Week of Oct. 8, 2007/US$10.00

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OIL&GAS JOURNAL

International Petroleum News and Technology / www.ogjonline.com

Completion Methods

Biofuels producers confront evolving market unknowns
How BP's E&P unit navigated the IT vision and chasm
Study forecasts US fuel demand for next decade
Spark spread trends allow analysis of LNG consumers

OIL&GAS JOURNAL

Oct. 8, 2007
Volume 105.38

Completion Methods

Regular Features

Cover

Many service companies, including Weatherford International Ltd., are partnering with national oil companies and independents in central Europe to help revitalize this important producing region. The Romanian oil industry, once Europe's primary oil producer, is managed by two state-owned companies that oversee what is essentially a giant brownfield development (photo from Weatherford; by Salvo Photography 2006). This issue's special report on completion methods begins on p. 49 with a discussion of BP's recent installation of subsea multiphase pumps at a record-breaking 1,700 m water depth. A second article, beginning on p. 52, focuses on a new ultrasonic leak-detection logging tool that can detect tubing or casing leaks as small as 0.0024 gpm. Coiled tubing is increasing in use for well completions, either as wellbore tubulars or as a means for conveying completion equipment. In the photo above, new CT reels are ready at Stewart & Stevenson's engineered products division in Houston (photo by Nina M. Rach).

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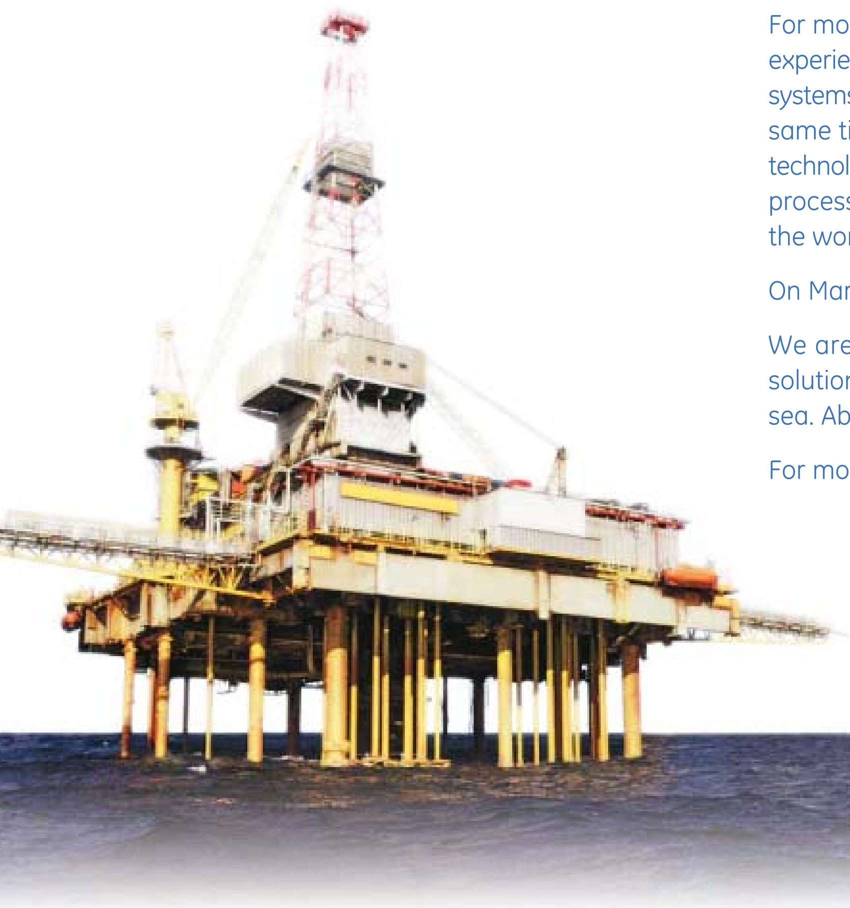

Requests for bulk orders should be addressed to the Editor. **Oil & Gas Journal (ISSN 0030-1388)** is published 48 times per year by PennWell Corporation, 1421 S. Sheridan Rd., Tulsa, Okla., Box 1260, 74101. Periodicals postage paid at Tulsa, Okla., and at additional mailing offices. Oil & Gas Journal and OGJ are registered trademarks of PennWell Corporation. **POSTMASTER:** send address changes, letters about subscription service, or subscription orders to P.O. Box 3497, Northbrook, IL 60065, or telephone (800) 633-1656. Change of address notices should be sent promptly with old as well as new address and with ZIP code or postal zone. Allow 30 days for change of address. Oil & Gas Journal is available for electronic retrieval on Oil & Gas Journal Online (www.ogjonline.com) or the NEXIS® Service, Box 933, Dayton, Ohio 45401, (937) 865-6800. **SUBSCRIPTION RATES** in the US: 1 yr. $60, 2 yr. $85, 3 yr. $109; Latin America and Canada: 1 yr. $64, 2 yr. $100, 3 yr. $135; Russia and republics of the former USSR, 1 yr. 1,500 rubles; all other countries: 1 yr. $109, 2 yr. $175, 3 yr. $250, 1 yr. premium digital $59 worldwide. These rates apply only to individuals holding responsible positions in the petroleum industry. Single copies are $10 each except for 100th Anniversary issue which is $20. Publisher reserves the right to refuse non-qualified subscriptions. Oil & Gas Journal is available on the Internet at http://www.ogjonline.com. (Vol. 105, No. 38) Printed in the US. GST No. 126813153. Publications Mail Agreement Number 602914. Return Undeliverable Canadian Addresses to: P.O. Box 1632, Windsor, ON N9A 7C9. Ride-A-Long Enclosed in Version P2.

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

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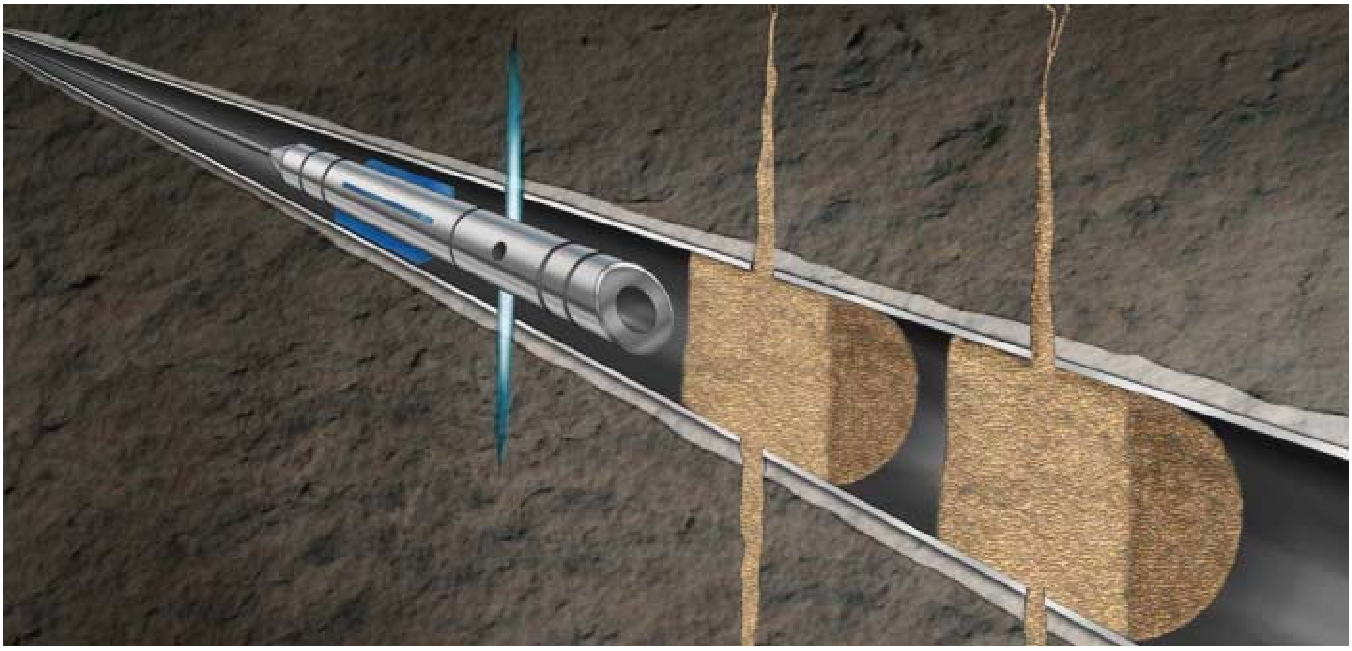

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Industry Challenge

- Improve sustained production
- Consistently create fractures in cased and cemented horizontal wellbores
- Optimize frac design
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OGJ Newsletter

Oct. 8, 2007

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General Interest — *Quick Takes*

Venezuela officials take issue with OPEC figures

Venezuelan Oil Minister Rafael Ramirez as well as other country officials have taken issue with the latest oil production quota figures published by the Organization of Petroleum Exporting Countries.

On its web site, OPEC's figures reduce Venezuela's quota ceiling to 2.47 million b/d in November, some 750,000 b/d lower than the 3.22 million b/d allotted earlier in September.

Ramirez said there is confusion and manipulation in the figures because, under OPEC's quota system, Venezuela is allocated 11.5% of the organization's total output. He said any change in the system of quotas would require a resolution by OPEC's ministers.

Venezuela's new production limit represents 9% of OPEC's 27.25 million b/d in total production—a figure that is in line with estimates by independent analysts and oil organizations concerning the level of Venezuela's actual output.

Paris-based International Energy Agency, among other secondary sources of information, pegs Venezuela's output at 2.4 million b/d. In his criticism of OPEC's figures, Ramirez said they reflect information based on such secondary sources.

Carlos Ramones, Venezuela's vice-minister of finance, also expressed surprise about the OPEC decision, saying the ministry will review the change for the 2008 budget. "You can't reduce that many barrels to the quota [ceiling.] This will be reviewed because we have to set an oil production level for the [2008] budget," he said. The OPEC figures also might come as an embarrassment to Venezuelan President Hugo Chavez, who as recently as Sept. 16 announced plans to increase his country's oil production to 5 million b/d in 2012 from the current 3.2 million b/d (OGJ Online, Sept. 19, 2007).

Kashagan issues not to be politicized, leaders say

Kazakh President Nursultan Nazarbayev and Italian Prime Minister Romano Prodi, meeting on the sidelines of a recent United Nations meeting, said the situation regarding the Kashagan oil project should not be politicized.

The informal agreement came even as Kazakhstan's lower house of parliament unanimously passed legislation allowing the government to break oil contracts in the name of "national security."

"Prodi and Nazarbayev believe that politics should not be involved in this," said Yerlan Bayzhanov, Nazarbayev's press secretary. "This is a matter of business and cooperation between specific business circles."

Bayzhanov said, "Prodi expressed a wish that his forthcoming visit to Kazakhstan in October would not be linked with this issue," referring to the disagreement between his country's government and a consortium led by Italy's Eni SPA.

The legislation passed by the Kazakh lower house of parliament will increase the government's leverage in ongoing talks with Eni over the future of the stalled Kashagan oil project.

In a unanimous vote, lawmakers in the lower house passed amendments to the country's subsoil law that allow the government to force retrospective changes to any existing oil contracts or even break the contracts altogether if they are deemed "a threat" to the country's national security.

With the upper house of parliament also stacked with loyal members of the president's party, according to analyst Global Insight, the new legislation is likely to sail through that house shortly and quickly be signed into law by the Kazakh president ahead of his October meeting with Prodi.

Kazakh official eases Kashagan demands

Meanwhile, Kazakhstan reported it could drop its demand that state-run KazMunaiGas become joint operator of Kashagan field, according to a senior official who added that the government has no plans to revise contracts of other international oil companies.

Kazakh Energy Minister Sauat Mynbayev Oct. 2 said, "The question of Kazakhstan's role in the project as a co-operator is part and parcel of the negotiating process." He said Kazakhstan would not approve the development plan and budget of the consortium led by Eni SPA in their present forms (OGJ Online, Oct. 1, 2007).

As for environmental complaints lodged by the Kazakh Environmental Protection Ministry and the Kazakh Emergency Situations Ministry against the Eni group, Mynbayev said he saw no reason in them to suspend work on the project as a whole.

"The consortium accepted a part of the complaints, and it is currently in the process of rectifying them. We do not see any reasons to suspend the project because of the environment. The Environmental Protection Ministry and the consortium are reaching an agreement," he said. He also said the government of Kazakhstan has no intention of revising contracts with foreign producers that honor the country's laws. ✦

Exploration & Development — *Quick Takes*

Brazil's ANP to auction 312 blocks

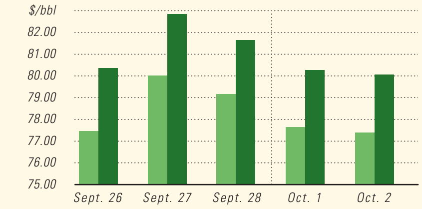
Brazil's National Petroleum Agency (ANP) said it plans to auction 312 offshore oil and gas blocks on Nov. 27-28. Of these, 221 are offshore and 91 on land.

Several blocks have an "elevated potential to hit oil or gas," the agency said Sept.18, adding that they are adjacent to promising finds in Brazil's Santos basin.

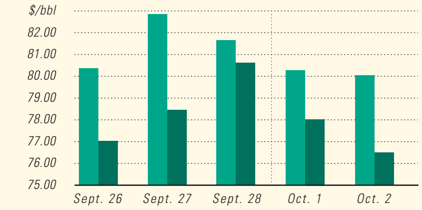
Petroleo Brasileiro SA and BG Group recently announced that

Industry Scoreboard

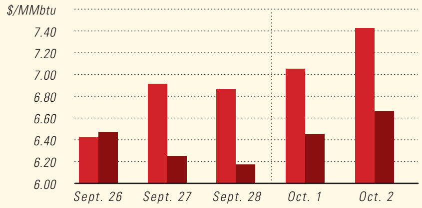
IPE BRENT / NYMEX LIGHT SWEET CRUDE



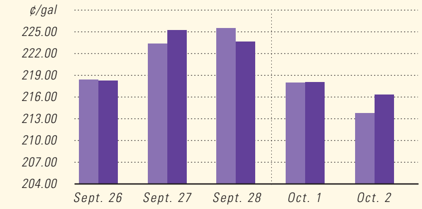
WTI CUSHING / BRENT SPOT



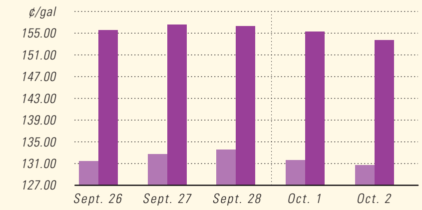
NYMEX NATURAL GAS / SPOT GAS - HENRY HUB



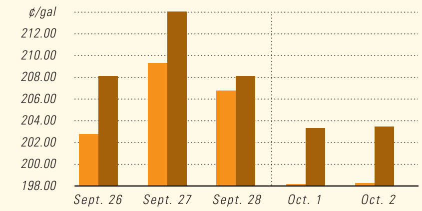
IPE GAS OIL / NYMEX HEATING OIL



PROPANE - MT. BELVIEU / BUTANE - MT. BELVIEU



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



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

US INDUSTRY SCOREBOARD — 10/8

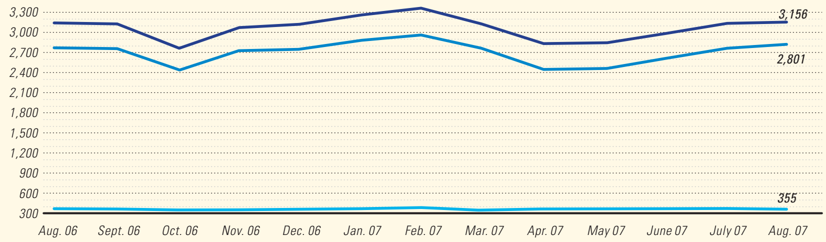
Latest week 9/21	4 wk. average	4 wk. avg. year ago[1]	Change, %	YTD average[1]	YTD avg. year ago[1]	Change, %
Demand, 1,000 b/d						
Motor gasoline	9,363	9,326	0.4	9,318	9,223	1.0
Distillate	4,095	4,146	–1.2	4,218	4,149	1.7
Jet fuel	1,629	1,661	–1.9	1,621	1,623	–0.1
Residual	745	607	22.7	762	707	7.8
Other products	4,822	4,975	–3.1	4,854	4,864	–0.2
TOTAL DEMAND	20,654	20,715	–0.3	20,773	20,564	1.0
Supply, 1,000 b/d						
Crude production	5,054	5,179	–2.4	5,170	5,110	1.2
NGL production[2]	2,321	2,401	–3.3	2,363	2,209	7.0
Crude imports	10,012	10,656	–6.0	10,053	10,149	–0.9
Product imports	3,181	3,787	–16.0	3,507	3,640	–3.7
Other supply[3]	1,089	1,049	3.8	1,000	1,128	–11.3
TOTAL SUPPLY	21,657	23,072	–6.1	22,093	22,236	–0.6
Refining, 1,000 b/d						
Crude runs to stills	15,460	15,751	–1.8	15,271	15,278	—
Input to crude stills	15,664	16,184	–3.2	15,521	15,643	–0.8
% utilization	89.8	93.1	—	89.0	90.0	—

Latest week 9/21	Latest week	Previous week[1]	Change	Same week year ago[1]	Change	Change, %
Stocks, 1,000 bbl						
Crude oil	320,617	318,775	1,842	324,767	–4,150	–1.3
Motor gasoline	191,366	190,834	532	213,899	–22,533	–10.5
Distillate	137,060	135,527	1,533	151,288	14,228	–9.4
Jet fuel-kerosine	41,751	41,602	149	42,123	–372	–0.9
Residual	37,960	37,115	845	43,204	–5,244	–12.1
Stock cover (days)[4]			Change, %		Change, %	
Crude	20.7	20.5	1.0	20.4	1.5	
Motor gasoline	20.4	20.2	1.0	22.8	–10.5	
Distillate	33.5	32.8	2.1	36.7	–8.7	
Propane	55.8	54.0	3.3	68.3	–18.3	
Futures prices[5] 9/28			Change%		Change	%
Light sweet crude, $/bbl	81.09	82.10	–1.01	62.41	18.68	29.9
Natural gas, $/MMbtu	6.59	6.30	0.29	4.84	1.75	36.0

[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.

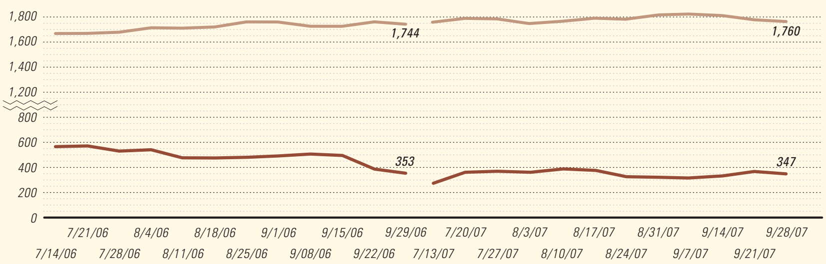
Sources: Energy Information Administration, Wall Street Journal

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

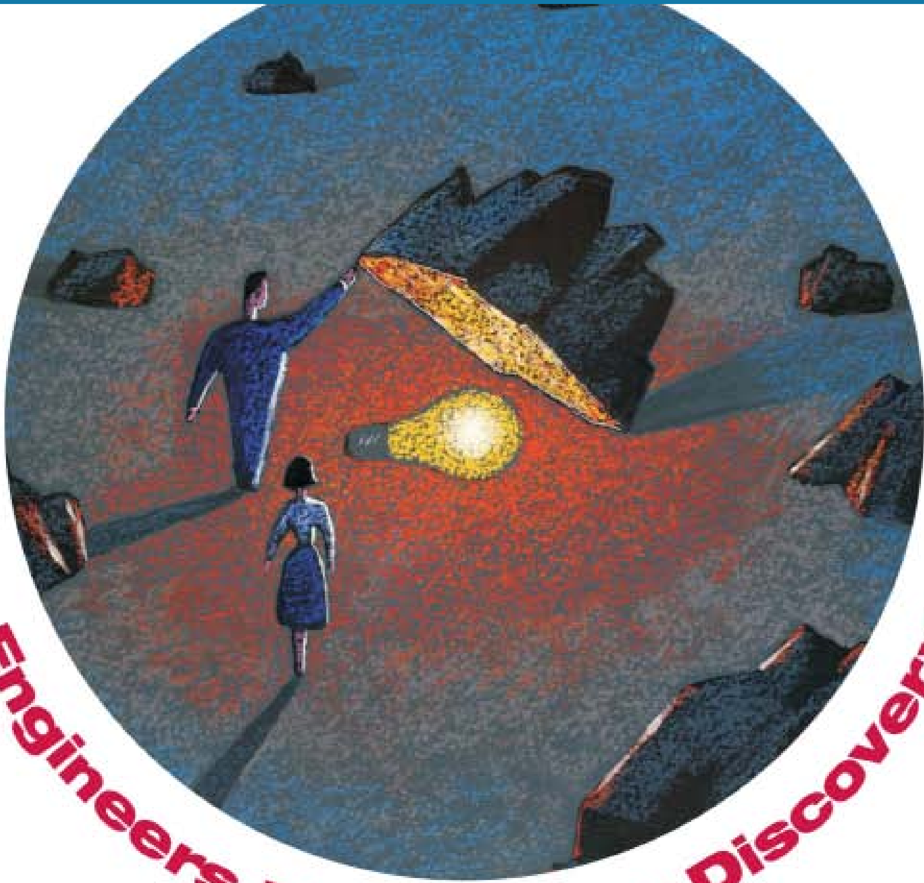


Note: Monthly average count

BAKER HUGHES RIG COUNT: US / CANADA



Note: End of week average count



they found oil in Carioca field in Santos basin, while late last year they discovered oil in nearby Tupi field (OGJ Online, Sept. 12, 2007 and Oct. 6, 2006).

Several of the blocks to be auctioned lie between those two finds, ANP said, adding that it also will auction promising blocks in the oil-rich Campos and Espirito Santo basins in November.

Tullow logs third Kaiso-Tonya well in Uganda

Tullow Oil PLC, operator and 100% interest owner of Uganda's Block 2, has drilled and logged the final well in its three-well appraisal program in the Kaiso-Tonya area. The Mputa-4 appraisal well, drilled 1 km east of the Mputa-1 discovery, was to test an adjacent fault block. The well reached 1,073 m TD and encountered three oil-bearing zones with a total net pay of 15.4 m.

The company's Mputa-3 well also intersected three oil-bearing zones, with a total net pay of 19.5 m, the best result to date in the appraisal area, Tullow said. Well data indicate that all three zones in Mputa-3 could flow at a combined rate of more than 4,000 b/d of oil. The well was being suspended as a future producer (OGJ Online, Aug. 23, 2007). Downhole pressure testing and sampling of Mputa-4 indicated moveable light, sweet crude with very good permeability, as seen in the other Mputa wells.

The Mputa-4 appraisal well has proved the lateral extent of oil-bearing reservoirs across the region. And the data from this program, which includes 3D seismic surveys and possible further production testing on existing wells, will help to determine the ultimate potential of the area and provide critical information for the early production system development, Tullow said.

Pearsall gas flow to evoke Maverick drilling

Drilling may increase in the next 3 years in the Maverick basin in Southwest Texas after a vertical exploratory well flowed 10 MMcfd of gas from Cretaceous Pearsall on a short drillstem test.

TXCO Resources Inc., San Antonio, intends to deepen the Glass Ranch B 1-77 well, in which it holds 100% working interest, through the Pearsall after gauging the 4-hr flow from an interval defined as the top of Pearsall under its joint exploration agreement with EnCana Oil & Gas (USA) Inc.

Meanwhile, TXCO and EnCana forged a new exploration agreement to examine the Pearsall and exploit other formations.

TXCO acquired 100% of EnCana's interests in formations above the Pearsall in 250,000 gross acres in the southern part of EnCana's acreage position that are subject to lease maintenance obligations.

TXCO agreed to drill three horizontal Pearsall wells by July 31, 2008, carrying EnCana for a 50% working interest in each well. TXCO will acquire a 50% interest in the Pearsall and deeper formations in 1,280 acres around each well.

TXCO will have the option to drill four more horizontal Pearsall wells by July 31, 2009, carrying EnCana for 50% interest, and TXCO will earn a 50% working interest in the deep rights on 5,760 acres around each well. TXCO will have a further option to carry EnCana for 25% interest in 16-20 horizontal Pearsall wells, depending on well costs, giving it the option to earn 50% of the deep rights in the remaining 250,000 acres in the block.

The vertical Glass Ranch well is the first effort by either company to drill the Pearsall in the southern part of the Maverick basin. TXCO said it believes that "horizontal wells will ultimately make the Pearsall a major producing interval in the Maverick basin."

Acquisition of the shallow rights gives TXCO the means to recomplete the 90-plus Glen Rose porosity wells drilled to date in other zones as they deplete.

US official warns of Kurdistan deal risks

Hunt Oil Co. has come under pressure from the US government for its recent signing of an exploration and production agreement with the Kurdistan Regional Government (KRG) in northern Iraq.

In Baghdad, a US Embassy spokesman warned that Hunt and a handful of small "wildcat" companies that have signed similar deals could find themselves in a legal battle between the Iraqi federal government and the northern, semi-independent Kurdistan region. "We think that these contracts have needlessly elevated tensions between the KRG and the government of Iraq, who both share a common interest in the passage of national legislation," the official said.

He added that the US is "pushing all sides to negotiate in good faith and knock off the things that undermine national unity." Meanwhile, he said, "We advise companies that they could incur significant political and legal risk by signing contracts with any party before the national law is passed." Analysts interpreted the spokesman's statements as signaling that the US government may be unwilling to support Hunt Oil should there be a future dispute about the legality of its contract with the KRG.

KRG, Hunt Oil Co. of the Kurdistan Region, and Impulse Energy Corp. on Sept. 8 announced the signing of a production-sharing contract covering the Dihok area of the Kurdistan region (OGJ, Oct. 1, 2007, p. 36).

Japex to expand operations in Libya

Japan Petroleum Exploration Co. (Japex) plans to expand its operations in Libya by launching test drilling on Blocks 176-4 and 40-3/4 and by training more Libyan engineers in Japan.

Test drilling on Block 176-4 will start in May 2008 following recent seismic surveys that encouraged Japex to believe that a commercial production prospect was viable. Japex will begin drilling on Block 40-3/4 later in the 2008 fiscal year.

Japex also has invited Libya's National Oil Corp. to send more engineers to the firm's machinery maintenance factory in Niigata Prefecture for welding training starting next month through March 2008. Earlier this year, Japex invited six NOC employees for exploration technology training in Japan. ✦

Drilling & Production — *Quick Takes*

Oil flow starts from Greater Plutonio area

Oil production has started Oct. 1 from the Greater Plutonio development area on Block 18 off Angola, reported block operator BP Angola (Block 18) BV. Production, which flowed at 45,000 b/d of oil, is expected to ramp up to a plateau of 200,000 b/d by next year.

The offshore development, the first BP-operated asset in Angola, is comprised of five fields: Galio, Cromio, Paladio, Plutonio, and Cobalto. BP made its first discovery on the block in 1999-2001 in 1,200-1,450 m of water. The area's final development plan calls for 43 wells—20 producers, 20 water injectors, and 3 gas injectors—which will be connected by a large subsea system to a floating production, storage, and offloading vessel.

The FPSO has a storage capacity of 1.77 million bbl of oil, a processing capacity of 240,000 b/d of oil, and gas handling of as much as 400 MMscfd of gas. The vessel, which has a treated water injection rate of 450,000 b/d, is held in position by 12 mooring lines connected to anchor piles on the seabed.

The subsea system includes the longest single riser tower system of its kind in the world, BP said. At 1,258 m, it connects the FPSO to a network of subsea flowline and control systems that include 150 km of flowlines, 9 manifolds, and 110 km of instrument and control umbilicals. Many components of the subsea systems, as well as the riser tower, were made in Angola, including six of the subsea manifolds along with the worlds largest CALM (Catenary Anchor Leg Mooring) offloading buoy and the first ever Angolan assembled and tested subsea trees.

Several Angolan technicians and engineers are being trained to operate and support the Greater Plutonio development area in an ongoing 5 year development program, BP said.

BP and Sonangol Sinopec International Ltd. each hold equal interest in Block 18.

Aramco lets oil production contract to Saipem

Saudi Aramco has let a contract to Saipem SPA and its Saudi partners TAQA and Al Rushaid to construct, transport, and install oil production facilities in the kingdom.

The 7-year contract will help Saudi Arabia maintain its oil production capacity. Saudi Aramco has two 3-year options to renew the deal.

"A minimum workload is guaranteed during the first 4 years of the agreement," Saipem said. "[Work will consist of] 16 platforms and 80 km of sea lines, in addition to the lay of the cables, ancillary to the platforms."

Aramco periodically will confirm the scope of subsequent work to be executed, valued on the base of a "price-per-unit" agreed scheme. Fabrication will be carried out in a yard under construction in Dammam, 400 km east of Riyadh, Saudi Arabia. The Castoro II vessel will carry out offshore activities.

Aramco plans to allocate budget in the fourth quarter.

GDF, Vattenfall plan CO_2 pilot in Germany

In a move it claims is consistent with its sustainable development policy, Gaz de France has signed a cooperation agreement with Germany's Vattenfall Group for a carbon dioxide pilot project in Germany.

Erdgas Erdol GMBH Berlin, GDF's wholly owned exploration and production affiliate, will use CO_2 to enhance gas recovery from its nearly depleted Altmark gas field—the second largest onshore field in Europe.

The project will take 15 months to implement and will contribute to GDF's research program on CO_2 capture, injection, and storage. The partners are involved in a number of European CO_2 storage projects such as the CO_2 injection experiments on K-12-B field in the Dutch North Sea that Gaz de France has carried out the past few years. ✦

Processing — *Quick Takes*

KNPC eyes 615,000 b/d Kuwaiti refinery for 2012

Kuwait National Petroleum Co.'s (KNPC) board has allocated a budget of 4 billion (KWD) for a 615,000 b/d refinery it intends to construct, according to state media.

Official KUNA news agency quoted KNPC Chairman and Managing Director Sami Al-Rushaid as saying that the budget allocated for its construction was based on "accurate estimates."

KNPC initially tendered the giant refinery with a budget of $6.3 billion, but was forced to withdraw the tender in February 2006 after the lowest bid came in at $15 billion.

Al-Rushaid said the new contract will be based on a cost-plus profit margin, which means Kuwait will pay the cost of the project to the successful bidder plus an agreed profit.

KNPC recently selected 17 international companies to bid for construction of the facility. The companies include Snamprogetti, Technip, GS Engineering & Construction Corp., SK Engineering & Construction Co., Hyundai Engineering & Construction Co., Hyundai Heavy Industries, JGC Corp., Petrofac International Ltd., and Saipem SA.

Also included are Foster Wheeler Energy, WGI Middle East, Daelim Industrial Co., Daewoo Engineering & Construction, CB&I, Archirodon Construction, and Gulf Leighton LLC. Fluor Corp. also was reported still in talks for parts of a tender.

The project will be divided into four major parts: two manufacturing units, utilities and services, storage tanks, and a pier.

Construction is due to start in 12-18 months, with the refinery to come on stream by the end of first quarter 2012. Completion was originally planned for 2010. KNPC also plans to modernize two of its three existing refineries, one at Al-Ahmadi and the other at Mina Abdullah, taking their combined capacity to 800,000 b/d from their current 700,000 b/d.

When those two projects are finished, KNPC will close down the country's third refinery, at Shuaiba, which has a capacity of 200,000 b/d. The net result will give Kuwait a refining capacity of 1.4 million b/d by 2012.

Japan, Angola discuss refining, oil supply

Japan's Ministry of Economy, Trade, and Industry (METI) has entered talks with Angola to build refining facilities in the African country in exchange for oil supplies in times of emergencies.

A METI delegation in early September met with the country's industry minister, Joaquim David, and senior officials at state-owned Sonangol.

No agreements have been reached, according to one Japanese official who explained that METI hopes to stabilize Japan's imports of oil and natural gas by diversifying its suppliers.

Angola's only refinery is a 39,000 b/d hydroskimming facility operated by Fina Petroleos de Angola at Luanda.

Angola has become a supplier of interest to a number of countries, including the US, according to a recent report.

"Few African countries are more important to US interests than Angola," said the report by the Center for Preventative Action, an arm of the Council on Foreign Relations, New York.

"Angola's success or failure in transitioning from nearly 30 years of war toward peace and democracy has implications for the stability of the US oil supply as well as the stability of central and southern Africa," the report said.

Angola on Jan. 1 became a member of the Organization of Petroleum Exporting Countries and is expected to have a production quota on Jan. 1, 2008. Reports say the amount of the quota will be decided on Dec. 5 at an OPEC meeting in Abu Dhabi.

In August, Roc Oil Co. Ltd., Sydney, confirmed a significant heavy oil find with its Massambala-1CH2 sidetrack well on Cabinda South Block in Angola (OGJ Online, Aug. 30, 2007).

ConocoPhillips, ADM to produce renewable fuel

ConocoPhillips has formed an alliance with agricultural processing firm Archer Daniels Midland Co. to develop technology to convert biomass into renewable transportation fuels.

The alliance reportedly will spend $10 million/year on the collaborative research of a next-generation biofuel production process that involves the conversion of biomass from crops, wood, or switchgrass into biocrude, as well as the refining of biocrude to produce transportation fuel.

ConocoPhillips last April teamed with meat producer Tyson Foods Inc. to produce diesel from animal fat. For this project, the major said it would spend $100 million over the next few years to upgrade several US refineries to enable production of the new diesel (OGJ Online, Apr. 18, 2007). ✦

Transportation — *Quick Takes*

Petrobras to spend $7.5 billion on gas transport

Petroleo Brasileiro SA (Petrobras) plans to spend more than $7.5 billion in natural gas transportation-related projects between now and 2012. Projects include more than 4,560 km of pipelines, 10 compressions stations, 31 city gates, and 2 LNG terminals.

Speaking at the Rio Pipeline 2007 Conference & Exhibition, Celso Luiz Silva Pereira de Souza, Petrobras's manager of natural gas planning, implementation, and logistics, said the Campinas-Rio gas pipeline and the Cacimbas-Vitória section of the Gasene gas pipeline would both enter operation before yearend, improving gas integration between the southeast and northeast sections of Brazil.

The Atalaia-Itaporanga and Itaporanga-Pilar gas lines in Brazil's northeast will also come on line this year, according to Souza.

Souza said Brazil's gas market has grown 15%/year since 2001, driven primarily by industrial and automotive demand. Total 2006 demand stood at 46.3 million cu m/day, expected to increase to 134 million cu m/day by 2012.

Brazil's gas transportation infrastructure must grow to meet this demand, but Carlos Felipe Guimaraes Lodi, Petrobras's general manager of operational supply planning, sees problems in achieving this growth, including: lack of skilled project managers, delays in environmental permitting, and difficulty in acquiring storage spheres and compressors, the delivery lead time of which he currently places at 450 days.

Russia plans Sakhalin Island oil, gas port

The Russian government plans to build a port to export oil and gas from fields off Sakhalin Island.

Transportation Minister Igor Levitin said the port, planned for the village of Ilyinsky on Sakhalin Island, will be linked to two trunk pipelines, one for crude oil and the other for gas. He said the arrangement will cut the number of pipelines crossing the island.

As a result, there will be lower transportation costs as well as fewer environmental impacts, he said, adding that the total cost of the Ilyinsky port will be 10-15% less than the transportation infrastructure for the Sakhalin-1 and Sakhalin-2 projects. Ilyinsky port will be open year-round to shipping, without the need for icebreakers, unlike the port of De-Kastri, which in the ice season requires two icebreakers for every 100,000-tonne tanker shipment.

The project will require investment of 82 billion rubles, according to expert estimates. The figure includes roughly 37 billion rubles in state investment and 45 billion rubles from other sources.

Russian official assures China on spur line

Russia will abide by its understandings to build a crude oil pipeline spur from Skovorodino in the Russian Far East to the border with China, according to Russia's Deputy Prime Minister Alexander Zhukov.

At a Sept. 28 meeting of a Russian-Chinese commission, Zhukov noted that Russian and Chinese companies have signed several energy agreements over the past few years.

"It is pleasant to note that all these understandings are implemented on time," he said. "This also applies to the Skovorodino-Chinese border oil pipeline project."

The statement followed remarks by Rosneft Deputy Pres. Dmitry Bogdanchikov that Russia should restrict the amount of oil it plans to transport to China via the projected Eastern Siberia Pacific Ocean line (OGJ Online, Sept. 18, 2007).

Construction starts on California LNG plant

Construction has begun on California's first large-scale LNG production plant in the Mojave Desert about 75 miles northeast of Los Angeles, said Clean Energy Fuels Corp., Seal Beach, Calif.

The plant will have an initial production capacity of 160,000 gpd, which will be expanded to 240,000 gpd. The plant's LNG storage capacity will be 1.5 million gal. Commercial shipments are scheduled to begin in the second half of 2008.

Tanker trailers will deliver the LNG, which will be used as fuel for vehicles, to customers throughout California and the US Southwest. Natural gas vehicles emit significantly less greenhouse gas and pollution than vehicles fueled by diesel or gasoline. ✦

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

OCTOBER

IPAA OGIS West, San Francisco, (202) 857-4722, (202) 857-4799 (fax), website: www.ipaa.org/meetings. 7-9.

Annual European Autumn Gas Conference, Düsseldorf, +44 (0)20 8241 1912, +44 (0)20 8940 6211 (fax), e-mail: info@theeagc.com, website: www.theeagc.com. 9-10.

