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OIL&GAS JOURNAL®

Oct. 20, 2008
Volume 106.39

UNTAPPED HYDROCARBON RESOURCES

REGULAR FEATURES

COVER

Government and industry believe US oil shale resources are vast, but the volume that might eventually be classified as proved reserves hinges upon demonstration of commercial production. Oil & Gas Journal's special report Untapped Hydrocarbon Resources, which begins on p. 22, discusses oil shale research and testing by various oil companies. The cover shows some early research by Shell Exploration & Production Co. Unconventional Gas at its Mahogany Demonstration Project in the northern Piceance basin in northwest Colorado. In both that project and subsequent testing, Shell inserts electric heaters underground to convert kerogen in the shale to producible hydrocarbons. Photo from Shell.

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Oct. 20, 2008

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General Interest — Quick Takes

E&Y: Alternate energy investments could slow

The credit crunch and falling oil prices could dampen investment in alternate energy companies until stock markets again stabilize, said speakers at an Ernst & Young energy forum on Oct. 9.

Investment momentum for solar, wind, and other alternate forms of energy could slow if oil prices continue to drop, said Dan Pickering, head of research for Tudor, Pickering, Holt & Co.

Before the credit crunch started, alternate energy was very popular in the US, he noted.

"The perception of the American public is alternative energy is very sexy to fund and very cool to do," Pickering said. "But don't forget about grandpa. Grandpa is conventional energy."

Alternate energy still needs traditional fossil fuel as a backup for days when the sun does not shine or the wind does not blow, Pickering said.

Joseph Muscat, Ernst & Young Americas director of venture capital, said access to capital could become more difficult for alternate energy companies. For instance, he noted that initial public offerings for such companies essentially stopped in July.

Venture capital funds are attracted to clean technology energy companies, Muscat said, adding that only software companies get a bigger share of global joint venture investment than clean technology energy companies.

On a US level, Muscat noted that government subsidies and tax credits for renewals appear to be here to stay. The $700 billion federal bailout package recently approved by the US Congress renewed subsidies and tax credits for wind, solar, and biofuels.

President George W. Bush signed an 8-year extension of tax credits for investments into solar energy and a 1-year extension for investments into wind energy.

IEA again trims global oil demand forecast

The International Energy Agency, Paris, has again trimmed its global oil demand forecast.

In its monthly oil market report for October, IEA cut its outlook for oil demand in 2008 by 240,000 b/d, and reduced the 2009 outlook by 440,000 b/d.

The new projections come as a result of weaker-than-expected oil deliveries to member countries of the Organization for Economic Cooperation and Development during July and August and in light of the International Monetary Fund's downward revisions to 2009 global gross domestic product assumptions, which foresee no US economic growth in 2009.

IEA now expects world oil demand to average 86.5 million b/d in 2008, up 400,000 b/d from last year, and 87.2 million b/d in 2009.

Oil demand in the OECD will average 48.1 million b/d in 2008, down 2.2% vs. 2007, and 47.5 million b/d in 2009. Revisions to both North America and Pacific data were significant, IEA said, as rapidly weakening economic conditions, financial turmoil, and high prices should have a marked impact upon OECD demand, most notably in the US.

Meanwhile, oil demand outside the OECD is forecast to average 38.4 million b/d in 2008, up 4.2% from a year earlier, and 39.7 million b/d in 2009, or 40,000 b/d higher than projected in IEA's previous monthly report. This minor upward revision is related to stronger-than-expected demand in almost all non-OECD regions. Overall, non-OECD demand growth should continue to offset the severe OECD demand contraction, IEA said.

Oil demand is forecast to post moderate growth next year in the former Soviet Union, China, Latin America, and the Middle East. IEA expects oil demand in other non-OECD Asian countries and Africa to increase as well during 2009.

Barclays forecasts 2009 E&P spending

Investment bank Barclays Capital on Oct. 14 released estimates for 2009 exploration and production spending and bases its findings on reduced oil and natural gas prices.

Barclays analysts James Crandell and James West in New York reduced their forecast for oil next year to $75/bbl from a previous forecast of $90/bbl. Their gas forecast now stands at $7/Mcf, down from $8.50/Mcf.

Based on these average price levels, they estimate that E&P spending in North America will drop 15% in 2009 vs. 2008 levels, while E&P spending elsewhere will increase 20% next year.

The new oil price forecast remains above threshold pricing for most international projects, both onshore and offshore.

"We had previously expected spending to increase in North America during 2009; however, lower natural gas prices due to supply growth, announced budget cuts, pressure on cash flows, credit market issues, and concerns about demand growth have led us to revise our forecast," the analysts said. Crandell and West estimate that a 15% decline in E&P spending in the US will lead to a drop in the rig count of about 400 rigs from today's levels. ✦

Exploration & Development — Quick Takes

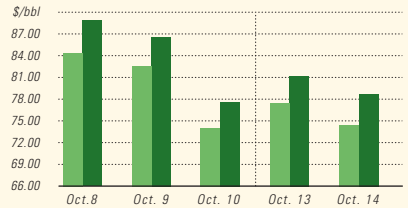
Eni discovers oil off Angola

Eni SPA and Sonangol EP tested 22.5° gravity oil in its discovery on the western area of Block 15/06 off Angola, underscoring the potential of the acreage because it exceeded forecasted rates.

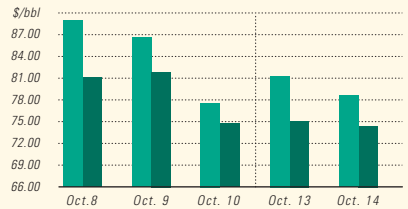
The Ngoma-1 well, 350-km from Luanda, reached a TVD of 3383 m. It was drilled in 1,421 m of water and struck an oil col-

Industry Scoreboard

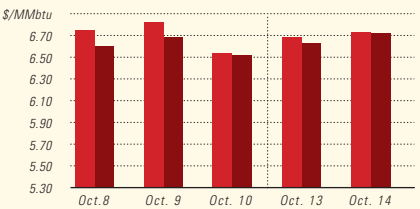
IPE BRENT / NYMEX LIGHT SWEET CRUDE



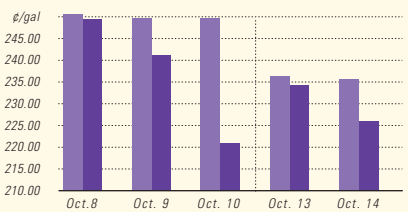
WTI CUSHING / BRENT SPOT



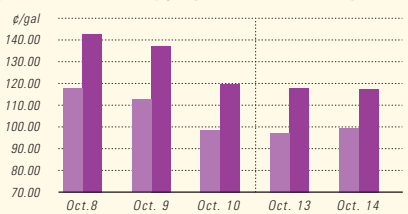
NYMEX NATURAL GAS / SPOT GAS - HENRY HUB



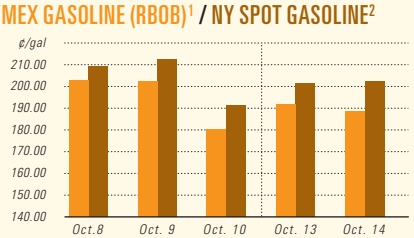
IPE GAS OIL / NYMEX HEATING OIL



PROPANE - MT. BELVIEU / BUTANE - MT. BELVIEU



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



[1]Reformulated gasoline blendstock for oxygen blending.
[2]Non-oxygenated regular unleaded.

