on conventional rectangular building lots. The limited width of right-of-ways limits the effectiveness of sediment traps and basins generally, forcing reliance on perimeter controls. Linear configuration also virtually eliminates any opportunity to install perimeter controls on the contour to increase their effectiveness.

The US Environmental Protection Agency consistently cites sediment as the primary pollutant of concern in runoff from construction sites.[1] Increased sediment loads almost always cause degradation of streams and are also implicated in degradation of wetlands, estuaries, lakes, and reservoirs.[2]

The pipeline industry has responded to increased regulatory and public pressure in a variety of ways, including encouraging use of best management practices on pipeline construction sites. An example of this is Reasonable and Prudent Practices for Stabilization, promoted by the Independent Petroleum Producers Association.[3]

The guidance document outlining these practices presents decision trees for erosion and sediment control based on region of the US, slope, proximity to water body, and vegetative cover. In every case where erosion-control practices are deemed necessary, the document lists perimeter controls, silt fence, and straw bales as recommended practices.

The pipeline construction industry clearly has a strong interest in effective perimeter controls for pipeline construction sites. The nearly universal use of silt fence has generally yielded poor results. Improper installation, lack of maintenance, or installation on unsuitable sites, particularly those with steep or long slopes, has generally been the cause of failures. Field inspections conducted by Barfield and Hayes of more than 50 construction sites in

Controlled field testing used this test bed and rainfall simulator to test extreme conditions for silt fence deployed in the field (Fig. 1).

Researchers installed Failure Avoidance Effective Silt Fence Technology on a landfill site in Greenville, SC (Fig. 2).

Installation of a conventional silt fence at the same landfill site provided a basis for comparison (Fig. 3).

An H-flume calibrated to measure flow rate measured discharge through the fence before diverting a representative portion of the discharge and sediment to a collection tank (Fig. 4).

South Carolina and Kentucky revealed silt fence was seldom installed according to standards and specifications and was frequently installed across contour.[4]

Undercutting of the toe, inadequate detention time, overtopping, and structural failure of either the fabric or posts are the common failure modes of silt fence. At moderately steep slopes, lateral flow along the toe of the fence can erode the toe trench and lead to undercutting failure. Settling of particles, not the fence acting as filter, is the principal mechanism for trapping sediment upstream of a silt fence. The fences instead act like permeable dams.

Most silt fence installations, however, do not provide adequate detention time for settling to occur. Flow concentration at low spots may lead to overtopping failure.

The pipeline industry benefits of a silt fence system resistant to undercutting when installed in uneven, hilly terrain, and able to provide adequate detention time without failure by overtopping are clear

Any of these modes of failure can currently occur even if current technology is properly installed.

Concept

One of the primary limitations of silt fence is the failure by undercutting and lack of detention caused by uncontrolled flow along the toe of the fence. To address this problem, Failure Avoidance Effective Silt Fence Technology includes a geotextile apron extending upslope of the toe and flow barriers spaced at regular intervals along the toe. The apron and vertical portion form a continuous geotextile surface to prevent scour under the fence. The flow barriers stop the flow, further preventing scour, and form impoundments to provide detention time and allow the sediment to settle.

An additional limitation of conventional silt fence is inadequate strength of fabric under incoming loads of water and sediment, resulting in excessive bulging, stretching, and eventual failure. The traditional response has been to require fabric be reinforced, typically with a wire mesh backing. The FAEST silt fence reduces spacing between posts, providing an equivalent gain in strength.

Most conventional silt fence, especially premounted fence, has post spacing of about 10 ft. Stapling the fence to the posts also creates stress concentrations and opportunities for tearing the fabric during installation.

The FAEST system uses 6-ft spacing, allowing the fabric to withstand water and sediment loads to a depth of at least 2 ft without failure. A combination of field testing and computer stress-strain modeling has verified these results. Clamping the posts to the fabric also occurs in such a way as to minimize stress concentrations.

A mechanized installation system capable of installing long lengths of fence (up to 1,000 ft) in a single pass requires folding and rolling the fabric onto a spool. It is not feasible to roll fabric with wire mesh and carry both on the installation equipment. Making an additional pass to add the wire mesh greatly reduces the advantages obtained by mechanized installation.

A final problem of conventional silt fence FAEST addresses is failure of wooden posts to remain erect in saturated soil conditions. The posts generally included with silt fence are pre-mounted 1 in. by 2 in. pine stakes that are easily damaged when driven into the ground. They also tend to rot and otherwise deteriorate in saturated soil.

Use of stronger oak posts that do not deteriorate rapidly partially solves this prob-

FIELD TEST PARAMETERS, TRAPPING EFFICIENCY

Table 1

Test	Soil type	Lateral slope, %	Trapping efficiency, %
1	Silty clay	10.1	97.4
2	Sandy loam	9.5	90.8
3	Loam	9.4	94.1
4	Loam	13.2	87.8
5	Sandy loam	13.3	51.1
6	Silty clay	12.2	94.9
7	Silty clay	20.2	85.9
8	Sandy loam	21.2	—
9	Loam	21.2	98.9

lem. If the soil is saturated, however, even oak posts may not remain erect. FAEST uses metal posts with vanes on the bottom to help stabilize them in saturated soil.

Metal posts are slightly more expensive but have two advantages which mitigate the extra expense: they can be recovered once the job is completed and reused and they can be easily driven into hard ground with a mechanized post-driver without being damaged. The mechanized FAEST installation system includes a post driver that sets the posts at the correct depth to ensure proper support of the fence.

Performance

The first round of field testing occurred under controlled conditions. Predetermined slopes, soils, and rainfall rate and duration determined FAEST's ability to trap sediment under specific conditions. These tests finished in 2005.

The second round of field testing deployed FAEST at a landfill site in South Carolina. Deploying conventional silt fence provides a basis for comparison. Fence and monitoring equipment installation concluded in June 2007, and data collection is in process.