IADC Drilling HSE Europe Conference & Exhibition, Copenhagen, (713) 292-1945, (713) 292-1946 (fax); e-mail: info@iadc.org, website: www.iadc.org. 9-10.

NPRA Q&A and Technology Forum, Austin, (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 9-12.

Deep Offshore Technology (DOT) International Conference & Exhibition, Stavanger, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.deepoffshoretechnology.com. 10-12.

International Bottom of the Barrel Technology Conference & Exhibition, Athens, +44 (0) 20 7357 8394, e-mail: Conferences@EuroPetro.com, website: www.europetro.com. 11-12.

The Athens Summit on Global Climate and Energy Security, Athens, +30 210 688 9130, +30 210 684 4777 (fax), e-mail: jangelus@acnc.gr, website: www.athens-summit.com. 14-16.

ERTC Petrochemical Conference, Brussels, 44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 15-17.

GPA Houston Annual Meeting, Kingwood, Tex., (918) 493-3872, (918) 493-3875 (fax), e-mail: pmirkin@gasprocessors.com, website: www.gasprocessors.com. 16.

Global E&P Technology Summit, Barcelona, +44 (0) 20 7202 7511, e-mail: anne.shildrake@wtgevents.com, website: www.eptsummit.com. 16-17.

PIRA Global Political Risk Conference, New York, 212-686-6808, 212-686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 17.

PIRA New York Annual Conference, New York, 212-686-6808, 212-686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 18-19.

SPE/IADC Middle East Drilling and Technology Conference, Cairo, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 22-24.

World Energy & Chemical Exhibition and Conference, Kuwait City, +32 2 474 8264, +32 2 474 8397 (fax), e-mail: d.boon@bruexpo.be, website: www.www.wecec-kuwait.com. 22-25.

Annual Natural Gas STAR Implementation Workshop, Houston, (781) 674-7374, e-mail: meetings@erg.com, website: www.epa.gov/gasstar. 23-24.

Louisiana Gulf Coast Oil Exposition (LAGCOE), Lafayette, (337) 235-4055, (337) 237-1030 (fax), website: www.lagcoe.com. 23-25.

Pipeline Simulation Interest Group Annual Meeting, Calgary, Alta, (713) 420-5938, (713) 420-5957 (fax), e-mail: info@psig.org, website: www.psig.org. 24-26.

GSA Annual Meeting, Denver, (303) 357-1000, (303) 357-1070 (fax), e-mail: gsaservice@geosociety.org, website: www.geosociety.org. 28-31.

Expandable Technology Forum, Reims, +44 (0) 1483 598000, e-mail: info@expandableforum.com, website: www.expandableforum.com. 30-31.

Asia Pacific Oil and Gas Conference and Exhibition, Jakarta, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. Oct. 30-Nov. 1.

Chem Show, New York City, (203) 221-9232, ext. 14, (203) 221-9260 (fax), e-mail: mstevens@iecshows.com, website: www.chemshow.com. Oct. 30-Nov. 1.

Methane to Markets Partnership Expo, Beijing, (202) 343-9683, e-mail: asg@methanetomarkets.org, website: www.methanetomarkets.org/expo. Oct. 30-Nov. 1.

NOVEMBER

IADC Annual Meeting, Galveston, Tex., (713) 292-1945, (713) 292-1946 (fax), e-mail: info@iadc.org, website: www.iadc.org. 1-2.

Annual U.S. – Canada Energy Trade & Technology Conference, Boston, (781) 801-4310, e-mail: ellenrota@aol.com, website: www.necbc.org. 2.

Deepwater Operations Conference & Exhibition, Galveston, Tex., (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.deepwateroperations.com. 6-8.

IPAA Annual Meeting, San Antonio, (202) 857-4722, (202) 857-4799 (fax), website: www.ipaa.org/meetings. 7-9.

Regional Mangystau Oil & Gas Exhibition & Conference, Aktau, +44 207 596 5016, e-mail: oilgas@ite-exhibitions.com, website: www.ite-exhibitions.com/og. 7-9.

GPA North Texas Annual Meeting, Dallas, (918) 493-3872, (918) 493-3875 (fax), e-mail: pmirkin@gasprocessors.com, website: www.gasprocessors.com. 8.

GPA North Texas Annual Meeting, Dallas, (918) 493-3872, (918) 493-3875 (fax), e-mail: pmirkin@gasprocessors.com, website: www.gasprocessors.com. 8.

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.

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Calendar

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.

Dry Tree & 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.

IP Week, 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.

International Catalyst Technology Conference, Prague, +44 (0) 20 7357 8394, +44 (0) 20 7357 8395 (fax), e-mail: Conferences@EuroPetro.com. website: www.europetro.com. 19-20.

Pipe Line Contractors Association Annual Conference (PLCA), Maui, (214) 969-2700, (214) 969-2705 (fax), e-mail: plca@plca.org, website: www.plca.org. 20-24.

International Petrochemicals & Gas Technology Conference & Exhibition, Prague, +44 (0) 20 7357 8394, +44 (0) 20 7357 8395 (fax), e-mail: Conferences@EuroPetro.com. website: www.europetro.com. 21-22.

AAPG Southwest Section Meeting, Abilene, Tex., (918) 560-2679, (918) 560-2684 (fax), e-mail: convene@aapg.org, website: www.aapg.org. 24-27.

Laurance Reid Gas Conditioning Conference, Norman, Okla., (405) 325-3136, (405) 325-7329 (fax), e-mail: bettyk@ou.edu, website: www.lrgcc.org. 24-27.

Middle East Refining Conference & Annual Meeting, Abu Dhabi, +44 (0) 1242 529 090, +44 (0) 1242 529 060 (fax), e-mail: wra@theenergyexchange.co.uk, website: www.wraconferences.com. 25-26.

SPE Intelligent Energy Conference & Exhibition, Amsterdam, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 25-27.

IADC Drilling HSE Asia Pacific Conference & Exhibition, Kuala Lumpur, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 26-27.

Middle East Fuels Symposium, Abu Dhabi, +44 (0) 1242 529 090, +44 (0) 1242 529 060 (fax), e-mail: wra@theenergyexchange.co.uk, website: www.wraconferences.com. 27-28.

MARCH

GPA Annual Convention, Grapevine, Tex., (918) 493-3872, (918) 493-3875 (fax), e-mail: pmirkin@gasprocessors.com, website: www.gasprocessors.com. 2-5.

GEO Middle East Geosciences Conference & Exhibition, Bahrain, +44 20 7840 2139, +44 20 7840 2119 (fax), (fax), e-mail: geo@oesallworld.com, website: www.allworldexhibitions.com. 3-5.

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

NPRA Security Conference, The Woodlands, Tex., (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npradc.org. 4-5.

ARTC Annual Meeting, Bangkok, +44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 4-6.

Global Petrochemicals Annual Meeting, Dusseldorf, +44 (0) 1242 529 090, +44 (0) 1242 529 060 (fax), e-mail: wra@theenergyexchange.co.uk, website: www.wraconferences.com. 4-6.

IADC/SPE Drilling Conference & Exhibition, Orlando, (713) 292-1945, (713) 292-1946 (fax); e-mail: conferences@iadc.org, website: www.iadc.org. 4-6.

NPRA Annual Meeting, San Diego, (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npradc.org. 9-11.

World Heavy Oil Congress, Edmonton, Alta., (403) 209-3555, (403) 245-8649 (fax), website: www.petroleumshow.com. 10-12.

New Zealand Petroleum Conference, Auckland, +64 3 962 6179, +64 4 471 0187 (fax), e-mail: crown.minerals@med.govt.nz, website: www.crownminerals.govt.nz. 10-12.

Gastech International Conference & Exhibition, Bangkok, +44 (0) 1737 855005, +44 (0) 1737 855482 (fax), e-mail: tonystephenson@dmgworldmedia.com, website: www.gastech.co.uk. 10-13.

API Spring Petroleum Measurement Standards Meeting, Dallas, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org/events. 10-14.

European Fuels Conference & Annual Meeting, Paris, +44 (0) 1242 529 090, +44 (0) 1242 529 060 (fax), e-mail: wra@theenergyexchange.co.uk, website: www.wraconferences.com. 11-12.

IADC International Deepwater Drilling Conference & Exhibition, Rio de Janeiro, (713) 292-1945, (713) 292-1946 (fax); e-mail: conferences@iadc.org, website: www.iadc.org. 11-12.

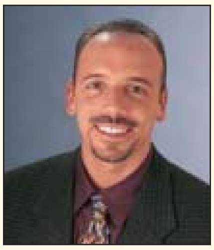
SPE North Africa Technical Conference & Exhibition, Marrakech, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 12-14.

NACE International Conference & Expo, New Orleans, (281) 228-6200, (281) 228-6300 (fax), website: www.nace.org. 16-20.

Sub-Saharan Oil, Gas & Petrochemical Exhibition & Conference, Cape Town, +27 21 713 3360, +27 21 713 3366 (fax), e-mail: expo@fairconsultants.com, website: www.fairconsultants.com. 17-19.

Turoge and Black Sea Oil & Gas Exhibition & Conference, Ankara, +44 207 596 5016, e-mail: oilgas@ite-exhibitions.com, website: www.ite-exhibitions.com/og. 18-20.

Big Oil, unveiled



Steven Poruban
Senior Editor

Need a surefire way to liven up boring party banter? Just introduce the phrase "Big Oil" into a dying conversation with practically anybody, and spirited discussion will closely follow. It's a near guarantee.

This is particularly true in the US because the mere mention of Big Oil stirs in most Americans negative emotions. For example, the emotions of US citizens reach boiling points whenever Big Oil turns significantly higher profits. Emotions are stirred even more, especially among hard-working car owners, when those profits seemingly result—directly or otherwise—from rising gasoline prices.

And when the emotions of the US populace are stirred, executives of large oil companies are typically summoned by politicians to the nation's capital to supply answers to questions about those high profits and spiking gasoline prices. This is as it should be, for it is those executives after all who are cashing in big on those exorbitant profits, right?

The real 'Big Oil'

A recent study commissioned and released by the American Petroleum Institute reveals, in fact, that the ownership of America's oil and gas companies is made up of a broad cross-section of Americans. The study, says one of its authors, in effect "disproves the popular misconception that 'Big Oil' is owned by a small group of industry insiders."

Robert J. Shapiro, study author and undersecretary of commerce for economic affairs under former President Bill Clinton, said, "In reality, across the oil and natural gas industry only 1.5% of shares of public companies are owned by company executives." Shapiro worked with economist Nam D. Pham on the study, entitled "The Distribution of Ownership of US Oil and Natural Gas Companies."

The study's data show that the majority of industry shares are held by institutional investors, "often on behalf of millions of Americans through mutual funds, pension funds, and individual retirement accounts," Shapiro said.

API Chief Economist John Felmy said, "When politicians seek to punish these companies and 'take their profits,' they are not targeting industry executives but the hard-earned savings of working people."

The study's findings include:

- 43% of oil and gas company shares are owned by mutual funds and asset management firms that have mutual funds, which manage accounts for 55 million US households with a median income of $68,700/year.
- 27% of shares are owned by other institutional investors like pension funds. In 2004, more than 2,600 pension funds run by federal, state, and local governments held almost $64 billion in shares of US oil and gas companies.
- 14% of shares are held in individual retirement accounts (IRAs) and other personal retirement accounts. Forty-five million US households have IRA and other personal retirement accounts, with an average account value of just over $22,000.

Comments abound

API's study's findings made their way to the web site R-Squared Energy Blog, an energy-focused discussion web log authored by Robert Rapier (http://i-r-squared.blogspot.com). Rapier holds a master's degree in chemical engineering from Texas A&M University and recently left Montana for an assignment in Scotland, where he maintains the personal blog site.

R-Squared readers left comments about Rapier's Sept. 18 entry that highlighted the study. Few of those leaving comments were surprised by the study's findings.

One reader noted that he wouldn't want to "stick it to Big Oil" but would "be content if they got no more or less special treatment than any other energy company."

Another reader commented that those unhappy about Big Oil's high profits should dig into their own pockets to buy a piece of a big oil company.

These are valid points, as were those left by many dozens of other R-Squared readers, but probably not the typical thinking of average Americans. Were these blog readers in attendance at the aforementioned party, no doubt they could hold their own in any emotionally charged conversation about "sticking it" to Big Oil.

Then those party-goers enraged by gasoline prices and oil company profits—particularly those whose mutual fund shares are growing in value—would come to learn that Big Oil, it seems, has many Little Owners. ✦

Security vs. insecurity

Security of demand, the rising concern of oil producers, links inevitably with security of supply, a worry of consumers. An official of the Organization of Petroleum Exporting Countries Secretariat repeated this verity of the oil trade at a press conference in Vienna last month. Consuming nations should heed the message. OPEC members should, too.

OPEC members, pointed out Mohamed Hamel, head of the Energy Studies Department, are investing more than $120 billion in at least 120 projects to boost crude oil production capacity in 2012 by 5 million b/d. They're also investing more than $60 billion to raise refining capacity by more than 3 million b/d in the same period. Hamel said the investments show OPEC's commitment to stability of oil supply. He's right.

Demand uncertainty

As other OPEC officials have been doing lately, Hamel extended his analysis to demand uncertainty, that bane of investment planning. The global need for OPEC crude in 2020 could be as high as 41 million b/d or as low as 32 million b/d, he said. Ten years later the range could be 36-49 million b/d. Much of the uncertainty comes from efforts by consuming nations to displace imported oil with more-expensive alternatives.

OPEC might be wasting resources on production capacity the market won't need, Hamel pointed out. Emergence of large amounts of unneeded capacity would suppress oil prices and the incomes of OPEC members. The diminished revenue would depress investment in future capacity. "All of this demonstrates the inseparability of security of demand and security of supply," Hamel observed with unassailable logic.

But the two types of security are linked in other ways that shouldn't escape OPEC's notice.

In August, Bolivia began cutting gas exports under several contracts with buyers in Brazil and Argentina. It can't meet all its delivery commitments because exploration and development have stalled. They've stalled because the government of President Evo Morales in May 2005 hiked taxes on production and a year later renationalized the oil and gas industry.

Bolivia does not belong to OPEC. But at every step of the evisceration of the industry that represents his pitiful country's best hope for prosperity, Morales received counsel from Hugo Chavez, president of Venezuela, an OPEC founding member.

The Venezuelan strongman is of course evangelizing his socialist populism throughout Latin America, buying political support with cut-rate crude and chasing international capital away from Venezuelan oil and gas fields. Like Morales in Bolivia, Chavez is gutting his country's oil and gas producing industry, which is of course much larger than Bolivia's and takes longer to show the wear. His talk about raising Venezuelan production capacity to 5 million b/d by 2012, while foreign oil companies are leaving or slashing investments, is laughable. Even OPEC tacitly acknowledges with its latest quota assignment what everyone else knows: that Venezuela's capacity to produce oil is far less than what the country claims to be producing.

The world's oil buyers thus have reason to expect Venezuela to become as unreliable a supplier of oil as its vassal Bolivia has made itself with gas. Chavez does his best to confirm the suspicion with regular threats to suspend exports to the US, his biggest oil customer and favorite demon.

Unsavory faces

To the consuming world, the smirking Chavez has become one of many unsavory faces of oil. Another is Iranian President Mahmoud Ahmadenijad, who wants to obliterate Israel, seems to be developing nuclear weapons, and fronts for a regime notorious for supporting terrorism. When the rogue leaders of OPEC's third and fifth-largest oil producers embrace, as they increasingly do, the consuming world, especially the US, sees more than insecurity of oil supply. It sees geopolitical menace suffused with petroleum.

This is one of several reasons why politics in the world's largest oil-consuming country seethes with antagonism toward oil. If security of supply and security of demand are inseparable, as Hamel noted, so are insecurity of those market fundamentals. OPEC members truly committed to market stability can't afford to ignore a marketing problem that's aggravated at every opportunity by their least stable colleagues. ✦

Biofuels producers confront evolving market unknowns

Paula Dittrick
Senior Staff Writer

With biofuels likely to become a global industry by 2012, companies that emerge as leaders will have to be nimble and develop flexible strategies to negotiate inherent market uncertainties.

Accenture reached that conclusion in a recent report entitled "Irrational Exuberance? An assessment of how the burgeoning biofuels market can enable high performance: a supply perspective." The report examines future scenarios for biofuels production, processing, and distribution.

Diversity of transportation fuels will be a fundamental change for the oil industry in the coming decade, said Melissa Stark, Accenture senior executive in the energy practice in London. She wrote the report after an Accenture team analyzed 20 countries.

"As the global supply market emerges, it is difficult to see who will come out the winners," Stark said. "Governments are the biggest players in the emerging biofuels market. It is the government that determines the profitability."

Energy-consuming countries—particularly the US, China, India, and Europe—are eager to diversify fuel supply. Stark noted government politics will remain dominated by domestic priorities such as energy security, agriculture, and the environment.

Biofuels feedstock choice will reflect local supply opportunities, said the Accenture report, which compared feedstocks worldwide. Sugarcane was the only feedstock scoring high on all Accenture's criteria. Even if cellulosic ethanol fulfills its promises, sugarcane will remain competitive (see table).

"In order for policy-makers, farmers, agribusiness, and producers to create a global supply for biofuels, the choice of feedstock needs to be weighed against production costs, fossil energy balance, land availability for yield, and the size of the global feedstock market," Stark said.

Accenture analyzed four categories of biofuels producers: farmer (cooperative) producers, agribusiness-agriculture supply chain and food producers, international oil companies (IOCs) and national oil companies (NOCs), and independents.

Biofuel supply growing

The International Energy Agency (IEA) forecasts a tripling or quadrupling of ethanol and biodiesel production by 2020 (Fig. 1).

Accenture said 2006 global crop-based ethanol production was 13.5 billion gal or 51.1 billion l. Of that, the US produced 4.8 billion gal, Brazil 4.5 billion gal, and members of the European Union 800 million gal.

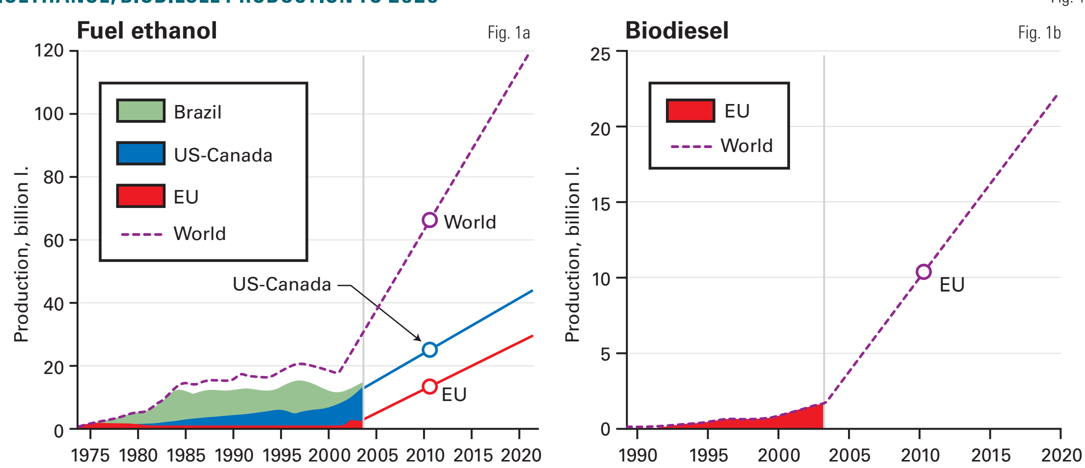
The biodiesel market remains much smaller than the ethanol market. Global biodiesel consumption during 2005 was 1.1 billion gal or 4.2 billion l.

Current global oil consumption is 82.5 million b/d. Together, Japan, US, and China consume 36 million b/d of oil.

US President George W. Bush

BIOETHANOL, BIODIESEL PRODUCTION TO 2020

Fig. 1



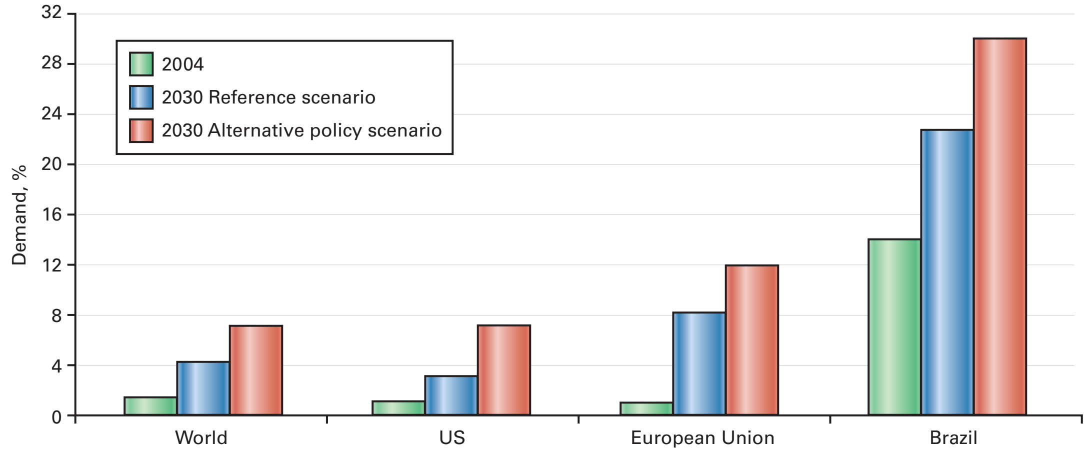
Source: International Energy Agency (http://www.worldenergyoutlook.org/graphs/Slide12.gif) has announced a target of cutting gasoline use, now about 11 million b/d, by 20% over 10 years. To that end, he has called for consumption of renewable and other alternative road fuels of 35 billion gal/year by 2017. That would displace 15% of projected gasoline consumption in the US, up from 3.5% today.

The EU in 2003 set a target of increasing the use of biofuels in energy transportation to 5.75% by 2010. But a progress report indicates EU members likely will achieve only a 4.2% biofuels share by then. In March 2007, an EU summit proposed biofuels account for 10% of transportation fuels by 2020 in each member state.

Today, biofuels make up just over 1% of road fuel demand worldwide—85% ethanol and the rest biodiesel. Stark believes it's unlikely that biofuels will make up more than 8% of road fuel demand by 2030 in even the most optimistic scenario (Fig. 2).

Share of biofuels in road-transport fuel consumption

Fig. 2



Source: International Energy Agency (http://www.worldenergyoutlook.org/graphs/Slide12.gif)

Global market requirements

Accenture defines a global biofuels industry as having price transparency and markets that connect buyers and sellers spanning multiple locations.

Such a market will be driven by policy-makers, farmers, agribusiness, and producers, Stark said. Demand hinges upon how much governments, vehicle manufacturers, product blenders, and retailers view and support biofuels as an alternative to petroleum.

Because biofuels currently cost more to produce than fossil fuels, government interventions appear crucial for now, Stark said. She believes government intervention can be reduced when the industry matures.

Different priorities for different biofuels-producing countries result "in a patchwork of targets, incentives, import tariffs, and tax structures, all aimed at growing the domestic biofuels market (albeit at different levels of commitment and aggressiveness)," she said.

The oil and transportation industries are considering their next steps in the biofuels industry based upon unfolding government policies, availability of fuels, and technology, Stark said.

"Technology will continue to improve the economics of biofuels development, but it is still uncertain which technologies will have the most impact and what the ultimate scale of the industry will be," she said.

Accenture concluded technology

Biofuels feedstock characteristics

Feedstock	Feedstock cost, $/l.	Production cost, $/gasoline/diesel-equivalent l.	World crop production, million tonnes	Yield, l./ha of cropland
Bioethanol				
Wheat	0.22-0.34 (Eur.)	0.53-0.93 (Eur.)	593	2,500 (EU)
Sugarcane	[1]*0.127*	*0.34*	*1,169*	*6,500 (Brazil)*
Sugar beet	0.20-0.32 (Eur.)	0.63-0.90 (Eur.)	213	*5,500 (EU)*
Corn	0.23 (US)	*0.43 (US)*	*693*	3,100 (US)
2nd generation cellulosic ethanol (est. near term)	*0.087-0.097*	0.43-0.53	N/A	Variable, depends on feedstock
Gasoline	N/A	0.40-0.50	N/A	N/A
Biodiesel				
Soybean oil	0.38-0.55 (US)	0.48-0.73 (US)	*229 (soybeans)*	500 (US), 700 (EU)
Rapeseed oil	[2]0.30-0.60 (Eur.)	0.35-0.80 (Eur.)	46.9 (Rapeseed)	*1,200 (EU)*
Palm oil	Data unavailable	Data unavailable	39	Data unavailable
Waste vegetable oil	Data unavailable	[3]*0.33-0.44*	N/A	N/A
Jatropha	0.39 (India)	[3]0.55 (India)	Data unavailable	529
Diesel fuel	N/A	N/A	N/A	N/A

[1]Red type indicates best relative performance. [2]Feedstock cost as $/diesel-equivalent liter. [3]Total production cost standardized to diesel-equivalent liter.

Sources: International Energy Agency, "Biofuels for Transport: An International Perspective" 2004 (http://www.iea.org/textbase/nppdf/free/2004/biofuels2004.pdf), Natural Resources Forum 29—George Francis et al. 2005, California Energy Commission, 2007 (http://www.energy.ca.gov/gasoline/margins/index.html), US Department of Agriculture, June 2007 (http://www.fas.usda.gov/psdonline/circulars/production.pdf), Food and Agricultural Organizations of the United Nations 2007 (http://www.fao.org/es/ess/top/commodity.html?lang=en&item=156&year=2005) and (http://www.fao.org/es/ess/top/commodity.html?lang=en&item=157&year=2005)

OECD report questions benefits of subsidies for biofuels

Paula Dittrick
Senior Staff Writer

Governments subsidizing biofuels could support a fuel that is more expensive and more environmentally harmful than its corresponding petroleum product, a group in the Organization for Economic Cooperation and Development said in a report issued from Paris.

"The current push to expand the use of biofuels is creating unsustainable tensions that will disrupt markets without generating environmental benefits," said a September report entitled, "Biofuels: Is the Cure Worse than the Disease?"

The overall environmental harm from ethanol and biodiesel easily can exceed those of petroleum products when increased fertilizer use, biodiversity loss, and agricultural pesticides associated with biofuels are taken into account, the report said.

Meanwhile, the volume of imported fossil fuels displaced by a country's domestically produced biofuels will be small in most cases, said the report issued by the OECD's Round Table on Sustainable Development (OGJ, Sept. 24, 2007, p. 17).

"What's more, an augmented biofuels market will tend to increase the positive relation between oil prices and biofuels costs," it said. Higher oil prices increase agricultural production costs and consequently raise biofuels production costs because feedstocks become more expensive.

Without subsidies, most biofuels cannot compete on price with petroleum products throughout most of the world, said report authors Richard Doornbosch and Ronald Steenblik.

Biofuels are not the only competition for traditional petroleum products. Oil from tar sands and coal-to-liquid fuels also will vie for market share.

Government policies analyzed

"Government policies play a large role in the financial attractiveness of biofuels production and trade," the report said. "Quantifying and assessing these policies is not an easy task."

Subsidies directly linked to output include protection from foreign competition by tariffs on ethanol and biodiesel, exemptions from fuel-excise taxes, and tax credits related to the volume produced, sold, or blended.

Regulations mandating usage or blending percentages and fuel-tax preferences stimulate production directly as well.

The leading OECD countries producing crop-based ethanol apply a most-favored nation (MFN) tariff that adds at least 25% or 14¢/l. to the cost of imported ethanol. That's often enough to discourage imports of cheaper, foreign-produced ethanol.

The US charges a 2.5% ad valorem tariff plus an additional 14.3¢/l. secondary duty for fuel ethanol vs. ethanol destined for beverages and other end uses. The European Union applies a lower MFN tariff of €0.00192/l. on pure ethanol and €0.00102/l. on denatured ethanol.

Taxes and subsidies also can be used to discriminate between foreign and domestic production. Australia has a 27¢/l. excise duty on imported ethanol. Worldwide, biodiesel is subject to much lower tariffs than ethanol.

The sustainable development report suggested governments encourage lower transportation fuel demand rather than encouraging biofuels production.

"A liter of gasoline or diesel conserved…is a full liter of gasoline or diesel saved at a much lower cost to the economy than subsidizing inefficient new sources of supply," the report said.

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has the potential to convert biofuels net importers, such as the US and China, into net exporters.

"In general, technology will continue to improve the economics of biofuels development, but it is still uncertain where and to what scale," Stark said. "Cellulosic ethanol is the most obvious and anticipated, but significant advancements could be made in processing costs."

Oil industry's role

IOCs and NOCs own the existing fuels distribution infrastructure that the biofuels industry wants. But biofuels transportation and marketing represent "a direct cannibalization" of the oil industry's gasoline and diesel volumes, Stark said.

"For IOCs, their big decision is whether to buy into the fast-moving and increasingly expensive and crowded first-generation market or continue with their strategies of investing in second-generation technology research," Stark said.

First-generation biofuels are made from food crops. Second-generation biofuels are made from nonfood feedstocks, such as waste from agriculture and forestry. When commercialized, the cost of second-generation biofuels could be more comparable with gasoline and diesel than are first-generation biofuels.

"For NOCs, the key questions are around growing and integrating this new business into their downstream businesses and managing new stakeholders from the agriculture sector (including government agriculture departments)," Stark said.

IOCs and NOCs will influence how quickly and easily the biofuels market expands, Stark said.

"The IOCs, in particular, are some of the biggest investors in second-genera-

tion technology," she said. "If any of these technologies becomes commercial, these players have the resources and capability to scale quickly, shifting the supply curve of the market."

She forecasts an increase in mergers and acquisitions as the biofuels industry becomes more international and competitive. "We expect consolidation (independents that serve one country and that have one to two plants will not be able to stay competitive)," Stark said. "This consolidation will happen through either the merging of independents or the acquisition of independents by IOCs and NOCs or agribusiness."

Alliances and joint ventures will help biofuels producers grow, access markets, and share risks. She foresees continuing diversity as companies refine investment strategies and their partnering skills to better access markets and financing.

So, although the potential and the costs of producing ethanol, biodiesel, and other biofuels remain uncertain, Stark said the big message to the oil industry is that energy resources will definitely be more diversified in the future. ✦

DOI auditor probe finds other royalties flaws at MMS

Nick Snow
Washington Correspondent

A US Department of Interior internal investigation found that four auditors in the Minerals Management Service's Minerals Revenue Management division did not follow departmental procedures for reporting royalty and interest underpayment allegations before suing to recover the money.

The investigation also criticized MRM's working environment "in which poor communication, or no communication, compounded an already existing element of distrust." It found signs of "a profound failure in the development of a critical MRM information technology system." And it revealed "a band-aid approach to holding together one of the federal government's largest revenue-producing operations," said DOI Inspector General Earl E. Devaney in his cover letter to the investigation's report.

Questions the report raised beyond its initial scope exposed "matters that heighten our concerns about the agency's administration of its royalty management program," said two congressional energy leaders Sept. 25 after receiving copies of the report.

"The report points to MMS's 'conflicting roles and relationships with the energy industry,' 'systemic communication failures' that hinder federal auditors' efforts to collect royalties, and a 'profound failure' to develop computer systems critical to the efficient collection of these revenues...," said US Senate Energy and Natural Resources Committee Chairman Jeff Bingaman (D-NM) and House Natural Resources Committee Chairman Nick J. Rahall (D-W.Va.) in a letter to US Sec. of the Interior Dirk A. Kempthorne.

MMS Director Randall Luthi on Sept. 26 said the agency was reviewing the report, but also said the auditors removed, without authorization, and used proprietary, sensitive, or confidential business information to prepare their lawsuits. But he said the investigation did not find instances of retaliation, which the auditors had alleged.

1997 policy decision

Once MMS and DOI review the report more thoroughly, Luthi said, Assistant Secretary for Lands and Minerals Management C. Stephen Allred will determine steps to bolster royalty and interest collections, including asking the department's royalty policy subcommittee to provide input in its upcoming report. "One of the key items that needs to be reviewed is a policy decision made in 1977 regarding calculation of interest payments," he noted.

Kempthorne ordered the investigation after Bingaman and Rahall brought to the secretary's attention the auditors' 2005 and 2006 lawsuits under the Federal Civil False Claims Act and their allegations that DOI and MMS had suppressed their royalty recovery efforts. Two of the four false claim suits were later dismissed.

The law allows a private citizen to sue for fraud on behalf of the US and possibly receive 15-30% of any money recovered, the report explained. The US Department of Justice investigates such false claim (qui tam) lawsuits with support from the appropriate department (in this case, DOI). DOJ then decides whether to intervene and prosecute the suit, decline to intervene and allow the person filing the suit to proceed alone, or seek to dismiss the action.

"We found that the collective bases for the qui tam lawsuits were either premised on a lack of knowledge of other MMS efforts to collect royalties and interest or the relators' (persons bringing the claim) fundamental disagreement with MMS decisions and MMS guidance that the oil companies were following. Better communication about management's decisions may have forestalled the filing of these lawsuits," Devaney said in his cover letter to the report. But he found unsound a 1997 policy decision which assumed that calculation of interest would be a hardship on oil companies if their payment forms did not include interest.

Calculating interest

Devaney said MRM manually calculated interest for the oil companies for years, while spending considerable money to modify its IT system to calculate interest automatically. His office has begun a separate investigation of the original procurement of and modifications to this system, he said.


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The investigation found that the auditors did not follow either MMS or DOI reporting requirements in any of the four cases. "Again, however, systemic communications failure exasperated the relators' fundamental distrust that their management chain would proceed appropriately," Devaney said.

The IG said courts have ruled that government employees were not precluded from suing based on facts learned during the course of their official duties. "Our findings concerning the use of official and/or proprietary information remain inconclusive," he said, primarily because of dated, vague policies and rules, and poor document control," Devaney said.

In considering 18 allegations of retaliation against the auditors ranging "from trivial to troubling," the investigation found no conclusive evidence of deliberate retaliation. Reprisals might have been perceived because of disconcerting behavior, such as "management's manifest inattention to personnel matters affecting the reassigned relators when MMS management should have been paying extraordinary attention."

Devaney said the investigation's findings call for improvements in MRM's program, particularly in document control, guidance clarification and treatment, and management of reassigned relators.

The investigation found four other issues within MMS's royalty collections division that have spawned investigations, involving:

- The acquisition, contract management, and performance of the MRM Support System, which has cost $149 million since the contract was awarded Sept. 13, 1999.
- The involvement of three senior MMS employees in creating a consulting contract leading to jobs for two of them once they left federal service, which is a potential violation of procurement laws and regulations.
- Potential criminal conduct and ethical violations by a senior manager of MMS's royalty in-kind program.
- Potential criminal and ethical violation of other employees assigned to the RIK program. ✦

NGSA sees little upward gas-price pressure this winter

Nick Snow
Washington Correspondent

High storage levels, steady drilling rates, and expected warmer-than-normal winter temperatures suggest there will be minimal upward pressure on natural gas prices during the coming US heating season, the Natural Gas Supply Association said in its annual forecast.

But the tight markets of the past several years are expected to continue and could easily be thrown off balance by any of several variables, outgoing NGSA Pres. Chris Conway of ConocoPhillips told reporters.

"We've been in a tight market for a number of years, and we believe that has become an accepted situation. But a tight market still can be knocked off balance fairly easily," he warned.

Weather risks, such as late-season hurricanes and cold snaps, are the biggest variable, but markets also can be affected by conservation and additional transmission capacity, according to Conway. Additional pipelines as well as high drilling rates are responses to high gas prices.

NGSA uses five pressure points—weather, the general economy, demand, storage, and supply—to develop its annual heating-season forecast. In its predictions for the 2006-07 period, it said it was correct in the last three instances but overestimated weather impacts and forecast a neutral economy instead of the decline that occurred.

Pressure point specifics

The association uses information from other sources and outside consultants to develop its forecast. It said that, while the National Oceanic and Atmospheric Administration expects the coming heating season to again be warmer-than-normal overall, NOAA's forecast calls for temperatures to be somewhat lower overall than a year earlier (2% vs. 7% warmer-than-normal).

NGSA said gas demand probably won't change much year-to-year as the general US economy continues the low growth that emerged during the 2006-07 heating season. It said consulting firm Global Insight predicts 2.2% gross domestic product growth (up slightly from the 2.1% growth a year earlier), an average 4.9% unemployment rate (up from 4.5%), 2.6% manufacturing growth (down slightly from 2.8%) and 2.8% growth in the US Department of Labor's consumer price index (up from 2.2% in the 2006-07 period).

Using information developed by another consulting firm, Energy Ventures Analysis Inc., NGSA predicted that average gas demand during the coming 5-month heating season will rise to 74.2 bcfd from 72.9 bcfd in the comparable period a year earlier.

Residential users will replace electricity as the primary growth sector when annual generating capacity additions fall to 9.9 from 6.2 Gw, it indicated. "In the past few years, there have been fairly significant additions of gas-fired generation. I think we're at the tail end of that growth," Conway said.

That situation could change if more electric utilities cancel plans for coal-fired power plants. "NGSA believes the country needs all sources of electrical energy—gas, coal, and nuclear included. I can't say I know what's going to happen with coal, but I do see natural gas playing a major role, particularly in trying to reduce greenhouse gas emissions," he said.


Don't you just hate the holidays?

NGSA said the US Energy Information Administration estimates that gas storage inventories at the end of the 2007 injection season will be a record 3.52 tcf, compared with 3.445 tcf a year earlier. Energy and Environmental Analysis Inc. (EEA), an ICF International company, forecasts that an estimated 104 bcf of additional storage capacity will become available during the 2007-08 period vs. 24 bcf a year earlier.

Production outlook

NGSA said EEA expects annual well completions to grow to 30,500 from 29,000 last year, the annual average rig count to increase to 1,485 from 1,372, and average winter gas production to rise to 51.3 bcfd from 50.7 bcfd.