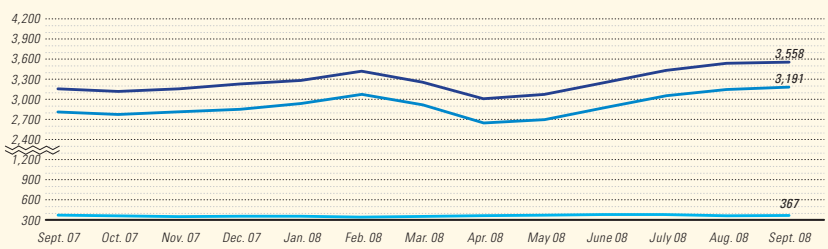
US INDUSTRY SCOREBOARD — 10/20

Latest week 10/3	4 wk. average	4 wk. avg. year ago[1]	Change, %	YTD average[1]	YTD avg. year ago[1]	Change, %
Demand, 1,000 b/d						
Motor gasoline	8,767	9,253	–5.3	9,045	9,301	–2.8
Distillate	3,819	4,165	–8.3	4,009	4,208	–4.7
Jet fuel	1,456	1,541	–5.5	1,549	1,626	–4.7
Residual	441	671	–34.3	612	735	–16.7
Other products	4,177	4,789	–12.8	4,678	4,811	–2.8
TOTAL DEMAND	18,660	20,419	–8.6	19,690	20,713	–4.9
Supply, 1,000 b/d						
Crude production	4,045	4,895	–17.4	4,984	5,073	–1.8
NGL production[2]	2,108	2,418	–12.8	2,253	2,375	–5.1
Crude imports	8,747	10,266	–14.8	9,718	10,080	–3.6
Product imports	3,437	3,329	3.2	3,169	3,535	–10.4
Other supply[3]	1,180	876	34.7	1,376	1,032	33.3
TOTAL SUPPLY	19,517	21,784	–10.4	21,500	22,095	–2.7
Refining, 1,000 b/d						
Crude runs to stills	14,671	14,802	–0.9	14,671	15,144	–3.1
Input to crude stills	14,905	15,480	–3.7	14,905	15,434	–3.4
% utilization	85.0	88.7	—	85.0	88.5	—

Latest week 10/3	Latest week	Previous week[1]	Change	Same week year ago[1]	Change	Change, %
Stocks, 1,000 bbl						
Crude oil	302,587	294,464	8,123	320,081	–17,494	–5.5
Motor gasoline	186,815	179,640	7,175	193,000	–6,185	–3.2
Distillate	122,601	123,090	–489	135,324	–12,723	–9.4
Jet fuel-kerosine	36,783	36,050	733	41,353	–4,570	–11.1
Residual	37,809	36,228	1,581	36,566	1,243	3.4
Stock cover (days)[4]			Change, %		Change, %	
Crude	23.6	23.2	1.7	21.1	11.8	
Motor gasoline	21.3	20.3	4.9	21.0	1.4	
Distillate	32.1	32.3	–0.6	32.1	0.0	
Propane	79.7	72.0	10.7	54.7	45.7	
Futures prices[5] **10/10**			**Change**		**Change**	**%**
Light sweet crude ($/bbl)	86.22	96.68	–10.46	80.66	5.56	6.9
Natural gas, $/MMbtu	6.74	7.45	–0.70	7.25	–0.51	–7.0

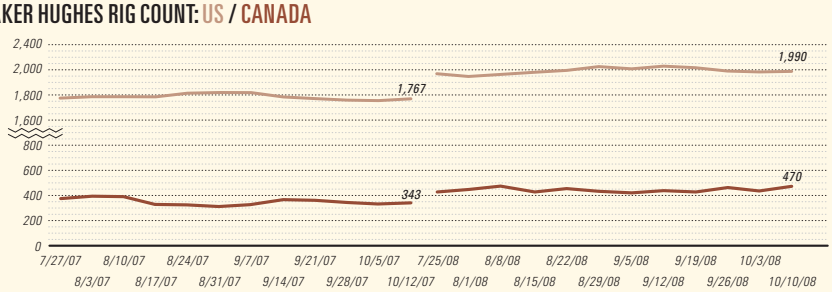
[1]Based on revised figures. [2]Includes adjustments for fuel ethanol and motor gasoline blending components. [3]Includes other hydrocarbons and alcohol, refinery processing gain, and unaccounted for crude oil. [4]Stocks divided by average daily product supplied for the prior 4 weeks. [5]Weekly average 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

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umn of 127 m in high permeability Miocene sands.

Eni said the deepwater discovery could be synergized with other nearby structures following the drilling of exploration wells.

Eni secured the acreage in November 2006 after an intensive international bidding round. Eni operates Block 15/06 with a 35% interest and Sonangol EP is the concessionaire. Other partners are Sonangol Pesquisa e Produçao SA 15%, SSI Fifteen Ltd. 20%, TEPA (Block15/06) Total 15%, Falcon Oil Holding Angola SA 5%, Petrobras International Braspetro BV 5%, and Statoil Angola Block 15/06 Award AS 5%.

BP lets development contract for In Salah fields

BP Exploration (El Djazair) Ltd. has let a front-end engineering and design contract to Foster Wheeler Ltd. for development of the southern fields of the In Salah project in Algeria.

The value of the contract was not disclosed.

Foster Wheeler's contract underpins the second phase of the In Salah gas (ISG) development, which is the largest dry gas joint venture development in Algeria. It will update design; develop the technical data, specifications, and requisitions; and provide a detailed cost estimate for the engineering, procurement, and construction scope of work.

Under the second phase, gas output will be maintained at plateau levels when production from the three northern fields starts to drop. "It involves the development of the four fields to the south of the current development, Garet el Befinat, Hassi Moumene, In Salah and Gour Mahmoud, located near the town of In Salah in the Walia of Tamanrasset," Foster Wheeler said (see map, OGJ, Dec. 4, 2000, p. 45).

ISG currently produces 9 billion cu m/year from three northern fields. Seven proved gas fields are under development in the southern Sahara, 1,200 km south of Algiers. ISG is also the world's first full-scale carbon dioxide capture project at an onshore gas field.