Controlled testing

Controlled field testing of FAEST occurred at the USDA Hydraulics Laboratory near Stillwater, Okla. Test parameters represented extreme conditions for silt fence deployed in the field, including a rainfall rate of 2.5 in./hr and slopes along the toe of the fence ranging from 9.4 to 21.2%. Fig. 1 shows the test bed and rainfall simulator.

Testing used three different soils: sandy loam, loam, and silty clay. Monitoring for each rain event captured the amount of rainfall, sediment yield from the source area (which was worked to simulate a newly-graded construction site), and sediment discharged through the fence. FAEST demonstrated very good trapping efficiency (Table 1).

FAEST traps much more sediment, shown here, than the conventional fence (Fig. 5).

While trapping sediment, FAEST remained intact with all posts erect and no undercutting (Fig. 6).

In field tests Nos. 5 and 8, scour occurred along the front (upslope) toe of the apron, causing a small gully to form which intercepted the flow before it entered the impoundments. This problem needs to be addressed for FAEST to work well in non-cohesive soils. Grading the soil at the front toe to force the runoff onto the apron and prevent the gully from forming emerged as the solution to this problem.

A need to prevent wind from blowing underneath the apron and displacing it also became apparent in the first round of field testing. Adding a back toe to anchor the apron and vertical portion of the fence prevented displacement of the apron.

The controlled field tests used metal posts and attached the fence to the posts with wire ties looped through openings in the fabric. Observation showed the fabric to be highly susceptible to damage from the ties, creating tears and openings through which excess sediment would escape. A modified post using a clamp applying continuous pressure along the entire height of the post solved the problem and held the fence in place.

Controlled field testing showed FAEST provides effective sediment control under conditions that would cause failure in a conventional silt fence.

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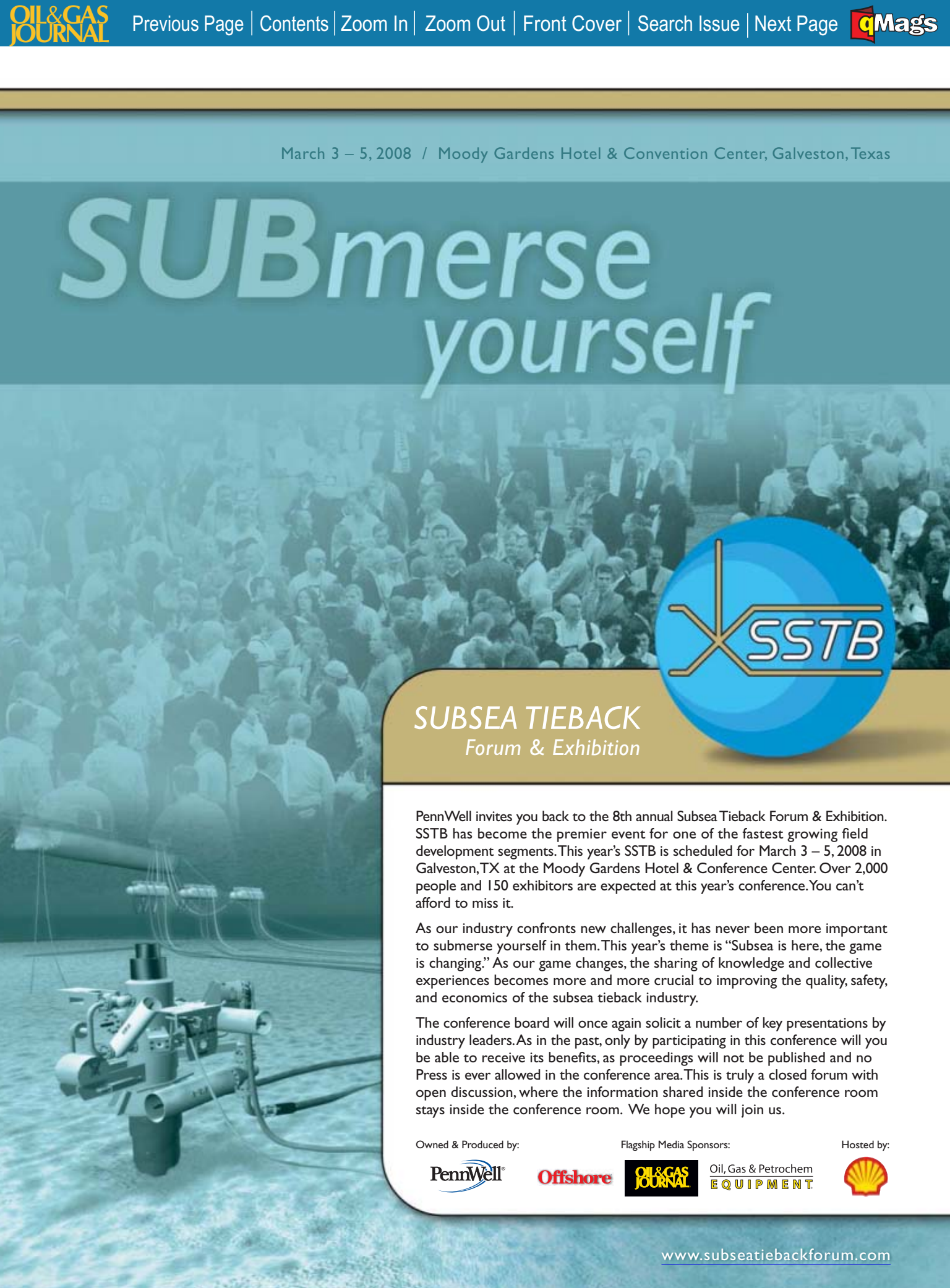

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Long-term performance

Fig. 2 shows the FAEST system installed on a landfill site in Greenville County, SC. Fig. 3 shows the conventional silt fence installed for comparison. The site used a tipping-bucket rain gauge to monitor rainfall. A calibrated H-flume measured discharge (Fig. 4). Once measured in the H-flume, the discharge passes through a flow diverter that transfers a representative portion of the discharge and sediment to a collection tank.