"Producers are continuing to aggressively invest in this stable price environment. At the same time, it's important to remember that per well production rates continue to decline and that more wells have to be drilled simply to keep production steady," Conway said.

The import outlook is mixed, with purchases of gas from Canada expected to fall to an average 8.5 bcfd from 7.8 bcfd last year and LNG imports rising to 2 bcfd from 1.9 bcfd, according to NGSA.

Overall, said Conway, "We're continuing to see pressures on costs. It's becoming more expensive to drill wells, build LNG import terminals, and construct pipelines and storage facilities. Unfortunately, at the moment, the tone in Congress seems to be to penalize the industry instead of trying to work with it to develop new supply sources."

The US economy will require additional and more-diverse energy supplies, he continued. "As greenhouse gas legislation is developed, it will be important to recognize growing pressure on natural gas supplies and address access questions," Conway said. ✦

FERC considers revising gas pipeline reporting rules

Nick Snow
Washington Correspondent

The US Federal Energy Regulatory Commission has proposed revisions to financial forms, statements, and reports it requires interstate natural gas pipelines to submit. The proposals are designed to better reflect current market and cost information and to strengthen shippers' ability to file complaints by providing better access to public information, FERC said on Sept. 20.

FERC also issued a notice of inquiry seeking comments on several proposals for gas pipeline rate recovery of fuel, lost and unaccounted-for gas. While a proposed rule would update financial forms, FERC also is interested in views of its policy regarding pipelines' costs recovery method and whether the policy should change to prescribe a uniform approach.

"We have seen a fall in the number of general rate cases since we eliminated the triennial restatement rates in Order No. 636, and in some cases, pipeline rates have not been reviewed for more than a decade. These changes will provide more detail so the commission and the public can assess whether pipeline rates are just and reasonable," FERC Chairman Joseph T. Kelliher said.

Among other things, the proposed rule, which would take effect Jan. 1, 2008, would require interstate gas pipelines to submit additional revenue information, including revenue from shipper-supplied gas; identify the costs associated with affiliate transactions; and provide additional information on incremental facilities and discounted and negotiated rates.

Companies subject to the new requirements would file revised Form 3-Q quarterly reports beginning with first-quarter 2009, while the revised Forms 2 and 2-A for calendar year 2008 would be filed by Apr. 30, 2009, FERC said.

Inquiry applauded

OGJ was unable to obtain a comment at presstime last week from the Interstate Natural Gas Association of America, which represents interstate gas pipelines, on either FERC action. In a joint statement, however, the Independent Petroleum Association of America and the Process Gas Consumers applauded the gas cost recovery notice of inquiry.

"Without periodic rate review, many pipeline fuel retention rates have been in effect for years. While pipelines should be compensated fairly for the fuel used in transporting natural gas, some pipelines appear to be benefiting from large over-recoveries," IPAA Chairman Mike Linn said. FERC's notice will prompt an assessment of the way in which pipelines recover fuel costs, he added.

"As FERC has previously held, fuel should not serve as a pipeline profit center. We are anxious to work with FERC to make sure this principle is followed throughout the pipeline grid," said PGC General Counsel Dena Wiggins. She noted that the organization has been working with IPAA on the issue, the two groups have retained an outside consultant to study the situation, and they plan to submit results of that study to FERC.

Kelliher said the proposal to revise financial reporting procedures for pipelines resulted from five outreach sessions held by FERC's enforcement office in 2006 and the experience gained from two complaints the commission received based, in part, on data from Form No. 2 which pipelines argued did not provide an adequate basis for the complaints.

"In my view, it is essential that public information suffice as a foundation for a [Natural Gas Act] Section 5 complaint. Otherwise, the ability of shippers to file complaints will be significantly curtailed," the FERC chairman said.


To Stop Leaks,
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Commissioner Marc Spitzer said federal courts have reminded FERC on several occasions that its orders must be based on a full record with substantial evidence. He added that FERC should not impose new reporting requirements on regulated entities for information outside its jurisdiction or which does not advance its regulatory mission.

But Commissioner Jon Wellinghoff said the adequacy of data collected in Forms 2, 2-A and 3-Q had been questioned for years and that the proposals should correct many deficiencies in the forms. "Most of the information requested is data that is maintained by the pipeline and can readily be transferred to existing and new schedules. Consequently, I do not believe we have blurred the distinctions between NGA Sections 4 and 5, a concern expressed by some commenters" during the notice of inquiry leading to the proposals, he said. ✦

Turkmen head invites foreign oil, gas investment

Eric Watkins
Senior Correspondent

Turkmenistan's President Gurbanguly Berdimuhamedow, who Sept. 20 met with US Sec. of State Condoleeza Rice, has encouraged international investment in his country's oil and gas industry.

"The [Turkmen] oil and gas sector needs foreign investment" to allow Turkmenistan to triple gas production by 2030, Berdimuhamedow said. He offered assurances to potential investors, saying, "As the president of Turkmenistan, I am the guarantor of the safety of your future investments."

In addition, he said, "We also have thoroughly worked-out legislative basis on all aspects of external economic activities. A number of such laws in this field have been improved with the direct participation of the European Union's international aid programs."

Berdimuhamedow and Turkmen Foreign Minister Rashid Meredov held brief talks with Rice on the sidelines of the United Nations General Assembly's ministerial meeting, discussing several topics, including investments in the country's oil and gas industry.

"They discussed how to create conditions for private investment and the development of a private economy in Turkmenistan," said a US State Department spokesman. "They talked about energy opportunities, including cooperation with US companies, but also with other countries in the region."

Turkmenistan is reported to have some of the world's largest gas reserves and is the second-largest gas producer, after Russia, in the former Soviet Union. According to Berdimuhamedow, Turkmenistan produces 70-80 billion cu m/year of gas, and some 10 million tonnes of oil.

Turkmenistan's gas export pipelines are controlled by Russia's state-controlled OAO Gazprom, something Berdymukhamedov wants to change, saying his country is ready to bypass Russia and begin selling some of its natural gas to Europe (OGJ Online, Sept. 21, 2007).

Berdimuhamedow recently said governments, banks, and companies of a number of countries have drawn up several new pipeline proposals, including Turkmenistan-China, Turkmenistan-Afghanistan-Pakistan, as well as Caspian and trans-Caspian.

The Turkmen president also addressed potential concerns over the viability of these lines, saying, "The main [concern of others] is whether or not we have enough resources to meet all declared obligations. My answer is 'Yes, we have enough,' and moreover, we guarantee the implementation of these projects." ✦

Surgutneftegaz studies oil pipeline expansions

Eric Watkins
Senior Correspondent

Russia's Surgutneftegaz, entering discussions over the feasibility of the planned East Siberia Pacific Ocean (ESPO) pipeline, said it can ensure production of 3 million tonnes/year of oil for transportation via the line.

Surgutneftgaz has invested about 50 billion rubles in Talakan fields in northwest Yakutia, where oil will be transported via a 40-km spur to the main ESPO pipeline. A similar spur will be laid from its Verkhnechonsk fields in northern lrkutsk.

The two sets of fields, which have total estimated reserves of 325 million tonnes, together will contribute about 10%/year to filling the first phase of the ESPO line, which will have an initial annual capacity of 30 million tonnes.

Phase 1 of the ESPO pipeline, from Taishet in the Irkutsk region to Skovorodino in the Amur region, will begin operation in late 2008, when 15 million tonnes of oil will be delivered through a spur from Skovorodino to China and an additional 15 million tonnes by rail to Kozmino on the Pacific coast.

In Phase 2 of the ESPO, throughput capacity of the Taishet-Skovorodino pipeline will be boosted to 80 million tonnes and another pipeline, to carry 50 million tonnes, will be built from Skovorodino to Kozmino. Branches also

will be built to refineries in Khabarovsk and Komsomolsk-on-Amur. Russia has long said that the beginning of Phase 2 depends on the results of exploration in eastern Siberia.

Meanwhile, Russia's Fuel and Energy Ministry estimates that Phase 2 could be commissioned in 2015-17, and in September, state-run pipeline company OAO Transneft said it is ready to start designing Phase 2.

Transneft Chief Executive Officer Semyon Vainshtok told Russia's President Vladimir Putin: "We are now waiting for a decision of the Cabinet to get down to the job. We are ready to start the work." He said the company has laid more than 1,130 km of pipe, with work under way on all sections of the route in the Yakutia, Amur, and Irkutsk regions.

In August Russia's minister of industry and energy said that Russian Railways should prepare design estimates on the construction of Khmilovskiy passing-track which will be necessary for oil to be transshipped to the Pacific coast before construction of the ESPO's second phase.

Last month, Rosneft Deputy President Dmitry Bogdanchikov said Russia should restrict the volumes of oil it plans to transport to China via ESPO (OGJ Online, Sept. 18, 2007). ✦

Producers warn of harm from Alberta's royalty proposals

Proposals for increased taxation of oil and gas production in Alberta have come under specific criticism from the producing industry.

In an Oct. 2 speech to the Calgary Chamber of Commerce, Canadian Association of Petroleum Producers Pres. Pierre Alvarez challenged "the foundation of the report—the justification given by the panel for raising taxes and royalties and their assessment of the consequences of doing so."

In an Oct. 3 letter to Alberta Premier Ed Stelmach, Ron Brenneman, president and chief executive officer of Petro-Canada, said the report by the Alberta Royalty Review Panel "contains material flaws in its analysis."

And on Oct. 2, Jim Buckee, former chief executive officer of Talisman Energy Inc., Calgary, sent an "open letter" to Stelmach saying the company might cut its capital budget by $500 million/year if the panel's proposals are implemented.

The late-September report, asserting that Albertans failed to receive a "fair share" of benefits from oil and gas production, proposed royalty increases on most conventional oil and gas and an added severance tax on bitumen from oil sands (OGJ, Oct. 1, 2007, p. 25).

Earlier, Encana Corp. said it would cut 2008 capital investment in Alberta by $1 billion if the government enacted the proposals.

Justification, assessment

Alvarez faulted the royalty report for considering government take—the government's share of income from oil and gas production—in Alberta in comparison with other producing regions while ignoring return on investment, discovery size, production per well, and production costs.

He cited a recent Tristone Capital analysis that said, "We have found that a common theme in the panel's work is that the report understates capital and operating costs, which distorts rates of return and overestimates economic rent available to the resource owners and the producers."

For example, Alvarez said, the panel used historic rather than actual costs, which recently have soared. It thus estimated the cost of a typical oil sands project at $4-6 billion, while recent projects have cost $10-11 billion.

The panel similarly underestimated costs of gas projects and failed to account for lease bonus bids, which totaled $3.5 billion in 2005-06 and $2.4 billion in 2006-07.

Alvarez also faulted the panel for suggesting that the government can increase royalties and taxes by 20% without causing great economic harm.

"Of course there is going to be an impact," he said. "When government takes more there is less money to be reinvested in the economy."

Under the proposals, taxes and royalties would increase more for oil sands than for conventional production, which the panel said would stimulate conventional activity.

Alvarez challenged that view, pointing out that a panel assertion that royalty would decline for 82% of Alberta's gas wells would hold true only at prices below break-even levels. The wells represented by the 82% figure account for only 25-30% of the province's total production.

"The most immediate impact and slowdown will be felt in conventional gas," Alvarez said. "This is a sector that has already been rocked by soft prices and escalating costs. The downturn you are seeing in rural Alberta would be accelerated."

Fairness issue

In his letter, Petro-Canada's Brenneman disputed the judgment that Albertans don't receive a "fair share" of revenue gains accompanying oil and gas price increases.

In the past 7 years, he said, royalties on conventional production increased 128%, while industry revenue rose 133%.

Like Alvarez, Brenneman noted that the panel ignored lease bonuses in its calculations of government revenue, considered only royalty rates in its judgments of competitiveness, and used an uncompetitive base price as its reference point for claiming that royalty would decline for 82% of Alberta's gas wells.

Eric Watkins, Senior Correspondent

Kurdistan deal riles officials

Government interference in any business is rarely a good thing, especially when it is the oil and gas business. Consider the case of Hunt Oil Co., which apparently has unsettled the views of several governments about Iraq's oil industry.

The Kurdistan Regional Government (KRG), Hunt Oil Co. of the Kurdistan Region, and Impulse Energy Corp. recently announced the signing of a production-sharing contract covering the Duhok, Kurdistan, area of Iraq (OGJ, Oct. 1, 2007, p. 36).

Iraqi Oil Minister Hussein al-Shahristani was quick to intervene, saying the deal had no standing with Iraq's federal government. Any contracts agreed with the KRG need to be approved by the federal authority before they can be considered legal, he said.

The Kurds had a ready response. Indeed, on Sept. 12, the semiautonomous Kurdish government in northern Iraq said that al-Shahristani's remarks on Hunt's agreement with the Kurds were out of line.

'No authority'

"Shahristani's recent remarks about the legality of the [KRG's] oil and gas contracts are totally unacceptable," a KRG spokesman said, adding, "Shahristani has no authority to question the legitimacy of contracts awarded by the KRG."

But governments around the world support Baghdad's position, especially when it comes to the laws of the land. That was certainly the position of the US Department of State, which Sept. 28 said Iraq's national oil law will supersede Hunt Oil's deal with the KRG.

Deputy Spokesman Tom Casey said, "These kinds of contracts don't contribute to a resolution that is in the best interest of the Iraqi people, and they do elevate tensions between the Kurdish regional government and the government of Iraq. And to the extent that they detract from an ability to get a national oil law completed...aren't particularly helpful."

Enter King Abdullah

The importance of Iraq's unity was also stressed on Sept. 30 by Jordan's King Abdullah II, who called for the preservation of Iraq's territorial integrity following talks he had with visiting Iraqi Vice-President Adil Abdel-Mahdi in the Jordanian capital.

The king called for an agreement on reconciliation among the leaders of Iraq's Sunnis, Shiites, and Kurds to be reached as "a serious step to maintaining unity and the solidarity of Iraqis," which would enable "all segments of Iraqi society to participate more widely in the political process."

King Abdullah, of course, had good reason to support the central government in Baghdad. After all, the Jordanian king is once again the beneficiary of oil supplies from Iraq, which arrived on Sept. 28 after a 4-year hiatus. And it was also arriving at less than market rates.

Oh, and lest we forget! The supplies of Iraqi crude oil which arrived in Jordan came from the country's northern Kirkuk fields—the very fields that are located in Kurdistan and which the Kurds would like to call their own. How dare Hunt Oil try to intrude on geopolitics? ✦

Brenneman further said introduction of a nondeductible severance tax for oil sands projects "ignores the higher cost and risk of these megaprojects." The tax would have the effect of adding 2-15% to the base royalty rate, depending on the oil price.

"The severance tax would make in situ projects—the recovery method for 80% of Alberta's oil sands resource—simply uneconomic," he said. "Oil prices, which year-to-date have averaged $80/bbl, would need to be more than $100/bbl on a sustained basis for in situ oil sands investments to make sense with the proposed changes."

He recommended that Alberta increase royalty rates only when oil and gas prices exceed current levels; account for "unique aspects of Alberta's mature basin and the resultant returns for investors" in its royalties on conventional production; retain the net-profit structure for oil sands projects; and phase in royalty changes so investors have time to adjust.

Talisman's cuts

Buckee elaborated on the potential effects of the royalty proposals on natural gas, which accounts for "the vast majority of conventional drilling in Alberta."

The domestic gas price, he said, is about $30/boe, which provides little margin with finding and development costs at about $20/boe and operating costs near $10/boe.

Decisions based on the proposed royalty increase would affect future drilling, he noted, adding: "You can't get royalties from wells that are not drilled."

Before the panel published its recommendations, he said, Talisman had decided to cut next year's spending by $500 million "because as much as a third of our drilling program is marginal at current gas prices."

Buckee pointed out that "government take can only be seen in the light of costs and prospectivity." In a mature producing theater like Alberta, costs are high and discoveries are small. At present, moreover, gas prices are low.

"Typically, as basins mature, governments reduce the royalty burden to encourage activity and maintain revenue," he said.

Most of the money the industry makes in Alberta "finds its way back to the people of Alberta by way of capital expenditures, lease payments, taxes, salaries, or operating costs," he said. "To deter investment in the name of increasing government take hurts Albertans."

Buckee also disputed the royalty report's cost assumptions for high-productivity gas wells, which he said are too low.

"At current gas prices, I believe it will be difficult for anyone to grow their natural gas production in Alberta," he said. "If you implement these proposals we will see a significant loss of investment, jobs, taxes, and the loss of world-class technical expertise."

EnCana's cuts

In a Sept. 28 press release, EnCana stated, "If adopted in full, the royalty changes will negatively impact EnCana's future investments and operations in Alberta and will have a widespread impact on economic activity across the province."

The proposed cut in its capital outlays would represent 30-40% of the $2.5-3 billion planned for EnCana's Alberta-based activity. Most of the reductions, the company said, would be to its natural gas activity "in areas where the proposed royalty scheme makes those activities uneconomic or uncompetitive in its portfolio."

If the cuts are made, EnCana said it would reallocate the capital to investments "outside Alberta."

Randy Eresman, EnCana president and chief executive officer, said: "If the Royalty Panel's recommendations are adopted in full, many of Alberta's new and emerging resource plays will simply not be economically viable. These new plays would have formed the foundation for the future of Alberta's natural gas production.

"Even without that future gas production growth, under the recommended changes EnCana's royalties on Crown lands would effectively double, assuming current gas prices. We will have no choice but to slow down our Alberta-based activity and move investments to other areas in Canada and the US that are more economically attractive."

Eresman continued, "We do not want this to happen. This does not need to happen. The consequences would be far-reaching. We are open to changes to Alberta's royalties—changes that reflect the economic realities of volatile commodity prices, higher costs, and the appropriate risks and rewards of long-term capital investments.

"A royalty system can be developed that achieves Alberta's objectives without so severely damaging the province's future." ✦

China, Russia to sign ESPO line construction agreement

Eric Watkins
Senior Correspondent

Chinese Premier Wen Jiabao is scheduled to visit Moscow next month to meet with Russian Prime Minister Viktor Zukhov and sign an intergovernmental agreement for the construction of the East Siberia Pacific Ocean (ESPO) oil pipeline.

The scheduled talks follow earlier ones in September between Russia's Deputy Prime Minister Alexander Zhukov and his Chinese counterpart Vice-Premier Wu Yu in which the two sides discussed construction of the line from Taishet to Skovorodino, with a spur to the Chinese border.

Wu is said to have argued that, along with the pipeline spur, China also should get special terms and preferences for the oil to be carried along the line. But the Russians did not agree and suggested instead that, without a separate agreement on the prices and amounts of oil required, no pipeline could be built.

"Building a pipeline only makes sense if companies can reach agreement on prices and oil delivery volumes," said Zukhov. "Otherwise," he said, "the pipeline's capacity will be wasted."

Zhukov further explained: "Oil supplies should be negotiated between companies, while an intergovernmental agreement should regulate precisely the construction of an oil pipeline."

While assuring the Chinese that Russia can meet their demand for oil, Zhukov said OAO Rosneft is unhappy with the price at which it is currently shipping oil to China because it has the opportunity to "sell oil to the West at a higher price."

As a result, he said, "Negotiations are currently under way with China to change the oil-price formula so that supplies to China and in the Western direction be equally beneficial."

The Chinese are reported to have agreed to cover all construction costs for the pipeline spur from Skovorodino to the Chinese border but they will have to negotiate pricing formulas separately with Rosneft.

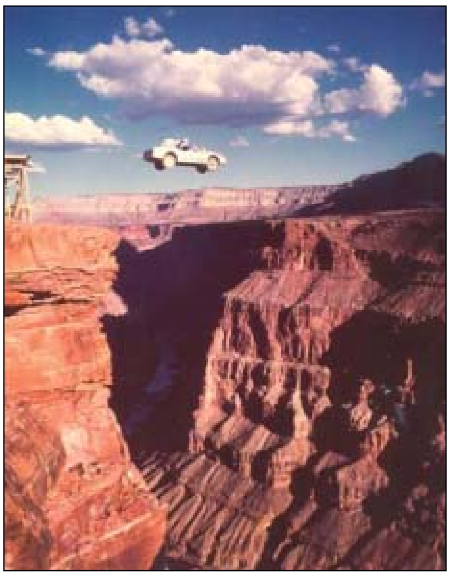
Those discussions could be formidable as Rosneft Deputy Pres. Dmitry Bogdanchikov last month said Russia should restrict the amount of oil it plans to transport to China via the projected ESPO line (OGJ Online, Sept. 18, 2007). ✦

WEB SERVICES TO SOA—1

How BP's E&P unit navigated the IT vision and chasm

Russell D. Foreman
James W. Jones
Danny J. Ducharme
BP
Houston

Dean Forrester
SAIC
Houston



In the absence of a strong service-oriented architecture vision and clear roadmap, getting from simple web services projects to a full institutional SOA capability is like taking a giant, very risky leap of faith across the Grand Canyon (Fig. 1). Photo from http://www.the-rocketman.com/Dar-R-gallery.html)

Our strategy is to automate BP's business processes so that the organization can achieve its goals faster, smarter, and more efficiently than the competition.

Until now, we have done this by developing and testing dedicated applications each time the business has wanted to create, modify, or improve a process. The time and cost involved in this has meant that, at times, computerization has slowed rather than facilitated BP's ability to capitalize swiftly on market developments.

This is about to change. A new approach to software development will help us to react much more quickly and cost effectively to new market opportunities, changes in business climate, and new regulation. It is called service-oriented architecture (SOA) and, in simple terms, it breaks applications into a series of "services," each designed to perform a specific task. By joining these services together—like links in a chain—we create a complete application.

The beauty of this approach is, when the business wants to introduce, change, or improve a process, often we can simply adapt, reconfigure, and resequence our existing services. When we do need to bring in new software, this can be taken off the shelf, making it more cost-effective and faster to implement. So, in a world where companies need to adapt quickly and costs are a constant challenge, SOA offers us an exciting opportunity.

The principles of SOA are not new to all parts of our organization. We are already starting to use this approach in IT projects in our business units. What is new, though, is the move to use SOA more broadly, at an enterprise-wide level. BP is now pursuing a transformational program to realize the potential of SOA and enable BP to achieve new levels of efficiency, speed to market, and, ultimately, to optimize our business, both financially and operationally.

Introduction

IT professionals can't pick up an industry publication these days without seeing something about web services or service-oriented architectures (SOA).

We have all heard intriguing stories about the vision and value of SOA, and even Hollywood seems to have heard. In the movie "Firewall," a computer security specialist played by Harrison Ford can be seen reading a journal on SOA and web services. There is a good reason for all this hype.

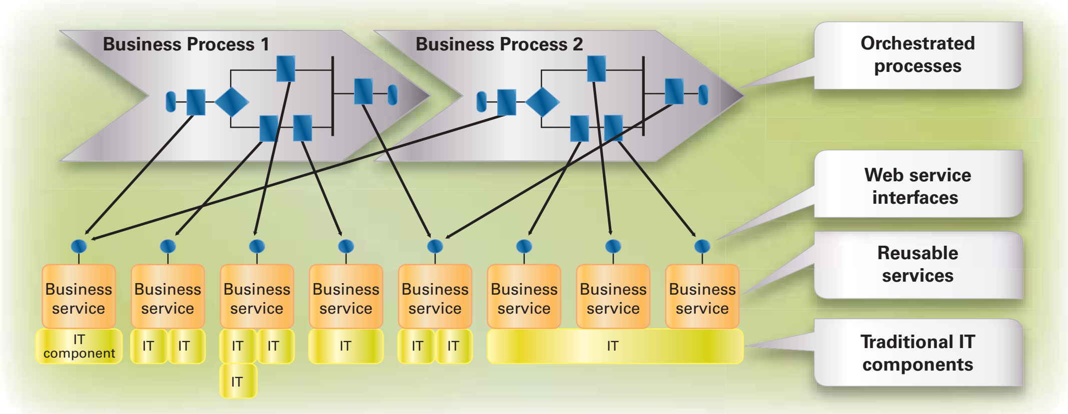
SOA is an approach to delivering business solutions through services (capabilities) that are linked together by business logic. This approach reflects how a business actually operates compared to conventional application development methods. As a result, the relationship between IT and the business is transformed from consumer/supplier to collaborating partners.

IT groups in many organizations have begun experimenting with web services as the interoperability standard from which to build the future. They may have undertaken a few pilot projects to gain a sense of the challenges, costs, and potential benefits of deploying web services more widely. They may even have begun adapting, or "wrapping," some of their legacy applications and data stores to use web service interfaces, based on what they're learning from pilot testing.

In many organizations, enthusiasm is growing about the possibility of moving toward a true SOA—the next-generation IT infrastructure built around web services, and designed to support highly flexible, increasingly competitive and cost-effective business process optimization.

BP started the implementation of web services to solve point-integration problems in the organization in late 2003. Based on early successes, the vision of a fully service-oriented architecture was embraced by the organization, and this article, offered in two parts, describes the approach that BP has adopted to deliver this vision.

BUSINESS PROCESS ORCHESTRATION IN A SERVICE-ORIENTED ENVIRONMENT* Fig. 2



*Multiple processes can reuse common services, and processes can be rapidly changed by rearranging services without necessarily writing any new code.

Part 1 outlines the vision and key business drivers of SOA, as BP understands them, and introduces a maturity model that can be used to structure the institutionalization of SOA concepts.

Part 2 examines the detailed, multi-level, standards-driven maturity model that will enable BP to plan, track, and measure the evolution of its growing organizational SOA capability.

Edge of the canyon

With both a huge marketing push from the major IT vendors (Microsoft, IBM, Oracle, BEA, etc.) and a realization that SOA is an approach that can deliver real value to the business and not just the "next big thing," many organizations are preparing to embrace SOA as their architecture of choice.

Just as they're starting to pick up speed on the path towards SOA, IT groups in many organizations encounter something like the edge of the Grand Canyon. There is an enormous, seemingly unbridgeable gulf between what they are doing at a "micro" or project level and what they realize they need to do at the "macro" corporate or enterprise level in order for SOA to be more than just a tantalizing idea.

All they've done so far is take a few baby steps, but the next step will require either a giant, very risky leap of faith (Fig. 1), or they'll need some extremely pragmatic ideas on how to cross that chasm without falling headlong into an abyss.

The problem is there doesn't seem to be many straightforward, proactive and vendor-neutral roadmaps from here to the other side. There are, of course, numerous technology developers ready to offer an array of shiny new products, and consulting firms poised to insert teams of experts to study the problem and make customized recommendations for every step of the way.

Everyone seems to have an agenda, but it's never quite clear, despite all the arm-waving and glossy brochures, how anyone will ever achieve the SOA vision without, well, something a bit more definitive.

This is precisely where BP's Exploration & Production IT organization found itself more than a year ago. The digital communications and technology function had successfully tested web services by adapting the organization's legacy systems to deliver real-time operational data and were seeing terrific bottom-line potential (see sidebar, p. 43).

This early success provided justification for the next step: the pursuit of a coherent SOA strategy for the whole E&P segment of the business.

The newly formed SOA team read a plethora of industry papers, researched options, and talked with vendors of SOA products and services. That's when the team nearly drove off the cliff—there were no bridges to the other side.

Building the bridge to SOA

As a result, the team realized that they would have to generate their own blueprints for how to bridge that gap between the small, scattered pilot projects and a global, enterprise-wide SOA capability (beyond even the initial E&P segment).

This two-part article presents a simplified set of those blueprints, which are already in use within as the basis for the organization's transition to a service-oriented enterprise.

BP believes that three qualities make this model worth considering by other corporations that have arrived at the edge of the cliff:

1. First, it's totally vendor-independent. There are no strings attached to any name brands. Any relevant technology component can be adopted, as long as it complies with emerging industry standards.

2. Second, it's eminently actionable. BP, one of the largest oil and gas companies, is purposefully implementing the plan now. There's nothing vague or fuzzy about it.

3. Third, it's reassuringly incremental. No "big bang" here. No leap of

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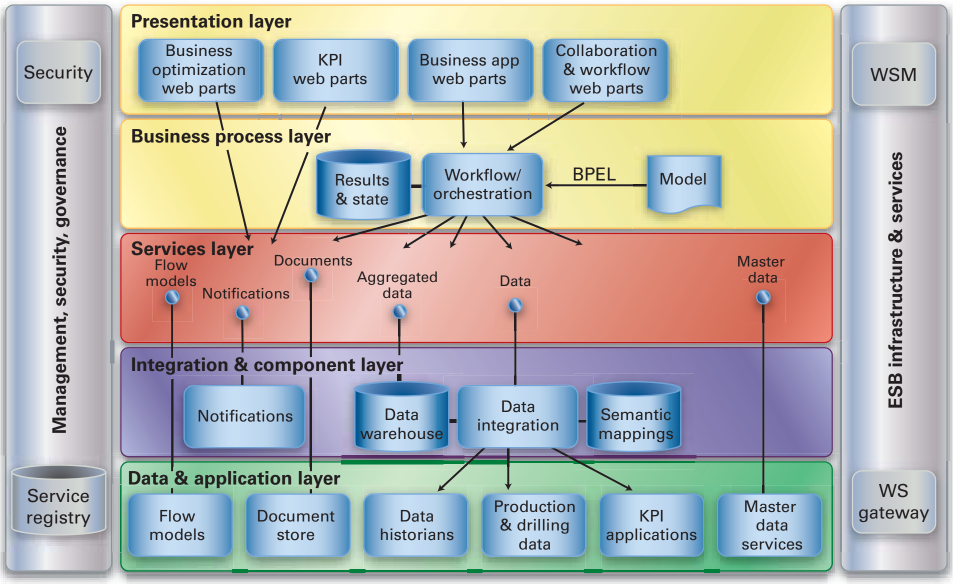
Conceptual model of a service-oriented architecture

Fig. 3



faith, small or large. Just one, highly measurable step at a time toward a revolutionary new way for IT to collaborate with business. As BP's Vice-Pres. of Enterprise Architecture Jim Ginsburgh so aptly stated, "Large-scale transformational change is best undertaken through small steps toward a common and compelling vision."

We offer the following intellectual capital for use by companies and IT groups within organizations in any industry that have been struggling with how to cross the chasm from simple IT experiments to the full organizational SOA vision.

What's on the other side?

What exactly is a service-oriented architecture?

For starters, while XML-based web services (see sidebar, p. 44) are a critical element of any SOA and have made SOA a reality, successful implementation of web services does not make a service-oriented architecture. We've encountered some misunderstanding along these lines from both our development teams and major vendors.

While there has been work done by the standards bodies such as OASIS (www.oasis-open.org), there does not yet seem to be a single definition in the industry that organizations can rally around.

SOA: a working definition

In BP's view, SOA is a transformational approach to the design, implementation, and management of business solutions and their supporting technical infrastructures.

SOA is more than technology or even a collection of technologies. It's an architectural style that creates new business applications through the intelligent "orchestration" of discrete, reusable business functions called "services" (Fig. 2), each of which performs a single, well-defined task (such as getting a stock quote or delivering real-time operations data).

Business solutions, in this new paradigm, are "composite applications" consisting of standard services linked together with business logic and standard web service connections. Unlike traditional monolithic software applications, which reflect current (even outdated) processes, a suite of component services can be rapidly rearranged and-or extended to reflect new business strategies and evolving market conditions.

Ultimately, therefore, an SOA environment will abstract the application engineering process to a higher level, requiring little or no programming as we know it to adapt to changing business requirements.

In a conceptual model of an SOA (Fig. 3), users of a composite business application leverage a common interface layer, which provides access to standard business process modeling and orchestration tools, a common set of generic SOA functions (including security, management, and governance of services), and a repository of specific business services they can work with—including component services provided by external vendors, and legacy internal applications "wrapped" with a standard interface to look and act like any other service.

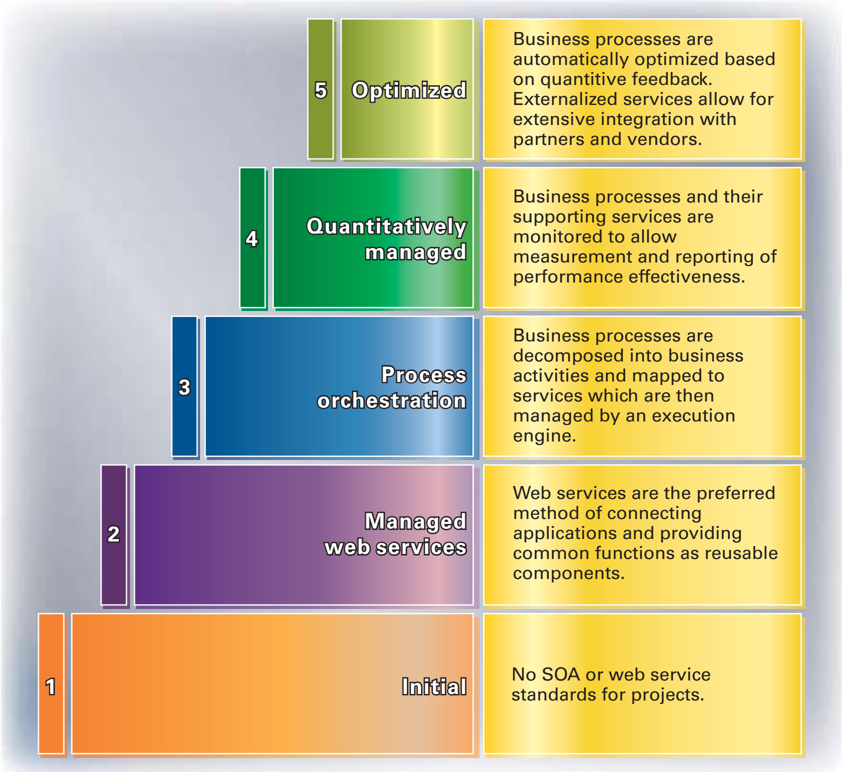
Unlike the project-centric approach of simple web services and conventional application solutions, a successful SOA strategy requires corporate investment in common infrastructure components and the definition and operation of relevant governance processes to encourage and reward the development and reuse of services and processes across the organization.

A major point worth underscoring is that SOA will fundamentally alter the historical relationship between IT and the operating units, making the implementation of solutions more of a partnership between business and IT rather than the traditional model where requirements are "thrown over the fence" to be implemented by the technologists.

With this approach, business users who are not programmers can sit down

BP's SOA maturity model

Fig. 4



with IT staff and collaboratively develop the composite applications they need to run their business more efficiently and competitively. No more waiting a year or more and spending unpredictable amounts of money for a monolithic, one-off solution that may or may not meet the original need, given the technical constraints, dependencies, and time lag. In an SOA environment, business units take real ownership of the business process and the change management of that process, thereby maintaining direct control of their IT spend.

The IT organization, in turn, provides common services and the relevant infrastructure functions that enable the efficient creation, location, and reuse of these services by authorized internal and external subscribers and partners.

IT, therefore, becomes more of an accelerator of business change, rather than a supplier or, as is often seen, an impediment.

Drivers and benefits

Once a global organization has a sufficient library of services available, almost any business process can be orchestrated without having to write new code.

What's more, new and better services can be swapped out for old ones without causing a ripple in the business workflow. As such, SOA provides an almost unimaginable degree of business agility. This is one of the top reasons why SOA is gaining so much momentum, and why a growing number of IT industry leaders are actively moving in this direction.

BP believes that the key business drivers and benefits of our SOA vision include:

- Better aligning IT with the business—especially in decentralized organizations, like BP—enabling more collaborative approaches to incremental change in both business process and technical infrastructure.
- Responding and adapting to changing business conditions more rapidly by automating and optimizing business processes, lowering both costs and cycle times along the way. According to early industry adopters, SOA should yield time and cost benefits of 50% or more; one company reports that no projects last longer than 6 weeks as they have a full set of services to build upon.
- Preserving huge investments in legacy applications by exposing their functionality to evolving SOA business processes through standard web service interfaces. Industry pundits claim that a typical organization fully utilizing SOA development techniques will achieve return on investment of more than five to one.
- Efficiently reusing existing software assets—long the Holy Grail of the IT world—by decomposing hard-wired, traditional applications into "loosely coupled" services. In our experience, the first time a service is reused, it pays for itself. Additionally, there are reports of doubling savings when a formal reuse program (with incentives) is put in place versus just ad hoc reuse of services.
- Maximizing the value of commodity software, as more vendors adopt SOA for their own product development process and increasingly deliver software in the form of more granular "native" services, rather than monolithic applications that must be adapted to act like services. For example, one major SAP user slashed its annual operating cost by 60% and its application integration time by 75% by using SAP's new SOA environment.
- Extending the virtual enterprise, enabling companies to seamlessly integrate services across traditional corporate boundaries as more of their suppliers and partners embrace the same international SOA standards.

Coordinated SOA program

Clearly, SOA is not just about technology.

It can be easy for IT professionals to get sidetracked by all the fascinating

Case study: BP's real-time architecture project

BP's US Onshore Business Unit, built largely through mergers and acquisitions, had seven different production/operations data capture and storage systems. Then the business unit developed a new web-based real-time data monitoring and reporting tool that would be far more effective than the multiple applications currently in use.

Problem

The business unit wanted to replace existing software tools. However, to swap them out for the new application would require them to rewrite every one of the custom, point-to-point connections to multiple different data capture systems, and create new interfaces where they did not yet exist, a potentially massive IT effort.

Solution

BP had launched the Real-Time Architecture Project (RTAP) in March 2003, utilizing web services to create highly flexible interfaces based on established and emerging internet standards. The RTAP prototype was pilot-tested in the US Onshore Business Unit in late 2003-early 2004 to connect a new real-time software application with multiple legacy data sources. Only one simple web service interface had to be (re)used to connect to the various date-sources rather than creating multiple one-off, point-to-point interfaces.