The partners in the ISG venture are Sonatrach, BP, and Statoil-Hydro.

BP has Freedom deepwater find in Gulf of Mexico

BP America Inc. has discovered oil for the third time in the deepwater Gulf of Mexico and will appraise it to determine its size and commerciality.

The Freedom discovery, 70 miles southeast of Louisiana, is on Mississippi Canyon Block 948 in 6,100 ft of water. It follows BP finds in nearby Tubular Bells and Kodiak fields. The well reached 29,280 ft TD and encountered more than 550 net ft of hydrocarbon-bearing sands in Middle and Lower Miocene reservoirs.

"We believe that Freedom straddles Mississippi Canyon Block 948 (BP, operator) and Mississippi Canyon Block 992 (BHP, operator 32.25% and BP 67.75%)," said Andy Inglis, BP chief executive, E&P.

BP Exploration & Production Inc., a wholly owned subsidiary of BP America Inc., operates the exploration well on Block 948 with a 25% working interest. Its partners are Noble Energy Inc. with a 37.5% interest, Samson Offshore Co. 25%, and Marathon Oil Co. 12.5%.

Noble Energy and Samson Offshore acquired the lease at federal OCS Lease Sale 198 in March 2006.

BP makes oil find on Block 31 off Angola

BP Exploration (Angola) Ltd. has made an oil find with its Dione exploration well, which was drilled in the ultradeep waters of Block 31 off Angola.

The Dione well, which tested more than 5,000 b/d of oil under production conditions, lies on the southern portion of the block and is the sixteenth discovery to date for BP off Angola. The well lies 9 km southwest of the Juno-1 discovery, which tested at a mechanically restricted rate of 2,676 b/d of oil in 2005.

Dione reached 3,272 m TD and was drilled in 1,696 m of water about 390 km northwest of Luanda.

Block 31 covers 5,349 sq km and lies in 1,500-2,500 m of water.

Sonangol is the concessionaire of Block 31 with a 20% interest. BP operates the block with a 26.67% stake. Other partners are Esso Exploration & Production Angola (Block 31) Ltd. 25%, Statoil Angola AS 13.33%, Marathon International Petroleum Angola Block 31 Ltd. 10%, and Total SA unit TEPA (Block 31) Ltd. 5%.

Anadarko reports presalt discovery off Brazil

Anadarko Petroleum Corp. has reported a presalt discovery at the Wahoo prospect in the Campos basin off Brazil.

The 1-APL-1-ESS discovery well on Block BM-C-30 lies in 4,650 ft of water 25 miles southeast of and syncline separated from Petroleo Brasileiro SA's (Petrobras) previously announced presalt discoveries at giant Jubarte field off Espirito Santo state.

Preliminary Wahoo results, based on wireline logs, indicate at least 195 ft of net pay with play characteristics similar to those of the nearby Jubarte 1-ESS-103A well. It is Brazil's first producing presalt field having recently achieved reported initial rates of 18,000 b/d of light oil (OGJ Online, Sept. 2, 2008).

"Our first operated presalt test in Brazil is a resounding success as we're seeing data that mirrors other very significant presalt discoveries in this prolific area," said Bob Daniels, Anadarko senior vice-president of worldwide exploration. "It's still early in the process, and we plan to continue drilling toward additional targeted objectives to a total depth of approximately 20,000 ft. The positive results so far provide encouragement and validate our decision to relocate the Transocean Deepwater Millennium drillship to Brazil to execute our ongoing presalt exploration program, which includes at least four additional wells in the deepwater Campos and Espirito Santo basins through the middle of next year."

The Wahoo well is drilling at about 18,400 ft. To fulfill the work program, the partners have run a full suite of wireline logs, including porosity tools. The partners plan to conduct additional logging, including pressure and fluid sampling, once the well reaches total depth, with the potential to conduct a drillstem test at a later date.

After completing operations at Wahoo, Anadarko plans to move the Deepwater Millennium to the Serpa prospect, where it holds a 30% working interest, to reenter the BM-ES-24 well. The well initially encountered presalt hydrocarbon-bearing zones in secondary objectives but did not reach the primary objective because of rig limitations.

Anadarko, through a wholly owned subsidiary, holds a 30% working interest in and is operator of BM-C-30. Devon Energy Corp. holds 25%; EnCana Brasil Petroleo Ltd., a wholly owned

subsidiary of Bharat PetroResources Ltd. and Videocon Industries, holds 25%; and SK do Brazil Ltda. holds the remaining 20%.

Oxy signs up for Jarn Yaphour, Ramhan fields

Occidental Petroleum Corp. has signed a preliminary agreement with Abu Dhabi National Oil Co. (ADNOC) to appraise and develop the Jarn Yaphour and Ramhan oil and gas fields in Abu Dhabi.

"The development of these two fields provides an exciting opportunity to create value for the people of Abu Dhabi and for our stockholders," said Ray Irani, Oxy chairman and chief executive officer. Oxy will operate both fields and hold a 100% interest in the newly created concessions.

Development activities at Jarn Yaphour field, which lies onshore near the capital city of Abu Dhabi, will start immediately. First production from the field, which is expected in 2009, will see 10,000 boe/d of gross production from the initial development.

The Ramhan discovery, which lies in very shallow water near the Abu Dhabi refinery, was tested in 1992 and flowed at a combined rate of 1,750 b/d of oil and 14 MMcfd of gas from one well.

Appraisal activities will commence immediately and, if technically and commercially successful, first production from the Ramhan initial development could begin as early as 2011 in the range of 10,000 boe/d.

Oxy said its total capital investment in both development projects is expected to be $500 million over the next 3-4 years.

"In addition to the initial field developments, this investment will include further field appraisal activities to determine the full upside potential of each area," Oxy said.

Nile Delta gas-condensate discovery gauged

Dana Gas, Sharjah, UAE, estimated that its Al Tawil-1 discovery in Egypt's eastern Nile Delta has located 90 bcf of gas and 4 million bbl of condensate recoverable.

The discovery well, in the West Manzala onshore concession 15 km south of the company's El Wastani gas processing plant, flowed 23.5 MMcfd and 1,027 b/d after encountering 34 m of net pay in the Miocene Qawasim formation. TD is 3,163 m measured depth.

The company plans to drill more exploratory wells in the West Manzala and West Qantara concessions in 2008-09 and is determining how to develop the discovery, the third in its $170 million 2008 drilling campaign. ✦

Drilling & Production — *Quick Takes*

API: Third quarter US completions up 16%

US oil and gas drilling continued to outpace year-ago activity during the third quarter and is nearly twice the levels seen during the 1990s, the American Petroleum Institute said Oct. 10.