When rainfall of 0.25 in. occurs, the rain gauge sends an alert via cell phone to test personnel so that they know to visit the site. Rainfall needs to exceed about 0.5 in. before sufficient sample material can be obtained for laboratory analysis. Once at least 0.5 in. of head has accumulated on the H-flume, a pumping sampler begins operating, diverting discharge into 1-l. bottles.

The sampler obtains samples at 5-min intervals. Plans exist to reprogram the sampler to select a time interval based on the volume coming through the H-flume.

Removal of the trapped sediment accumulated behind the fence follows each event, with the weight of the removed sediment recorded and samples are taken for laboratory analysis of water content. This information yields the volume of sediment collected in the fence.

Discharge rates and concentrations determine the volume of sediment discharged through the fence and allow calculation of its overall trapping efficiency.

These data-collection processes occur for the instrumented portions of both FAEST and the conventional silt fence. Each sampling event is followed by a thorough cleaning of the collection gutters, flumes, and sampling tanks in preparation for the next event. A visit to check the site occurs once each month.

The instrumented installations will remain in place, and data collection continue, long enough to obtain data from three to five events greater than 2 in.

Laboratory analysis of samples from the first events is still under way.

Storms between June 14 and July 5, 2007, damaged the conventional fence installed on the same site at which FAEST remained intact (Figs. 7-8).

Visual monitoring

Visual observations made to date confirm the FAEST installation is trapping much more sediment than the conventional fence. The FAEST installation also remains erect and is not undercut, while the standard silt-fence installation has undercut rapidly and overturned more than once.

Fig. 5 shows sediment accumulation in the FAEST installation. Fig. 6 shows the FAEST installation intact, with all posts erect.

Figs. 7-8 show the damage sustained by conventional fence in the same storms. This damage occurred during rainfall events between June 14 and July 5, 2007.

Manufacture, installation

The Biosystems and Agricultural Engineering Laboratory at Oklahoma State University fabricated the FAEST fence deployed in South Carolina. Fabrication played an important role in FAEST's development, generating information regarding manufacturing issues that might arise in commercial production.

The Charles Machine Works Inc. has developed a specialized vibratory plow that can rapidly and consistently bury the toe of a conventional silt fence at the proper depth. Modifications to the conventional silt fence installation machine are under way to add the ability to bury the front and back toe simulta-

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neously as well as to drive steel posts to proper depth.

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References

1. US Environmental Protection Agency, "Developing Your Stormwater Pollution Prevention Plan," EPA 833-R-060-04, 2007.
2. Clar, M.L., Barfield, B.J., and O'Connor, T.P., "Stormwater Best Management Practice Design Guide —Volume 1—General Considerations," US Environmental Protection Agency, EPA/600/R-04/121, 2004.
3. http://www.ipaa.org/issues/hot_topics/rapps.asp.
4. Barfield, B.J., and Hayes, J.C., "Unpublished results of field evaluation of sediment controls in South Carolina and Louisville, Ky., construction operations," J.C. Hayes & Associates, Clemson, SC, 1992 and 1997.

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Correction

In the article "Spark spread trends allow analysis of LNG consumers," by David Wood, Figs. 1-3 (OGJ, Oct. 8, 2007, pp. 72-74) contained errors. The legend for each figure transposed the symbols for coal and LNG. The corresponding figures have been updated in the electronic version of the story available at www.ogjonline.com.

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Equipment/Software/Literature

New offshore capsule holds as many as six persons

The Frog-6—a higher-capacity version of the original, three-person Frog-3 (OGJ, Apr. 9, 2007, p. 67)—is designed to move as many as six persons at a time by crane.

This new Frog has been specifically developed to reduce the number of crane operations required and to decrease the time taken for crew transfers. It appears similar to the Frog-3, retaining its tetrahedral design, but with differences. The frame and seating arrangement has been expanded to accommodate six persons. The suspension system has been enhanced—comprising three peripheral springs, hydraulic dampers, and larger feet to cushion impacts and protect passengers.

Balancing the space required for six people and keeping the footprint compact led to the introduction of bench-style seating. As a result, the Frog-6 footprint is only fractionally larger than that of the Frog-3, allowing for ease of storage and landing on vessel decks. The bench seating also speeds up the process of securing a stretcher into the Frog in the event of a MedEvac scenario.

In "marine ambulance" mode, the Frog-6 can carry a stretcher and as many as two accompanying passengers. The low-temperature version of the Frog-6 is capable of transferring people in temperatures as low as –40° C.

Source: **Reflex Marine Ltd.,** 13 Albyn Terrace, Aberdeen, AB10 1YP, UK.

New gasket creates own load

The newly launched MULTI-SWELL gasket is a self-loading general service type, creating its own load when it comes into contact with hydrocarbons or water, virtually eliminating what the maker says is the most common cause of gasket failure —insufficient load.

This new material performs equally well in oil or water, does not degrade in contact with oils, and adapts easily to all types of flange designs, suiting it for pipelines as well as exploration and production uses. Particularly well-suited for maintenance, repair, and operation applications, the gasket seals flanges in less than perfect condition, minimizing maintenance, the firm notes.

Source: **Garlock Sealing Technologies,** 1666 Division St., Palmyra, NY 14522.

Services/Suppliers

Curtiss-Wright Flow Control Corp.

Falls Church, Va., has announced the appointment of David Cunningham as vice-president and general manager of the company's Valve Systems Div., and Anthony Fabbo as vice-president for business development and integration. Both men are based in East Farmingdale, NY.

Cunningham has more than 20 years of experience with United Technologies Corp. companies, most recently serving as president of Lenel Systems International, a physical security software technology firm.

Fabbo has been with Curtiss-Wright for over 22 years, most recently serving as vice-president and general manager of the Valve Systems Div. He holds a BA degree is business from Montclair State University, and an MBA from Dowling College.