Results

Data access was faster. A greater range of technical users could access the software from any geographic location. The lifespan of legacy data systems was extended, preserving investments of hundreds of thousands to millions of dollars. Future software upgrades will require less time. Deployment of the RTAP solution in subsequent BP assets reduced the cost of implementation by c. 25% per asset. Writing a new RTAP interface took only days vs. weeks or months to create custom interfaces in the past. Reuse of the same interface in another asset took only hours to implement. By the end of 2006, some 22 BP assets had implemented RTAP.

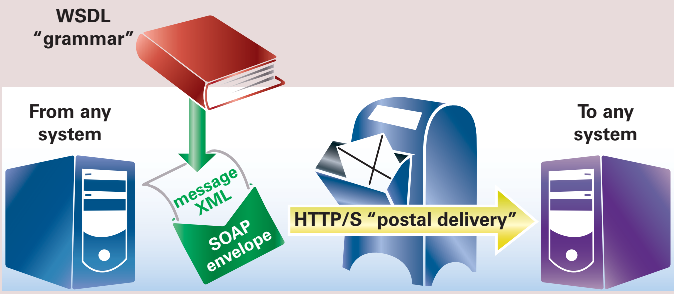
For more details, see Foreman, R.D., Gregovic, R.M., and Forrester, D., "Web Service Standards Provide Access to Real-Time E&P Operations Data," OGJ, Jan. 2, 2006.

technology issues, overlooking the much more challenging communication, culture change, business process, and governance issues essential to achieving the SOA vision.

A coordinated program is necessary, therefore to migrate an organization step by step toward this revolutionary new way of doing business. Basic elements of a corporate SOA

Web services: key components and technologies

Web services are platform-independent interfaces based on well-understood internet protocols and standards. Web services enable any system within an IT infrastructure to send requests and receive responses from any other system, analogous to the way two people who speak the same language can send and receive mail by "standard" postal delivery service.



In this analogy, the people are any two computers on a network. The language in which the letter is written is XML (eXtensible Markup Language). The grammar and syntax used to compose the letter is WSDL (Web Services Definition Language).

The envelope in which the letter is sealed is SOAP (Simple Object Access Protocol). And the postal system or courier service is HTTP (HyperText Transport Protocol) or HTTPS (a secure form of HTTP).

program ought to include the following characteristics in some form:

1. A shared vision and understanding of direction.

If SOA is to be a true collaboration between IT and the business, all parties must understand what direction the company is going and why, including the expected benefits and business value to everyone involved. Part 1 of this article is a summary of BP's SOA vision.

2. A roadmap outlining concrete steps toward the SOA vision.

To plan an organizational transition to SOA, a fairly prescriptive technical architecture and operational infrastructure must be defined and understood internally. The SOA roadmap should outline a natural sequence of activities, best practices, and dependencies—including the use and interpretation of emerging, competing, and established standards—to ensure interoperability, accelerate adoption, and "future-proof" the SOA design. Part 2 of this article, a discussion of BP's SOA maturity model, describes this in some detail.

3. Definition and support of new organizational roles, processes, and governance.

Traditional organization and governance processes can actually block movement toward SOA. Many aspects of building, operating, and maintaining composite applications based on a library of shared "services" fall outside of traditional IT skill sets, which are usually aimed at developing and supporting client-server applications and-or physical infrastructures. Sharing and reuse of digital assets are essentially alien both to internal organizations as well as to external partners and application vendors. To be clear: SOA is not a natural evolution of current behaviors. Thus, version control, change management, shared services governance, and formal reuse initiatives must be defined, incentivized, and carefully managed to ensure success.

4. Measurement of service quality and value.

Often, IT metrics focus only on the IT aspect of a business solution, such as server availability. SOA standards, on the other hand, enable measurement of actual service quality, which has real meaning to business subscribers as well. Quality of Service (QoS) expectations and appropriate service level agreements (SLAs) need to be explicitly defined for various types of business services, as well as the monitoring and reporting of "new" service metrics such as "number of reuse instance." Only by tracking such metrics can IT and the business begin to determine the true value of SOA in action.

5. Consistent, multilevel communications.

To ensure that all parties involved actually understand the vision and SOA migration process, communication programs must be created to address both IT and the business, and delivered consistently using a variety of channels.

Blueprint for the bridge

Having established a common and compelling SOA vision, BP set out to define a "maturity model" that is both practical and proactive.

In other words, it doesn't succumb to the vague descriptions typical of so many transformational change programs (which tend to lose clarity and purpose, especially at the higher levels). In fact, BP's model describes the detailed standards, tools, and governance processes required at each level of the model and doesn't just rely on vague statements that a given level is about some undefined goal of "business transformation."

Neither is the BP model a knee-jerk reaction to what the market may be doing or saying about SOA. Considerable research, thought, discussion, and iteration went into the development of BP's SOA Maturity Model (Fig. 4), which we're convinced will enable deployment of SOA in clear, rigorously-defined, incremental steps.

The five levels defined in BP's model provide a conservative and comprehensive framework with guidelines for managers to assess the evolving SOA capabilities of staff, projects, a segment of the business, the whole global organization—even partners and vendors.

This model is based on the Carnegie Mellon Software Engineering Institute's Capability Maturity Model (CMM) (see sidebar, p. 46). The CMM suggests that corporations can achieve progressive improvements in their organizational maturity through "evolutionary steps rather than revolutionary innovations."

In the BP model, as in the CMM, each maturity level forms a necessary foundation on which the next level is built. Levels, therefore, cannot be skipped without risking failure or unnecessary waste of time and money.

Without systematically defining the processes, implementing the standards, and adopting the common services required at lower levels, individual projects attempting to move up too quickly may have to rip and replace some or all of their work as the broader infrastructure matures.

If, for example, a project tries to jump to Level Three (Process Orchestration) without access to a sufficient library of reusable, standards-based services, they will be forced to go back to Level Two and buy or build them, whether they

Carnegie Mellon's capability maturity model

The Carnegie Mellon Software Engineering Institute's Capability Maturity Model (CMM) describes organizational maturity as "continuous process improvement based on many, small evolutionary steps rather than revolutionary innovations." Evolutionary steps are arranged in five maturity levels.

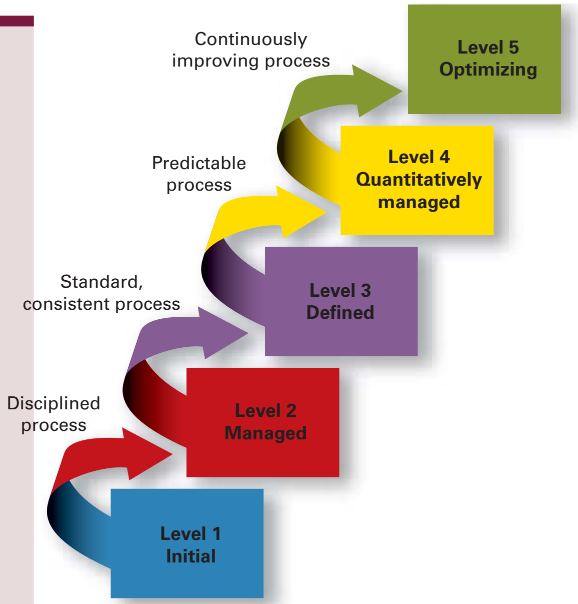
Level 1. The software process is characterized as ad hoc, occasionally even chaotic. Few processes are defined, and success depends on individual effort rather than organizational competence.

Level 2. Basic project management processes are established to track cost, schedule, and functionality. Process discipline is in place to ensure repeatability.

Level 3. The software process for both management and engineering is documented, standardized, and integrated with the organizational software process. All projects use an approved version of the organizational standard process to develop and maintain software.

Level 4. Detailed quantitative measurements of the software process and product quality are collected, understood, and controlled.

Level 5. Continuous process improvement is enabled by quantitative feedback from the process and from piloting innovative ideas and technologies.



like it or not.

The SOA Maturity Model is an organizational model. SOA principles must be institutionalized so that all projects in the organization embrace the concepts. Without wide-ranging adoption, the catalogue of available services and the related level of reuse will not reach an optimum level.

BP also believes that the CMM is well suited to adaptation for SOA because of its emphasis on discipline, repeatability, and consistency. If an IT organization lacks rigor and maturity in conventional software engineering, it is unlikely that it can implement SOA very effectively. Our sense is that a group or company that has achieved CMM Level Two will be able to move more quickly to SOA Level Two. However, an organization with poor project management controls will struggle to achieve even basic levels of SOA as the organizational maturity will not support the level of reuse and sharing that a successful SOA requires.

While others have applied the CMM to SOA, two aspects distinguish BP's approach. First, there is no vendor "slant" put on the model. Second, there is a lot more substance than the usual "high level" SOA roadmap, which may look more like an academic exercise.

Deploying the model

During 2006, BP rolled out SOA Level Two across the E&P segment of the business, with a handful of more advanced projects developing Level Three capabilities.

The RTAP project, described in the sidebar on p. 43, is an example of a Level Two reusable service generating value in the organization today. A significant number of additional services are already in production based on the standards defined for Level Two.

No large company, as far as we know, has fully achieved Levels Three, Four, or Five today. This is mainly because SOA is so young that certain required standards and toolsets are still emerging.

The Maturity Model is built to anticipate that and expects an incremental evolution, not only of the organization's capabilities, but also of the availability of standards in the industry. For example, the Service Monitoring and Metrics required to achieve Level 4 can be implemented today using proprietary tools, but an industry standard to enable this will only be available in the medium term future—likely after many organizations have managed to develop and embed the first three levels.

Just as individual projects cannot get very far ahead of the organization as a whole, individual corporations cannot get ahead of the IT industry as a whole. This is why it's critical that innovators, early adopters, IT technology suppliers, and thought leaders—particularly those operating within a given industry vertical—work together toward achieving the SOA vision, and establishing the necessary industry standards to make it happen.

BP is participating in this sharing of expertise by offering both our Maturity Model and specific elements of the SOA standards documents, such as the

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Interoperability Standards from Level 2, and making them available to other operators and vendors in the E&P industry.

Conclusion

As Albert Einstein said, "We can't solve problems by using the same kind of thinking we used when we created them." It has become apparent to many of us that we'll never solve the problems created by some 40 years of monolithic software engineering by using the same kind of thinking. SOA is a totally different kind of thinking.

The SOA vision is clear. The technologies and standards are evolving rapidly enough to enable enterprise-wide adoption. Perhaps the biggest risk is not in attempting to cross the chasm but in sitting on the wrong side just because it's more familiar. SOA services and solutions will soon become ubiquitous. If we try to deploy them in the same way we deploy current technology, we'll never reap the benefits outlined above. We'll just implement the same chaotic and complex environment with new technologies, without solving the problems that the business sees every day.

SOA will not happen on its own. And it certainly won't happen in a single leap. Transitioning from an IT environment with, at most, ad hoc web services projects to a fully institutionalized SOA capability requires a coordinated and comprehensive sequence of activities. The definition of the appropriate activities and their logical sequence is the core of the SOA Maturity Model that BP has defined as its roadmap for the next several years.

Next: Part 2, Oct. 15, 2007.

Further reading

In the second part of this article, the discrete maturity levels are discussed in detail. Part 2 examines the standards that must be defined, the potential product types that must be selected and implemented, and the governance processes that must be established for an organization to adopt each of the defined maturity levels of BP's SOA model. ✦

Gulf of Mexico King field gets world's deepest subsea pumps

Nina M. Rach
Drilling Editor

In July, BP America Inc. began installing two subsea pump stations to boost production from three wells in King field, Gulf of Mexico. At 1,700 m, this is the world's deepest installation of subsea multiphase pumps.

The electric pumps will be powered by a Nexans umbilical from the Marlin tension leg platform in Viosca Knoll Block 915, 18 miles away.

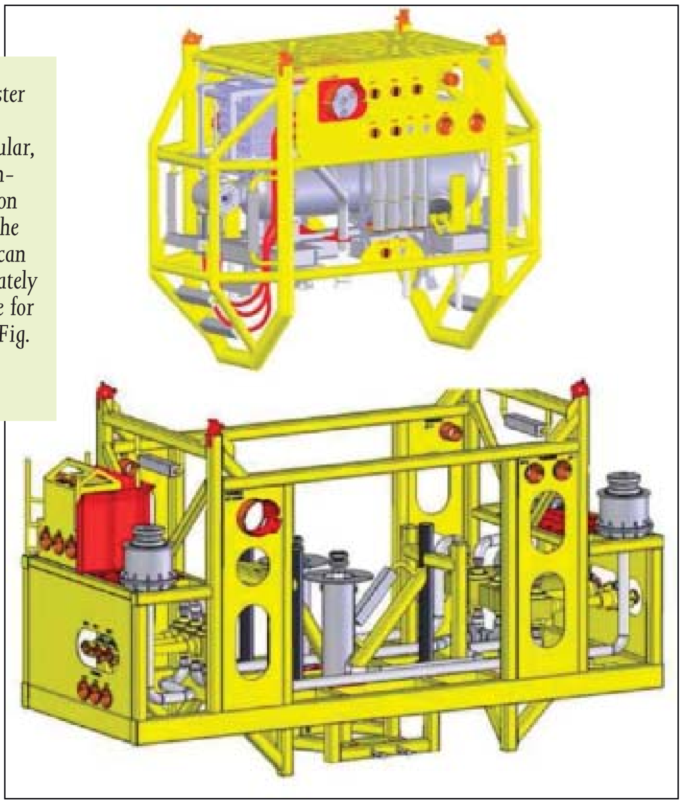
MultiBooster pumps

Aker Kvaerner says the MultiBooster subsea pump technology was developed under the Norwegian government's Demo 2000 program, with support from major oil companies. Cost of the development from 1998-2005 was about 100-150 million kroner ($17.5-26.3 million).

In October 2005, Aker Kvaerner announced an engineering, procurement, and construction contract with BP for the subsea pumping project, worth 220 million kroner ($38.6 million). Aker Kvaerner is providing modules with manifolds, variable speed drives, topside and subsea control systems, a topside lube oil hydraulic power unit, and high voltage connectors and jumpers to BP for two operating pump stations and one spare. The equipment was manufactured at Aker Kvaerner Subsea's facility in Tranby, Norway (Fig. 1).

MultiBooster technology was recognized at the 2006 Offshore Technology Conference with a Spotlight on Technology award (OGJ, May 8, 2006, p. 25). The MultiBooster with Bornemann twin-screw multiphase pump inserts will increase

The new MultiBooster pumps were loaded at Drammen Port, Norway, for transport to the Gulf of Mexico (Fig. 1; photo from Aker Kvaerner Subsea).



The MultiBooster subsea pump system is modular, designed to simplify installation and recovery. The pump module can be pulled separately from the frame for maintenance (Fig. 2; image from BP).

oil recovery and enable longer step-out distances between wells and tieback facilities by adding energy to the wellstream, increasing flowline pressure, and improving recovery. The modular design should facilitate installation and removal (Fig. 2).

Lyell field

Aker Kvaerner ran a MultiBooster system pilot off Scotland in the North Sea. In May 2005, Canadian Natural Resources International requested a MultiBooster pump system for the Lyell field.

Aker Kvaerner delivered the 50-tonne pump module to CNR in December 2005 and installed it in 145-m water depth. The system is powered by an umbilical from the Ninian North platform, and the Lyell production flowline connects to the Ninian South platform.

King field

BP's objectives for its deepwater Gulf of Mexico subsea pump project are to:

- Develop cutting edge technology that increases recovery from existing fields.
- Prove up technology for subsea pumping.
- Share technology across the Gulf of Mexico and worldwide.

King field is in water depths of 4,900-5,600 ft in Mississippi Canyon Blocks 84, 85, 128, and 129. BP is the sole equity owner with 100%.

BP's Nicola Montorsi told OGJ the key technology challenges at King were the high-voltage umbilicals and connectors (12,000 v), pump seals, and remote operations of the subsea kit. Inlet pressures at King range 48-127 bar.

Aker Kvaerner shipped three MPC-335-50s Bornemann pumps from Norway in June. Each weighs about 57 tonnes. They can reach up to 50-bar differential pressure. Each pump station weighs 70 tonnes.

Montorsi said the pumps arrived in Mobile, Ala., early July, installation began in mid-July, and the full project would require 10-12 weeks. BP expects the pumps to be operating by yearend.

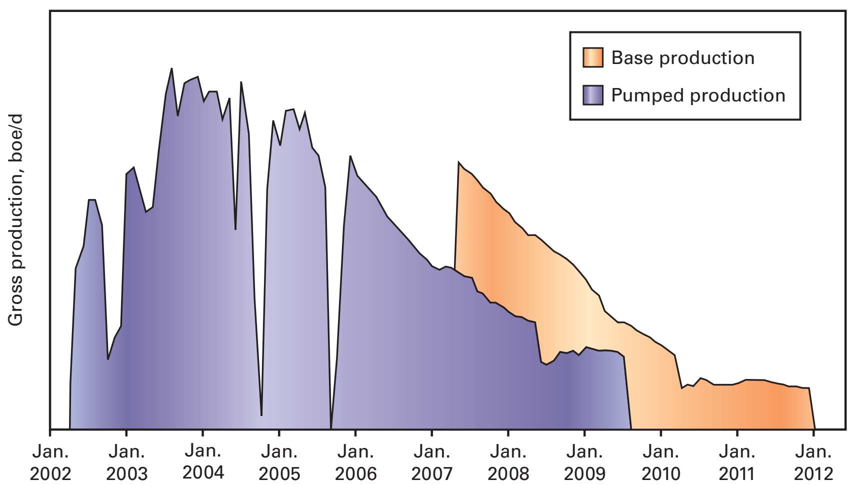
Each of the pumps at King field is designed to handle as much as 75,000 b/d. Each is rated to 5,000 psi and will handle reservoir fluids at 60° C.

Three wells will be boosted from two pump stations: one MultiBooster will work on the D5 (King) and D3 (King West) wells; the other will work on well D6 (King).

King field production began declining sharply at the end of 2005, but BP expects addition of subsea pumps to extend meaningful production into 2012 (Fig. 3). ✦

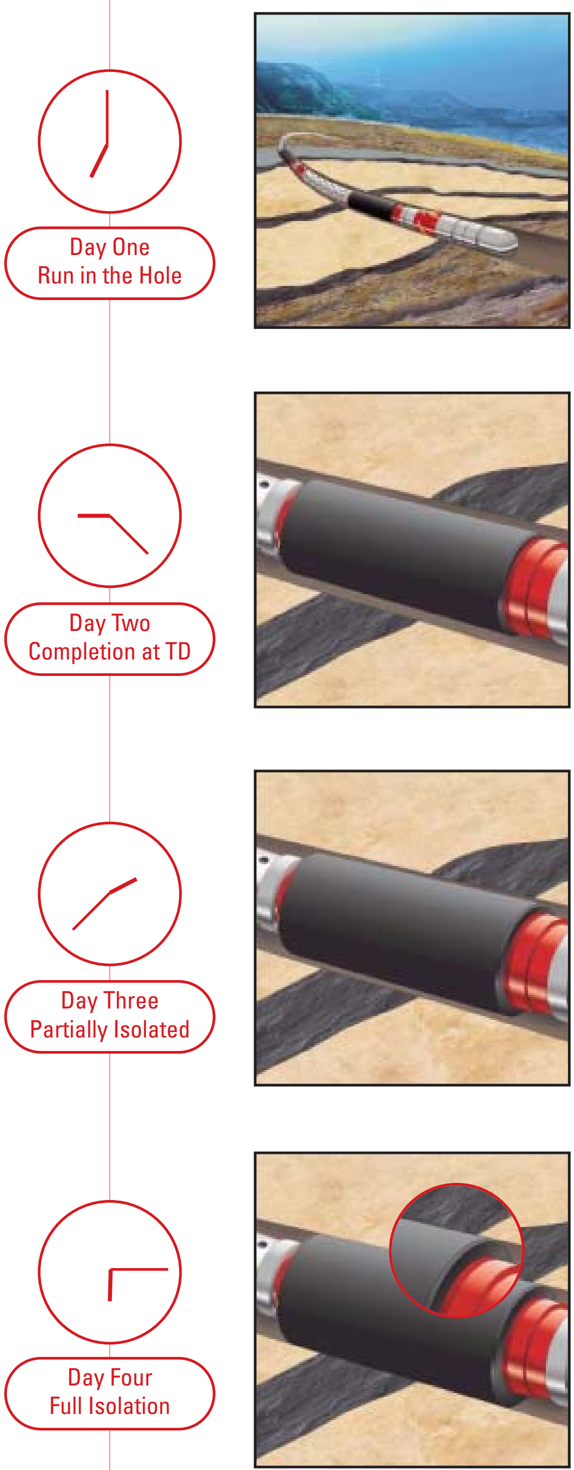
KING FIELD PRODUCTION

Fig. 3



What is **reliability** worth?

Being able to depend on a proven, engineered solution that controls the elastomer swelling process.



Timeline is for illustration purposes only — varies depending on desired delay time.

Industry Challenge

- Reducing risk while drilling and completing with oil-based mud or in a liquid hydrocarbon environment
- Achieving complete zonal isolation of producing zones

Halliburton Solution

Halliburton's **Swellpacker™ OBM** (oil-based mud) product is the industry's only system that allows an oil-swelling elastomer packer to be run without fear of premature swelling. This "industry-first" Swellpacker OBM system:

- Can be run in oil-based mud or liquid hydrocarbon environment
- Is proven for stimulation placement, open- and cased-hole straddles, water control, multilaterals, expandables and is also an alternative to cementing and perforating
- Has been installed thousands of times worldwide—problem-free

Operator Benefit

- Reduces risk profile and well costs; increases uptime
- Engineered solution that delays start of packer swelling process, maintaining maximum working envelope
- Reliable, simple, safe and cost-effective isolation of zones
- Perfect seal for irregular borehole geometry

To learn more about how Halliburton puts reliability in action, visit www.halliburton.com/reliability or e-mail us at easywell@halliburton.com.

Unleash the energy.™

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Ultrasonics detect small leaks in Alaska North Slope wells

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D.B. Robertson
BP Inc.
Anchorage, Alas.

J.E. Johns
TecWel Inc.
Houston

J.K. Sack
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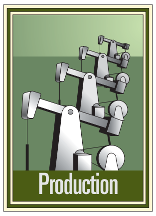


A new ultrasonic leak-detection logging tool conveyed on wireline, and recently on slick line in memory mode, can detect leaks as small as 0.0024 gpm. This detection ability has assisted the operator in better diagnosing leaks in tubing and behind pipe. The improved diagnostics has aided the opeerator in selecting remediation techniques that can be performed without pulling the tubing from the well.

The ultrasonic tool incorporates data-acquisition equipment and filtering algorithms that allow continuous logging, instead of time-consuming stationary counts required by old-style noise logs.

Based on a presentation to the SPE International Oil Conference and Exhibition, Veracruz, Mexico, June 27-30, 2007.

To date, BP Alaska has run 21 ultrasonic leak-detection logs in Alaskan fields with an 81% success rate. The recent introduction of a memory mode tool has opened up additional logging opportunities for the tool.

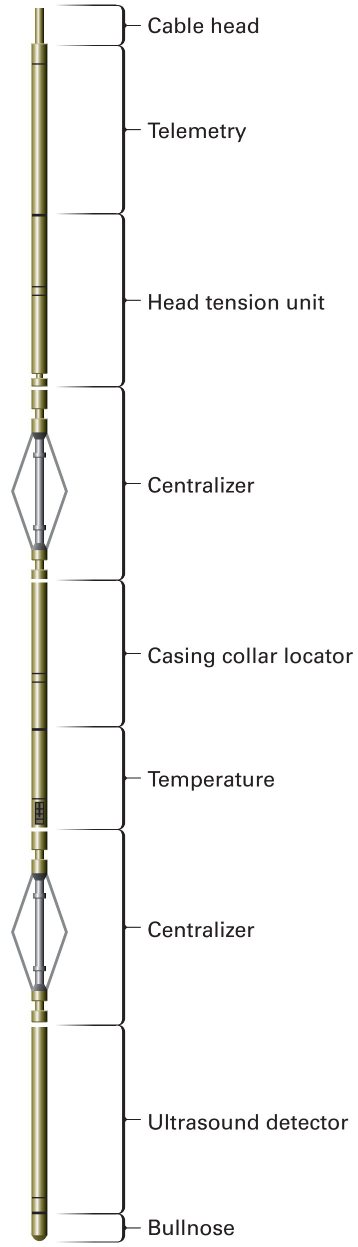
The tool is particularly useful where rig workovers are expensive, such as at remote locations, offshore, and arctic region.

Rigless repairs

BP operates several enhanced oil recovery and waterflood oil fields that have experienced well integrity problems as they mature. Rigless tubing repair has become an alternative to workovers with rigs and include wireline set tubing straddles and coiled tubing packer repairs. The methods are faster because no tubing has to be pulled from the well. The limiting factor in rigless repairs has been in identifying leaks below the resolution of conventional leak-detection methods.

The velocity and temperature changes caused by small leaks often are below the resolution of conventional logging tools, including spinners, temperature logs, downhole cameras, and noise logs. These tools have even more limitations when trying to detect leaks behind tubing.

ULTRASOUND LEAK DETECTION TOOL Fig. 1



Note: The tool has a 1 11/16-in. OD and is rated for a maximum 302° F. temperature and 15,000 psi pressure.

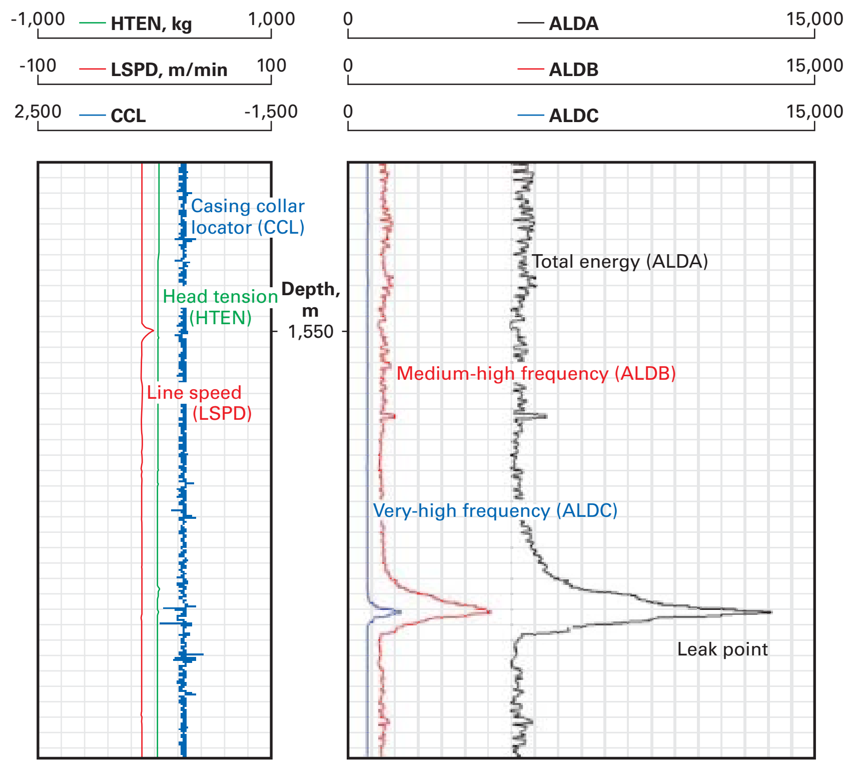
Tool operation

The frequency spectrum that a leak produces is a function of differential pressure, leak magnitude, and leak geometry. These properties determine whether the frequency will be audible, ultrasonic, or both.

The ultrasonic logging tool (Fig. 1)

TYPICAL LOG RESPONSE

Fig. 2



uses a sensor that detects a frequency spectrum, including those typically produced by leaks. An on-board processing unit has a series of band-pass algorithms that focus on frequencies in the ultrasonic range and processes the signal generated by the sensor.

The algorithms filter out almost all audible noise associated with tool movement, thus allowing continuous logging. Typical logging speed is 30 fpm and the tool can identify leaks while logging either up or down. It can detect leaks through multiple strings because ultrasound is not significantly attenuated by gas, liquid, or steel.

Ultrasound typically travels only 3-10 ft in a wellbore before any significant attenuating. This attenuation allows for a very sharp signal resolution, typically identifying a leak within 1 or 2 ft.

Sound passing through steel normally has some attenuation, but the sensitivity of today's equipment is such that the tool can detect leaks through multiple strings.

Ultrasonic energy travels poorly in low-pressure gas; therefore the best results are in cases where the gas is compressed.

BP ALASKA WELLS LOGGED

Table 1

Leak type	Leak rate, gpm	No. of leaks
Equalizing dummy gas-lift valve	0.16	1
Inconclusive	0.4-0.8	
Tubing collar	1.1	1
Tubing collar and tubing joint	0.26-0.36	2
Pup below gas-lift mandrel	0.03-0.3	1
Leaking patch	0.3	1
Production casing	0.36	8
Inconclusive	0.38	
Liner hanger	16.8-21	1
Packer	0.013	1
Production casing	1.3	1
Tubing collars	0.2-0.8	2
Packer and gas-lift mandrel	0.2-1.4	2
Packer, pup joint, and production casing	1.5-2.5	3
Three dummy gas-lift valves	0.05-0.75	4
Inconclusive	0.08-0.16	
Tubing leaks	2.6-6.3	5
Inconclusive	0.9	
Wellhead	0.22-2.99	1
Four dummy gas-lift valves and packer	0.85	4
Safety valve nipple and packer	12.6	2

Fig. 2 shows a typical log presentation with three frequency windows of investigation. The three traces are: total energy level (ALD A), medium-high frequency (ALD B), and very-high frequency (ALD C). These ultrasound signal strength measurements do not have units.

For depth correlation, the log also includes a casing collar locator (CCL) track.

Reference 1 provides more details on the tool's physics and development history.

Stationary readings at 1-2 ft increments above and below the leak can verify the exact leak location. With the tool positioned at the leak, manipulation of wellbore pressure can causes changes in the signal strength that can confirm which tubular has the leak.

North Slope history

Since the introduction of the tool on the North Slope in December 2005, BP Alaska has logged 21 wells with an 81% success rate (Table 1).

Of these wells, 14 were producers and 7 were water or gas injectors. Liquid leak rates ranged from 0.013 to 21 gpm.

The logs have identified leaks in 10 annuli, 4 production casing strings, 4 packers, 1 wellhead, 1 liner hanger, and 1 tubing straddle. Nine wells had multiple leaks. One well had three leaks: tubing, packer, and production casing. Based on these results, 10 of these wells will have rigless repairs.

Dummy valve leak

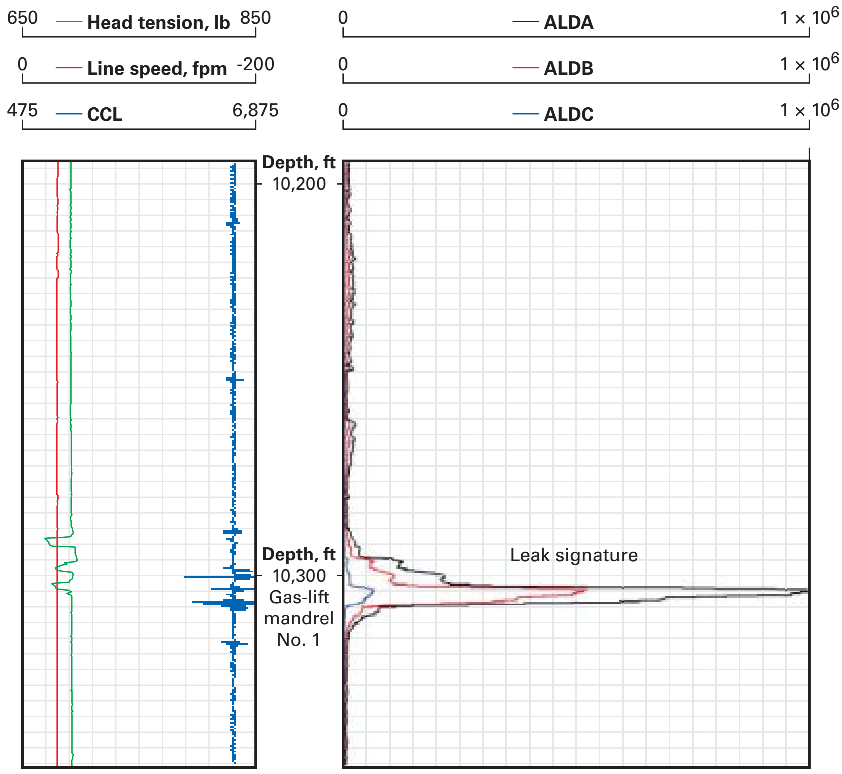
The first ultrasonic log run by the operator in Alaska identified a leaking dummy gas-lift valve in an active water injection well.

The operator completed the well as a preproduced injector in 1983 and converted it to water-alternating-gas (WAG) injection in 1985. The completion included nine gas-lift mandrels with dummy valves.

The well injected miscible injectant (MI) gas during four cycles prior to de-

GAS-LIFT MANDREL LEAK

Fig. 3



veloping tubing to annulus communication while injecting MI. Although the well passed a liquid pressure test of the annulus, the annulus pressure would increase during MI injection.

The logging operations for finding the leak involved placing the well on water injection at 4,900 b/d and 900 b/d with a 2,000-psi wellhead pressure. The annulus was bled off to 100 psi and then allowed to repressure while logging. Calculations based on pressure buildup indicated that the leak rate was 0.16 gpm. Fig. 3 shows the leak signature at the lowermost mandrel, which contained an equalizing dummy gas-lift valve. These valves are prone to leaks.

After replacement of the leaking valve with a dummy valve with extended packing stacks, the well successfully passed a pressure test.

This was the first time that the operator had identified a dummy valve as the source of tubing-to-annulus communication in an injector. Before the ultrasonic log, the general belief was that multiple thread leaks in the tubing caused slow tubing to annulus communication in WAG injectors.

Ultrasonic logs have identified three other injection wells with communication through eight leaking dummy valves. Replacement of the leaking valves repaired the communication. A new technique that uses nitrogen, discussed later in this article, detected the leaks in two of these wells.

At least 10 injectors in the operator's Alaskan fields have had tubing replaced because of slow tubing-to-annulus communication. If ultrasonic logging had existed, the operator may have identified these as valve leaks and remediated them with rigless methods.

Memory tool

Running the tool in a memory mode on slick line is less costly and provides the operator additional flexibility. An added advantage of this mode is that it allows for a single rig-up to obtain a multifinger tubing caliper and leak-detection log.

If the log indicates a leak at a gas-lift mandrel, the slick line unit can immediately replace the dummy valve. If the leak is not at the mandrel, the slick line can run and set a dummy tubing patch in preparation for a wireline set tubing straddle. Of the seven memory jobs completed in Alaska, only one has been inconclusive.

One well was logged in real-time on wireline and in memory mode on slick line. Both wells had consistent log results, with no significant difference between the two methods.

The first memory ultrasonic log in the world was run in July 2006 in Alaska in Well 2, a water injector completed in 1991.

The well displayed communication with sustained pressure on the annulus. A multiarm caliper indicated that the tubing was in good condition, yet a leak was still present.

Because the leak was small, 1.1 gpm, the operator decided to run an ultrasonic leak-detection log. A tubing plug was set below the packer before logging. During logging, the leak rate was established by pressuring up and maintaining 1,500-2,200 psi on the annulus and bleeding off the tubing pressure to 500-700 psi. The leak rate ranged from 0.9 to 1.2 gpm.

The log indicated a leak signature at a tubing connection (Fig. 4).

A memory temperature probe run in conjunction with the ultrasonic tool also showed a change in temperature at the leaking collar. The temperature probe detected other temperature fluctuations above the leak, however, while the ultrasonic tool showed no response. Often it is difficult to interpret temperature logs because of multiple temperature anomalies that may interfere in identifying small leaks.

Installation of a tubing patch is scheduled for Well 2.

Improper tubing makeup

The ultrasonic tool run on wireline identified a tubing leak in Well 3. After completion of the well with a new chrome string during a rig workover, the tubing failed a pressure test, leaking 0.2-0.8 gpm. The logging used a surface readout wireline while pumping down the annulus to maintain the leak.

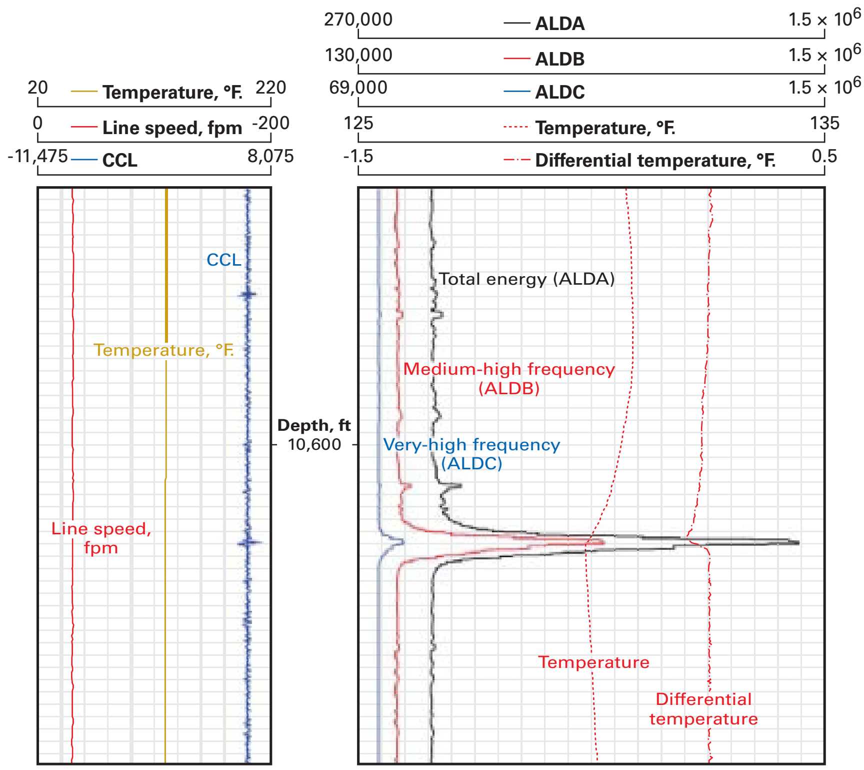
The log clearly showed leaks at the top and bottom connections of a tubing joint (Fig. 5). Note the more precise ultrasonic leak signature compared with the temperature traces.