During the 3 months ended Sept. 30, an estimated 16,379 oil wells, natural gas wells, and dry holes were completed—16% more than the comparable 2007 period, API said in its latest quarterly well completion report.

It said the estimates show that the resurgence in US oil well drilling that began in 2000 has continued during 2008. An estimated 6,244 oil wells were completed this past quarter, 34% more than in 2007's third quarter and the highest third-quarter domestic oil activity estimate in more than 2 decades, API indicated.

Gas continued to be the primary domestic drilling target. An estimated 8,467 wells were completed during the third quarter, 6% more than in the same period a year earlier and more than double the number 10 years ago, it continued.

Estimated exploratory well completions increased 8% year-to-year, while the estimated number of development wells drilled climbed 17% year-to-year, largely because of a 36% surge in oil development wells from 2007's third quarter, according to API.

Total estimated footage drilled during the most recent 3-month period grew 26% year-to-year to a third-quarter record of 107,631,000 ft as estimated oil well footage rose 40% year-to-year, the agency said.

StatoilHydro to install Marulk production system

StatoilHydro will select the concept and install the production system for Marulk gas-condensate field in the Norwegian Sea under an agreement signed with operator Eni Norge.

The field, which is estimated to hold 80-120 million boe, will be tied in to the Norne vessel, utilizing idle capacity.

Oivind Dahl-Stamnes, vice-president for StatoilHydro's partner-operated fields said StatoilHydro would realize synergies from the agreement because it has worked on similar projects in the same area, which will help to reduce costs.

Marulk, appraised in January, is on PL 122 about 21 km southwest of Norne field at Haltenbanken. Exploration well 6507/2-4 was drilled in water 365 m deep and confirmed the extension of the discovery. The well reached a TD of 3,600 m.

Eni 20% and StatoilHydro 50% share Marulk along with Dong E&P Norge AS 30%. ✦

Processing — *Quick Takes*

Petroperu again delays Talara refinery upgrade bid

Recent alleged irregularities at Peru's state-owned Petroperu have led the company to further extend to Oct. 30 its deadline for bids on the front-end engineering design and the engineering, procurement, and construction of facilities to modernize its Talara refinery at Piura, 1,200 km north of the country's capital Lima.

The delay, one of several in recent weeks, apparently stems from news of alleged irregularities in the country's latest bidding round, which led to the resignation of Energy and Mines Minister Juan Valdiva, along with Petroperu head Cesar Gutierrez.

Their resignations came after Pres. Alan Garcia fired Petroperu board member Alberto Quimper Herrera, allegedly for participating in a kickback scheme with Discover Petroleum in the recent bids for oil exploration licenses.

In September Petroperu extended the bidding deadline to Oct.

15 from Oct. 3. Petroperu said it intended to present the contract on Oct. 29.

At the time, Gutierrez said the Talara modernization project was part of a wider effort to double Peru's production. To do so, he said, Petroperu would have to modernize the Talara refinery at a cost of $1 billion and start production from the 12 blocks where petroleum exploration is taking place (OGJ Online, Sept. 16, 2008).

Modernization of the Talara refinery will include revamping existing units and adding facilities for desulfurization of diesel and gasoline, production of sulfuric acid, and electricity generation. According to the US Energy Administration, the capacity of the facility is to be increased to 90,000-100,000 b/d from 62,000 b/d.

PDVSA breaks ground on Santa Ines refinery

Venezuela's state-owned Petroleos de Venezuela (PDVSA), aiming to process more of the country's heavy oil at home, has begun construction of the 100,000-b/d Santa Ines refinery, located in the state of Barinas.

The refinery will help the country "achieve economic independence, financial independence as banks and stock markets in the US and Europe sink," said Venezuelan president Hugo Chavez. "Latin America has finally begun assuming its course," he said.

The complex, valued at some $1.2 billion, is being developed in two phases: the first is scheduled for completion in 2011 with an initial capacity of 30,000 b/d, while the second will be reached in 2014, bringing the plant to full capacity.

The facility will refine crude oil from Barinas and Apure states, as well as oil from the Orinoco heavy crude belt. It will produce regular and high-octane gasoline, LPG, diesel, kerosine, fuel oil, and asphalt.

Rafael Ramirez, who doubles as PDVSA president and Venezuelan energy minister, said the new refinery will refine mostly crude oil for the domestic market.

Santa Ines is one of four domestic refineries either under way or planned. The others include the 50,000-b/d Caripito refinery, a 200,000-b/d refinery in the state of Zulia, and a 400,000-b/d refinery at Cabruta.

In September, Chavez said his country and China plan to construct two refineries, one in each country. Chavez said the Venezuelan refinery will be built in the Orinoco basin (OGJ Online, Sept. 23, 2008).

FACTS: Asia ethylene capacity to rise 60% by 2015

The Asia-Pacific region is experiencing a massive expansion during which it will increase its ethylene production capacity to more than 64 million tonnes/year (tpy) from 40 million tpy by 2015, according to a report from FACTS Global Energy, Honolulu.

The report, "Asia's Petrochemical Industry: Implications for Future Naphtha Demand," said a wave of additions will take place during 2009-11, with strong peaks in first-quarter and fourth-quarter 2009.

Most of the new capacity will be added in China. The second-largest global producer of ethylene, China will add 14 million tpy by 2015 to its existing 10 million tpy of production capacity. "Firm and likely additions" will occur mainly in 2009 (4.95 million tpy) and 2011 (3.8 million tpy), according to the report.

China will increase its naphtha consumption from to about 825,000 by 2010 and more than 1.1 million b/d in 2015 from 600,000 b/d in 2007.Because most of the new ethylene production capacity is based on naphtha feedstocks, its consumption also will increase greatly. China will become the largest naphtha consumer in Asia by 2011, according to the report. ✦

Transportation — *Quick Takes*

KMEP completes ethanol test, begins biodiesel

Kinder Morgan Energy Partners LP has successfully completed tests to determine the commercial viability of moving batched denatured ethanol between Tampa and Orlando in the 195-mile, 16-in. gasoline line on its Central Florida Pipeline (CFP) system.

It is finalizing mechanical modifications to the pipeline to offer ethanol transportation services to its customers by mid-November and is evaluating batched ethanol transport possibilities for other parts of its pipeline system.

The company says the short length of the pipeline will limit transmix.

CFP has segregated storage for the ethanol at the Orlando end of the pipeline. Total storage capacity is 546,000 bbl, contained in 28 tanks of 8,190 gal—80,000 bbl each. Land is available for expansion (OGJ Online, Apr. 9, 2008).

Kinder Morgan has completed more than $60 million in ethanol projects including modifications to tanks, truck racks, and related infrastructure for new or expanded ethanol service in the Southeast US and Pacific Northwest and has approved an additional $27 million for ethanol projects in the Southeast.