Curtiss-Wright Flow Control Corp. specializes in the design and manufacture of highly engineered valves, pumps, motors, generators, electronics, and related products for a range of industries including defense, power, and oil and gas processing.

Gaffney Cline & Associates Inc.

Houston, has announced the addition of four industry veterans to its technical team.

Mike Hologram, a registered professional engineer and graduate of Colorado School of Mines, has over 30 years of experience in reservoir, production, and drilling engineering.

Daniel Amitrano joins the firm from Repsol Argentina. He holds degrees in civil engineering, reservoir engineering, and production engineering from Buenos Aires University, and has over 18 years of experience in reservoir engineering.

Jim Blagg earned his degree in geophysics from West Texas State University, and did graduate studies at Colorado School of Mines. He has over 27 years of global experience.

Joshua Uzezi Oletu, a senior petroleum engineer/petrophysicist, joins Gaffney Cline after working in various capacities for Shell for almost 20 years.

Gaffney Cline & Associates Inc. is an independent worldwide petroleum consultancy of 45 years' standing. The company provides strategic, commercial, management, and technical assistance to national oil companies, governments, international oil and gas companies, and financial institutions.

GE Oil & Gas

Houston, has announced expansion of its service capabilities in North America with the acquisition of a service center in Edmonton, Alta. The center, previously managed by GE Energy, is now totally dedicated to providing service support for oil and gas industry applications, with focus on Canada and Alaska.

The Edmonton service center operation startup follows the recent expansion of the company's Americas service hub in Houston.

GE Oil & Gas, based in Florence, Italy, offers complete solutions for production, LNG, transportation, storage, refineries, and petrochemicals operations, as well as pipeline integrity solutions.

Imports of crude and products

	Districts 1-4		District 5		Total US		
	10-26 2007	10-19 2007	10-26 2007	10-19 2007	10-26 2007	10-19 2007	*10-27 2006
	1,000 b/d						
Total motor gasoline	1,233	838	5	—	1,238	838	1,219
Mo. gas. blending comp.	611	435	—	—	611	435	702
Distillate	325	235	—	—	325	235	265
Residual	235	293	—	5	235	298	473
Jet fuel-kerosine	86	152	88	83	174	235	201
Propane-propylene	212	167	4	1	216	168	204
Other	897	919	31	67	928	986	125
Total products	**3,599**	**3,039**	**128**	**156**	**3,727**	**3,195**	**3,189**
Total crude	**8,080**	**8,133**	**1,301**	**970**	**9,381**	**9,103**	**10,093**
Total imports	**11,679**	**11,172**	**1,429**	**1,126**	**13,108**	**12,298**	**13,282**

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

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

OIL&GAS JOURNAL online research center

OGJ crack spread

	*11-2-07	*11-3-06	Change	Change, %
	$/bbl			
SPOT PRICES				
Product value	101.45	63.96	37.49	58.6
Brent crude	71.76	57.46	14.30	24.9
Crack spread	29.69	6.49	23.20	357.2
FUTURES MARKET PRICES				
One month				
Product value	100.95	64.72	36.23	56.0
Light sweet crude	93.57	58.56	35.01	59.8
Crack spread	7.38	6.16	1.22	19.8
Six month				
Product value	103.68	74.13	29.54	39.9
Light sweet crude	89.04	63.86	25.18	39.4
Crack spread	14.64	10.28	4.36	42.5

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

Purvin & Gertz LNG netbacks—Nov. 2, 2007

Receiving terminal	Liquefaction plant					
	Algeria	Malaysia	Nigeria	Austr. NW Shelf	Qatar	Trinidad
	$/MMbtu					
Barcelona	6.70	5.06	5.81	4.95	5.72	5.79
Everett	6.72	4.41	6.29	4.48	5.06	7.06
Isle of Grain	8.85	6.44	8.28	6.32	7.11	8.19
Lake Charles	5.48	3.33	5.19	3.52	3.85	6.18
Sodegaura	5.14	7.60	5.33	7.14	6.40	4.52
Zeebrugge	6.46	4.52	6.02	4.41	5.15	6.01

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

Crude and product stocks

District	Crude oil	Motor gasoline		Jet fuel, kerosine	Fuel oils		Propane-propylene
		Total	Blending comp.[1]		Distillate	Residual	
	1,000 bbl						
PADD 1	14,682	49,989	23,166	10,768	61,191	14,321	4,983
PADD 2	60,107	47,437	15,021	7,509	28,530	1,311	23,166
PADD 3	167,327	64,015	29,324	12,904	31,464	15,756	30,357
PADD 4	15,138	5,725	1,461	542	2,442	345	[1]3,008
PADD 5	55,429	27,966	21,008	9,820	11,652	5,225	—
Oct. 26, 2007	**312,683**	**195,132**	**89,980**	**41,543**	**135,279**	**36,958**	**61,514**
Oct. 19, 2007	**316,577**	**193,837**	**89,119**	**41,928**	**134,471**	**36,739**	**60,991**
Oct. 27, 2006[2]	**334,255**	**204,617**	**92,493**	**42,143**	**141,258**	**42,398**	**72,241**

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

Refinery report—Oct. 26, 2007

District	REFINERY OPERATIONS		REFINERY OUTPUT				
	Gross inputs	Crude oil inputs	Total motor gasoline	Jet fuel, kerosine	Fuel oils: Distillate	Fuel oils: Residual	Propane-propylene
	1,000 b/d						
PADD 1	1,491	1,511	1,857	76	486	115	72
PADD 2	3,075	3,052	2,000	212	911	51	209
PADD 3	7,290	7,266	3,248	704	1,966	329	672
PADD 4	491	487	256	22	149	12	[1]143
PADD 5	2,687	2,611	1,556	393	603	180	—
Oct. 26, 2007	**15,034**	**14,927**	**8,917**	**1,407**	**4,115**	**687**	**1,096**
Oct. 19, 2007	**15,202**	**14,940**	**8,998**	**1,409**	**3,946**	**709**	**1,024**
Oct. 27, 2006[2]	**15,467**	**15,277**	**8,763**	**1,533**	**4,182**	**572**	**1,070**
	17,448 operable capacity		**86.2% utilization rate**				