An investigation concluded that the connections were improperly made up. After discussion with the service company, the field adopted an operating procedure to ensure the workover crew observed and recorded all aspects of the make-up (shoulder torque, number of turns, and final torque). The procedure also allows only three attempts for making up a tubing connection before the collar and joint are discarded.

Installation of a tubing straddle repaired the leaking connection, eliminating the 4 days and $1 million required for pulling and rerunning the tubing.

TUBING CONNECTION LEAK

Fig. 4



Casing leak

Detection of small casing leaks behind tubing is difficult, if not impossible, with conventional logging methods. Companies historically have tried with little success to identify small leaks by comparing a baseline temperature pass with traces logged after pumping into the annulus.

Well 4, a producer completed with 4.5-in. chrome tubing inside $9\frac{5}{8}$-in. casing, exhibited sustained annulus pressure and failed a pressure test.

The first step in determining the leak location was to test the tubing by installing a tubing tail plug and then applying pressure to test the tubing. Because the tubing held pressure, this suggested that the well had either a production-casing leak or a one-way packer leak.

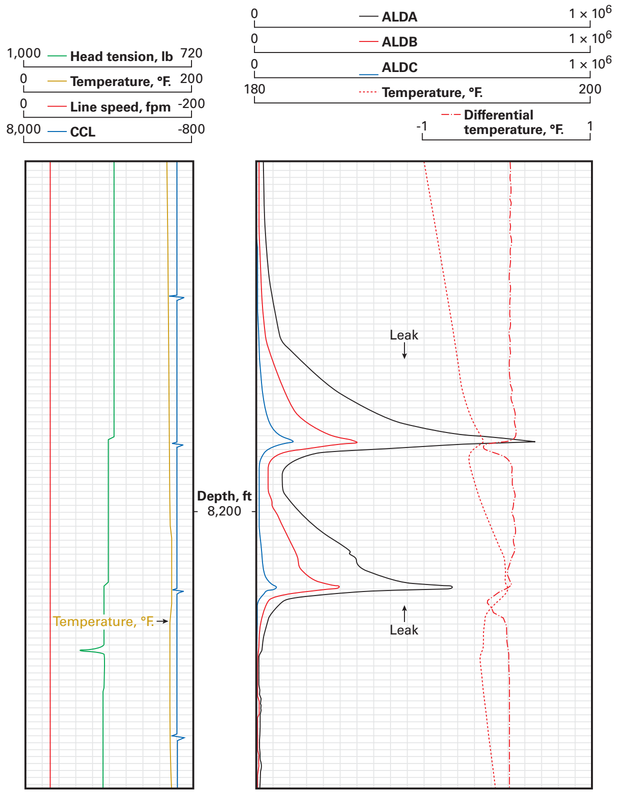
The operator then ran the ultrasonic leak-detection tool in memory mode on slick line. The logging operation involved pressuring up the annulus and maintaining the pressure at 3,000 psi with a calculated leak rate of 0.36 gpm.

The log identified eight leaks, a tool record for the most casing leaks found behind tubing in one well. Temperature traces indicated minor fluctuations on the four uppermost leaks but did not indicate the lower four leaks.

Fig. 6 shows one of the leaks identified. Note that the temperature trace does not provide any conclusive information. Also note that casing leaks typically have a symmetrical shape. The other spikes below the leak signature

TWO TUBING CONNECTION LEAKS

Fig. 5



LOG RUN IN MEMORY MODE

Fig. 6

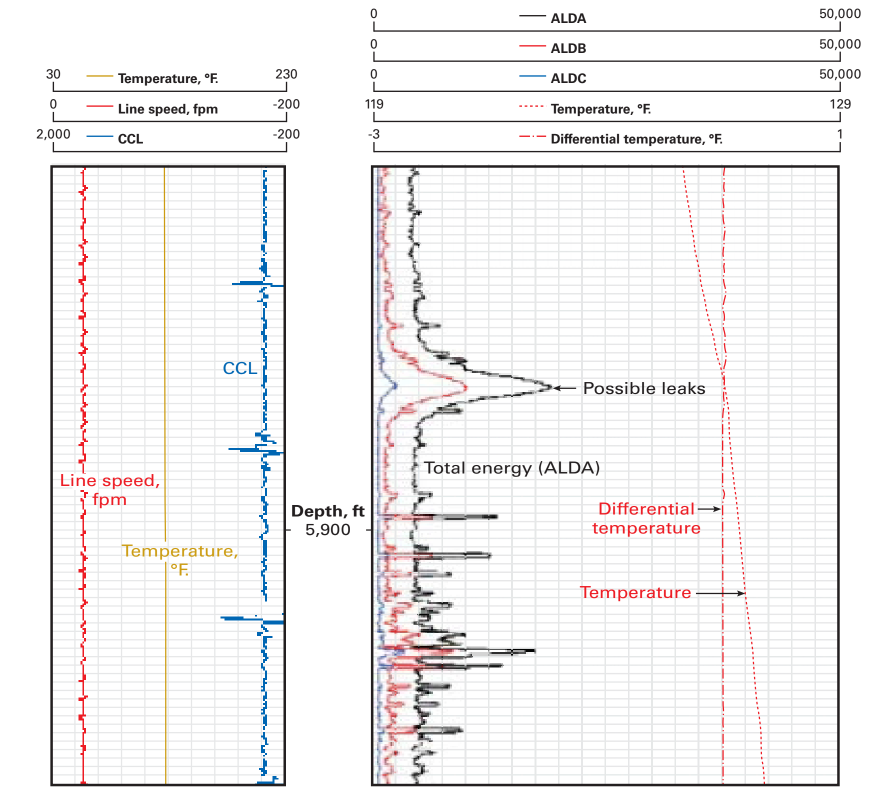


exhibit a shape typically associated with mechanical noise.

Well 5

Well 5 had three types of leaks: tubing, packer, and production casing.

The operator secured Well 5 with a slick line plug after the well exhibited communication between the tubing-casing annulus, and the casing-casing annulus. A pressure test of the tubing-casing annulus failed with a leak rate of about 2.5 gpm. The tubing pressure tracked the annulus pressure during the test.

A pressure test of the tubing also failed, with a 0.48 gpm leak rate and the tubing-casing annulus pressure tracked the tubing pressure during this test.

A combination pressure test of the tubing and the tubing-casing annulus failed, indicating a possible packer or production casing leak. During this test, the tubing-casing and casing-casing annuli were in communication.

The evaluation of the tubing to annulus communication involved applying a pressure of 2,400-3,000 psi to the tubing and maximizing the differential pressure across the leak by taking returns from the tubing-casing annulus through a choke. The leak rate ranged from 1.2 to 2 gpm.

The leak was found to be at the packer and was confirmed by positioning the tool at the leak and manipulating the leak pressure and rate (Fig. 7).

The tool also located a shallow production casing leak in Well 5 that caused the tubing-casing and casing-casing annuli to be in communication. The second-phase logging operations involved pressuring up the tubing and tubing-casing annulus together to 3,000 psi to evaluate the production casing, packer, and casing-casing annulus. The test indicated a leak rate of 1.2-2 gpm.

The tool located the leak at 2,340 ft while pressuring the tubing and tubing-casing annulus together.

The leak was confirmed by positioning the tool at the leak point, equalizing the pressure, and observing the signal die away.

Wellhead leak

Well 6 exhibited slow tubing-casing and casing-casing annuli communication while on gas-lift. Multiple tests attempted to confirm whether the communication was in the wellhead past the intermediate casing hanger seals or from a shallow production casing leak. Diagnostics gave conflicting results and led to the running of the ultrasonic leak-detection log.

After obtaining a baseline pass, the test activated the leak by pressuring the tubing and tubing-casing annulus to 1,600 psi with lift gas. The leak rate fluctuated substantially, ranging from 0.2 to 3.0 gpm.

Lift-gas injection was halted while logging across the wellhead and tree to insure that any ultrasonic signal detected was due to leak activity.

A comparison of the two logs clearly indicates that the leak was in the wellhead. A pressure-activated sealant squeeze repair is planned to remediate the leakage past the wellhead seals.

Nitrogen use

The ultrasonic leak-detection tool in memory mode provides more opportunities to find smaller leaks. One advantage is that the tool can be run in high-pressure wells in which it is difficult to maintain a pressure seal for the wireline.

The technique developed by the operator uses nitrogen to identify leaks in WAG injection wells. These wells have typically 4,000-psi injection pressures. In some cases, injection wells can pass tubing-casing annulus pressure tests to liquid but build up pressure when injecting gas. These wells must remain on water injection until worked over to allow gas injection.

Many injection wells were previously producers and therefore have gas-lift mandrels. Miscible injectant gas consists of 35% methane, 20% each of ethane,

propane, and carbon dioxide, and 5% butane. It is an excellent solvent and easily dissolves grease seals, o-rings, and elastomers.

To minimize logging risk in wells injecting miscible fluids, a technique was developed using nitrogen to simulate MI injection that requires only one slick line rig-up.

The procedure involves first performing a pressure test on the tree after which a multiarm caliper log run determines the tubing condition. Lift gas then depresses the well's fluid level in the tubing as deep as possible. This step is not required but saves on the amount of nitrogen needed. Following this, nitrogen pumped into the well depresses the fluid level to below the packer.

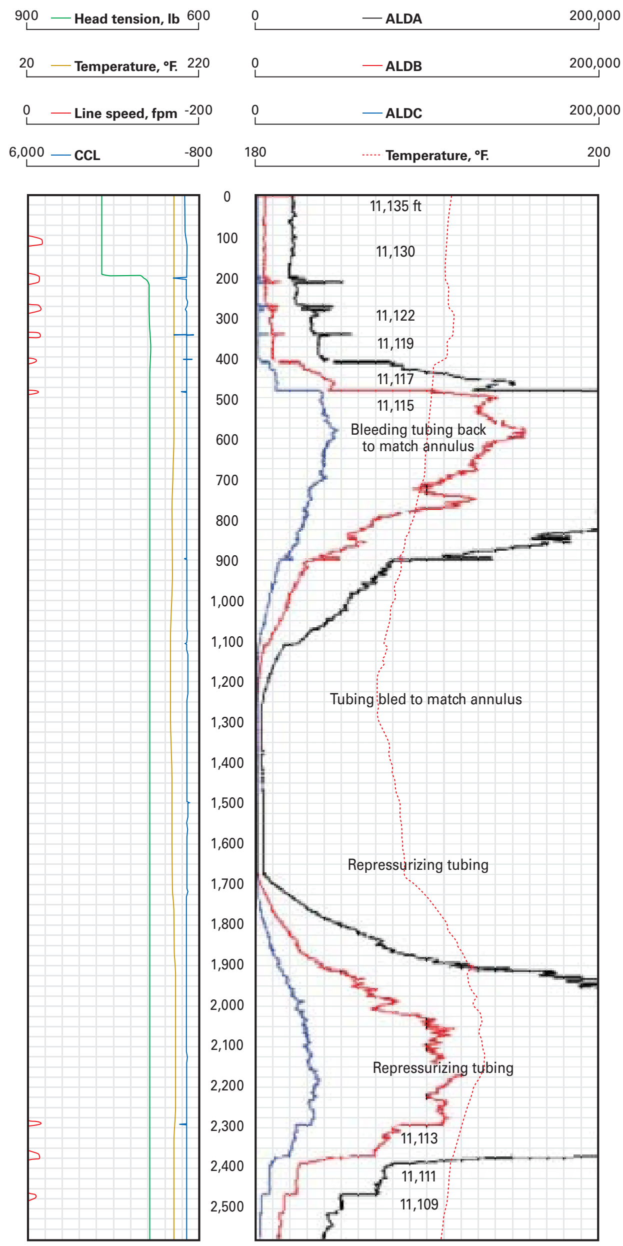
Upon complete evacuation of the tubing, a tubing plug is set below the packer after which nitrogen is used to pressure the tubing to 4,000 psi. The ultrasonic tool obtains a baseline log after the tubing plug is run. After the tubing-casing annulus is bled to 0 psi, the tool logs the well to surface at 30 fpm, slowing to 10 fpm across any equipment placed in the tubing string.

BP Alaska has logged two wells with this technique. The first log found leaks at three gas-lift mandrels and the second log found leaks at four mandrels.

A subsequent change out of the dummy valves resulted in both wells passing 4,000-psi tubing-casing pressure tests. Subsequent MI injection will determine if the communication problem has been resolved.

Investigations also have addressed the possibility or replacing the dummy valve packing material with packing material that is more resistant to the miscible injectant.

TOOL STOPPED ACROSS PACKER LEAK Fig. 7



Note: With tool stopped across the packer, the tubing is bled off to equalize with the tubing-casing annulus, effectively stopping the flow across the packer. The ultrasonic signal dies away, indicating the leak is in the packer. The tubing is then repressured and the leak signal is detected again.

Inconclusive logs

To date, BP Alaska has run four inconclusive ultrasonic logs. Two of these wells are scheduled to be relogged with increased differential pressure to ensure turbulent flow, possibly creating a stronger signal for identifying the leak.

Ultrasonic signatures depend on the rate, differential pressure, and leak geometry. A possible explanation of why a few logs were inconclusive is that one of these factors was insufficient for generating the expected result.

With small leaks, a leak may have gone silent when the tool passed. It is important to note that conventional methods cannot locate small leaks, particularly those behind tubing.

There have been a few problems in obtaining successful ultrasonic data. The most common, although infrequent, operational problem is the activation of small leaks that are either intermittent or one-way leaks. Patience is a requirement in assuring that any pressure fluctuations are leak behavior and not annulus ballooning or thermal effects. Pressure data analysis prior to the job serves to assist in avoiding this problem.

Because the tool almost always produces a very distinct signature, the logging operations may be streamlined further. Rather than taking time to confirm every leak under pressure manipulation, a complete pass may be made first, prior to investigating anomalies.

The number of leaks found and potential remediation techniques may help decide on whether to do additional logging.

Future plans

The number of rigless repairs in Alaska is expected to increase because this new technology can locate other-

wise unidentifiable leaks. Millions of dollars have already been saved in the last year.

The method is preferred over conventional leak-detection logging tools because of its sharp leak delineation. The tool, however, has not been used to detect leaks greater than 2 bbl/min. Rates greater than this may be a tool limitation.

The track record has proved that ultrasonic technology is a viable, efficient, and economic option in detecting leaks as small as 0.0024 gpm. The tool has become part of the standard well work toolkit in Alaska.

The tool's pinpoint accuracy is superior to conventional leak-detection methods, and continued work is ongoing to determine if the tool can detect ever smaller, as well as larger, leaks.

Further ultrasonic-based tool development underway includes a high-temperature leak-detection tool. In addition, a tool for detecting microannulus flow, and a tool which will illustrate the flow profile at the produced interval have been released and now are in field use.

Acknowledgments

The authors thank the management of BP Exploration Alaska and other unit working interest owners for permission to publish this article. The opinions stated and the techniques described are those of the authors and are not necessarily shared by Unit Working Interest Owners. ✦

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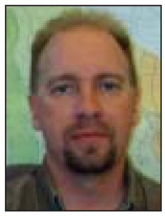

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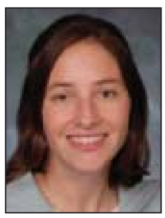

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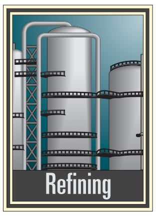
Study forecasts US fuel demand for next decade

Michael Canes
Energy Policy Research Foundation Inc.
Washington



Economic growth, fuel prices, and policy choices will determine the rate of growth of US gasoline and diesel markets during the next decade.

Diesel demand is sensitive mostly to economic growth. The diesel market will therefore remain strong if the economy continues to do well.

Growth of 15-20% in motor fuel demand during the next decade could be slower than the recent past; but continued adjustments to past price increases and a somewhat lower economic growth rate could plausibly push future growth into that range. Biofuels and carbon policies would further constrain diesel demand growth, perhaps to the lower end of the estimate.

The gasoline market also will grow with the economy but is more sensitive to price and is still adjusting to past price increases. Base case growth of 15-20% during the next 10 years is plausible.

Biofuels, corporate average fuel economy (CAFE) policies, and changes in the vehicle mix, however, could reduce gasoline demand by up to 1.2 million b/d. Alternatively, constraints on carbon emissions and biofuels substitution could reduce overall motor fuels demand by as much as 1.3 million b/d. In that case, gasoline demand would grow only about 200,000 b/d during the next 10 years and diesel would grow 400,000 b/d.

This is the context in which US refiners must make investment plans. Given reasonable assumptions about US economic growth during the next several years, the market for motor fuels appears poised to grow, albeit more slowly than in the recent past. Investment in new diesel and gasoline processing capacity is needed and consumers will benefit if additions to refining capacity keep pace with demand.

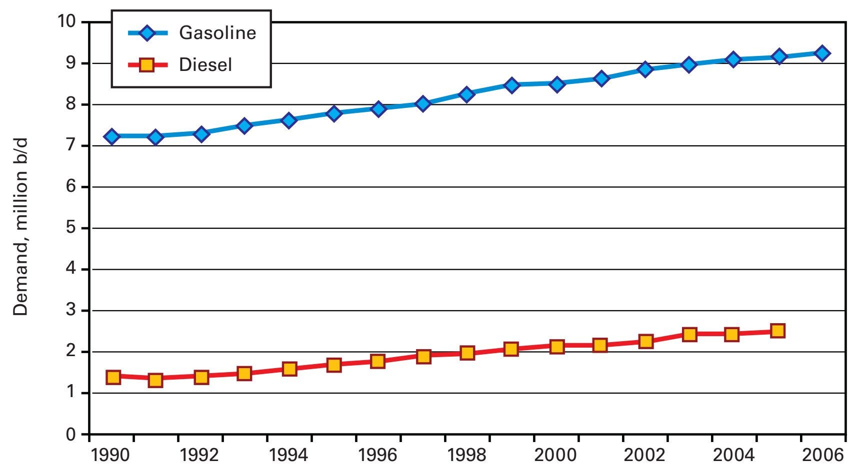
From a refiner perspective, however, policy uncertainties abound. Industry faces immediate prospects of anti-price gouging and punitive tax legislation.

Investors also cannot be certain how CAFE requirements will be implemented nor the extent to which policy will compel use of biofuels beyond the 15 billion gal expected from corn ethanol.

There also are supply risks facing ethanol output—changes in feedstock prices, weather, and distribution costs could curtail output in that market. In addition, cellulosic ethanol may not be available in large quantities in the next 10 years, but mandated biofuels targets could be established on the belief that

US FUEL DEMAND

Fig. 1



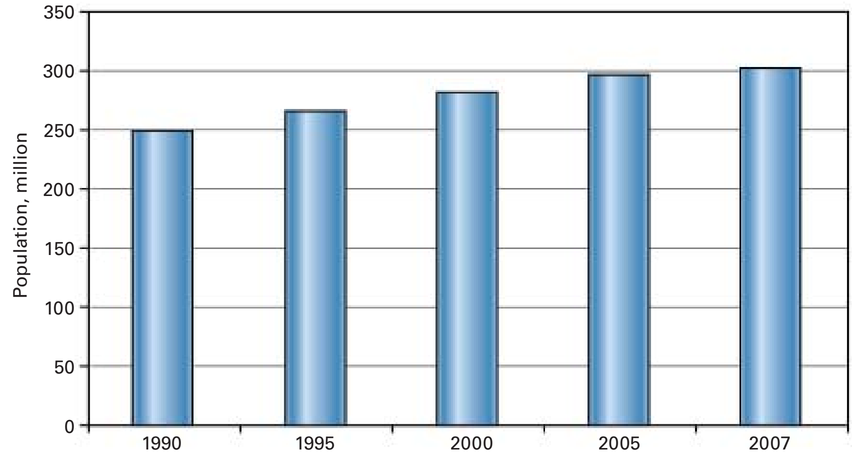
Source: US Energy Information Administration Monthly Energy Review it will be.

These various uncertainties cloud prospects for investment in US motor fuel production capacity. The outcome could be a situation in which market forces imply a need for expansion of domestic refining capacity while policy discourages it.

This article, the first of two parts, will cover current and future demand for gasoline and diesel, and the economic factors that will influence demand during the next decade. The concluding article in next week's issue will discuss the government policy initiatives that will affect motor fuel demand in the next decade.

US POPULATION

Fig. 2



Source: US Bureau of the Census

Background

During the past 15 years, motor fuel demand in the US has increased steadily. On average, gasoline demand has increased about 1.5%/year; on-road diesel demand has risen faster—up almost 4%/year.

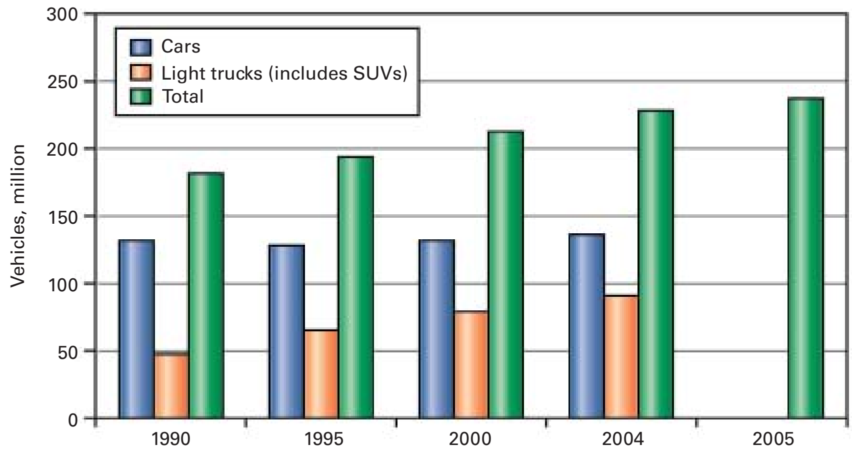
Although this demand increase has largely been due to rising US prosperity, concerns have been expressed that the country is becoming too dependent on imported crude oil as well as imported refined products, notably gasoline. An additional concern is that the US may be producing too much carbon dioxide.

In his 2006 State of the Union address, for example, Pres. Bush said that the US "is addicted to oil, which is often imported from unstable parts of the world." He has since announced a goal of reducing annual US gasoline demand 20% in 10 years, through a combination of increased use of biofuels and higher light vehicle fuel economy standards.

Additionally, although the US has not agreed to greenhouse gas limits under the Kyoto protocol, proposals proliferate in Congress to constrain US carbon emissions beginning in 2010, if not before. For example, Sen. Diane Feinstein (D-Calif.) has introduced a bill that would cap annual US greenhouse gases at 2006 levels beginning in 2010 and ratchet them downwards in subsequent years.

US LIGHT VEHICLES

Fig. 3



Source: US Department of Transportation, Department of Energy

What effects on motor fuel demand might these various programs have? The US population continues to increase, incomes are rising, and the US light vehicle fleet continues to expand. These forces inexorably push gasoline and diesel demand upwards.

On the other hand, fuel prices have been rising. Technological means are at hand to increase vehicle fuel economy. The biofuels industry is booming. These and other factors could constrain the rise in petroleum motor fuel demand if not reverse it.

Finally, refiner profits in the first half of 2007 were historically high but fell substantially in July 2007. Unscheduled shutdowns and ongoing required maintenance have caused short-run motor fuel prices to rise substantially.

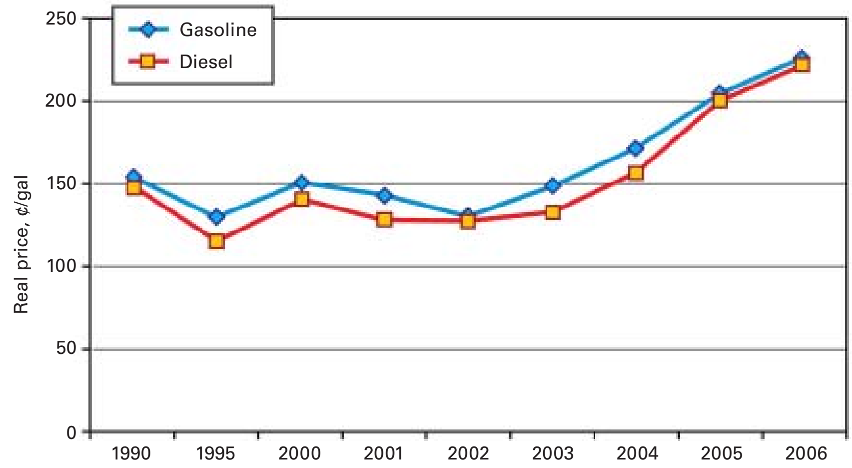
In response, some in Congress and elsewhere have proposed anti "price gouging" legislation as well as special taxes on refiner profits. These policy responses also bear on the willingness of firms to make large and long-term capital investments in new US refining capacity.

Demand

Fig. 1 shows US gasoline demand during 1990-2006 and diesel demand

US PRODUCT PRICES

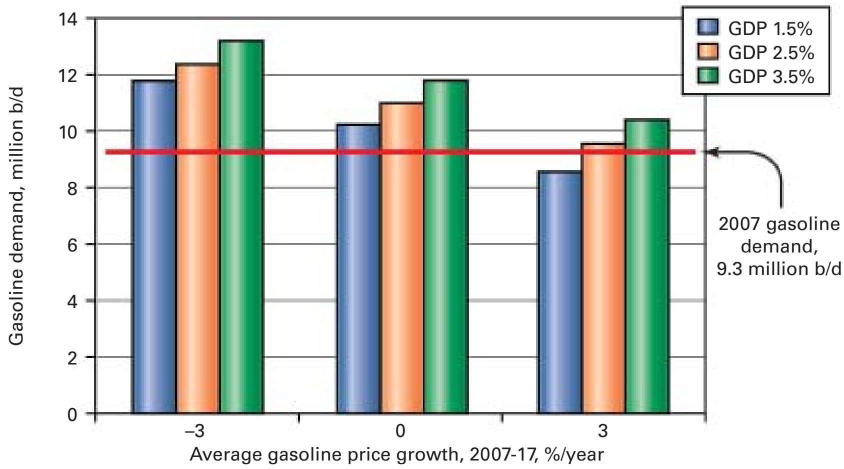
Fig. 4



Sources: US Energy Information Administration Monthly Energy Review, CPI deflator

GASOLINE FORECAST, 2017

Fig. 5



Sources: EPRINC, US Energy Information Administration

through 2005. Gasoline demand grew at 1.5%/year, rising to 9.2 million b/d from 7.2 million b/d. Diesel demand rose virtually without slowing at 3.9%/year, increasing to 2.5 million b/d from 1.4 million b/d.

The principal factors affecting demand for motor fuels are national income—the combination of population and per-capita GDP—and price.

Fig. 2 shows the rising US population during 1990-2007.

Between 1990 and 2005, population increased 19.2%, or 1.2%/year. The Census Bureau projects US population will be 309 million by 2010 and 336 million by 2020. The projected rate of increase, less than 1%/year, is lower than what occurred during 1990-2007; it appears conservative.

Per-capita income also has been rising. In 1990, per-capita US income was \$19,500; by 2005 it was \$34,600, an increase of more than 77%. The GDP deflator increased 33% during the same period, implying real income rose 44%.

Increasing population and real income lead to more vehicles, as has been the case in the US. Furthermore, the fleet composition has been changing, from mostly passenger cars to a combination of cars, light trucks, and sport utility vehicles (SUVs).

Fig. 3 shows the US light vehicle fleet during 1990-2005.

Between 1990 and 2004 the number of automobiles changed very little, but the numbers of light trucks and SUVs changed a great deal. In 1990, light trucks and SUVs comprised about 1/3 of all light vehicles sold in the US. But since 2000, these categories have comprised 50-55% of all new light vehicles sold. Their numbers have been rising both absolutely and as a proportion of the vehicle fleet.

Fig. 4 shows the real (inflation-adjusted) prices for gasoline and diesel during the same period. During 1990-2002, real prices did not rise; but since then there has been an increase of about 50% in both fuels. Real prices have risen even further in 2007.

These increases will have an effect on demand; in particular they will change the choices consumers make on the types of vehicles they decide to buy.

Gasoline forecast

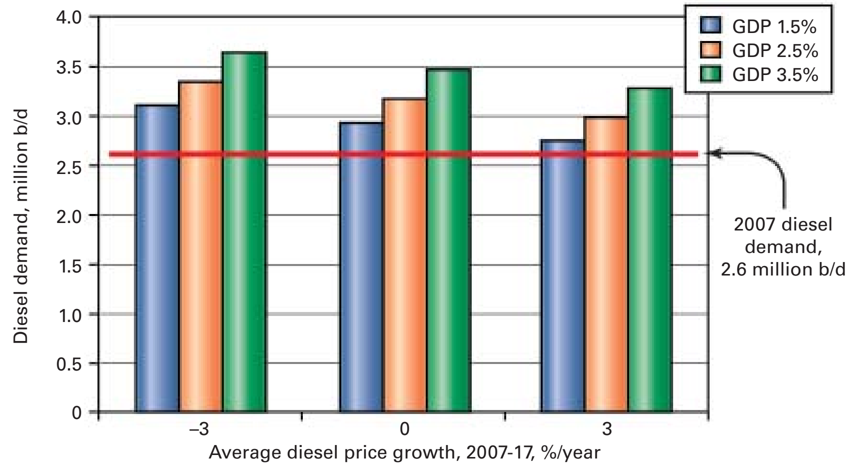
A recent survey of gasoline demand studies performed since 1990 suggests that demand elasticity with respect to price in the US is -0.5 in the intermediate term and -0.75 in the long term. Elasticities of demand with respect to income in the intermediate and long term are 0.65 and 1.0.[1]

If long-term demand is mainly a function of these two variables, the predicted demand increase during 1990 and 2005 would be 28%. Actual demand in that period increased just less than 27%, indicating that these parameter estimates and the assumption that price and income largely explain long-term gasoline demand are close to the mark.

The next 10 years is too short a period for the US light-vehicle fleet to turn over completely. The median age of US passenger cars is 9 years. On average, US cars last almost 17 years. It will take several additional years for a price increase in any given year to substantially alter the vehicle stock.

DIESEL FORECAST, 2017

Fig. 6



Source: EPRINC

With this as a consideration, Fig. 5 reflects use of intermediate term elasticity to project demand growth using different price and GDP growth assumptions.

Growth in gasoline demand ranges from -7% to 42%; the former represents consistently slow economic growth and steadily rising real prices at 3%/year and the latter represents rapid economic growth coupled with steadily declining prices. The true range is probably narrower.

Rapid economic growth coupled with steadily declining prices seems unlikely because the growth would probably push demand up and exert upwards pressure on prices. On the other hand, economic growth is likely to average more than 1.5%/year; i.e., we expect consumers will continue to see sustained real incomes consistent with recent history.

A medium case is moderate (2.5%/year) economic growth with no change in real prices during the next decade. That would imply an 18% overall increase in gasoline demand. This projection, however, is probably high for two reasons. Consumers still are adjusting to the real price increases of the past few years, and real prices have continued to rise so far in 2007.

Accounting for likely consumer adjustments to recent price increases in motor fuels, growth of 10-15% during the next decade given the midcase assumptions is more likely.

We compared these projections with US Energy Information Administration projections of gasoline demand. In its 2007 Annual Energy Outlook, the US Department of Energy projected declining real gasoline prices followed by increases. It also projected 2.9%/year economic growth, which is between our 2.5%/year and 3.5%/year growth cases.

Using our parameter estimates, these assumptions would yield projected growth of about 22% during the next 10 years, although past price increases likely would reduce this to 15-20%. In its Annual Energy Outlook, however, DOE projects growth of only about 1.2%/year or 13% for the decade. This is within the range of our midcase estimate.

Diesel forecast

Estimates of the effect of price and income on diesel demand exist for the entire OECD, not just the US.[2] The estimates suggest a higher long-run income elasticity of demand than for gasoline, about 1.15, and a lower long-run price elasticity, around -0.3.

Using these parameter estimates to predict the growth in diesel demand between 1990 and 2005, we got 71%, not much different from actual growth of 78% during the period.

Fig. 6 shows the results using intermediate-term elasticity.

In all of the cases, diesel demand rises, although the rise might not be as great as shown because diesel consumers are still adjusting to past price increases. For the midcase assumptions, this might reduce growth to about 15-20%. Nevertheless, the clear implication is that so long as US GDP continues to rise, the on-road diesel market is likely to remain strong. ✦

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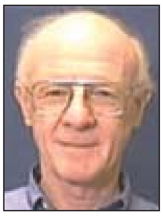

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LNG TRADE—Conclusion

Spark spread trends allow analysis of LNG consumers

David Wood
David Wood & Associates
Lincoln, UK

Spark spread trends and volatility show that opportunities for gas supply through LNG vary from market to market and require careful contracting and risk management to position LNG favorably against competing fuels and sustain a competitive position.

Despite taking more control of oil and gas resources, many gas-resource-rich nations, their governments, and their national oil companies recognize the benefits of a continued reliance on international oil companies' technological, financial, and managerial assistance in developing their natural gas industries over the medium term.

The first part of two articles (OGJ, Oct. 1, 2007, p. 60) used analysis of natural gas statistics for production, consumption, net exports, and proved reserves to help identify and explain strategies being pursued by NOCs in producing countries where they control their national industries.

This concluding article reviews gas and LNG spark spreads in relation to electricity prices and competing fuels to provide insight into the main gas consuming countries.

Spark spreads

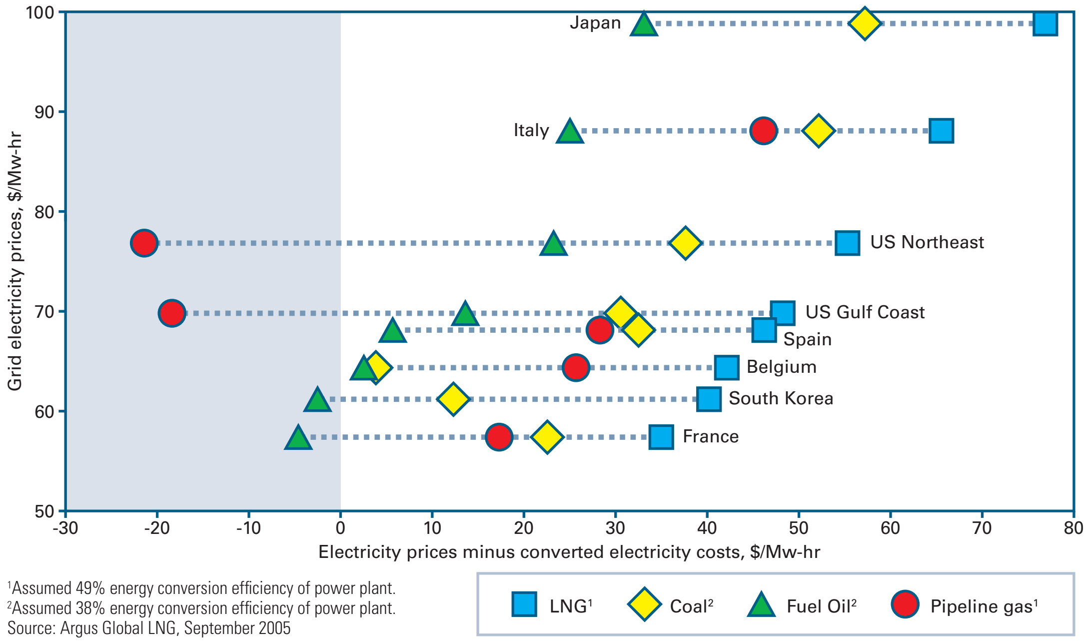
Volatile global gas prices create difficulty in predicting future economic returns for gas markets. As most LNG is used for power generation, however, focusing on gas prices' effect on power prices in specific markets allows for useful economic analysis.

Spark spread, the unit electricity price minus the price of the fuel consumed to generate it, measures the profitability of power generation facilities. The amount of fuel consumed depends on the energy conversion efficiency of the power plant. Conversion efficiency for modern combined-cycle gas turbines is generally > 50%, whereas energy efficiency is < 40% in conventional coal, oil, and nuclear power plants.

A short-term increase in natural gas price usually leads to a smaller spark spread and less profitability for the electricity utility if the increase is not (or cannot) be passed on to power

SPARK SPREAD VS. ELECTRICITY PRICES, AUGUST 2005

Fig. 1



[1]Assumed 49% energy conversion efficiency of power plant.
[2]Assumed 38% energy conversion efficiency of power plant.
Source: Argus Global LNG, September 2005

customers. Spark spread therefore determines the value of LNG to an electricity utility.

Tables 1-3 list spark spreads and power prices in selected North American, European, and Asian markets for three periods over the past 2 years: August 2005, February 2006, and April 2007. LNG and pipeline gas uses an energy conversion efficiency of 49% to provide spark spreads in a CCGT plant. Coal and oil-fired plant comparisons in Tables 1-3 use an energy conversion efficiency of 38%.

Spread trends

Figs. 1-3 compare the competitiveness of LNG vs. pipeline gas, coal, and fuel oil in each market at each specific time. These data confirm the effects of price volatility, but also highlight that some markets are more robust in the face of high gas prices than others.

Each market also shows different price trend fluctuations over the past 2 years. To some extent these trends reflect the different supply and contracting strategies adopted by the different markets.