The company is also undertaking tests to assess commercial transportation of biodiesel through its pipelines, running blended B-5 biodiesel through a segment of its Plantation Pipe Line system between Collins, Miss., and Spartanburg, SC. The company expects test results by the end of October. It also is evaluating transporting biodiesel on its Portland-Eugene, Ore., line to support Oregon's forthcoming biodiesel mandate.

Appalachian gas projects starting up

East Tennessee Natural Gas plans to have added 95 MMcfd of contracted long-term, firm capacity on its pipeline system in the Central Appalachian basin by yearend.

Spectra Energy Partners LP, Houston, said its ETNG affiliate has placed the Glade Spring project into service in southwestern Virginia. With the improvements to the Glade Spring compressor station and related facilities, contracts associated with the project took effect on Oct. 1. Glade Spring is just south of ETNG's Saltville gas storage field.

The CNX and Greenway/Nora projects, also in southwestern Virginia, are expected to be available for service on Nov. 1 and Dec. 1, respectively.

Transportation services under the three contracts are slated to increase to 134 MMcfd in 2010. ✦

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.

OCTOBER

Petchem Arabia Conference, Abu Dhabi, +44 207 067 1800, +44 207 430 0552 (fax), e-mail: c.verma@theenergyexchange.co.uk, website: www.theenergyexchange.co.uk. 20-22.

SPE Asia Pacific Oil & Gas Conference & Exhibition, Perth, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 20-22.

SPE International Thermal Operations & Heavy Oil Symposium, Calgary, Alta., (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 20-23.

Permian Basin International Oil Show, Odessa, Tex., (432) 367-1112, (432) 367-1113 (fax), e-mail: pbioilshow@pbioilshow.org, website: www.pbioilshow.org. 21-23.

AAPG International Conference & Exhibition, Cape Town, (918) 560-2679, (918) 560-2684 (fax), e-mail: convene@aapg.org, website: www.aapg.org. 26-29.

GPA Houston Midstream Conference, Houston (713) 222-0852, (713) 222-0858 (fax), e-mail: tom.rommel@accessed.com, website: www.gasprocessors.com. 28-29.

Gas to Liquids Conference, London, +44 (0) 20 7827 6000, +44 (0) 20 7827 6001 (fax), website: www.smi-online.co.uk/08gtl44.asp. 28-29.

Biofuels Conference, Berlin, +44 207 067 1800, +44 207 430 0552 (fax), e-mail: c.taylor@theenergyexchange.co.uk, website: www.theenergyexchange.co.uk. 28-30.

SPE Russian Oil & Gas Technical Conference & Exhibition, Moscow, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 28-30.

Arab Oil & Gas Show, Dubai, +971 4 3355001, +971 4 3355141 (fax), e-mail: info@icedxb.com, website: www.ogsonline.com. 28-30.

Offshore Middle East Conference, Doha., (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: http://ome08.events.pennnet.com/fl/index.cfm. 28-30.

IADC Contracts & Risk Management Conference, Houston, (713) 292-1945, (713) 292-1946 (fax); e-mail: conferences@iadc.org, website: www.iadc.org. 29-30.

NOVEMBER

Sulphur International Conference and Exhibition, Rome, +44 20 7903 2410, +44 20 7903 2432 (fax), e-mail: conferences@crugroup.com, website: www.sulphurconference.crugroup.com. 2-5.

ASME International Mechanical Congress & Exposition, Boston, (973) 882-1170, (973) 882-1717 (fax), e-mail: infocentral@asme.org, website: www.asme.org. 2-6.

✦Deepwater Operations Conference & Exhibition, Houston, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.deepwateroperations.com. 3-5.

Abu Dhabi International Petroleum Exhibition & Conference (ADIPEC), Abu Dhabi, +971 (0) 2 4444 909, +971 (0) 2 4444 383 (fax), e-mail: info@adipec.com, website: www.adipec.com. 3-6.

Purvin & Gertz Latin American LPG Seminar, Rio de Janeiro, (713) 331-4000, (832) 209-4451 (fax), e-mail: ts@prvingertz.com, website: www.purvingertz.com. 3-6.

North African Oil and Gas Summit, Vienna, +44 (0) 207 067 1800, +44 207 430 0552 (fax), e-mail: c.brown@theenergyexchange.co.uk, website: www.theenergyexchange.co.uk/nas3register.html. 4-6.

Mangystau International Oil & Gas Exhibition, Aktau, + (44) 020 7596 5000, + (44) 020 7596 5111 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.ite-exhibitions.com/og. 5-7.

GPA North Texas Annual Meeting, Dallas, (918) 493-3872, (918) 493-3875 (fax), email: pmirkin@gasprocessors.com, website: www.gasprocessors.com. 6.

GITA's GIS Annual Oil & Gas Conference, Calgary, (303) 337-0513, (303) 337-1001 (fax), e-mail: info@gita.org, website: www.gita.org/ogca. 6-7.

IADC Annual Meeting, Paradise Valley, Ariz., (713) 292-1945, (713) 292-1946 (fax); e-mail: conferences@iadc.org, website: www.iadc.org. 6-7.

SEG International Exposition and Annual Meeting, Las Vegas, (918) 497-5542, (918) 497-5558 (fax), e-mail: register@seg.org, website: www.seg.org. 9-14.

IPAA Annual Meeting, Houston, (202) 857-4722, (202) 857-4799 (fax), website: www.ipaa.org. 10-12.

Houston Energy Financial Forum, Houston, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.accessanalyst.net. 11-13.

Financial Modelling in the Oil and Gas Industry Conference, London, +44 (0) 20 7827 6000, +44 (0) 20 7827 6001 (fax), website: www.smi-online.co.uk/oilgasmodelling38.asp. 12-13.

American Institute of Chemical Engineers (AIChE) Annual Meeting, Philadelphia, (212) 591-8100, (212) 591-8888 (fax), website: www.aiche.org. 16-21.

ERTC Annual Meeting, Vienna, +44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 17-19.

Annual Houston Energy Financial Forum, Houston, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.accessanalyst.net. 18-20.

Annual European Autumn Gas Conference (EAGC), Cernobbio, Italy, +44 (0) 1737 855281, +44 (0) 1737 855482 (fax), e-mail: vanessahurrell@dmgworldmedia.com, website: www.theeagc.com. 25-26.

DECEMBER

IADC Well Control Middle East Conference & Exhibition, Muscat, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 2-3.

Annual Refining & Petrochemicals in Russia and the CIS Countries Roundtable, Prague, +44 207 067 1800, +44 207 430 0552 (fax), e-mail: e.polovinkina@theenergyexchange.co.uk, website: www.theenergyexchange.co.uk. 2-4.