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

OGJ GASOLINE PRICES

	Price ex tax 10-31-07	Pump price* 10-31-07	Pump price 11-1-06
	¢/gal		
(Approx. prices for self-service unleaded gasoline)			
Atlanta	246.0	285.7	201.6
Baltimore	233.7	275.6	209.6
Boston	228.7	270.6	221.5
Buffalo	225.6	285.7	226.6
Miami	254.4	304.7	225.6
Newark	242.4	275.3	221.5
New York	225.5	285.6	235.5
Norfolk	233.0	270.6	209.4
Philadelphia	230.0	280.7	226.6
Pittsburgh	231.9	282.6	225.5
Wash., DC	251.1	289.5	229.6
PAD I avg.	236.6	282.4	221.2
Chicago	254.6	305.5	231.0
Cleveland	237.7	284.1	212.9
Des Moines	240.3	280.7	201.9
Detroit	244.9	294.1	223.9
Indianapolis	249.1	294.1	213.9
Kansas City	237.9	273.9	209.9
Louisville	257.2	294.1	206.9
Memphis	230.9	270.7	218.9
Milwaukee	247.7	299.0	221.5
Minn.-St. Paul	252.6	293.0	219.9
Oklahoma City	234.4	269.8	207.9
Omaha	234.9	281.3	219.9
St. Louis	230.6	266.6	215.9
Tulsa	228.8	264.2	204.9
Wichita	224.6	268.0	212.9
PAD II avg.	240.4	282.6	214.8
Albuquerque	247.1	283.5	219.1
Birmingham	236.7	275.4	210.9
Dallas-Fort Worth	227.3	265.7	205.9
Houston	232.3	270.7	209.9
Little Rock	230.4	270.6	213.9
New Orleans	234.3	272.7	216.9
San Antonio	231.3	269.7	212.9
PAD III avg.	234.2	272.6	212.8
Cheyenne	247.5	279.9	228.1
Denver	255.1	295.5	233.2
Salt Lake City	248.1	291.0	236.4
PAD IV avg.	250.2	288.8	232.6
Los Angeles	254.4	312.9	252.0
Phoenix	234.4	271.8	239.4
Portland	259.3	302.6	251.1
San Diego	264.4	322.9	260.5
San Francisco	276.8	335.3	271.5
Seattle	259.7	312.1	261.1
PAD V avg.	258.2	309.6	255.9
Week's avg.	**241.6**	**285.2**	**223.3**
Oct. avg.	**237.3**	**280.9**	**228.0**
Sept. avg.	**236.3**	**280.4**	**253.3**
2007 to date	**230.4**	**274.0**	—
2006 to date	**217.7**	**261.3**	—

*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

	10-26-07 ¢/gal		10-26-07 ¢/gal
Spot market product prices			
Motor gasoline (Conventional-regular)		Heating oil No. 2	
New York Harbor	229.55	New York Harbor	242.38
Gulf Coast	224.50	Gulf Coast	240.97
Los Angeles	249.00	Gas oil	
Amsterdam-Rotterdam-Antwerp (ARA)	220.11	ARA	242.18
Singapore	228.40	Singapore	239.17
Motor gasoline (Reformulated-regular)		Residual fuel oil	
New York Harbor	227.63	New York Harbor	160.43
Gulf Coast	224.25	Gulf Coast	170.83
Los Angeles	251.00	Los Angeles	167.73
		ARA	175.08
		Singapore	185.31

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

BAKER HUGHES RIG COUNT

	11-2-07	11-3-06
Alabama	7	4
Alaska	9	6
Arkansas	49	25
California	42	33
Land	41	30
Offshore	1	3
Colorado	114	93
Florida	0	0
Illinois	0	0
Indiana	2	0
Kansas	14	11
Kentucky	8	13
Louisiana	167	198
N. Land	60	62
S. Inland waters	26	20
S. Land	34	44
Offshore	47	72
Maryland	1	0
Michigan	1	3
Mississippi	9	14
Montana	10	18
Nebraska	0	0
New Mexico	69	90
New York	8	9
North Dakota	48	39
Ohio	14	8
Oklahoma	193	190
Pennsylvania	18	15
South Dakota	0	1
Texas	854	792
Offshore	8	14
Inland waters	2	2
Dist. 1	22	21
Dist. 2	32	27
Dist. 3	66	58
Dist. 4	91	97
Dist. 5	180	133
Dist. 6	116	116
Dist. 7B	32	47
Dist. 7C	62	45
Dist. 8	112	97
Dist. 8A	24	24
Dist. 9	43	42
Dist. 10	64	69
Utah	39	45
West Virginia	32	30
Wyoming	75	96
Others—NV-3; TN-6; VA-3	12	6
Total US	**1,795**	**1,739**
Total Canada	**368**	**376**
Grand total	**2,163**	**2,115**
Oil rigs	335	291
Gas rigs	1,455	1,443
Total offshore	57	90
Total cum. avg. YTD	**1,761**	**1,638**

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	11-2-07 Percent footage*	Rig count	11-3-06 Percent footage*
0-2,500	61	6.5	50	2.0
2,501-5,000	98	59.1	91	52.7
5,001-7,500	232	25.0	231	16.4
7,501-10,000	422	1.6	424	2.8
10,001-12,500	454	2.4	441	2.2
12,501-15,000	275	—	246	0.8
15,001-17,500	108	—	117	—
17,501-20,000	68	—	71	—
20,001-over	34	—	31	—
Total	**1,752**	**7.8**	**1,702**	**6.5**
INLAND	38		38	
LAND	1,663		1,600	
OFFSHORE	51		64	

*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]11-2-07	[2]11-3-06
	1,000 b/d	
(Crude oil and lease condensate)		
Alabama	15	20
Alaska	690	699
California	649	683
Colorado	51	63
Florida	6	6
Illinois	32	28
Kansas	97	99
Louisiana	1,360	1,369
Michigan	15	14
Mississippi	51	47
Montana	95	89
New Mexico	173	144
North Dakota	110	116
Oklahoma	172	172
Texas	1,358	1,356
Utah	46	49
Wyoming	145	141
All others	62	67
Total	**5,127**	**5,162**

[1]OGJ estimate. [2]Revised.