All three figures show that coal has consistently provided a higher spark spread than gas, which in turn has provided a higher spark spread than fuel oil. LNG remains competitive with pipeline gas in most markets in all three periods. The variability of the Belgian and US markets, however, requires further explanation.

The higher spark spread of coal generation ignores expectations of the increased future price of carbon emissions, as legislation progressively addresses this issue in the power generation sector. Natural gas' higher conversion efficiency and cleaner burning nature will limit the effects of such legislation on gas-fuelled power generation relative to coal.

Electricity prices, spark spread, $/MW-hr; August 2005

Table 1

Country, region	Grid electricity price	LNG spark spread[1]	Coal spark spread[2]	Fuel oil spark spread[2]	Pipeline gas spark spread[1]	Pipeline gas source
Japan	99.31	57.2	77.1	33.2	n/a	n/a
South Korea	61.64	12.3	40.6	–2.6	n/a	n/a
Belgium	64.64	3.9	42.4	2.8	25.8	Zeebrugge
France	57.59	22.4	35.2	–5.3	17.3	Russia
Italy	88.15	52.3	65.9	25.4	46.3	Russia
Spain	68.53	32.6	46.2	5.7	28.5	Algeria
US Gulf Coast	69.72	30.4	48.2	13.6	–18.1	Henry Hub
US Northeast	77.01	37.7	55.5	23.3	–21.1	Transco Z6 New York

[1]Assumed 49% energy conversion efficiency of power plant. [2]Assumed 38% energy conversion efficiency of power plant.
Source: Argus Global LNG, September 2005

Electricity prices, spark spread, $/MW-hr; February 2006

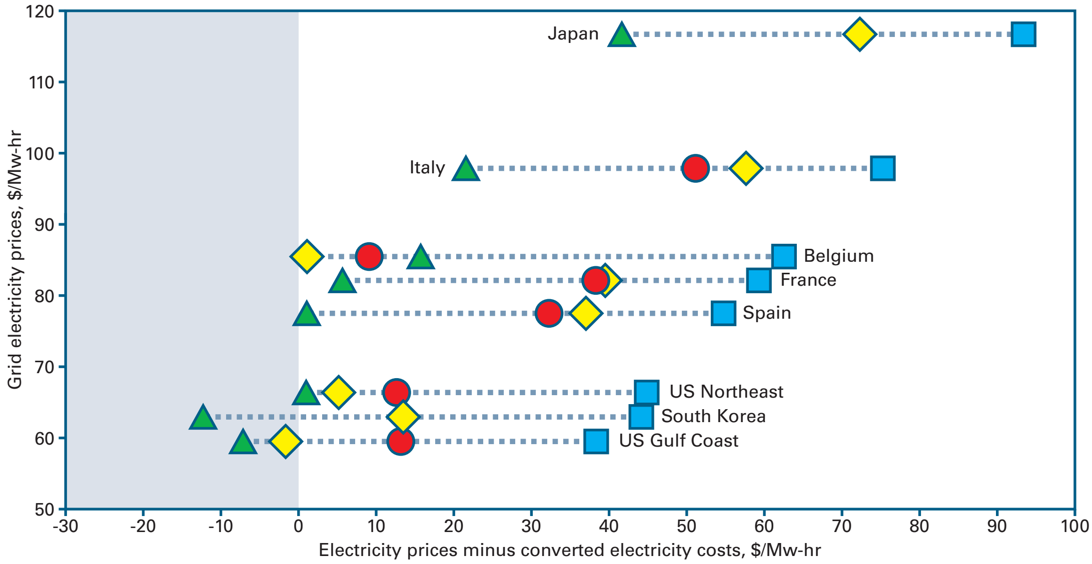
Table 2

Country, region	Grid electricity price	LNG spark spread[1]	Coal spark spread[2]	Fuel oil spark spread[2]	Pipeline gas spark spread[1]	Pipeline gas source
Japan	116.65	72.4	93.3	41.6	n/a	n/a
South Korea	62.85	13.5	44.3	–12.2	n/a	n/a
Belgium	85.38	1.1	62.7	15.4	9.1	Zeebrugge
France	82.04	39.7	59.4	5.9	38.8	Russia
Italy	97.97	57.6	75.3	21.8	51.1	Russia
Spain	77.50	37.0	54.8	1.4	32.4	Algeria
US Gulf Coast	59.43	–1.5	38.4	–7.0	13.2	Henry Hub
US Northeast	66.16	5.3	45.1	1.4	12.5	Transco Z6 New York

[1]Assumed 49% energy conversion efficiency of power plant. [2]Assumed 38% energy conversion efficiency of power plant.
Source: Argus Global LNG, March 2006

Spark spread vs. electricity prices, February 2006

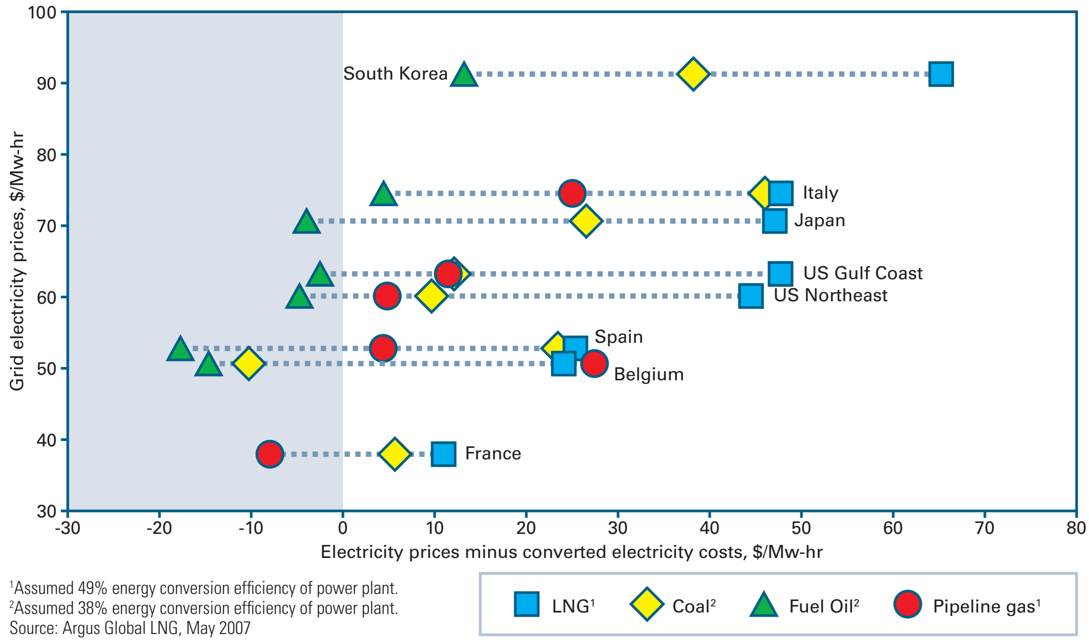
Fig. 2



[1]Assumed 49% energy conversion efficiency of power plant.
[2]Assumed 38% energy conversion efficiency of power plant.
Source: Argus Global LNG, March 2006

SPARK SPREAD VS. ELECTRICITY PRICES, APRIL 2007

Fig. 3



[1]Assumed 49% energy conversion efficiency of power plant.
[2]Assumed 38% energy conversion efficiency of power plant.
Source: Argus Global LNG, May 2007

prices (Figs. 1-3), but also in LNG and pipeline gas for lower-price electricity markets (France and Belgium in April 2007).

In markets where the price of electricity has historically remained >$80/Mw-hr (e.g., Japan and Italy), all fuels generate attractive spark spreads. These markets are less sensitive to gas price fluctuations, and LNG remains attractive even at high prices as a source of supply security. This situation undoubtedly pushes the long-term strategy of such countries toward gas-fired power plants.

Markets with volatile electricity prices, including periods of low prices below $65/Mw-hr (e.g., South Korea, Belgium, and the US), place greater importance on gas and LNG prices. LNG price indexing can play a critical role in such markets.

Belgian LNG, linked to crude and fuel oil prices, has been expensive and unprofitable for power generation for much of the past 2 years. Countries with long-term high volume LNG contracts linked to electricity prices (e.g., Spain and France), however, have been able to achieve better spark spreads from LNG than from competing pipeline gas. Japan's S-curve price formulas for long-term LNG supplies (using both ceiling and floor prices) linked to the Japanese crude cocktail oil price, have also managed to achieve price stability for LNG while providing power generators with enviable spark spreads.

Contrasting the trends in spark spreads (and electricity prices) in Japan and South Korea for the past 2 years shows some of the forces at work. Nei-

The additional cost and energy consumption of clean-coal technologies, as well as carbon capture and sequestration, much talked about but not yet implemented on a commercial scale, will affect the spark spreads achievable by newbuild clean coal power plants using either CCS or integrated gasification combined-cycle systems. Such costs suggest that gas will compete aggressively with coal in the decades ahead, but also that gas and LNG's share of the power market will continue to be limited by the effects of price volatility.

Volatile gas prices and growing dependence on imported gas in the main energy consuming markets affect the future uncertainty of spark spreads for power generators. These trends, combined with the uncertainty of future geopolitics, technological developments, and international competition, increase power generators' interest in spreading fuel price risks by building a portfolio of power plants that includes nuclear, coal, and biomass plants, which are less affected by price volatility and supply geopolitics than gas.

A spark spread of zero or less means that it is unprofitable for power generators to burn a specific fuel. This situation has occurred in some markets over the past 2 years; particularly in fuel oil as a consequence of higher crude

ELECTRICITY PRICES, SPARK SPREAD, $/MW-HR; APRIL 2007

Table 3

Country, region	Grid electricity price	LNG spark spread[1]	Coal spark spread[2]	Fuel oil spark spread[2]	Pipeline gas spark spread[1]	Pipeline gas source
Japan	70.76	26.5	47.4	–4.3	n/a	n/a
South Korea	91.19	38.4	65.2	13.5	n/a	n/a
Belgium	51.24	–10.3	24.1	–14.5	27.5	Zeebrugge
France	38.12	5.6	10.9	–32.2	–7.8	Russia
Italy	74.91	45.9	47.7	4.6	25.1	Russia
Spain	52.50	23.4	25.3	–17.8	4.4	Algeria
US Gulf Coast	63.38	12.6	47.6	–2.5	11.9	Henry Hub
US Northeast	60.28	9.5	44.5	–4.6	5.0	Transco Z6 New York

[1]Assumed 49% energy conversion efficiency of power plant. [2]Assumed 38% energy conversion efficiency of power plant.
Source: Argus Global LNG, May 2007

ther country has pipeline gas supplies, and both have historically had to pay premium prices to secure large-volume LNG supplies.

South Korea manages greater seasonal demand variations and more volatile LNG and electricity prices than Japan. Both have successfully diversified their LNG supply sources, using long-term and medium-term contracts (both ex-ship and FOB) and pricing against competing fuels in their specific markets.

South Korea's market seasonality makes short-term LNG price fluctuations more problematic there because it needs to buy additional short-term cargoes in cold winters. It recently, however, has committed to building additional LNG storage capacity, and increasing its number of LNG receiving terminals to five, to ease such seasonal vulnerability.

LNG has generally provided a comparable spark spread to pipeline gas in the US markets, but both are subject to volatility in both short-term gas and electricity prices. Most LNG cargoes are indexed to Henry Hub spot or short-term futures prices with a time lag involved. The time lag, in times of price volatility, can result in either pipeline or LNG providing a more attractive spark spread for generators at any given time.

Spark spreads frequently lie close to the margins (<$20/Mw-hr) for gas and LNG in the US, combining with geopolitical concerns about growing dependence on gas imports to make power generators reluctant to commit to substantial newbuild gas-fired power plants.

Short-term gas pricing strategies of US buyers can also make it difficult to secure LNG cargoes at competitive prices because they can at certain times be sold at more attractive prices into European (and sometimes Asian) markets. Using an LNG strategy with long-term contracts linked to a basket of competing fuels (or with floor and ceiling prices) might help power generators overcome such problems moving forward.

Gas-producing nations find it difficult to sustain the risks of supplying LNG to markets with volatile spark spreads without the involvement of international oil companies in the supply chain to absorb a substantial amount of the price and demand risk. Term contracts that provide financial upside in times of high demand, frequently expose gas suppliers to over capacity and low prices during periods of demand downturn.

IOCs, with diverse downstream gas portfolios, are better equipped to handle market volatility by mixing and matching supply to several markets on a short-term basis than more resource-oriented NOCs. ✦

Equipment/Software/Literature

Optical flowmeter provides accurate data

Here's the Focus probe, an optical flowmeter that provides accurate data independently of gas composition or contamination of the sensing elements.

Using laser beams to measure the velocity of naturally occurring particulates, the probe is specifically developed for flare and biogas applications with variable flow rates and a range of pipe diameters. Designed with no moving parts and featuring a high turndown ratio of 1,000:1, the tool is immune to pipe vibration and acoustic noise. It is intrinsically safe and compliant to ASME Code Section VIII, Division I.

Source: **Photon Control Inc.,** 8363 Lougheed Hwy., Burnaby, BC V5A 1X3.

Mobile computers designed for oil field operations

Now available to the industry are two Panasonic Toughbook UL 1604, Class 1, Division 2-certified computers: The Toughbook 19 convertible tablet PC, and the Toughbook 30 clamshell notebook.

The company says the computers deliver a safe and reliable mobile computing solution for spark free use in upstream and downstream operations.

Designed and tested with severe conditions in mind, MIL-STD-810F tested Panasonic Toughbook notebooks are built to withstand drops, shocks, vibration, and extremes in temperature. They are also sealed and rated at IP54 level for water and dust resistance. They come equipped with Intel Core Duo processors, daylight-readable screens, and durable features—magnesium alloy cases, sealed keyboards and ports, flexible internal connectors, and shock-mounted hard drives and LCDs.

With battery life of about 6 hr, the Toughbook 19 features a bright screen with a new low-reflection coating, and the Toughbook 30 offers screen brightness of a fixed mount display in a portable computer, critical for mobile workers required to use computers in direct sunlight. Both units also offer security features to protect critical data, including a cable lock slot, Trusted Platform Module (TPM v1.2) security chip, Computrace software, and optional fingerprint scanner. The CF-30 can also be configured with an optional SmartCard reader.

Source: **Panasonic Computer Solutions Co.,** 50 Meadowlands Pkwy., Secaucus, NJ 07094.

Statistics

Imports of crude and products

	Districts 1-4 9-21 2007	Districts 1-4 9-14 2007	District 5 9-21 2007	District 5 9-14 2007	Total US 9-21 2007	Total US 9-14 2007	Total US *9-22 2006
	1,000 b/d						
Total motor gasoline	1,034	942	18	69	1,052	1,011	1,459
Mo. gas. blending comp.	531	625	18	38	549	663	682
Distillate	314	307	—	—	314	307	404
Residual	341	335	7	—	348	335	302
Jet fuel-kerosine	118	127	150	73	268	200	158
Propane-propylene	167	360	1	2	168	362	173
Other	590	277	32	(11)	622	266	520
Total products	**3,095**	**2,973**	**226**	**171**	**3,321**	**3,144**	**3,698**
Total crude	**9,224**	**8,679**	**1,218**	**1,126**	**10,442**	**9,805**	**11,083**
Total imports	**12,319**	**11,652**	**1,444**	**1,297**	**13,763**	**12,949**	**14,781**

*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

	*9-28-07	*9-29-06	Change	Change, %
	$/bbl			
SPOT PRICES				
Product value	90.15	66.35	23.80	35.9
Brent crude	78.27	58.82	19.45	33.1
Crack spread	11.88	7.53	4.35	87.8
FUTURES MARKET PRICES				
One month				
Product value	89.21	67.19	22.02	32.8
Light sweet crude	81.06	62.22	18.84	30.3
Crack spread	8.15	4.97	3.17	63.8
Six month				
Product value	89.91	74.00	15.91	21.5
Light sweet crude	77.64	65.87	11.77	17.9
Crack spread	12.27	8.14	4.14	50.8

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

Purvin & Gertz LNG netbacks—Sept. 28, 2007

Receiving terminal	Liquefaction plant: Algeria	Malaysia	Nigeria	Austr. NW Shelf	Qatar	Trinidad
	$/MMbtu					
Barcelona	6.63	4.66	5.82	4.55	5.17	5.79
Everett	5.42	4.01	5.04	4.10	4.59	5.72
Isle of Grain	6.21	5.80	5.73	5.69	6.23	5.72
Lake Charles	4.02	2.47	3.92	2.64	2.91	4.30
Sodegaura	5.48	7.33	5.69	7.35	6.67	4.93
Zeebrugge	6.41	4.34	5.80	4.24	4.91	5.82

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

Crude and product stocks

District	Crude oil	Motor gasoline Total	Motor gasoline Blending comp.[1]	Jet fuel, kerosine	Fuel oils Distillate	Fuel oils Residual	Propane-propylene
	1,000 bbl						
PADD 1	15,390	50,788	24,500	10,629	58,197	14,168	5,028
PADD 2	64,515	47,969	15,725	7,484	29,675	1,339	22,905
PADD 3	173,838	58,615	24,958	13,353	33,452	16,639	28,385
PADD 4	14,183	5,776	1,664	559	2,563	328	[1]2,813
PADD 5	52,691	28,218	20,474	9,726	13,173	5,486	—
Sept. 21, 2007	**320,617**	**191,366**	**87,321**	**41,751**	**137,060**	**37,960**	**59,131**
Sept. 14, 2007	**318,775**	**190,834**	**85,809**	**41,602**	**135,527**	**37,115**	**58,066**
Sept. 22, 2006[2]	**327,767**	**213,899**	**95,839**	**42,123**	**151,288**	**43,204**	**68,950**

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

Refinery report—Sept. 21, 2007

District	Refinery operations: Gross inputs	Crude oil inputs	Refinery output: Total motor gasoline	Jet fuel, kerosine	Fuel oils Distillate	Fuel oils Residual	Propane-propylene
	1,000 b/d		1,000 b/d				
PADD 1	1,584	1,592	1,753	77	532	137	71
PADD 2	3,217	3,201	2,058	233	892	63	182
PADD 3	7,042	6,980	3,152	583	1,967	264	620
PADD 4	550	553	257	33	162	12	[1]126
PADD 5	2,772	2,692	1,502	446	578	188	—
Sept. 21, 2007	**15,165**	**15,018**	**8,722**	**1,372**	**4,131**	**664**	**999**
Sept. 14, 2007	**15,627**	**15,357**	**9,070**	**1,435**	**4,105**	**700**	**1,020**
Sept. 22, 2006[2]	**16,079**	**15,846**	**9,260**	**1,551**	**4,249**	**669**	**1,026**
	17,448 operable capacity		**86.9% utilization rate**				

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

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OGJ GASOLINE PRICES

	Price ex tax 9-26-07	Pump price* 9-26-07	Pump price 9-27-06
		¢/gal	
(Approx. prices for self-service unleaded gasoline)			
Atlanta	238.7	278.4	238.4
Baltimore	225.2	267.1	246.4
Boston	222.2	264.1	247.4
Buffalo	220.0	280.1	258.7
Miami	248.9	299.2	254.0
Newark	228.3	261.2	248.4
New York	219.1	279.2	262.7
Norfolk	224.4	262.0	225.4
Philadelphia	225.6	276.3	253.9
Pittsburgh	225.4	276.1	248.4
Wash., DC	240.7	279.1	258.8
PAD I avg.	228.9	274.8	249.3
Chicago	265.7	316.6	264.4
Cleveland	235.5	281.9	215.5
Des Moines	232.9	273.3	204.6
Detroit	256.9	306.1	226.6
Indianapolis	246.8	291.8	216.5
Kansas City	244.4	280.4	212.7
Louisville	256.1	293.0	209.6
Memphis	220.8	260.6	228.5
Milwaukee	248.9	300.2	246.5
Minn.-St. Paul	252.6	293.0	222.7
Oklahoma City	242.5	277.9	210.6
Omaha	231.9	278.3	221.4
St. Louis	227.9	263.9	222.9
Tulsa	240.1	275.5	208.6
Wichita	229.4	272.8	215.6
PAD II avg.	242.2	284.4	221.8
Albuquerque	239.2	275.6	237.6
Birmingham	227.0	265.7	214.1
Dallas-Fort Worth	226.3	264.7	209.3
Houston	232.4	270.8	213.2
Little Rock	226.6	266.8	217.1
New Orleans	233.3	271.7	239.1
San Antonio	227.7	266.1	232.4
PAD III avg.	230.4	268.8	223.3
Cheyenne	246.6	279.0	251.3
Denver	245.9	286.3	262.8
Salt Lake City	239.2	282.1	272.2
PAD IV avg.	243.9	282.5	262.1
Los Angeles	224.3	282.8	264.0
Phoenix	255.1	292.5	236.4
Portland	248.2	291.5	263.7
San Diego	236.1	294.6	267.9
San Francisco	232.1	290.6	279.2
Seattle	235.1	287.5	273.6
PAD V avg.	238.5	289.9	264.1
Week's avg.	**236.3**	**279.9**	**238.2**
Aug. avg.	**237.2**	**280.8**	**253.3**
July avg.	**251.6**	**295.2**	**296.7**
2007 to date	**229.5**	**273.1**	—
2006 to date	**222.1**	**265.6**	—

*Includes state and federal motor fuel taxes and state sales tax. Local governments may impose additional taxes.
Source: Oil & Gas Journal.
Data available in OGJ Online Research Center.

REFINED PRODUCT PRICES

Spot market product prices

	9-21-07 ¢/gal
Motor gasoline (Conventional-regular)	
New York Harbor	215.75
Gulf Coast	215.69
Los Angeles	223.94
Amsterdam-Rotterdam-Antwerp (ARA)	198.01
Singapore	205.48
Motor gasoline (Reformulated-regular)	
New York Harbor	212.00
Gulf Coast	216.00
Los Angeles	225.94

	9-21-07 ¢/gal
Heating oil No. 2	
New York Harbor	222.44
Gulf Coast	224.40
Gas oil	
ARA	227.13
Singapore	220.95
Residual fuel oil	
New York Harbor	139.91
Gulf Coast	148.81
Los Angeles	156.42
ARA	142.28
Singapore	150.60

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

BAKER HUGHES RIG COUNT

	9-28-07	9-29-06
Alabama	6	5
Alaska	5	6
Arkansas	49	26
California	34	34
Land	33	30
Offshore	1	4
Colorado	119	96
Florida	0	0
Illinois	0	0
Indiana	2	0
Kansas	14	9
Kentucky	11	10
Louisiana	154	199
N. Land	60	58
S. Inland waters	25	20
S. Land	26	45
Offshore	43	76
Maryland	1	1
Michigan	1	1
Mississippi	11	12
Montana	13	15
Nebraska	0	0
New Mexico	69	89
New York	7	8
North Dakota	44	35
Ohio	13	9
Oklahoma	194	191
Pennsylvania	16	14
South Dakota	1	3
Texas	830	790
Offshore	5	8
Inland waters	1	2
Dist. 1	26	25
Dist. 2	32	25
Dist. 3	57	56
Dist. 4	86	93
Dist. 5	179	138
Dist. 6	118	118
Dist. 7B	35	46
Dist. 7C	58	38
Dist. 8	113	95
Dist. 8A	19	29
Dist. 9	37	41
Dist. 10	64	76
Utah	44	46
West Virginia	33	26
Wyoming	78	112
Others—NV-3; TN-5; VA-3	11	7
Total US	**1,760**	**1,744**
Total Canada	**347**	**353**
Grand total	**2,107**	**2,097**
Oil rigs	311	295
Gas rigs	1,443	1,445
Total offshore	50	89
Total cum. avg. YTD	**1,760**	**1,626**

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 (9-28-07)	Percent footage* (9-28-07)	Rig count (9-29-06)	Percent footage* (9-29-06)
0-2,500	60	8.3	50	—
2,501-5,000	103	62.1	83	38.5
5,001-7,500	223	22.4	238	20.5
7,501-10,000	427	3.2	398	3.7
10,001-12,500	429	2.3	388	2.0
12,501-15,000	273	—	293	0.6
15,001-17,500	113	—	112	—
17,501-20,000	66	—	71	—
20,001-over	34	—	35	—
Total	**1,728**	**8.2**	**1,668**	**6.3**
INLAND	41		38	
LAND	1,634		1,564	
OFFSHORE	53		66	

*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]9-28-07	[2]9-29-06
	1,000 b/d	
(Crude oil and lease condensate)		
Alabama	16	20
Alaska	751	655
California	663	679
Colorado	51	61
Florida	6	7
Illinois	31	27
Kansas	95	97
Louisiana	1,307	1,400
Michigan	14	14
Mississippi	48	48
Montana	92	100
New Mexico	166	163
North Dakota	107	113
Oklahoma	164	172
Texas	1,319	1,336
Utah	45	49
Wyoming	142	143
All others	60	73
Total	**5,077**	**5,157**

[1]OGJ estimate. [2]Revised.

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

US CRUDE PRICES

$/bbl*	9-28-07
Alaska-North Slope 27°	69.08
South Louisiana Sweet	82.75
California-Kern River 13°	70.35
Lost Hills 30°	78.35
Southwest Wyoming Sweet	74.66
East Texas Sweet	77.25
West Texas Sour 34°	72.25
West Texas Intermediate	78.25
Oklahoma Sweet	78.25
Texas Upper Gulf Coast	74.75
Michigan Sour	71.25
Kansas Common	77.25
North Dakota Sweet	69.50

*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]	9-21-07
United Kingdom-Brent 38°	77.46
Russia-Urals 32°	74.32
Saudi Light 34°	74.67
Dubai Fateh 32°	74.17
Algeria Saharan 44°	79.08
Nigeria-Bonny Light 37°	80.15
Indonesia-Minas 34°	76.67
Venezuela-Tia Juana Light 31°	74.10
Mexico-Isthmus 33°	73.99
OPEC basket	69.46
Total OPEC[2]	75.54
Total non-OPEC[2]	74.28
Total world[2]	74.97
US imports[3]	72.62

[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]

	9-21-07	9-14-07	Change
	bcf		
Producing region	951	931	20
Consuming region east	1,831	1,787	44
Consuming region west	424	414	10
Total US	**3,206**	**3,132**	**74**
	June 07	**June 06**	**Change, %**
Total US[2]	**2,580**	**2,617**	**–1.4**

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

Statistics

Worldwide crude oil and gas production

	July 2007	June 2007	7 month average production 2007	7 month average production 2006	Change vs. previous year Volume	Change vs. previous year %	July 2007	June 2007	Cum. 2007
	Crude, 1,000 b/d						Gas, bcf		
Argentina	622	627	629	637	–9	–1.3	150.0	130.3	902.73
Bolivia	45	45	45	45	—	–0.6	42.0	40.6	287.60
Brazil	1,774	1,784	1,755	1,702	53	3.1	28.6	28.0	196.60
Canada	2,592	2,631	2,614	2,451	163	6.6	473.9	481.4	3,505.05
Colombia	523	522	521	532	–11	–2.1	20.0	18.0	125.50
Ecuador	500	500	501	542	–41	–7.5	0.3	0.3	2.12
Mexico	3,166	3,206	3,162	3,322	–159	–4.8	193.4	185.8	1,265.72
Peru	116	117	114	114	—	–0.3	9.0	8.3	47.79
Trinidad	118	122	123	148	–25	–16.7	118.9	115.0	799.87
United States	5,188	5,139	5,187	5,095	91	1.8	1,697.0	1,639.0	11,417.00
Venezuela[1]	2,340	2,370	2,394	2,597	–203	–7.8	70.0	70.0	507.00
Other Latin America	79	78	80	79	1	0.9	5.5	5.2	37.82
Western Hemisphere	**17,062**	**17,140**	**17,125**	**17,265**	**–140**	**–0.8**	**2,808.6**	**2,722.0**	**19,094.80**
Austria	17	17	17	17	—	–1.8	5.0	4.8	35.60
Denmark	315	304	312	338	–26	–7.7	21.5	17.6	155.92
France	20	20	19	21	–2	–10.3	3.3	3.1	20.72
Germany	68	68	69	71	–2	–2.6	47.0	46.2	357.69
Italy	100	112	108	111	–3	–2.7	29.0	28.0	203.30
Netherlands	40	44	42	28	15	52.6	120.0	120.0	1,665.00
Norway	2,327	1,921	2,305	2,538	–234	–9.2	254.3	222.5	1,822.14
Turkey	42	41	41	41	–1	–1.8	—	2.0	8.50
United Kingdom	1,500	1,505	1,564	1,574	–10	–0.6	200.0	182.6	1,608.80
Other Western Europe	6	3	4	5	–1	–12.7	0.6	0.5	11.90
Western Europe	**4,434**	**4,035**	**4,482**	**4,745**	**–264**	**–5.6**	**680.7**	**627.2**	**5,889.58**
Azerbaijan	900	900	846	596	250	42.0	31.0	28.0	182.00
Croatia	16	16	16	17	–1	–4.9	6.5	6.5	43.25
Hungary	15	16	16	17	–1	–4.7	7.7	6.4	50.88
Kazakhstan	1,200	1,200	1,236	1,024	211	20.6	80.0	80.0	560.00
Romania	100	100	99	99	–1	–0.6	18.0	17.0	123.40
Russia	9,700	9,660	9,670	9,443	227	2.4	1,700.0	1,700.0	13,200.00
Other FSU	500	500	443	514	–71	–13.9	420.0	400.0	3,080.00
Other Eastern Europe	50	41	47	47	—	–0.5	89.1	87.4	619.65
Eastern Europe and FSU	**12,481**	**12,434**	**12,372**	**11,758**	**615**	**5.2**	**2,352.2**	**2,325.3**	**17,859.17**
Algeria[1]	1,350	1,370	1,344	1,351	–7	–0.5	275.0	270.0	1,925.00
Angola[1]	1,643	1,639	1,643	1,393	251	18.0	3.0	2.5	17.90
Cameroon	85	85	84	89	–5	–6.1	—	—	—
Congo (former Zaire)	20	20	20	20	—	—	—	—	—
Congo (Brazzaville)	240	240	240	240	—	—	—	—	—
Egypt	630	630	643	680	–37	–5.5	42.0	40.0	286.60
Equatorial Guinea	320	320	320	320	—	—	0.1	0.1	0.42
Gabon	230	230	230	239	–9	–3.6	0.3	0.3	2.12
Libya[1]	1,700	1,700	1,694	1,689	6	0.3	23.0	22.4	152.90
Nigeria[1]	2,100	2,070	2,159	2,220	–61	–2.8	70.0	68.0	506.00
Sudan	480	480	467	403	64	16.0	—	—	—
Tunisia	102	108	100	65	35	53.1	6.5	6.4	46.21
Other Africa	262	262	262	272	–10	–3.6	10.2	9.7	69.77
Africa	**9,162**	**9,154**	**9,206**	**8,981**	**226**	**2.5**	**430.0**	**419.3**	**3,006.92**
Bahrain	180	175	173	173	—	–0.1	26.0	24.0	171.53
Iran[1]	3,920	3,900	3,914	3,876	39	1.0	250.0	240.0	1,745.00
Iraq[1]	2,190	1,930	1,986	1,886	100	5.3	5.0	5.0	35.00
Kuwait[1,2]	2,445	2,345	2,405	2,507	–102	–4.1	32.0	30.0	212.00
Oman	710	710	717	750	–33	–4.4	58.0	55.0	393.00
Qatar[1]	830	810	804	823	–19	–2.3	115.0	110.0	770.00
Saudi Arabia[1,2]	8,535	8,485	8,496	9,249	–752	–8.1	170.0	160.0	1,105.00
Syria	390	390	391	434	–43	–9.9	18.0	17.4	115.30
United Arab Emirates[1]	2,590	2,590	2,573	2,630	–57	–2.2	135.0	132.0	922.00
Yemen	380	360	361	346	16	4.5	—	—	—
Other Middle East	—	—	—	—	—	–32.6	10.4	8.4	57.93
Middle East	**22,170**	**21,695**	**21,822**	**22,673**	**–852**	**–3.8**	**819.4**	**781.8**	**5,526.76**
Australia	484	482	457	376	81	21.7	134.3	129.3	812.13
Brunei	170	164	180	201	–21	–10.4	35.0	33.0	239.75
China	3,653	3,836	3,758	3,704	54	1.5	195.6	193.5	1,392.17
India	665	680	683	676	7	1.1	83.9	79.3	563.08
Indonesia[1]	830	830	843	914	–71	–7.8	185.0	180.0	1,263.00
Japan	15	15	17	16	1	7.2	11.0	9.7	76.14
Malaysia	750	750	746	741	4	0.6	150.0	145.0	978.00
New Zealand	25	22	20	15	5	30.6	15.5	14.5	93.10
Pakistan	72	72	68	65	3	4.1	120.6	116.1	820.13
Papua New Guinea	50	50	51	58	–6	–10.7	0.5	0.5	3.45
Thailand	218	216	212	215	–3	–1.3	80.0	78.8	531.92
Viet Nam	300	300	317	347	–30	–8.6	13.0	12.5	90.50
Other Asia–Pacific	36	35	36	31	4	14.1	95.5	89.3	647.79
Asia Pacific	**7,267**	**7,452**	**7,389**	**7,360**	**28**	**0.4**	**1,120.0**	**1,081.4**	**7,511.15**
TOTAL WORLD	**72,576**	**71,911**	**72,396**	**72,783**	**–386**	**–0.5**	**8,210.9**	**7,956.9**	**58,888.39**
*OPEC	30,473	30,039	30,256	29,741	515	1.7	1,330.0	1,287.4	9,142.90
North Sea	4,160	3,747	4,199	4,466	–267	–6.0	511.5	458.3	4,084.08

[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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Summer gasoline output discredits spring suspicion

The Editor's Perspective

by Bob Tippee, Editor

Timing makes the latest congressionally inspired investigation of the US oil industry look—to put it politely—seriously uninformed.

In May, the Connecticut congressional delegation asked the Government Accountability Office to probe relationships between refining capacity and gasoline prices.

The lawmakers had noticed that refining capacity utilization was down in April and disputed parallel arguments that refinery outages helped explain gasoline price increases early in the year.

"Increasing prices lead to higher profits for refiners, and a calculated decrease in refining capacity could create an artificial shortage and drive up the cost to consumers," they wrote in a letter to GAO.

At the same time, Sen. Charles Schumer (D-NY), chairman of the Joint Economic Committee, sent a similar letter to GAO.

On Sept. 24, members of the Connecticut group announced that the GAO had agreed to combine the requests and review refiners' behavior "to determine whether market and supply manipulation has occurred as well as to what extent their practices influence fuel prices" (OGJ Online, Sept. 26, 2007).

Like many predecessors, this investigation won't find misbehavior. No one makes money by refusing to sell something. But American political thinking just can't grow out of mindless suspicion to the contrary.

The core of the lawmakers' suspicion is that refiners were deliberately holding product off the market, not having the very real maintenance troubles that did suppress refinery operations just before the driving season.

But consider what happened after the lawmakers sent GAO their request—after refiners solved the operational problems in which faulty legislation played a role.

Gasoline production by US refiners in June set a record of 9.3 million b/d, according to the American Petroleum Institute. It reset the record in July at 9.325 million b/d. Record output of all products has pushed heating oil stocks to comfortably high levels as winter approaches, API reports.

Record-setting production is not the behavior of an industry trying to manipulate prices. It's rational business behavior. It was predictable. That predictability could have kept Schumer and the Connecticut gang from sending GAO on yet another witch hunt. Apparently, they'd rather look suspicious than rational.

(Online Sept. 28, 2007; author's e-mail: bobt@ogjonline.com)

Market Journal

by Sam Fletcher, Senior Writer

Analyst sees US oil supply cuts by 2012

Mexico, Saudi Arabia, Venezuela, Nigeria, Algeria, and Russia will cut crude exports to the US by 2012, and the resulting gap between supplies and demand will intensify investments to develop Canada's oil sands, claims Jeff Rubin, chief market strategist and economist at CIBC World Markets, the wholesale and corporate banking arm of Canadian Imperial Bank of Commerce.

The anticipated total drop of 2.5 million b/d of production among six of the largest suppliers of oil to the US is part of the keynote address that Rubin was to deliver Oct. 2 at CIBC World Markets' Industrial Conference in New York City. At that meeting, Rubin was to share his latest research on the global balance of oil supply and demand, focusing on the size and scope of the oil crunch facing the US in the next 5 years.

But at the recent 6th Annual Association for the Study of Peak Oil & Gas conference in Cork, Ireland, Rubin said crude prices are likely to hit $100/bbl by the end of next year as the biggest oil-producing nations reduce exports to supply their rapidly growing domestic consumption (OGJ Online, Sept. 17, 2007). With production likely to plateau or decline in the six named countries, Rubin expects global oil exports to fall by 7% by 2010.

"Domestic demand growth of as much as 5%/year in key oil producing countries is already beginning to cannibalize exports and will increasingly do so in the future as production plateaus or declines in many of these countries," he said in Ireland. "OPEC members together with independent producers Russia and Mexico consume over 12 million b/d, surpassing Western Europe to become the second largest oil market in the world."

Rubin noted that consumers in many major oil-producing countries pay much less than the global price for crude. He said highly subsidized gasoline prices are often a factor in the surging rates of domestic oil consumption. "In many countries, prices are as little as $10/bbl," he said.

Canadian oil sands

In Cork, Rubin predicted Canadian oil sands will surpass deepwater wells as the single largest source of new oil exports by the end of this decade as markets are forced to rely more on higher-cost unconventional deposits. He said Canada's oil sands represent 50-70% of the world's oil reserves open to private investment, depending on the investment climate in Nigeria and Kazakhstan. "Canada remains one of the few places where there is still private access to strategically important reserves, in sharp contrast, for example, to the oil sand deposits in Venezuela," Rubin said.