Downstream Asia Refining & Petrochemicals Conference, Singapore, +44 (0) 207 067 1800, +44 207 430 0552 (fax), e-mail: a.ward@theenergyexchange.co.uk, website: www.wraconferences.com/FS1/dalregister.html. 3-4.

Calendar

IADC Drilling Gulf of Mexico Conference & Exhibition, Galveston, Tex., (713) 292-1945, (713) 292-1946 (fax); e-mail: conferences@iadc.org, website: www.iadc.org. 3-4.

Deep Offshore Technology International Asia/Pacific Conference & Exhibition, Perth, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.deepoffshoretechnology.com. 3-5.

International Petroleum Technology Conference (IPTC), Kuala Lumpur, +971 (0)4 390 3540, +971 (0)4 366 4648 (fax), e-mail: iptc@iptcnet.org, website: www.iptcnet.org. 3-5.

USAEE/IAEE North American Conference, New Orleans, (216) 464-2785, (216) 464-2768 (fax), website: www.usaee.org. 3-5.

PIRA Natural Gas Markets Conference, New York, (212) 686-6808, (212) 686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 8-9.

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.

Seatrade Middle East Maritime Conference & Exhibition, Dubai, +44 1206 545121, +44 1206 545190 (fax), e-mail: events@seatrade-global.com, website: www.seatrade-middleeast.com. 14-16.

SPE Progressing Cavity Pumps Conference, Houston, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 27-29.

2009

JANUARY

Petrotech International Oil & Gas Conference & Exhibition, New Delhi, +91 11 2436 4055, +91 11 2436 0872 (fax), e-mail: convenor_petrotech@iocl.co.in, website: www.petrotech2009.org/registration.aspx. 11-15.

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

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

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

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

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

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

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

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

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

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

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

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

FEBRUARY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MARCH

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

PIRA Understanding Global Oil Markets Seminar, Dubai, 65 6581 4122, e-mail: jay@pira.com, website: www.pira.com. 23-24.

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

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

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

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

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

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

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

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

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

APRIL

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

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

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

GPA Mid-continent Annual Meeting, Oklahoma City,

Calendar

(918) 493-3872, (918) 493-3875 (fax), website: www.gasprocessors.com. 16.

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

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

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

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

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

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

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

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

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

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

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

MAY

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

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

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

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

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

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

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

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

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

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

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

NPRA Reliability & Maintenance Conference, Grapevine, Tex., (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 19-22.

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

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

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

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

JUNE

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

JULY

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

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

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

AUGUST

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

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

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

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

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

SEPTEMBER

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

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

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

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

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

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

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

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

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

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

OCTOBER

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

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

ISA EXPO, Houston, (919) 549-8411, (919) 549-8288 (fax), e-mail: info@isa.org, website: www.isa.org. 6-8.

Kazakhstan International Oil & Gas Exhibition & Conference (KIOGE), Almaty, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.oilgas-events.com. 6-9.

API Fall Petroleum Measurement Standards Meeting, Calgary, Alta., (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 12-15.

International Oil & Gas Exploration, Production & Refining Exhibition, Jakarta, +44 (0)20 7840 2100, +44 (0)20 7840 2111 (fax), e-mail: ogti@oesallworld.com, website: www.allworldexhibitions.com. 14-17.

SPE/EAGE Reservoir Characterization and Simulation Conference and Exhibition, Abu Dhabi, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 18-21.

GSA Annual Meeting, Portland, (303) 357-1000, (303) 357-1070 (fax), e-mail: meetings@geosociety.org, website: www.geosociety.org. 18-21.

SEG International Exposition and Annual Meeting, Houston, (918) 497-5500, (918) 497-5557 (fax), e-mail: register@seg.org, website: www.seg.org. 25-30.

SPE/IADC Middle East Drilling Conference & Exhibition, Manama, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 26-28.

Louisiana Gulf Coast Oil Exposition (LAGCOE), Lafayette, (337) 235-4055, (337) 237-1030 (fax), e-mail: lynette@lagcoe.com, website: www.lagcoe.com. 27-29.

NOVEMBER

IPAA Annual Meeting, New Orleans, (202) 857-4722, (202) 857-4799 (fax), website: www.ipaa.org. 4-6.

IADC Annual Meeting, Miami, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 9-10.

Measuring 'cheap' oil

Marilyn Radler
Senior Editor-Economics

Oil prices have been on a downward spiral for several weeks, punched by dwindling demand. The price decline quickened as the credit crisis and resulting turmoil in the world's financial markets sucked money out of commodities.

A special report by Deutsche Bank Global Markets Research addresses how low crude prices can slide given the slowdown in US and global economic growth. The report estimates that financial sector deleveraging and reduced credit availability could lower US GDP growth by up to 1.5 percentage points/year over the next 2-3 years.

In March—as prices were on the upswing—Adam Sieminski, chief energy economist for Deutsche Bank in New York, and Michael Lewis, the bank's head of global commodities research in London, issued a similar report which examined the point at which oil prices could be considered extreme on the high side (OGJ Online, Mar. 17, 2008).

The report found that relative to per capita income, crude would have to reach $134/bbl to bring to 1981 levels the purchasing power of "an average G7 consumer" from the group of seven industrialized nations: Canada, France, Germany, Italy, Japan, the UK, and the US.

Downside price discovery

Sieminski and Lewis now believe the deepening banking crisis and the slowdown in global economic growth that lies ahead will continue to pressure commodity prices downward, most notably in energy and industrial metals.

Their new analysis finds that oil prices would have to fall to $35/bbl to bring prices in real terms back to their long-run historical averages. But they believe that important changes in the market, especially the geographic location of marginal supply and demand, suggest that $60/bbl represents a more realistic characterization of "cheap oil."

But before oil reaches that level, they predict, OPEC will cut production to defend the price, and the group of exporters would need to make aggressive cuts, given the risk that global GDP growth will fall below 2% in 2009.

How low can oil prices go?

Indicator	Oil price, $/bbl
Budget balance	55-95
Marginal cost of production	80
Based on futures forecasting error	80
As a share of S&P 500	60-90
As a percentage of US disposable income	60-85
As a percentage of global GDP	40-75
Relative to G7 per capita income	45
Versus US dollar	30-60
In real terms (PPI)	35
Average	61

Source: Deutsche Bank Global Markets Research

Indicators

As shown in the table, the analysts find the nadir for oil prices based on a series of measurements, such as the price of oil relative to per capita income and as a percentage of global GDP.

They examined how many barrels of oil could be purchased with respect to per capita income in the G7 countries and found that in 1970, oil was about $3.30/bbl and income averaged about $3,700, sufficient to buy 1,000 bbl/year of oil.

But in July, when crude futures peaked above $145/bbl, affordability dropped such that incomes could purchase only 307 bbl. So for crude oil affordability to return to its long-run average, the price would have to fall to $45/bbl, which would allow the average G7 consumer to buy just over 1,000 bbl of oil.