Source: Oil & Gas Journal.
Data available in OGJ Online Research Center.

US CRUDE PRICES

$/bbl*	11-2-07
Alaska-North Slope 27°	71.17
South Louisiana Sweet	96.00
California-Kern River 13°	84.00
Lost Hills 30°	91.95
Southwest Wyoming Sweet	87.93
East Texas Sweet	92.00
West Texas Sour 34°	86.75
West Texas Intermediate	92.50
Oklahoma Sweet	92.50
Texas Upper Gulf Coast	89.00
Michigan Sour	85.50
Kansas Common	91.50
North Dakota Sweet	84.25

*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]	10-26-07
United Kingdom-Brent 38°	84.14
Russia-Urals 32°	81.47
Saudi Light 34°	81.43
Dubai Fateh 32°	78.90
Algeria Saharan 44°	85.49
Nigeria-Bonny Light 37°	86.12
Indonesia-Minas 34°	86.98
Venezuela-Tia Juana Light 31°	80.43
Mexico-Isthmus 33°	80.32
OPEC basket	69.46
Total OPEC[2]	81.62
Total non-OPEC[2]	80.85
Total world[2]	81.27
US imports[3]	79.47

[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]

	10-26-07	10-19-07	10-26-06	Change, %
	bcf			
Producing region	1,046	1,020	1,007	3.9
Consuming region east	2,004	1,970	1,978	1.3
Consuming region west	459	453	468	–1.9
Total US	**3,509**	**3,443**	**3,453**	**1.6**
	July 07	**July 06**	**Change, %**	
Total US[2]	**2,894**	**2,779**	**4.1**	