In a Sept. 25 report, however, Edinburgh consultant Wood Mackenzie Ltd. said proposed changes by the Alberta Royalty Review Panel would reduce the commercial value of current and planned oil sands projects in Canada by $26 billion, at a long-term price of $50/bbl for North Sea Brent crude (OGJ Online, Sept. 25, 2007).

This isn't the first time that Rubin's estimates of oil prices and other economic measures have garnered international headlines. In a report published in April 2005, Rubin said, "Over the next 5 years, crude prices will almost double, averaging close to $77/bbl and reaching as much as $100/bbl by 2010. That's over twice the previous 6-year high (1980-85) following the second OPEC oil shock, when crude, in today's dollars, averaged the equivalent of $65/bbl. Tomorrow's price hikes won't be triggered by sudden supply disruptions like the Arab oil boycott of 1973 or the Iranian Revolution in 1979. Instead, they will follow from the inevitable collision between surging global crude demand and accelerating depletion of conventional crude supply. By 2010, prices will have to take out nearly 9 million b/d from world oil consumption—no mean feat for a world that has never been more thirsty for oil."

In that report, Rubin foresaw "some fundamental differences" from energy prices in the 1970-80s. "On the economic front, the impact of surging crude prices is likely to be far more deflationary than inflationary. During the 1970s, surging fuel costs were the catalyst for a huge outbreak of wage-price inflation, as workers futilely tried to protect the purchasing power of their incomes through ever-escalating wage demands. But that was in a world where most workers in G-7 economies were protected by huge trade barriers against competition from cheap offshore labor. In today's world, where production and jobs can easily be shifted to low-wage economies, North American wages will have to eat energy price increases, and in the process, stomach the loss of purchasing power that comes along with it," Rubin said.

(Online Oct. 1, 2007; author's e-mail: samf@ogjonline.com.)

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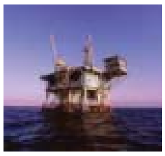

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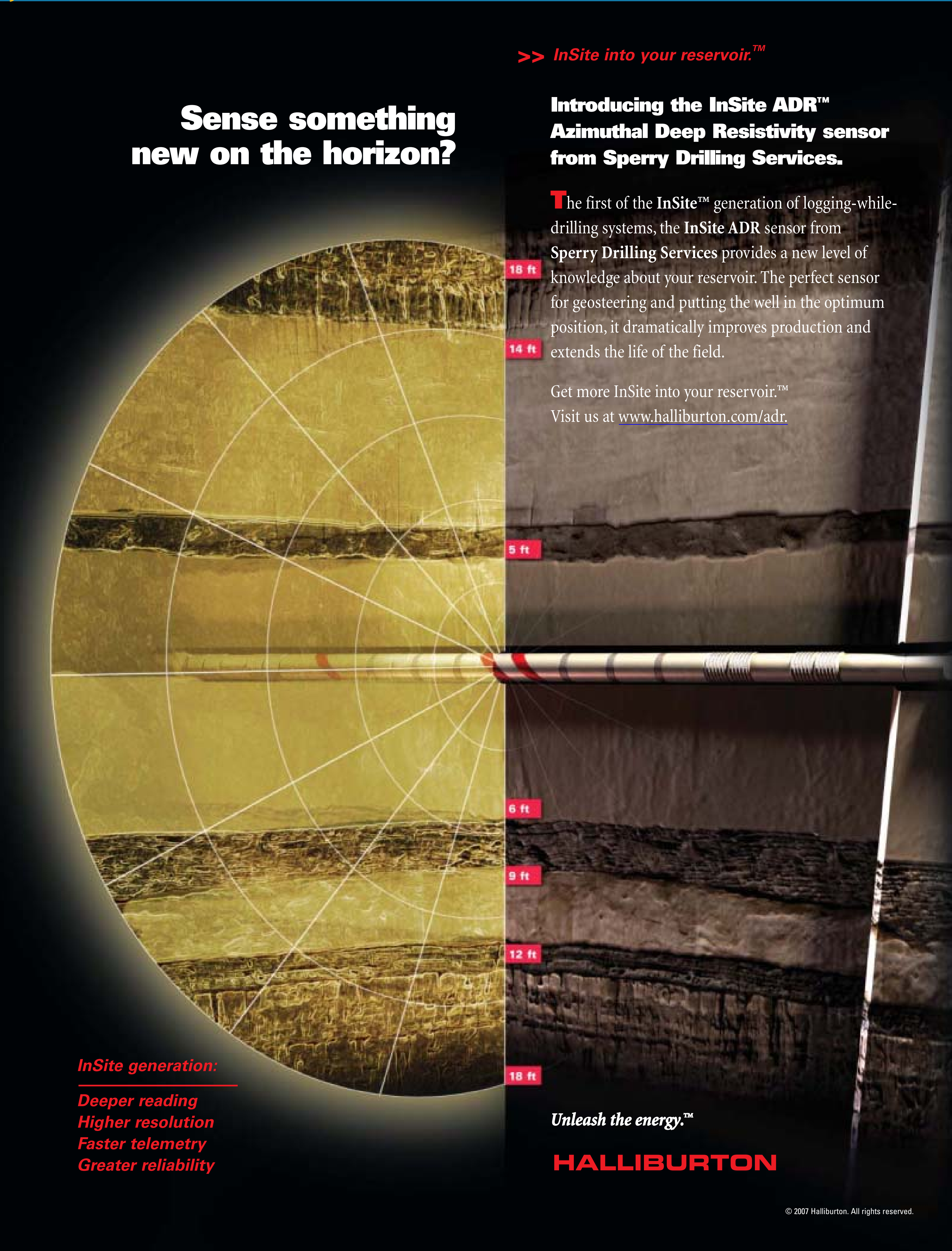
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Celebrating

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OCTOBER 23-25, 2007
CAJUNDOME & CONVENTION CENTER
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SCHEDULE OF EVENTS

TUESDAY, OCTOBER 23

9:00 a.m.	Official Opening of Exposition to Industry Personnel Only
9:30 a.m. - 10:30 a.m.	International Seminar
10:45 a.m. - 11:30 a.m.	Technical Session
1:00 p.m. - 2:00 p.m.	Keynote Address
2:30 p.m. - 3:15 p.m.	Technical Session
3:30 p.m. - 4:30 p.m.	International Seminar
5:00 p.m.	Show Site Closes

WEDNESDAY, OCTOBER 24

9:00 a.m.	Exposition Open to Industry Personnel Only
9:30 a.m. - 10:30 a.m.	International Seminar
10:45 a.m. - 11:30 a.m.	Technical Session
1:00 p.m. - 2:00 p.m.	Keynote Address
2:30 p.m. - 3:15 p.m.	Technical Session
3:30 p.m. - 4:30 p.m.	International Seminar
5:00 p.m.	Show Site Closes

THURSDAY, OCTOBER 25

9:00 a.m.	Exposition Open to Industry Personnel Only
12:00 p.m.	Exposition Opens to Public
2:00 p.m.	2007 Louisiana Gulf Coast Oil Exposition Closes

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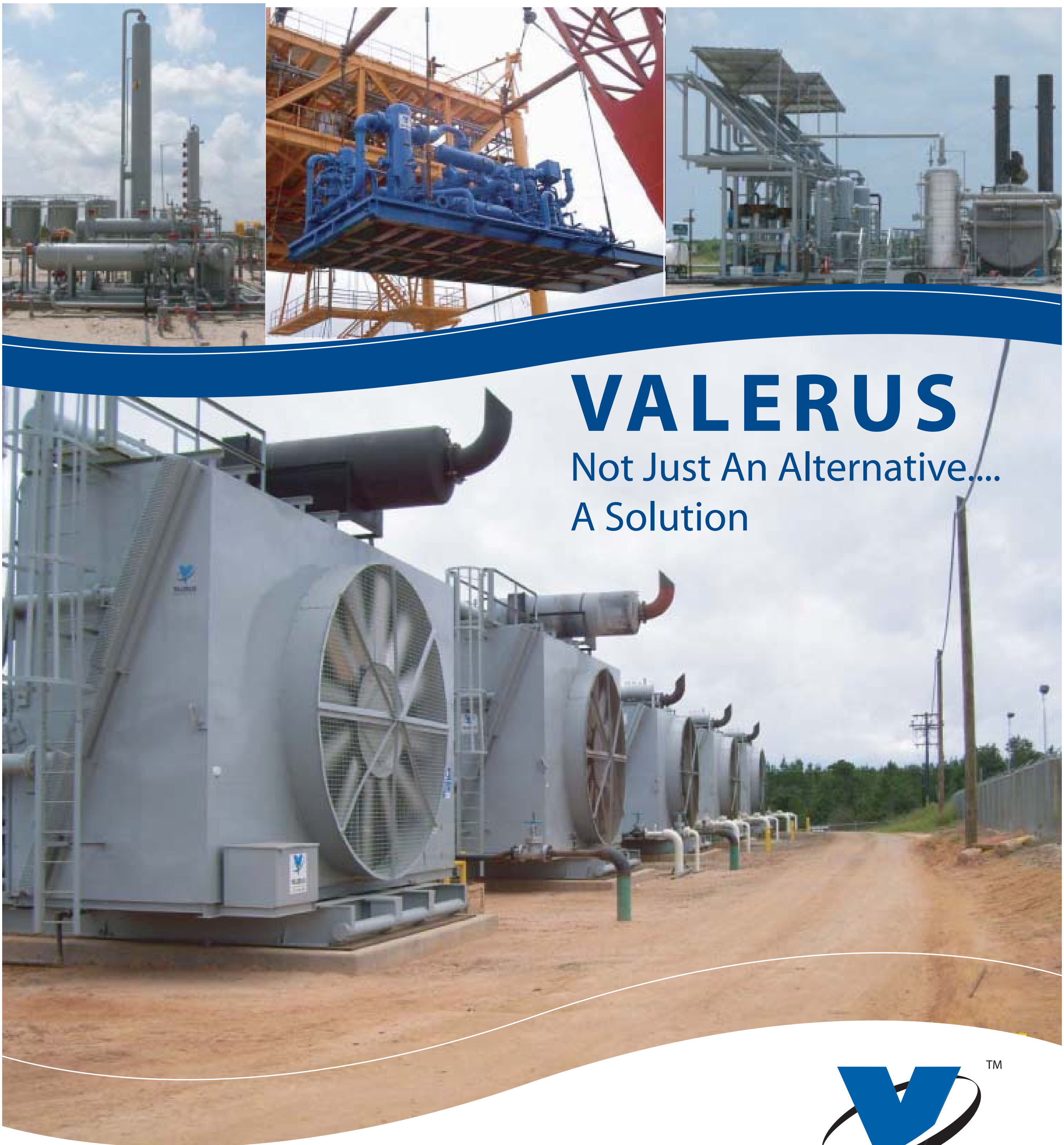
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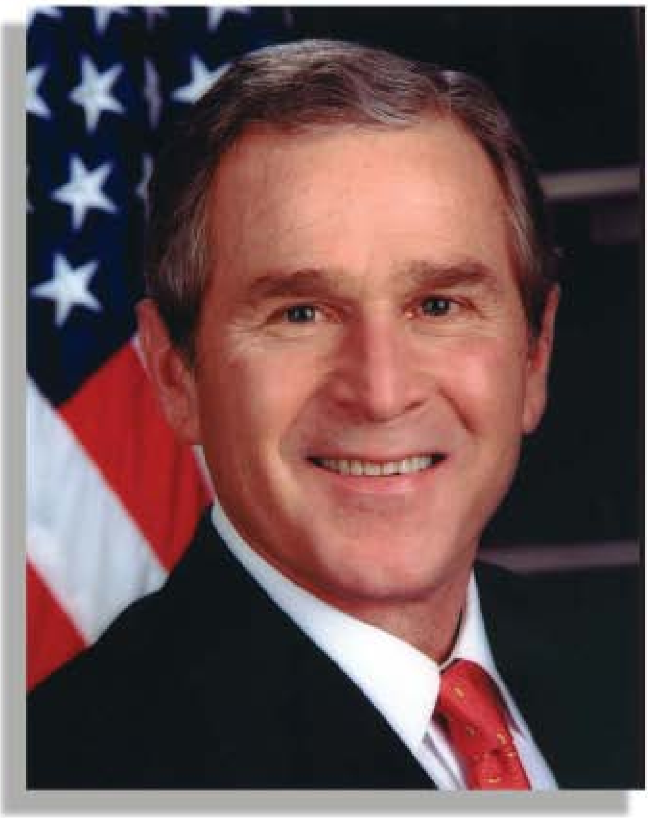

The White House
Washington

Warm greetings to exhibitors and visitors from around the world attending the 2007 Louisiana Gulf Coast Oil Exposition. As an event selected by the U.S. Commercial Service's International Buyer Program, this show allows U.S. companies to develop business partnerships with international buyers, sales representatives, and strategic partners.

As we continue to face the challenges of a new century, American businesses also recognize the opportunities posed by the global economy. By opening new markets and promoting international trade, we are working to achieve lasting prosperity for all nations. The international business relationships developed at this trade show will be vital to fostering economic growth in the United States and abroad.

I salute each of you for your committment to excellence. Cooperation within the international business community gives all of us confidence for a bright economic future.

Best wishes for a successful event.

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Greetings and welcome to the offical United States of America Pavilion.

This prestigious trade exhibition provides an exciting and informative venue to showcase the type of innovation and expertise for which American industry is known worldwide. The companies exhibiting at this event are prepared to meet the changing demands of the gobal marketplace with the finest and most advanced products and services, exemplifying the highest standards of quality.

Through its International Buyer Program, the U.S. Department of Commerce has made a strong commitment to bringing American companies together with international business partners. This commitment reflects our conviction that increased trade fosters economic growth and strengthens the bonds among nations.

Carlos M. Gutierrez
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MESSAGE: CHAIRMAN & CHAIRMAN-ELECT

WELCOME TO LAGCOE 2007

On behalf of the officers, directors and volunteers of the Louisiana Gulf Coast Oil Exposition, we welcome you to *Experience the Energy of LAGCOE 2007*! We are pleased and proud to have you here as we celebrate fifty-two years of the latest advances in technology, equipment and services for the energy industry. This is an exciting event. LAGCOE 2007 is a world-class business opportunity to *network* with decision makers from around the globe, *discover* world-class technology and solutions, *cultivate* dynamic business relationships and *gather* the latest information on safety and security.

The show has been selected for the third year as one of only 28 trade shows in the nation to participate in the United States Commercial Service's International Buyer Program (IBP). This program is a joint government-industry effort designed to match international buyers with domestic companies at selected trade shows in the U.S., helping to sell U.S. products and services to international markets. As part of the IBP promotion, U.S. Commercial Service officers in embassies and consulates around the world have screened and recruited international buyers to attend this show. LAGCOE is the only oil and gas industry trade show selected to participate in the program, and this recognition is a great honor. Beyond that, affiliation with the IBP offers unprecedented global opportunities for our exhibitors, attendees and the oil and gas industry as a whole.

DAVID SHEALY
LAGCOE 2007 CHAIRMAN

This year, we have again implemented an innovative plan to ensure that oil and gas industry decision makers are in attendance. With the help of some very generous sponsoring companies, LAGCOE has chartered jet aircraft and busses to transport key executives of the oil and gas industry from the Houston and New Orleans areas. The decision makers are here for LAGCOE 2007.

We offer our deepest gratitude to the hundreds of volunteers who rolled up their sleeves and did whatever was necessary to make this a great show, and we especially acknowledge Event Manager Sally Ware and Lynette Brown, for playing a vital role in the success of this event.

HOWARD WILSON
LAGCOE 2007 CHAIRMAN-ELECT

Again, welcome to LAGCOE 2007. All of us are at your service. We want to make this an exposition you'll remember for a long time to come, so call on us if we can assist you in any way.

Prepare yourself to *Experience the Energy* of this historic exposition.

Sincerely,
David Shealy, LAGCOE 2007 Chairman

Howard Wilson, LAGCOE 2007 Chairman-elect

Louisiana Gulf Coast Oil Exposition announces **C. Paul Hilliard as LAGCOE Looey**

The honor of LAGCOE LOOEY is bestowed upon an individual who has provided strength and integrity to the oil and gas industry and played a significant role in its growth and progress. The recipient must also have displayed a commitment to the community by helping others through community service. This year's LAGCOE Looey is C. Paul Hilliard.

Hilliard was born in Sandburr Coulee, Buffalo County, Wisconsin on June 18, 1925. Paul attended elementary school in Alcohol Bluff from 1931–1936. Our LAGCOE LOOEY says he really walked two miles, everyday, to a one-room, one teacher, two-outhouse institution. In 1936, Paul's four year old kid brother, affectionately known as the Emancipating Pyromaniac, burned the family barn to the ground, along with the winter hay supply. This forced the Hilliard family to move into town (1,896 population), where the Hilliard's were introduced to the luxuries of electricity and indoor plumbing. Paul completed his primary and high school education in the Wisconsin Public School System.

During World War II (1943 to 1946) C. Paul Hilliard served his country fearlessly and proud in the United States Marine Corps, Marine Air Group 24 and 32 Radioman-Gunner in SBD "Dauntless" dive bombers—the Solomon Islands and the Philippines.

Completing his honorable service to his country, Mr. Hilliard returned to Wisconsin to begin his formal education. From 1946 to 1948, Paul attended Wisconsin and Syracuse Universities. Upon graduation, he attended the University of Texas (1948-1951) where he earned a Juris Doctorate in 1951.

Hilliard began his career in the oil and gas industry as a landman for The California Company, now called Chevron Corporation. He chose this career path, even though he had a law degree, because the pay was better at $100 more a month. Acceptance of this job placed him in New Orleans, Louisiana. Three years later, he relocated to Lafayette, Louisiana to work for H.L. Hunt as a South Louisiana landman.

After four years in the industry, Hilliard's adventurous spirit and innovative thinking led him to start his own company. In 1955, Badger Oil Corporation, named after the University of Wisconsin mascot, was formed. Today, he continues to operate this company as an independent.

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LAGCOE LOOEY

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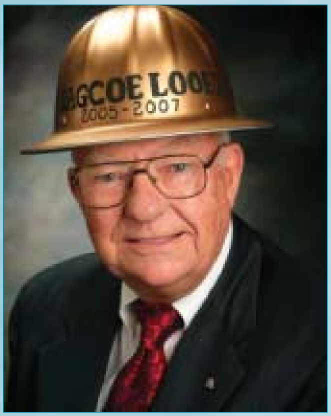
Hilliard's accomplishments within the oil industry are duly noted. He has served as national chairman of the Independent Petroleum Association of America, a member of the National Petroleum Council, and served as president of the Louisiana Oil and Gas Association (LOGA).

Known for his generous spirit and devotion to children, Hilliard has made exceptional contributions to his community in the area of education. Serving on the board of the St. Landry Charter School, he was instrumental in creating and personally funding classroom libraries. Additionally, he has implemented tutorial programs in low-income area schools to help bring 3rd graders to grade level, funded teacher appreciation functions and funded trips to a local bookstore allowing students to select a book of choice.



C. PAUL HILLIARD,
LAGCOE LOOEY

Hilliard's commitment to education and his passion to inspire tomorrow's leaders can be seen in the time he volunteers at schools reading to students. However, his ardor for learning and commitment to help others extends beyond elementary education. Hilliard and his deceased wife Lulu have long been major contributors to the University Art Museum and supporters of the Performing Arts Society of Acadiana and the Acadiana Symphony Orchestra.

The Acadiana community has embraced Hilliard and recognized his devotion. He was named the 1994 king of the Bishop's Charity Ball and the recipient of the 2003 Civic Cup. In June of 2007, Paul Hilliard was honored with the Evangeline Area Council Boy Scouts of America Distinguished Citizen Award. Paul shares with his deceased wife, Lulu, the honor of the Paul and Lulu Hilliard University Art Museum.

Hilliard was elected in June 2006 for a three year term to the Board of Trustees of the National World War II Museum in New Orleans, LA. He serves on the following committees of the Museum – Executive Committee, Education and Collections, Trusteeship and Capital Campaign.

Within the business sector of the community, Hilliard has served on numerous committees with the Lafayette Chamber of Commerce. He has worked with the Energy, Education, Governmental Affairs and Economic Development committees, as well as the I-49 task force.

Hilliard has been an active member of First Lutheran Church for 50 years. He and Lulu have four children, two stepchildren, 21 grandchildren, and 14 great-grandchildren.

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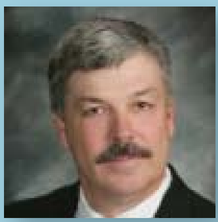

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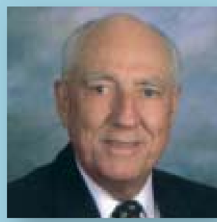

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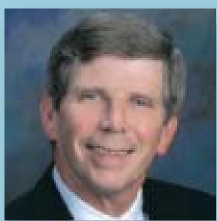

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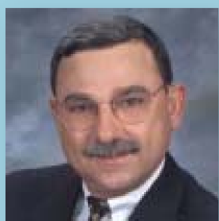

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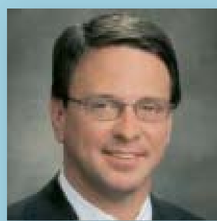

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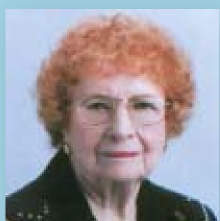

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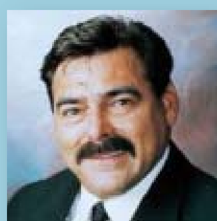

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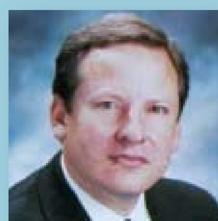

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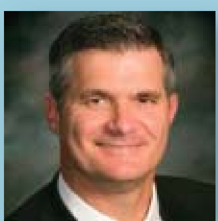

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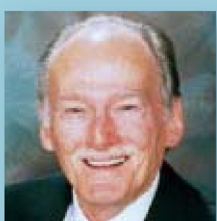

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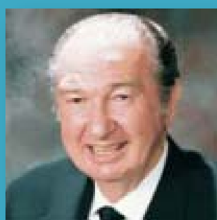

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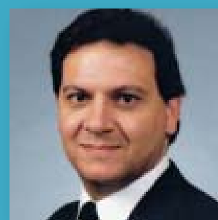
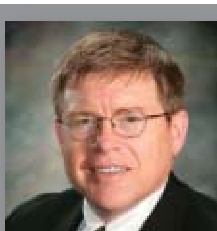


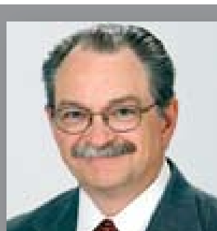
Kaliste J. Saloom, III
Legal Advisor
Saloom & Saloom,
Attorneys at Law

EXHIBIT JUDGES

Bart Boudreaux
Vice-President, Drilling
Samson Resources
Tulsa, Okla.

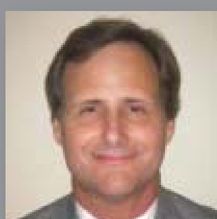


Steve Maley
Manager of Operations
Badger Oil Corp.
Lafayette, La.

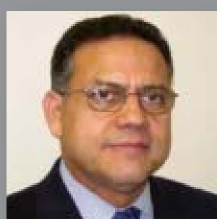


Jack McCarthy
Vice-President, Drilling
Hunt Oil Co.
Dallas, Tex.

Kerry A. Mire
Facilities Engineering Supervisor
GOM Business Unit
Chevron North America E&P Co.
Lafayette, La.



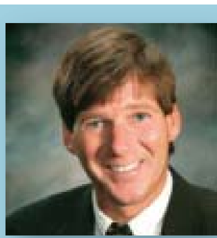
John Pantaleo
Drilling Manager
Stone Energy
Lafayette, La.



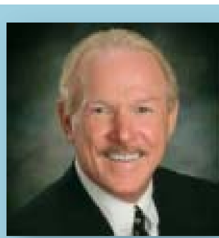
Juan Velasco
Vice-President, Commercial Development
Integrated Trade Systems Inc./Pemex
Houston, Tex.

DIRECTORS

David Alwell
Chalmers, Collins & Alwell, Inc.



Wade Artigue
Data Technolony Solutions

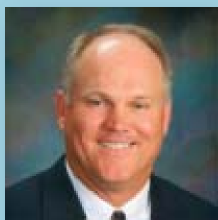


Cliff Angelle
Stabil Drill

Thomas A. Bell, Jr.
M&R Management Corp.

John Belsome
Laborde Marine, L.L.C.

Dan Bloomer
Kitty Hawk Energy Inc., L.L.C.

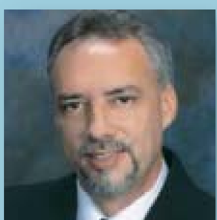


Doss Bourgeois
Plains Exploration and
Production Company

Goldy Breaux
Broadpoint

Sid Breaux
Breaux Engineering, Inc.

Kelly Cahill
Black Warrior Wireline

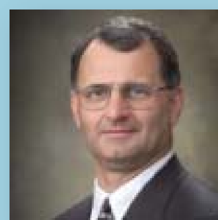


Charles Robert "Bobby" Chachere
Black Gold Services

Thomas Chance
C&C Technologies

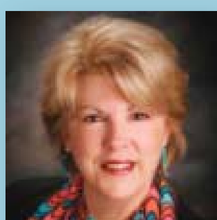
Johnny W. Cline
BJ Services Company

Jerry Lee Comeaux
Coastal Catering, LLC



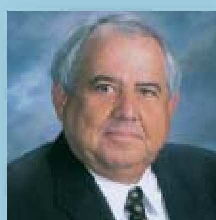
Clint Credeur
Marlin Energy, LLC

Kenneth W. Crouch
Southern Wireline Services, Inc.



Delilah Desouza
U.S. Commerical Service

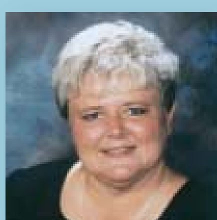
Jimmie Duhon
The Reynolds Company



Donald Dupont
Patterson Rental Tools

George E. Eaton
Eaton Oil Tools, Inc.

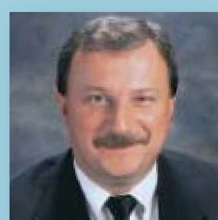
John Fenstermaker
C.H. Fenstermaker & Assoc.



Susan Fowler
Schlumberger

Kent Gerdsen
Parker Drilling Co.

Nicky Guidry
Janic Directional Survey, Inc.

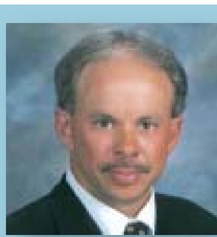


Ed Hebert
BJ Tubular Services

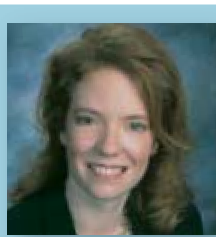
DIRECTORS

John H. Otto Jaschke
Expro Americas, L.P.

Randall Lanclos
Janic Directional Survey, Inc.



Gary Landry
Stric-Lan Companies



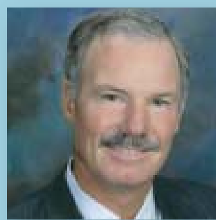
Heather Lecky
Stone Energy Corporation

Phil LeMaire
Astro-Bond Co., Inc.

Steve Maley
Badger Oil Corp.

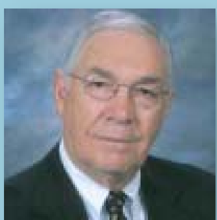
John Melancon
Thomas Tools, Inc.

Tim Melancon
M-I Drilling Fluids



Brad Mosing
Frank's Casing Crew & Rental Tools, Inc.

Brent Mosing
Frank's Casing Crew & Rental Tools, Inc.

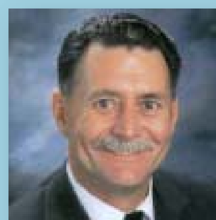


Rocco Musumeche
M&R Management Corporation

Bo Ramsay
Aries Marine Corp.

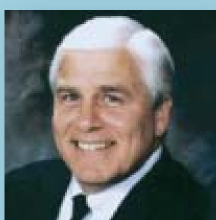
Rebekah Robertson
Norman Broadbent

Leah Roger
Enviro-Sense, Inc



Jim Simon
Baker Hughes Inteq

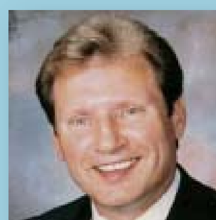
Mark Smith
Rebel Rentals, Inc.



Fred R. Stafford, III
Smith Services

Alfred J. Thomas III
Oilfield Innovators Limited, LLC

Terry Toye
Weatherford International, Ltd.



Rick Voth
Blueline Manufacturing

STAFF

Sally Ware
LAGCOE Event Director

Lynette Brown
LAGCOE-Assistant Director

COMMITTEES

LAGCOE 2007 OFFICERS

TITLE	NAME	COMPANY
Chairman	**David Shealy**	Hughes Christensen Company
Co-Chairman	**Howard Wilson**	Leed Petroleum, PLC
Treasurer	**Larry Lemarie'**	Halliburton Energy Services

AUXILIARY SERVICES: GOLF CARTS

TITLE	NAME	COMPANY
Chairman	**Jerry Comeaux**	Coastal Catering, LLC
Co-Chairman	**C.T. Miller**	
	Wade Artigue	Data Technology Solutions

AUXILIARY SERVICES: SIGNS

TITLE	NAME	COMPANY
Chairman	**Jonathan Mann**	M-Squared Products and Services, Inc.
	Wade Batchelor	Powerhouse Compression Services, Inc.
	Tim Bearb	Powerhouse Compression Services, Inc.
	Corey Douglas	Powerhouse Compression Services, Inc.
	Dale Holbert	Powerhouse Compression Services, Inc.
	Mike Bearb	Powerhouse Compression Services, Inc.
	Darrell Young	Accurate Measurement & Controls

ENTERTAINMENT & HOSPITALITY

TITLE	NAME	COMPANY
Chairman	**Norman Moore**	Shaw Global Energy Services, Inc.
Co-Chairman	**Don Biggs**	DLB Consulting

EXHIBIT JUDGES

TITLE	NAME	COMPANY
Chairman	**Benny Manuel**	Offshore Energy Services, Inc.
	Jim Dore	Global Industries, Ltd.

EXHIBITOR RELATIONS/INFORMATION

TITLE	NAME	COMPANY
Chairman	**Larry LeMarie'**	Halliburton
Co-Chairman	**Jerry Artigue**	W. Jerry Artigue & Assoc., Inc.
	Barbara Artique	
	Dan Bloomer	Kitty Hawk Energy LLC
	Tony Brown	Chevron Corporation - retired
	Sue Brown	
	Kenny Crouch	Southern Wireline Service
	Michelle Crouch	
	Madeline Comeaux	
	Heather Lecky	Stone Energy Corporation
	David Thompson	Unocal - retired
	Martha Thompson	
	Orville Watson	Central Industries, Inc.
	Charles Goodson	PetroQuest Energy, Inc.

INTERNATIONAL COMMITTEE

TITLE	NAME	COMPANY
Chairman	**Jim Dore**	Global Industries, Ltd.
Co-Chairman	**Rebekah Robertson**	Norman Broadbent
	John Bodin	Delmar Systems, Inc.
	David Boulet	Bayou Companies
	David Bull	Norman Broadbent
	Thomas Chance	C&C Technologies
	Delilah Desouza	U.S. Commerical Service
	Phillippe Gustin	Le Centre International de Lafayette
	Ross Keogh	Petsec Energy, Inc.
	Larry LeMarie'	Halliburton
	Brad Mosing	Frank's Casing Crew and Rental Tools, Inc.
	Courtney Olivier	Solar Turbines
	Bo Ramsay	Aries Marine Corp.
	Larry Tolleson	Chalker Energy Partners
	Donald Van DeWerken	U.S. Commerical Service

COMMITTEES

INSIDE EXHIBITS: CAJUNDOME AND CONVENTION CENTER

TITLE	NAME	COMPANY
Chairman	**Don Biggs**	DLB Consulting

INSIDE EXHIBITS: CAJUNDOME

TITLE	NAME	COMPANY
Chairman	**Kent Gerdsen**	Parker Drilling Company
Co- Chairman	**Kelly Cahill**	Black Warrior Wireline
	Jim Andrepont	Continental Alloys & Services
	Mark Buetow	Smith Industries
	Timmy Daigle	Timco Services
	Steve Hennigan	Petroleum Engineers
	James Leyh	Chevron
	Bob McKenzie	Fluid Systems
	Wayne Sellers	Chevron
	Lonnie Simoneaux	Smith Industries

INSIDE EXHIBITS: LOBBY

TITLE	NAME	COMPANY
Chairman	**George Eaton**	Eaton Oil Tools, Inc.
	Tommy Brinkman	Green's Pressure Testing
	Edward Eaton	Eaton Oil Tools, Inc.
	Carl Francois	Hughes Christensen
	Jim Hunter	Baker Hughes Inteq
	Chuck Langlinais	Hughes Christensen
	Junior Meche	Offshore Energy Services,Inc.
	Tim Viator	Petron Industries

INSIDE EXHIBITS: CONVENTION CENTER

TITLE	NAME	COMPANY
Chairman	**Al Thomas III**	Oilfield Innovators Limited, LLC
Co-Chairman	**Rocco Musumeche**	Gulf Coast Gaugers
	Jack Block	PetroQuest Energy, Inc.
	Randly Block	Wise Well Intervention
	Chuck Briley	Dufrene Pipe Company
	Tim Daigle	Premiere Equipment
	Sean Dauterive	CCS Midstream Services
	John Fenstermaker	C.H. Fenstermaker & Assoc.
	John Krener	Chevron Corporation
	Bob Lemaire	PetroQuest Energy, Inc.
	John Miguez	M Squared Products and Services, Inc.
	Lonnie Melancon	Oilfield Rental Iron
	Steve Oerting	Source Environmental Services

INSIDE EXHIBITS: OS-1000

TITLE	NAME	COMPANY
Chairman	**Nicki Guidry**	Janic Directional Survey, Inc.
Co-Chairman	**Will Guidry**	Janic Directional Survey, Inc.
	Rama Guidry	Janic Directional Survey, Inc.
	Troy Green	Baker Atlas
	Ronnie Champagne	TIW
	Keith Baudin	Oilfield Instrumentation

LEGAL ADVISORS

TITLE	NAME	COMPANY
	Kaliste J. Saloom, Jr.	Judge Advocate (Retired)
	Kaliste J. Saloom, III	Saloom & Saloom, Attorneys at Law

MAINTENANCE

TITLE	NAME	COMPANY
Chairman	**Johnny Cline**	BJ Services Company
Co-Chairman	**Duke Talbot**	Oilfield Instrumentation, USA
	Stan Adams	Tanner
	Jimmy Duhon	Excel Communications
	Craig Durio	Wildcat Services
	Charles Trahan	BJ Services Company
	Ken Venable	Dutch
	Chad Boudreaux	IPS

MEDIA LIAISON

TITLE	NAME	COMPANY
Chairman	**Bill Rourke**	Marathon - retired

OUTSIDE EXHIBITS

TITLE	NAME	COMPANY
Chairman	**Mike Hebert**	Consultant

COMMITTEES

ADVISORS/CENTRAL DISPATCH

TITLE	NAME	COMPANY
Blue Team	Doug Keller	Knight Oil Tools
	David Alwell	Chalmers, Collins & Alwell
Red Team	Ron Garber	Apache Corporation
	Bobby Chachere	Black Gold Services
Chairman	**Randall Lanclos**	Janic Directional Survey, Inc.
Blue Zone	Todd Babin	Babin Rental Tools
	Mark Barton	Brammer Engineering
	Greg Baudoin	Oilfield Marketing Consultatns
	Kevin Craig	Snap-On Tools, Industrial
	Jason Hornbeck	Production Wireline
	Kyle Lanclos	Janic Directional Survey, Inc.

TITLE	NAME	COMPANY
	Bob Moore	RLMoore & Assoc/ Energy Network Grp
	Jesse Thibodeaux	Fugro/John Chance
Chairman	**Otto Jaschke**	EXPRO Group
Red Zone	Adam Angelle	EXPRO Group
	Louis Domingue	Gulf Coast Chemical
	Barney Dupuis	Devon Energy Corporation
	Jason Hebert	Advanced Buildings
	Gary Landry	Stric-Lan
	Mike Leblanc	Weatherford
	Cliff Lombas	Bayou Welding
	Todd Roy	Wellbore Energy Solutions
	Terry Toye	Weatherford International, Ltd.

COMMITTEES

PARKING, TRAFFIC & SECURITY

TITLE	NAME	COMPANY
Chairman	**Randy LeBlanc**	Tri-City Services, Inc.
Co-Chairman	**Cliff Angelle**	Stabil Drill
Co-Chairman	**John Melancon**	Thomas Energy Services
Co-Chairman	**Fred Stafford**	Smith Services (Drilco)
Co-Chairman	**Donald Dupont**	Patterson Services
Co-Chairman	**Tim Melancon**	M I Drilling Fluids
Advisor	**Bill Lee**	Davis-Lynch
Advisor	**Ted Russell**	Medco Energi US LLC
Advisor	**Ed Hebert**	BJ Services
	Butch Abshire	Premiere, Inc
	Mike Arabie	Stokes & Spiehler
	Mark Bernard	Petro Tool And Supply
	Pat Broussard	Thomas Energy Services
	Aubin Buquet	Tarpon
	Frank Butler	Mi SWACO
	Leonard Castille	Franks Casing Crew & Rental Tools, Inc.
	John Comeaux	John Comeaux Trucking
	Don Cross	Quantum
	Dean Daye	Spidle Turbeco Triumph
	Jimmy Defelice	Boyd's Bit Services
	Daryl Dubois	Stokes & Spiehler
	Danny Fabacher	Fmc Technology
	Danny Harrell	Smith Services
	James Huval	B.O.P. Ram Rentals
	Mark Johnson	Alis-chalmers Rental Service
	Joe Lavergne	Chevron
	Reed Lormand	Stokes & Spiehler
	Ralph Mayes	Deep South Chemicals
	Chris Meche	Premiere, Inc.
	Mike Moncla	Moncla Well Service
	Jim Odom	Perf-o-log, Inc.
	Mike Powell	Patterson Services
	Robert Roger	Evans Rentals
	Jeremy Shealy	Onebane Law Firm
	David Spence	Hughes Christensen Company
	Perry Ste. Marie	Baker Oil Tools
	Mike Stelly	Lafayette City Police
	Keith Stokes	Stokes & Spiehler Usa, Inc.
	Nick Trahan	Delmar Systems
	Josh Venable	Spidle Turbeco Triumph
	John Vincent	Petroleum Engineers, Inc.