Deutsche Bank also looked at the oil price required to balance budgets in key oil exporting countries to provide insight into how low oil prices could go. Sensitivity of the oil price to government finances is different for every country.

The analysts note that it's no surprise that as oil prices have fallen below $95/bbl, the price needed to balance the budgets of Venezuela and Iran, the rhetoric from those two countries has grown louder in calling for action to defend the price. The Deutsche Bank report finds that Saudi Arabia requires an oil price of $55/bbl to balance its budget, while Russia's balancing point is $70/bbl.

As the table shows, given the various price indicators, Sieminski and Lewis determine that as long as economic growth is anemic and demand destruction risks continue to drive commodity prices lower, a price of about $60/bbl could represent an arresting point for crude. ✦

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Editorial

The crisis and capitalism

An extra hazard lurks in the turmoil that has engulfed the global financial system. It's the notion that the crisis repudiates market capitalism. Governments everywhere must resist the political temptations of this misjudgment.

The idea that capitalism's validity died along with various financial luminaries sprouts from two intellectual seeds. One of them is latent socialism. The belief that the state should play a central role in the economy, including outright ownership of core assets, will always have some support. So when capitalism yields unsavory consequences, a blind turn in political support toward its reciprocal is natural, however unwarranted.

Confidence failed

Capitalism, though, hasn't failed. What failed is confidence in a financial system choked by bad housing debt, some responsibility for which rests with statutory distortion of lending practices in the US and elsewhere. Capitalistic vigor, in fact, has so far kept economies working despite seriously constricted credit.

The second source of challenge to capitalism's legitimacy is confusion about the role of regulation. Deficiencies in regulation are only too evident in the current crisis, beginning with disparities in the US between treatment of investment and commercial banks and extending to reporting requirements, especially as they pertain to the assessment of risk. To acknowledge that the financial business needs more and better regulation, however, is not to surrender any intellectual ground in capitalism's defense.

Capitalism doesn't mean the absence of regulation. To the contrary, capitalism needs regulation. It depends on the free operation of markets. At the same time, it creates incentives for its practitioners to usurp markets for parochial gain. As with any system involving human beings, markets have rule-stretchers and cheaters. Recent economic history bears multiple scars of market malpractice, with Enron just the signature fiasco—until, perhaps, now.

Just as capitalism does not mean the absence of regulation, a tightening of regulation need not portend socialism. But regulation needs boundaries, too. Generally, it should confine itself to the enforcement of market freedom. It shouldn't make economic decisions. Regulation should set and police rules aiming at maximum transparency, ease of entry, equivalence of opportunity, and prevention of market control. Given the complexity and speed of modern markets, that's a tall order. If exercised with reasonable success, moreover, it's quite enough.

But the ideal of regulation confined to boundaries defined by function and activity is easier to describe in concept than to put into practice, only in part because self-restraint doesn't comes naturally to regulators. This is why regulation in most political systems cycles between too much and too little.

The danger is that governments worldwide will respond to the financial crisis as the US did to politically unsavory energy prices: with imprudent regulation. A fundamental change occurred with enactment of the Energy Policy Act of 2005, which made fuel choice an item of government business. America's energy destiny, now increasingly linked to favors from the government, has been up for grabs ever since. America's energy consumers and taxpayers thus have fallen subject to growing economic peril.

Conditions—for both energy and the global economy, which are, in fact, linked—can only worsen if financial jeopardy spawns a new round of aggressive economic regulation. Governments, especially that of the US, will feel obliged to prevent a recurrence of the credit collapse. They'll succeed only to the extent they concentrate on enhancing market flexibility, freedom, and transparency. They'll fail if they resort, as the US has with energy, to restriction, manipulation, and retribution.

Way out: growth

The only way out of the current crisis is economic growth. Core ingredients of growth are freely flowing capital and adequate supplies of affordable energy. Both essentials are compromised at present—capital by the credit seize-up, energy supply and affordability by any government action that distorts markets.

In both cases, governments have important restorative roles to play. But they must remember what history makes clear: that market capitalism is the best and most sustainable route to economic growth. The solution to urgent economic problems, therefore, is not to restrict or abandon market capitalism. The solution is to improve it. ✦

US oil shale resources look promising yet still uncertain

Paula Dittrick
Senior Staff Writer

The quest for commercial viability of oil shale ultimately could prove the most practical option among unconventional hydrocarbon resources to add large quantities of proved US reserves, say researchers working toward this goal.

Yet, it could take another 10-15 years to determine if the energy returned on the energy invested on oil shale development will prove worth the effort, oil companies note.

US oil shale is concentrated in northwestern Colorado, eastern Utah, and southwestern Wyoming. About 70% of oil shale is on federal land.

A 1-year congressional moratorium on the US Bureau of Land Management issuing final commercial oil shale leasing regulations expired Oct. 1. BLM has said leases are unlikely to be issued for years (see sidebar).

Government reports suggest oil shale development could add as much as 800 billion bbl of oil to US reserves. Worldwide, the oil shale resource base is estimated at 2.6 trillion bbl total and is found in more than 20 countries (OGJ, Aug. 9, 2004, p. 16).

Currently, Shell Exploration & Production Co. Unconventional Oil has three 160-acre leases that the BLM approved in its research, development, and demonstration program. BLM also granted one RD&D lease each to Chevron USA and American Shale Oil LLC, formerly EGL Shale Oil LLC.

These five leases involve in situ development in Colorado. BLM also approved a lease in Utah for Oil Shale Exploration Co. of Mobile, Ala. Most companies are researching various heat techniques. Chevron is focusing on chemistry to unlock the oil from the shale's kerogen.

Avoiding the boom-bust

Companies have extracted oil shale off and on since the US Naval Oil Shale Reserve program was created about 100 years ago.

A previous oil shale boom was halted in 1982 when Exxon shut its $5 billion Colony oil shale project near Parachute, Colo.

Since the 1990s, ExxonMobil Upstream Research Co. has investigated more than 30 different technologies to extract oil from oil shale.

Currently, ExxonMobil's leading candidate technology is the Electrofrac process, which is designed to heat oil shale in situ by creating hydraulic fractures and filling the fractures with an electrically conductive material.

Electricity would be conducted from one end of the fracture to the other, making the fracture a resistive heating element. Heat would flow from the fracture into the oil shale formation, gradually converting kerogen, the shale's solid organic matter, into oil and gas that could be produced by conventional methods.

Oil companies involved in ongoing oil shale research emphasized the need to avoid boom-bust cycles. Industry spokesmen told OGJ that any successful oil shale technology must be sustainable throughout the ups and downs of oil prices.