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

WORLDWIDE CRUDE OIL AND GAS PRODUCTION

	Aug. 2007	July 2007	8 month average production 2007	8 month average production 2006	Change vs. previous year Volume	Change vs. previous year %	Aug. 2007	July 2007	Cum. 2007
	Crude, 1,000 b/d						Gas, bcf		
Argentina	640	622	630	638	–7	–1.1	150.0	150.0	1,052.73
Bolivia	42	45	44	45	–1	–1.4	43.2	42.0	330.83
Brazil	1,758	1,774	1,755	1,702	53	3.1	30.0	28.6	226.60
Canada	2,781	2,599	2,618	2,461	157	6.4	478.2	473.9	3,983.25
Colombia	527	523	522	529	–7	–1.4	21.0	20.0	146.50
Ecuador	500	500	501	542	–41	–7.5	0.3	0.3	2.43
Mexico	2,843	3,166	3,123	3,313	–190	–5.7	209.8	193.4	1,475.56
Peru	106	116	113	115	–2	–2.0	9.5	9.0	57.29
Trinidad	120	118	123	148	–25	–17.1	120.0	118.9	919.87
United States	5,125	5,120	5,170	5,101	70	1.4	1,698.0	1,700.0	13,106.00
Venezuela[1]	2,360	2,340	2,390	2,588	–198	–7.6	70.0	70.0	577.00
Other Latin America	79	79	80	79	1	0.7	5.5	5.5	43.36
Western Hemisphere	**16,880**	**17,001**	**17,069**	**17,261**	**–192**	**–1.1**	**2,835.6**	**2,811.6**	**21,921.43**
Austria	17	17	17	17	—	–1.7	4.8	4.8	40.20
Denmark	323	315	313	339	–26	–7.7	26.5	21.5	182.40
France	20	20	19	21	–2	–9.7	3.2	3.3	23.96
Germany	67	68	68	70	–2	–2.4	45.5	47.0	403.14
Italy	111	100	109	111	–2	–1.7	29.0	28.5	231.80
Netherlands	34	34	41	26	14	55.0	120.0	120.0	1,785.00
Norway	2,134	2,327	2,283	2,525	–241	–9.6	229.5	254.3	2,051.64
Turkey	41	42	41	42	–1	–1.8	—	—	8.50
United Kingdom	1,239	1,497	1,524	1,530	–5	–0.4	167.8	196.8	1,772.45
Other Western Europe	5	6	4	5	–1	–11.7	1.2	0.9	13.38
Western Europe	**3,992**	**4,425**	**4,420**	**4,686**	**–266**	**–5.7**	**627.4**	**677.1**	**6,512.47**
Azerbaijan	900	900	853	605	248	40.9	31.0	31.0	213.00
Croatia	16	16	16	17	–1	–4.6	5.5	6.5	48.77
Hungary	15	15	16	17	–1	–4.0	7.8	7.7	58.64
Kazakhstan	1,300	1,200	1,244	1,031	213	20.6	80.0	80.0	640.00
Romania	100	100	99	99	—	–0.3	18.0	18.0	141.40
Russia	9,800	9,700	9,686	9,460	226	2.4	1,650.0	1,700.0	14,850.00
Other FSU	500	500	450	513	–63	–12.2	360.0	420.0	3,440.00
Other Eastern Europe	50	50	47	47	—	—	81.9	67.9	680.31
Eastern Europe and FSU	**12,681**	**12,481**	**12,411**	**11,789**	**622**	**5.3**	**2,234.1**	**2,331.0**	**20,072.11**
Algeria[1]	1,350	1,350	1,345	1,349	–4	–0.3	275.0	275.0	2,200.00
Angola[1]	1,735	1,643	1,655	1,400	255	18.2	5.0	3.0	22.90
Cameroon	85	85	84	89	–4	–5.0	—	—	—
Congo (former Zaire)	20	20	20	20	—	—	—	—	—
Congo (Brazzaville)	240	240	240	240	—	—	—	—	—
Egypt	630	630	641	676	–35	–5.2	42.0	42.0	328.60
Equatorial Guinea	320	320	320	320	—	—	0.1	0.1	0.48
Gabon	230	230	230	238	–8	–3.2	0.3	0.3	2.43
Libya[1]	1,700	1,700	1,695	1,693	3	0.1	23.0	23.0	175.90
Nigeria[1]	2,150	2,100	2,158	2,226	–69	–3.1	72.0	70.0	578.00
Sudan	480	480	469	405	64	15.7	0.0	0.0	0.00
Tunisia	97	102	99	65	34	52.2	6.4	6.5	52.57
Other Africa	262	262	262	271	–9	–3.3	10.2	10.2	79.92
Africa	**9,299**	**9,162**	**9,218**	**8,991**	**227**	**2.5**	**433.9**	**430.0**	**3,440.80**
Bahrain	169	180	173	173	—	–0.1	30.9	26.0	202.41
Iran[1]	3,920	3,920	3,915	3,898	18	0.4	250.0	250.0	1,995.00
Iraq[1]	1,990	2,190	1,986	1,900	86	4.5	4.0	5.0	39.00
Kuwait[1,2]	2,450	2,445	2,411	2,504	–94	–3.7	32.0	32.0	244.00
Oman	700	710	715	748	–33	–4.3	58.0	58.0	451.00
Qatar[1]	830	830	808	825	–18	–2.1	115.0	115.0	885.00
Saudi Arabia[1,2]	8,460	8,600	8,500	9,238	–738	–8.0	160.0	170.0	1,265.00
Syria	380	390	390	431	–41	–9.6	18.0	18.0	133.30
United Arab Emirates[1]	2,590	2,580	2,574	2,633	–59	–2.2	135.0	135.0	1,057.00
Yemen	380	380	364	346	18	5.1	0.0	0.0	0.00
Other Middle East	—	—	—	—	—	–31.7	10.8	10.4	68.77
Middle East	**21,869**	**22,225**	**21,835**	**22,696**	**–861**	**–3.8**	**813.7**	**819.4**	**6,340.47**
Australia	466	484	458	394	64	16.3	134.1	134.3	946.23
Brunei	173	169	179	202	–22	–11.1	35.6	35.5	277.57
China	3,757	3,653	3,758	3,700	58	1.6	203.0	195.6	1,595.17
India	680	665	683	673	10	1.4	83.8	83.9	646.88
Indonesia[1]	840	830	843	908	–65	–7.2	185.0	185.0	1,448.00
Japan	15	15	17	16	1	7.1	10.0	10.3	85.45
Malaysia	740	750	745	741	4	0.5	145.0	150.0	1,123.00
New Zealand	60	25	25	15	10	64.8	16.0	15.0	108.60
Pakistan	70	72	68	65	3	4.9	117.5	120.6	937.60
Papua New Guinea	50	50	51	57	–6	–10.5	0.5	0.5	3.95
Thailand	212	218	212	214	–2	–0.8	46.0	45.0	343.00
Vietnam	300	300	315	346	–31	–9.0	13.0	13.0	103.50
Other Asia-Pacific	32	33	35	32	3	9.8	94.5	95.5	742.29
Asia-Pacific	**7,394**	**7,263**	**7,389**	**7,363**	**26**	**0.4**	**1,084.0**	**1,084.3**	**8,361.23**
TOTAL WORLD	**72,115**	**72,557**	**72,342**	**72,785**	**–444**	**–0.6**	**8,028.7**	**8,153.4**	**66,648.52**
OPEC	30,375	30,528	30,278	29,760	518	1.7	1,321.0	1,330.0	10,463.90
North Sea	3,715	4,158	4,139	4,409	–270	–6.1	459.6	508.4	4,539.69

[1]OPEC member. [2]Kuwait and Saudi Arabia production each include half of Neutral Zone. Totals may not add due to rounding.
Source: Oil & Gas Journal. Data available in OGJ Online Research Center.

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Wailing begins about ruling on deepwater leases

"This is a sad day for the American public," wailed Senate Energy Committee Chairman Jeff Bingaman (D-NM) about a court decision favoring an oil company in a royalty dispute with large implications.

In office at passage of the Deep Water Royalty Relief Act of 1995 (DWRRA), Bingaman claims to know Congress never intended "to allow royalty-free oil regardless of price."

The Editor's Perspective

by Bob Tippee, Editor

Yet a federal judge in Louisiana has upheld a challenge by Kerr-McGee Oil & Gas Corp., now Anadarko Petroleum Corp., to the Department of Interior's authority to collect royalty on production from eight deepwater leases issued in 1996, 1997, and 2000 (OGJ Online, Nov. 1, 2007).

At issue are oil and gas price thresholds capping royalty relief for production in 200 m or more of water. Interior's Minerals Management Service inserted no such thresholds in leases it issued in 1998 and 1999. Before its merger into Anadarko, Kerr-McGee filed a lawsuit arguing Interior lacked authority under DWRRA to impose thresholds in the other 3 years.

A look at the statute raises questions about the recollections of Bingaman and several other similarly minded lawmakers about congressional intent.

The law discusses price thresholds only with regard to deepwater leases in existence at DWRR enactment. Because Congress didn't want royalty relief for leases granted after enactment to preclude development in deepwater areas already under lease, much of the statute, including all elaboration about price thresholds, addresses new production on existing leases.

For leases issued in the 5 years after enactment, DWRR refers to a general paragraph that says royalty can be suspended for "a period, volume, or value of production" determined by Interior, with suspension subject to variation according to the price of production.