LAFAYETTE CONSOLIDATED GOVERNMENT

TITLE	NAME	COMPANY
	Mike Mitchell	

UNIVERSITY OF LOUSIANA AT LAFAYETTE

TITLE	NAME	COMPANY
	Gerald Bertineaux	UL Lafayette
	Joey Dudley	UL Lafayette
	Lucien Gasteneau	UL Lafayette

PUBLIC RELATIONS

TITLE	NAME	COMPANY
Chairman	**Bill Flores**	W&T Offshore
	Kirby Arceneaux	Wellbore Energy Services
	Spencer Brizzard	Offshore Energy Services
	Artine Downer	Weatherford International, Ltd.
	Doug Kuykendall	Baker Hughes
	Guy A. Mirro	Newpark Resouces
	Gary Moore	BJ Services Company USA
	Brent Mosing	Frank's Casing Crew & Rental Tools, Inc.
	Mike Owens	National Oilwell Varco
	John Rabon	Mi SWACO
	Nolan Roberts	Cameron International Corporation
	David Shealy	Hughes Christensen
	Robert Siffert	Halliburton Energy Services
	Patrick Thompson	Schlumberger
	Mike Watson	Smith Bits
	Cathy Guidry	Devon Energy
	Kathy Elmore	Medco Energi US LLC

COMMITTEES

REGISTRATION

TITLE	NAME	COMPANY
Chairman	**Larry Tolleson**	Chalker Energy Partners
Co-Chairman	**Susan Fowler**	Schlumberger
Co-Chairman	**John Belsome**	LaBorde Marine, LLC
Co-Chairman	**Joe Bernard**	Pro-T Company
Co-Chairman	**Phil LeMaire**	Astro Bond Co.
Co-Chairman	**Jim Simon**	Baker Inteq/Apollo
Co-Chairman	**Mark Smith**	Rebel Rentals, Inc.
	Ken Battaglia	Sconner Petroleum
	Toby Begnaud	Parker Drilling
	Joe Bernard	Pro-T
	Lloyd Boudreaux	Schlumberger
	Sid Breaux	Breaux Engineering
	Lester Bruno	Weatherford
	Dale Clark	Badger Oil
	Richard Coatney	Coastal Drilling
	Earl Devall	Striclan
	Jim Docherty	Success Energy LLC
	Moe Francis	MB Rentals
	Michelle Fredrick	4M Promotional
	Jay Gallet	Chevron
	Bruce Garrett	
	Donna Green	Apache
	Cathy Guidry	B.J. Services
	Kenny Hopkins	B.J. Services
	Keri Juneau	Schlumberger
	Don Lantier	Multi Shot
	Wade Latiolais	Knight Oil Tools
	Malcolm Leger	International Well Testers
	Gene Lognion	ABL Enterprises
	Edgardo Padron	Schlumberger
	Blake Prather	Total Operating Services, Inc.
	Lynn Robinson	Rebel Rentals, Inc.
	Etienne Roux	Schlumberger
	Jesus Saenz	Schlumberger
	Nick Scelfo	Patriot Chemicals
	Rocky Scelfo	Gulf Fleet
	Danilo Teramo	Schlumberger
	Marty Usie	B.J. Services
	Ragan White	Schlumberger
	Melina Williams	Phenom Fire & Safety
	Eric Wilshusen	Schlumberger
	Rick Wimberley	PSC Industrial Outsourcing, Inc.

RISK MANAGEMENT

TITLE	NAME	COMPANY
Chairman	**Michael Pears**	Burch, Marcus, Pool, Krupp

SPONSOR

TITLE	NAME	COMPANY
Chairman	**Bruce Neimeyer**	Chevron Corporation
Co-Chairman	**Jim Dore**	Global Industries, Ltd.

COMMITTEES

TITLE	NAME	COMPANY

TECHNICAL SESSIONS

TITLE	NAME	COMPANY
Chairman	**Lawrence Svendson**	Marlin Energy, LLC.
	Shelby White	Completion Specialists, Inc.
	Leah Roger	Enviro-Sense, Inc.
	Tom Bell	PetroQuest Energy, LLC

UNIFORMS

TITLE	NAME	COMPANY
Chairman	**Heather Lecky**	Stone Energy Corporation

UTILITIES & COMMUNICATIONS

TITLE	NAME	COMPANY
Chairman	**Gene Blevins**	ProductionQuest
Co-Chairman	**Goldy Breaux**	Broadpoint
Co-Chairman	**Jimmie Duhon**	The Reynolds Company

TITLE	NAME	COMPANY
	Ricky Adams	Welch Rentals
	Wade Artigue	Data Technology Solutions
	Tom Boudreaux	Cajun Originals
	Jim Clark	Clark Serivces
	Kenny Delehousye	Aggreko
	Carl Matt	Broadpoint
	Dwayne Melancon	Welch Rentals
	Julie Oubre	Aggreko
	Bobby Prince	CCA Consultants
	Bill Schneider	Petro Soft Solutions
	Duane Swanson	Chevron Corporation
	Nicole Thibideaux	Auto Comm

UL LIAISON

TITLE	NAME	COMPANY
Chairman	**Norman Moore**	Shaw Global Energy Services

HISTORY & SPIRIT OF LAGCOE

HISTORY & SPIRIT OF LAGCOE: 1955 – 2007

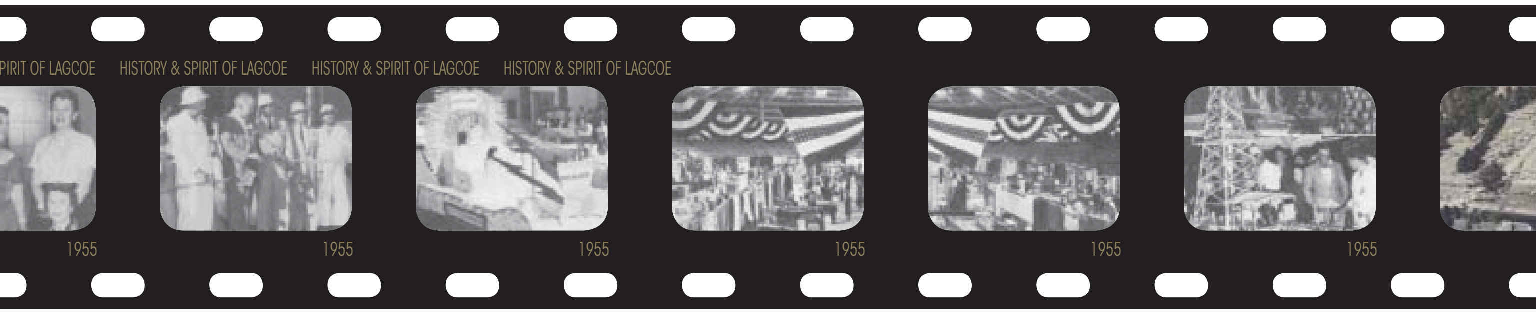
When the oil and gas people of Lafayette launched the first Louisiana Gulf Coast Oil Exposition in 1955, it is unlikely that any of them expected the show to grow into one of the largest oil and gas expositions in the nation. Certainly, they could not envision the infant show eventually being recognized as one of only 28 trade shows selected by the U.S. Department of Commerce to participate in the International Buyer Program. Over the last fifty years, all that has happened and much more.

Like the oil & gas industry, LAGCOE has changed steadily in the years since the first show, much of it driven by an eagerness to keep pace with advances in technology. The days in the old Blackham Coliseum are now only memories for the show currently calling the Cajundome and Convention Center its home. The biennial exposition has evolved into a premier business and marketing environment, focusing on presenting cutting-edge technology and information to the decision makers of the petroleum industry.

Despite the advances that have taken place over the years, one thing has remained constant: the spirit of the show and the people whose volunteer efforts make it work.

The spirit stems, perhaps, from the fact that LAGCOE is an oil and gas show staged by oil and gas people. The hard working committees and their members are involved daily in industry activities. They understand the challenges and demands of the search for energy. Working in the show promotes a sense of accomplishment and pride, because LAGCOE provides resources that help to meet those challenges. Thus, volunteers undertake the demanding tasks involved in producing the show with a spirit of adventure and anticipation. They are helping to make a difference.

There also is a spirit of genuine hospitality. LAGCOE workers sincerely appreciate the contributions of the



exhibitors, visitors and technical session participants. Their enthusiasm in welcoming attendees is contagious.

The LAGCOE spirit has been constant since that first show. At LAGCOE 1955, the list of officers, directors and volunteers read like a who's who of the early oil and gas industry in Lafayette. People who were key players when the industry first began to hit its stride along the Louisiana Gulf Coast were still around and deeply involved.

The first show, at Blackham Coliseum, was successful in every way except financially. Those who signed the note took a loss, but the success of other aspects of the exposition made up for that disappointment. The chamber of commerce, which had conceived the idea along with Peter Ferguson of Esso Standard as a way for the community to express its appreciation to the industry and its people, even loaned one of its employees to serve as the show's general manager.

There were some 130 exhibitors for the first show, enough to convince all involved that there was a bright future.

For the first show, the symbol was a cartoon character in a hard hat, coveralls and a five o'clock shadow called "Lafayette Looey," the forerunner of LAGCOE Looey. The first Looey was Lyle Cummins.

The inaugural program described Looey as "a funny guy… he works in an oil field, he uses your tools, eats your food and sleeps in your bed. He's an ordinary Joe—or Looey—maybe sporting a week's growth of beard after finishing up a long shift out on the rigs. He's here to clean up, sleep up, then see the show and meet his bosses and his bosses' bosses and their customers. He's one of your best customers, whomever you are."

Over the years, as technology advanced and as the industry became more knowledge-oriented, the initial description of Looey declined in accuracy, but he remained the exuberant symbol of the working oil man.

Looey two-stepped through the first LAGCOE program, appearing on pages that detailed the gala atmosphere of

HISTORY & SPIRIT OF LAGCOE CONTINUED ON PAGE 34

HISTORY & SPIRIT OF LAGCOE

HISTORY & SPIRIT OF LAGCOE CONTINUED FROM PAGE 33

social and entertainment events accompanying the show: Charlie Aillet and his band playing for a Cajun fais do do; the famed Keesler Field Air Force Band leading an opening day parade through downtown Lafayette, with 17 marching bands behind them; the selection of the first "Queen LAGCOE" at a formal concert and dance; a rollicking press party; a shrimp and beer party, luncheon and style show, and the grand queen's ball.

It was a small show compared to today's world-class exposition, but the remarkable LAGCOE spirit was evident in every activity. In 1957, the program was bigger and more professional. Each show brought new, enthusiastic volunteers whose names became synonymous with the local oil and gas industry and with LAGCOE.

"Lafayette Looey" became "LAGCOE Looey," in 1957, and the list of exhibitors increased to more than 180. Lafayette got a look at the heavy equipment of the industry as it was featured in a downtown parade, and the Odessa Chuck Wagon Barbecue Group made the first of many journeys to LAGCOE. That year, 35 contestants sought the title of "Queen LAGCOE II."

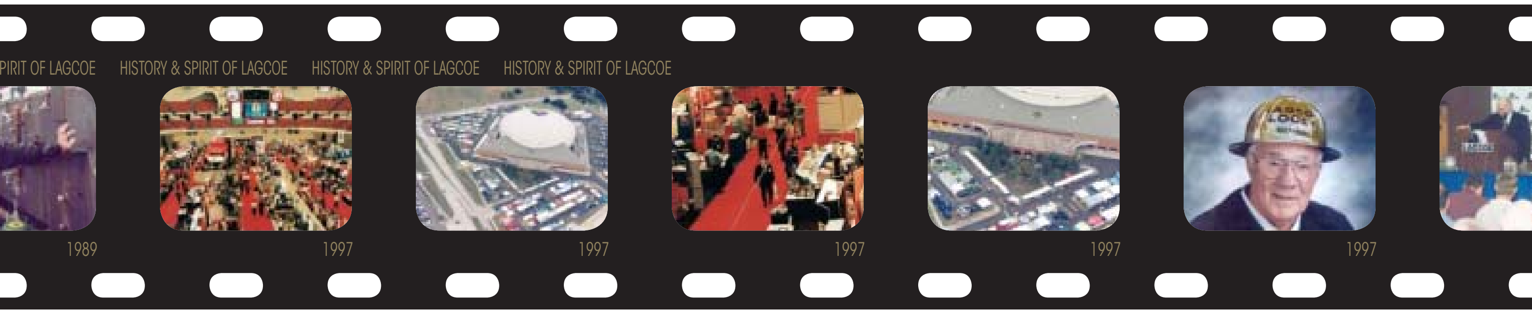
With two successful shows under their belts, the oil and gas people of Lafayette were ready to challenge the big established expositions. In the years to come, there would be steady growth, both in the industry and in LAGCOE.

In 1961, Paul Harvey was featured speaker at a LAGCOE luncheon, and he would make return appearances. The Sixties also saw the appearance of the attractive young "Oil Drops," and in 1969, the U.S. Secretary of the Interior, Walter Hickel, was a guest at the show.

The 1989 show brought Louisiana Congressman Jimmy Hayes and then-Speaker of the House Tom Foley, to tour the exhibits.

After the slump that hit in the eighties, the industry became more conservative and the show became geared to the serious business of helping find more efficient and cost effective ways to produce the nation's energy.

HISTORY & SPIRIT OF LAGCOE



The year 1993 marked the debut of the LAGCOE technical sessions, with legendary wild well fighter "Red" Adair serving as keynote speaker.

The featured speaker for the 1995 technical sessions was Cynthia Quarterman, Director of the Minerals management Service of the U.S. Department of the Interior.

In 1999, LAGCOE featured a man destined to hold one of the nation's most powerful offices. Dick Cheney, then chief executive officer of Halliburton and now vice president of the U.S., was a keynote speaker for the technical sessions.

In 2001, the featured speaker was U.S. Secretary of the Interior Gale Norton.

The 2003 exposition marked LAGCOE's 25th industry showcase. That year, the show also was selected for the first time to participate in the U.S. Department of Commerce International Buyer Program.

In 2005, LAGCOE was set to selebrate it's 50th anniversary. For the first time in the history of the exhibition, LAGCOE was cancelled due to the tragic impact of Hurrican's Katrina and Rita.

This biennial exposition has grown in every respect over the years, particularly in the number of exhibitors and in the exuberance of its volunteers. Some of the gala trappings of the early days have disappeared, but the vivacious, adventurous and hospitable spirit of LAGCOE has never wavered.

Thank you for joining us to Experience the Energy of LAGCOE 2007 and to celebrate fifty-two years of the latest advances in technology, equipment and services for the oil and gas industry.

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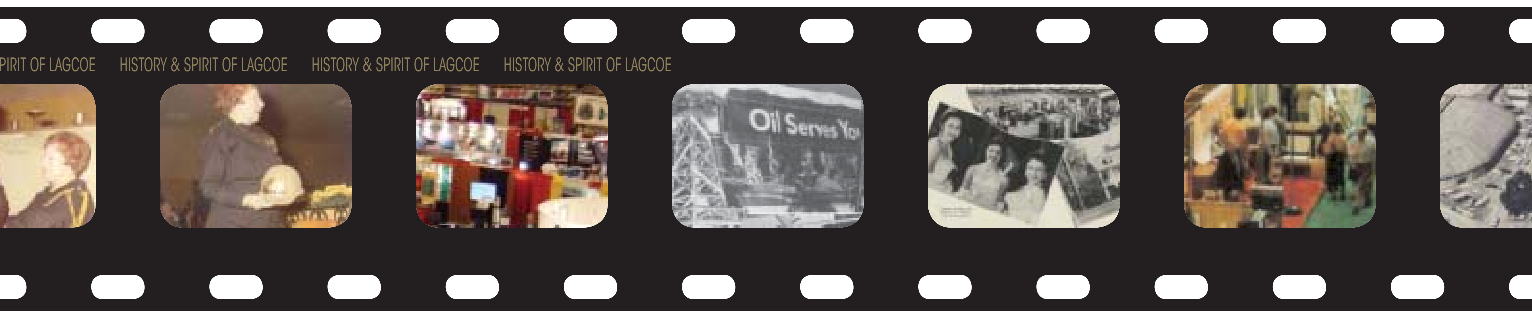

UL LAFAYETTE

UNIVERSITY OF LOUISIANA Lafayette

THE DECADES-OLD RELATIONSHIP BETWEEN **THE UNIVERSITY OF LOUISIANA AT LAFAYETTE** AND **THE OIL AND GAS INDUSTRY** HAS GROWN INTO AN ESTABLISHED PARTNERSHIP FOR A NUMBER OF REASONS.

Among them: a thriving Petroleum Engineering Department which educates undergraduates and graduates for the workforce, and a strong faculty who've helped advance the industry through research.

Professors throughout the College of Engineering are researching different aspects of the oil and gas industry from the design and use of wells and well systems for producing oil, gas, and other liquified natural resources to pipe corrosion and drill bit vibration.

The university also has partnered with local entities to bring innovative, world-class ideas to life here in Lafayette including the Louisiana Immersive Technologies Enterprise facility.

Construction is now under way for the $20 million facility in University Research Park. It will house the world's first six-sided digital virtual reality cube and the world's largest 3-D auditorium. Both the reality cube and the auditorium are powered by one of the fastest supercomputers in the world.

The creation of LITE is a result of a successful collaboration between the university, the Lafayette Development Economic Authority and the state of Louisiana.

The facility will offer leading edge technology that can be applied in almost any field, from energy and manufacturing to aerospace and the military to medicine, environmental and entertainment.

In addition, University Research Park is home to UL Lafayette's Energy Institute. This center provides expert knowledge of the geology and geophysics of the Gulf of Mexico and the gulf coast region.

Its primary concern is the application of this information for use by the petroleum industry, environmental concerns and government institutions. The Institute provides research, education and collaborative opportunities with partner organizations and individuals.

PETROLEUM ENGINEERING

The Petroleum Engineering Department has played a historic role in the oil and gas industry for years now.

In 1955, the university initiated a bachelor's degree in petroleum engineering. In the next half century, 850 students completed undergraduate studies in petroleum engineering.

Most recently, administrators strengthened the department's role by reintroducing a graduate program in petroleum engineering.

Originally started in 1960, the program was discontinued by the state Board of Regents in 1997 based on requirements.

It now draws from the large number of oil and gas professionals in Lafayette, as well as from students who have earned bachelor's degrees in petroleum engineering.

"Lafayette is the natural place to offer this sort of curriculum," said Dr. Ali Ghalambor, head of UL Lafayette's petroleum engineering department. "We have many industry people in the area, many of whom want to improve their education and get an advanced degree. Without the master's program here, that would be impossible."

UL Lafayette is one of only 15 schools nationwide to offer a petroleum engineering curriculum. In addition, the UL Lafayette Society of Petroleum Engineers Student Chapter is one of the top three outstanding student chapters among more than 125 worldwide.

Faculty continue to distinguish themselves among their peers through research and publications.

Ghalambor and Dr. Boyun Guo recently co-authored a new book "Offshore Pipelines" with Dr. Shanhong Song from the ChevronTexaco Corporation and Jacob Chacko with INTEC Engineering Inc.

The book covers the full scope of pipeline development from design, installation and testing to operation. It includes guidelines to achieve cost-effective management of offshore and deepwater pipeline development and operations.

The book is considered the most up-to-date reference for engineers, developers and management personnel challenged with bringing oil and gas onshore.

The pair previously co-authored "Gas Volume Requiremenvts for Underbalanced Drilling" which aids well construction engineers in planning UBD wells.

"We will continue the tradition of supplying the petroleum industry with excellent workforce and knowledge," said Ghalambor. "Through undergraduate and graduate programs along with continual research projects, we strive to develop and offer the latest advances in the oil and gas industry."

UL LAFAYETTE CONTINUED ON PAGE 38

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UL LAFAYETTE

UL LAFAYETTE CONTINUED FROM PAGE 36

CONTINUING EDUCATION

Since 1975, oil and gas industry leaders have relied on UL Lafayette's Continuing Education Department to keep them updated in terms of national safety standards.

By offering an array of courses relating to the industry, the department's Louisiana Environmental Training Center has delivered.

Courses cover topics from OSHA compliance, DOT regulations, Emergency Preparedness and Safety and Health among others.

In terms of offshore operations, one of LETC offerings include "Legal Aspects of Offshore Oil Operations."

This one-day seminar presents the latest perspectives on legal issues and legislation affecting offshore oil and gas interests. It is designed to give attendees a working knowledge of the law as it applies to claims arising from offshore operations.

It's of particular interest to attorneys, risk managers and managers who have the responsibility for offshore operations impacted by Admiralty Law and maritime labor and employee issues.

MARINE SURVIVAL TRAINING CENTER

The Marine Survival Training Center at UL Lafayette offers highly regarded marine safety training at its' state-of-the-art facilities. The 60-acre training site adjacent to Lafayette Regional Airport is the only one of its kind in the United States.

Most notably, the MSTC is home to a high-tech helicopter simulator that teaches offshore workers how to escape during a water accident. Lafayette's The module can be rearranged to simulate any type of helicopter. Because of these features, the MSTC attracts workers from across the country and world seeking such training.

Since 1989, MSTC has brought more than 17,000 offshore workers up-to-date in water safety and survival techniques.

Aside from survival craft training and underwater helicopter egress training, the facility has expanded to include marine fire safety and much more.

EXHIBITOR INDEX

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Abform, Inc...L-25

Acadian Integrated Solutions A-187,188

Acadian Monitoring Services A-183
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E: mobilemonitoring@acadian.com
www.acadian.com
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Alford Services...ROS-104

All Hose & Specialty Inc..EH-181,182

Allendorph Specialties Inc...A-177,178

Alpine Specialty Chemicals.................................... EH-183,184,185

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ARC Industries ROS-37,38,39

Arkla Taylor Inc...BOS-242,243

Armstrong Oil Directories A-20

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Auto Comm Engineering Corp. L-7,8,9

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Basic Supply LLC **A-130**

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BelGas (SES) **A-50**

Benoit/Steel Service **L-2,3**

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CeRam-Kote Coatings A-30

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HLR Controls, Inc. A-155

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Tulsa, Oklahoma 74112 United States

PennWell .... EH-Lobby
P: 713-621-9720
F: 713-963-6285
www.pennwellpetroleumgroup.com
1700 West Loop South, #1000
Houston, Texas 77027 United States
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Petroleum Equipment Co. Inc. BOS-205

Petron Industries, Inc. EH-33,34,47,48

Platform Crane Services, Inc.....................................ROS-8,9,17,18
P: (985) 641-3853
F: (985) 641-3856
E: sales@platformcrane.com
www.platformcrane.com
60461 Doss Rd.
Slidell, Louisiana 70460 United States
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Pneumatic and Hydraulic LLC BOS-172

Power Systems Ltd./ D&H Rig Service Inc. ROS-15,16
P: 432-366-8855
F: 432-366-0607
E: don.davis@powersystemsltd.com
P.O. Box 3065
Odessa, Texas 79760 United States
Specializing in power transmission equipment including new and remanufactured drawworks, clutches, torque convertors, over-running clutches, water cooled and auxiliary brakes and pump drives for drilling equipment and marine drives.

P-Quip Ltd..BOS-203
P: 281-540-4573
F: 281-540-6617
E: sales@pquip.com
www.pquip.com
1910 Humble Place Dr.
Humble, Texas 77338 United States
P-Quip is an established Scottish company that designs, manufactures, and markets high quality mud pump fluid end assemblies which, through design, innovation and attention to detail, improve the safety and efficiency of modern drilling operations.

Precision IBC A-27,28

Pressure Specialty & Supply..A-125

Prime Marine Services.. ROS-99
P: 337-837-6500
F: 337-837-6511
E: angel@primemarineinc.com
www.pilecutter.com
211 Old Farm Lane
Broussard, Louisiana 70518 United States
Prime Marine Services, Inc. purpose is to supply hydraulic shears with or without technicians to perform the cutting of concrete or steel structures from 6" to 70" material depending on wall thickness.

Quadrant Valve & Actuator LLC.....................................EH-19,20,21

Quality Cargo Packing Inc./Harold O'Neil Co. Inc.................... ROS-91
P: 337-873-0361
F: 337-873-9747
E: bgqcp@aol.com
www.qualitycargopacking.com
3846 Ridge Road
Rayne, Louisiana 70578 United States
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R.A.W. Corporation A-103

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P: 800-742-7246
F: 661-393-1542
E: sales@rainforrent.com
www.rainforrent.com
P.O. Box 2248; 3404 State Road
Bakersfield, California 93303 United States
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Ray Oil Tool Co. Inc. A-36,37

Red Fox Environmental....EH-37,38, and BOS-182

Red Man Pipe and Supply Co. BOS-163

Redfish Rental....BOS-230,231,232
P: 985-868-8758
F: 985-868-8786
E: wdmorrison@redfishrental.com
www.redfishrental.com
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Houma, Louisiana 70360 United States
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Reliable EDM Inc. BOS-244

RigData L-24

RigPower LLC....A-15,16
P: 225-272-8800
F: 225-272-8830
E: larry@rigpower.com
www.rigpower.com
10345 South Perdue Avenue
Baton Rouge, Louisiana 70814 United States
RigPower, LLC manufactures and distributes an advanced design single pole electrical (1135 amp) connectors. The RMP & Secure Mount series are 100% intermateable with existing connectors but offer increased safety, reliability, and ease of use.

Robin Instrument & Specialty Inc. A-113

Rotorcraft Leasing Co., LLC....ROS-115
P: 337-837-6038
F: 337-837-9938
www.rotorcraftleasing.net
430 North Eola Road
Broussard, Louisiana 70518 United States
Rotorcraft Leasing Company, L.L.C. is a licensed FAA Part 135 Air Taxi/Commercial Operator with our main base in Broussard, La. We feature a fleet of over 95 helicopters with numerous strategically placed base locations across the gulf.

Rotork Fluid System (SES)....A-57

Safety, Environmental & Operational Training Inc. BOS-253
P: 337-264-0323
F: 337-316-6907
E: robin@seot.com
www.seot.com
1300 Bertrand Dr., Bldg B100
Lafayette, Louisiana 70506 United States
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Safoco Inc....ROS-119

Scan-Pac Manufacturing Inc....EH-28

Schlumberger Oilfield Services....A-65-68,85-88
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F: 337-265-2452
www.slb.com
1819 West Pinhook Road, Suite 250
Lafayette, Louisiana 70508 United States
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F: (281) 999-2020
E: sales@scorpion.cc
www.scorpion.cc
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Sea Horse....BOS-267

Seal Tite Lining Systems....EH-13

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Seal-Tite International
Engineered Sealing Solutions

Seal-Tite International BOS-194,195
P: 985-875-1292
F: 985-875-0687
E: info@seal-tite.com
www.seal-tite.com
500 Deer Cross Dr.
Madisonville, Louisiana 70447 United States
Seal-Tite International provides downhole leak repair services based on proprietary pressure-activated sealant technology. Since 1995, Seal-Tite has performed over 1600 leak repair operations including: surface controlled safety systems, wellheads, hangers, tubing, casing, pipelines/flowlines, downhole and subsea equipment, and microannulus leaks.

Seasafe Inc. BOS-174
P: 337-406-2345
F: 337-406-8880
7of9.seasafe.com
www.seasafe.com
209 Glaser Drive
Lafayette, Louisiana 70508 United States
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SeaTrepid LLC ROS-1
P: 985-350-6299
F: 985-542-2917
E: info@seatrepid.com
www.seatrepid.com
1250 SW Railroad Ave, Suite 230B
Hammond, Louisiana 70403 United States
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Shannon Hardware Co. Ltd. A-3,4,5

Siemens Water Technologies Corp. ROS-118

Silver Fox EH-36

Silverline America S.A. de CV A-195,196

Sioux Steel Co. / Bob Smith Sales L-26

Sky Sheave LLC BOS-250

Smith International BOS-233,234,235,241

Solar Turbines EH-141,142

Southwest Oilfield Products Inc. BOS-206

Southwest PV Systems A-106
P: 800-899-7978
F: 281-351-8356
E: swpv@southwestpv.com
www.southwestpv.com
212 E. Main Street
Tomball, Texas 77375 United States
Since 1986,Southwest PV Systems has been a value added distributor of solar power systems. We design, engineer, supply and integrate high quality PV systems for industrial applications and projects.

Spartek Systems Inc. A-101,102
P: 713-783-7454
F: 713-783-7206
E: sales@sparteksystems.com
www.sparteksystems.com
800 Wilcrest Drive STE 170
Houston, Texas 77042 United States
Spartek Systems design and manufacture well testing, production monitoring, reservoir monitoring, well diagnostics, casing inspection, and permanent monitoring systems for supply to oil & gas operators, and service companies worldwide.

Special Equipment Manufacturing Inc. ROS-112,113,114

Specialty Equipment Sales Inc. A-49,50,51,52,and 57,58,59,60
P: 337-233-1308
F: 337-233-1369
E: rdugal@ses-sws.com
www.sesinc.bz
P.O. Box 51565
Lafayette, Louisiana 70505 United States
Production Specialty Equipment, AOP Industries, Array Products, Ashcroft, BelGas Regulators, Enduro Bond, Enardo, In-Line Closures, Nowata Filtration, Quest-Tec, Rotork, SF Equipment, Taylor Valve, Tel-Tru, Tulsa Valve, Whittle & Neher, Zensor

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SPM Flow Control, Inc. EH-39,40,41,42
P: 337-837-3161
F: 337-837-8171
www.spmflo.com
3535 Hwy 90 E.
Broussard, Louisiana 70518 United States
SPM Flow Control founded in 1958 produces pumps and flow control products. WEIR SPM remains the only company in the well service to provide the entire product .The Weir Group purchased SPM in July 2007.

SPX Corp. L-36-38
P: 262-728-1900
F: 262-728-4904
E: info@processequipment.spx.com
www.spxpe.com
611 Sugar Creek Rd
Delavan, Wisconsin 53538 United States
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St. Martin Oil & Gas ROS-106

Stallion Oilfield ROS-72-77

Stewart & Stevenson .... ROS-69,70,71 and 94
P: 713-751-2700
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Houston, Texas United States
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Stric-Lan Co. Corp BOS-147,148,149

Sulzer Enpro Inc. A-79,80
P: 504-392-1800
F: 504-392-2235
E: sales@sulzerenpro.com
www.sulzerenpro.com
1516 Engineers Road
Belle Chasse, Louisiana 70037 United States
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Superior Manufacturing & Hydraulics Inc. EH-64,65

Supreme Services BOS-260,261
P: 713-715-1931
F: 713-715-1935
E: tim.labruyere@supremesevices.com
www.supremeservices.com
11111 Wilcrest Green, Suite 240
Houston, Texas 77042 United States
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Sure Cast Inc. A-168

T&B Repairs Inc. ROS-125
P: 337-234-5781
F: 337-234-5790
E: sales@TandBrepairs.com
www.TandBrepairs.com
413 Mecca Drive
Lafayette, Louisiana 70508 United States
T & B Repairs,Inc. has been serving the oilfield for over 17 years. We specialize in air starters,turbochargers,and pumps. Components for Caterpillar and Waukesha engines available for exchange.

T3 Energy Services EH-98-101,132-135
P: 713-996-4110
F: 713-440-3210
E: sales@t3energy.com
www.t3energy.com
7135 Ardmore Street (Corporate)
Houston, Texas 77054 United States
T3 Energy Services manufactures, remanufactures and services drilling and production sector oilfield products within the oil and gas industry. T3 manufactured products include a wide range of pressure & flow control, wellhead equipment and pipeline valves.

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F: 337-774-3503
www.talensmarine.com
P.O. Box 1040
Lake Arthur, Louisiana 70549 United States
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TAM International Inc. EH-4
P: 713-462-7617
F: 713-462-1536
E: info@tamintl.com
www.tamintl.com
4620 Southerland
Houston, Texas 77092 United States
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Taylor Valve (SES) A-52

Taylor's Industrial Specialties Inc. ROS-12

Technical Control Systems (SES) A-49
P: 337-261-0160
F: 337-261-0950
E: tcsfrontdesk@cox-internet.com
www.tcsmanifolds.com
209 Bolton Ave.
Lafayette, Louisiana 70508 United States
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Technical Industries Inc. A-62

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F: 504-371-3001
E: info@test-us.com
www.test-us.com
1036 Destrehan Blvd.
Harvey, Louisiana 70058-2517 United States
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The Bayou Companies A-83,84
P: 337-369-3761
E: 337-365-9747
E: info@bayoucompanies.com
www.bayoucompanies.com
5200 Curtis Lane
New Iberia, Louisiana 70560 United States
The Bayou Companies offers over 65 years of growing experience in a wide range of products and services including anti-corrosion coatings, concrete weight coating, fabrication, welding and insulation of pipelines and it's associated equipment.

The Gauge House A-29
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F: 337-261-0512
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www.gaugehouse.com
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Lafayette, Louisiana 70508 United States
The Gauge House, is an established intrumentation specialty company maintaining large inventories of pressure & temperature gauges, thermowells, instrumentation tubing, valves, fittings, and accessories. GHI is an authorized distributor of Perma-Cal® and Dk-Lok® products.

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F: (281) 381-3756
E: info@tiburondivers.com
www.tiburondivers.com
25227 Grogan's Mill Rd., Ste. 222
The Woodlands, Texas 70433 United States
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Titan Specialties Ltd. A-117,118
P: 800-692-4486
F: 806-669-6674
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E: bradwsawyer@cox.net
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F: 337-837-1064
E: mail@totalsafety.com
www.TotalSafety.com
5749 Highway 90 East
Broussard, Louisiana 70518 United States
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Total Valve and Equipment .... **A-172 and 193**

Tradequip International **A-115**
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F: (931) 484-2532
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Triple "H" Chemicals Inc. **A-18**
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F: 985-631-2060
E: tripleh@teche.net
PO Box 2086
Morgan City, Louisiana 70381
831 Degravelle Rd.
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Tyco Valves & Controls **EH-63**

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F: 713-590-4749
E: monicat@uslla.com
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820 Gessner, Suite 1680
Houston, Texas 77024 United States
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U.S. Tsubaki Inc. **EH-146,147**

UK Trade and Investment **EH-45,46**

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F: 405-275-4625
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www.unitliner.com
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United Fuels & Lubricants **L-20,21**

Univar USA **A-47**

Varel International **EH-174,175,176**

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Wood Group Production Services ROS-31,32
P: 281-647-8300
www.woodgroup.com
1311 Broadfield, Suite 200
Houston, Texas 77084 United States
Wood Group Production Services offers scalable, integrated operations and maintenance solutions to suit individual client requirements, recognizing the need for service compatibility throughout the life of an asset.

World Oil L-39
P: 713-529-4301
F: 713-520-4433
E: sales@gulfpub.com
www.worldoil.com
2 Greenway Plaza, Ste. 1020
Houston, Texas 77046 United States
World Oil provides authoritative coverage of the latest technology in onshore/offshore exploration, drilling, production and well servicing, reporting innovations and significant trends to industry management and engineering/operating personnel monthly.

WPT Power Transmission ROS-124
P: 940-761-1971
F: 940-761-1989
E: info@wptpower.com
www.wptpower.com
1600 Fisher Rd.; Po Box 8148
Wichita Falls, Texas 76305 United States
WPT,a fifteen year old manufacturer, offers high energy clutches and brakes for drawworks, water cooled brakes for assist braking and engine mount ptos for mud pumps from 250-2,000 horsepower.

Zap-Lock Pipeline Systems, Inc. ROS-116

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EXPORT INTEREST DIRECTORY

In the following section, you will find a listing of LAGCOE exhibitors who have indicated they are interested in meeting with international visitors and exporting their equipment and services.

We invite you to visit the International Business Center, located at the main entrance to the Cajundome exhibit floor, to assist you in locating the equipment/services you are seeking.

Le Centre International · Lafayette, Louisiana, USA

LAGCOE
Louisiana Gulf Coast Oil Exposition

U.S. COMMERCIAL SERVICE
United States of America
Department of Commerce

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ENHANCED RECOVERY

ENVIRONMENTAL PROTECTION & REGULATORY SERVICES

EXPLORATION

INSTRUMENTS & CONTROL

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3. Northgate Mall
4. Acadiana Park Nature Station
5. Cajunfield
6. Cajundome/ Convention Ctr.
7. Blackham Coliseum
8. University Art Museum
9. Vermilionville
10. Jean Lafitte Acadian Cultural Ctr.
11. Longfellow Evangeline Statue
12. Acadian Village
13. Cypress Lake
14. Zoo of Acadiana
15. Acadiana Mall
16. Carencro Fairgrounds
17. Heymann Convention Ctr.
18. Chamber of Commerce
19. Wetlands Center
20. U.S. Post Office
21. Lafayette Natural History Museum and Planetarium
22. Lafayette Art Association Gallery

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(337) 237-5800

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(337) 237-0005

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