But it adds, "[T]he suspension of royalties shall be set at a volume of not less than" production totals calibrated to water depth.

That this phrase begins with the words "except that," together with silence on price thresholds in language related to leases issued for 5 years after enactment of the law, seems to mean Congress intended for production volumes to be the only limits on royalty relief.

A judge in Louisiana thinks so.

(Online Nov. 2, 2007; author's e-mail: bobt@ogjonline.com)

Market Journal

by Sam Fletcher, Senior Writer

Anticipating $100/bbl oil

Crude prices swung sharply during the trading week of Oct. 29-Nov. 2, fluctuating at record levels of $93-95/bbl that had many analysts anticipating $100/bbl oil within weeks.

"It was a rollercoaster week for oil prices," said Robert S. Morris, Banc of America Securities LLC, New York. The market got a boost at midweek with a larger than expected drop in crude inventories for the second straight week.

On Oct. 29, the December contract for benchmark US crudes climbed to record highs for the fifth consecutive trading session, setting new intraday and closing records above $93/bbl on the New York Mercantile Exchange, due to a weak dollar and stormy weather that shut in some of Mexico's crude production the previous week.

But then prices tumbled to $90.38/bbl Oct 30 in the largest correction of the year as Goldman Sachs Group Inc., New York, advised investors to take their profits from the recent rally. "Nowadays the price of oil is set not by a few countries in the Middle East, but by a few banks on Wall Street," said Olivier Jakob, managing director of Petromatrix GMBH, Zug, Switzerland. "The Goldman report will very surely push some market participants to turn from buying the dips to selling the rallies," he predicted at the time.

'Mother of stock draws'

On Oct. 31, however, the crude contract rebounded to a record $94.53/bbl closing then continued climbing to $95.28/bbl in after-hours electronic trading on NYMEX as the US Department of Energy reported "the mother of all stock draws" from commercial crude storage at Cushing, Okla., instead of the slight build that traders were expecting for the week ended Oct. 26.

"We thought the size of the [Oct. 30] correction had diminished the chances that we would be able to open the $95/bbl doors to $100/bbl," said Jakob. But with such extreme volatility, he said, "It is impossible to exclude the reach of $100/bbl before the end of the week."

Paul Horsnell at Barclays Capital Inc. in London said, "Our conservative expectation is for [benchmark US crude] to average $90.70/bbl this quarter."

Most of the drawdown was at the key Cushing, Okla., delivery point for NYMEX, where oil stocks fell 3.1 million bbl to 15.1 million bbl. "The world economy is taken hostage by a few million barrels in Cushing, and there is little that the Organization of Petroleum Exporting Countries can do about it," Jakob said then.

The sharp drop in crude inventories "occurred without any uptick in refinery runs, following only a minor rise in imports," Horsnell noted. "The overall build [of crude and petroleum products] is down to its lowest since October 2005," he said.

Record low dollar

The US dollar hit a record low against the euro Oct. 31 after the Federal Open Market Committee cut the federal funds rate (the rate commercial banks charge on overnight loans among themselves) by 0.25 percentage point to 4.5%. "The single variable that exhibits the strongest correlation to the rise in oil prices over the past year is the concurrent drop in the US dollar," Morris said.

The December crude price fell to $93.49/bbl Nov. 1 on NYMEX, but not before setting a new intraday price record of $96.24/bbl. Again the influencing factors were outside the fundamentals of supply and demand for oil; instead, the value of the dollar improved against the euro on Nov. 1. Oil usually moves in the opposite market direction from the dollar, since a stronger dollar reduces the appeal of commodities as a hedge against inflation.

On Nov. 2, the December crude price rebounded to a record closing of $95.93/bbl amid indications of a stronger US economy and possible new United Nations sanctions against Iran over its nuclear power program. "The US government reported twice as many new nonfarm jobs as expected were added in October, which alleviated fears of an economic downturn, at least for the moment," Morris said. Meanwhile, the British Foreign Office said the UN Security Council agreed to draft a new sanctions resolution that could be passed in November unless Iran cooperates with the International Atomic Energy Agency.

Refinery problems contributed to the Nov. 2 price rise in crude prices. Petroplus Holdings AG's 172,000 b/d refinery in England expects production to be limited for a month due to a fire. Chevron Corp. said its 330,000 b/d refinery in Pascagoula, Miss., will operate at reduced rates until early next year because of a fire in August.

(Online Nov. 5, 2007; author's e-mail: samf@ogjonline.com)

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- Drilling Methods
- Field Geology
- Workforce and Demographics
- Market Dynamics
- Field Economics
- Transportation and Logistics
- Risk and Reliability
- Technology Qualification and Implementation
- Well Stimulation
- Project Execution and Management
- Produced Water Handling
- Geological Methods

Information for Authors

1. Final selection of papers will be determined by the Unconventional Gas International Conference Advisory Board. Papers will be evaluated on the basis of abstract submitted. The papers should be in English, completely original, and address issues as outlined in the conference focus areas. Papers and presentations should avoid any commercialism.
2. You are allowed 20-minutes to present a paper (presentation in English). A 10-minute discussion will follow each presentation.
3. Authors of papers selected for the Unconventional Gas International Conference & Exhibition program will be notified by the end of **March 2008**.
4. A manuscript and technical presentation will be required for each paper selected. Manuscripts shall be provided with the text on a CD-ROM or a 3-1/2" diskette in MS Word format. Copyright of papers and presentations belongs to the Unconventional Gas International Conference & Exhibition.
5. Maximum length of paper shall be 15 typewritten pages, including references. Bibliography tables should not exceed 6 pages.
6. Full instructions on preparation of manuscripts and presentations will be sent to authors of selected papers.
7. Complimentary conference registration will be provided only for authors who present a paper (One author per paper). Unconventional Gas International Conference & Exhibition assumes no obligation for expenses incurred by authors for travel, lodging, food, or other expenses.

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