"The boom-bust cycle issue really relates to the recovery cost of oil shale," said Robert Lestz, Chevron's oil shale technology manager. "We've taken a slightly different approach than our predecessors. We looked at this in a holistic process from the resources in the ground to the transportation fuel in the end. What is that energy balance you get from the resource to the finished product?"

He emphasizes the need to develop and maintain a sense of cooperation with the local community regarding environmental, social, and economic issues. Regional feedback helps Chevron develop its technical and business perspectives, Lestz said.

"Chevron said we need to develop a technology that will be much less energy intensive, environmentally responsible, and economically sustainable," he said. "If we can have a process that is sustainable, then we alleviate the issues of boom-bust."

Tracy Boyd, communications and sustainability manager for Shell's Mahogany Shale Project near Meeker, Colo., agrees.

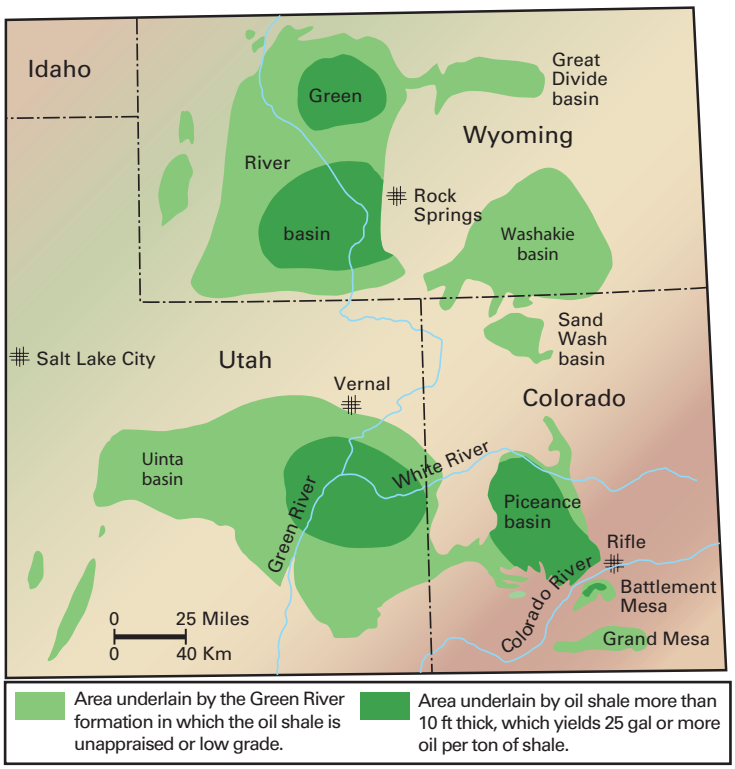
"The US has long known of this significant hydrocarbon resource, but past attempts have failed to develop the resource in an economically viable and environmentally and socially responsible manner," Boyd said.

Previously, Shell said oil shale would be economic if prices for conventional oil were $30-35/bbl on the New York Mercantile Exchange. But Boyd said the company stopped making such forecasts.

There simply are too many unknowns today to accurately forecast the economics of future commercial oil shale projects, he said.

"You tell me what the economic atmosphere is going to look like 15 years from now," Boyd said. "What are going to be the costs of construction, services, and other oil field support? What are going to be the environmental requirements of the time? What will be the status of global warming and carbon controls on projects? There are just too many variables now to say at some point in the future if oil price is X, we can do it, and if it's Y, we can't."

US OIL SHALE RESOURCES



Source: Oil & Gas Journal

Shell runs freeze wall test

Shell has researched oil shale development methods for 27 years and has run field tests on private land near Meeker, Colo., since 1996.

"We envision that it will be at least the middle of the next decade and possibly longer before we would be making a decision to move forward with a commercial scale project," Boyd said.

Shell's patented In situ Conversion Process was tested on an area measuring 30 ft by 40 ft. Shell recovered 1,700 bbl of light oil plus associated gas, indicating its proprietary process generates more oil from a smaller surface area than previous oil shale processes.

Boyd said the in situ heating process can recover 60% of hydrocarbons in the shale compared with 28-30% recovered using traditional mining and retort processes. In situ does not involve open-pit mining.

Shell inserts electric heaters underground to convert kerogen in the shale to producible hydrocarbons that can be collected and pumped to the surface. Rock is heated slowly to 650-750° F.

In its Mahogany Research Project, Shell is running a freeze wall test on a 25-acre plot having a rectangular pattern of 136 holes targeted at 1,800 ft

Shell's Freeze Wall test site at its Mahogany Research Project in Rio Blanco, County, Colo., involves a vertical ice wall and contained oil shale reservoir to prevent ground water contamination. Freeze began in early 2007. Photo from Shell Exploration & Production Co. Unconventional Oil.

deep. A vertical ice wall is designed as a barrier to keep ground water out of the contained reservoir.

Within the wall, a closed-loop pipe system circulates ammonia, a common refrigerant. No heating or production occurs during this test. Freezing began in early 2007.

The test is scheduled to run for 2-3 years, possibly longer. It's a long sequence of various tests to determine whether Shell can manage the wall effectively.

In addition to the freeze wall test, Shell is developing plans for pilot projects on the three RD&D leases that BLM granted in 2006, Boyd said. No details or anticipated schedules are yet available for the RD&D pilot projects.

Chevron's hydrology wells

Chevron's oil shale researchers are conducting various stages of research in numerous laboratories and in the field.

Last year, Chevron took cores from an entire section of its RD&D lease and ran hydrology tests to understand the aquifers and water flow. Lestz said three separate pads of hydrology monitoring wells are being drilled.

Regarding kerogen, Chevron's research is still in various laboratories, he said. There are two phases in the laboratory. One is from the experimental side and the other is from the simulation and modeling side.

Chevron is working in its own laboratories in Houston and in Richmond, Calif., along with scientists at the University of Utah and also at Los Alamos National Laboratory, Argonne National Laboratory, and the Pacific Northwest National Laboratory.

"The oil shale rock itself is not like a typical oil and gas reservoir," Lestz said. "It has no permeability or porosity. Our ability to convey chemistry is quite limited unless we can create flow paths in the shale. That is the whole purpose around how we go out and create surface area so we can basically have a

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Environmental, leasing policies evolving

Paula Dittrick
Senior Staff Writer

Oil companies researching oil shale development are watching the unfolding of US leasing and environmental regulatory policies that could influence the economics of producing unconventional petroleum resources, said the National Oil Shale Association.

GlennVawter, executive director of National Oil Shale Association in Glenwood Springs, Colo., said technological advances have sharply reduced possible negative environmental consequences of production processes.

Yet, questions still remain about how much energy would be used and how much carbon dioxide could be emitted if commercial oil shale projects are undertaken in the US.

"Oil shale developers are actively engaged in research, development, and planning for the best methods to manage the carbon that will be produced during production," Vawter said, adding that sequestration technology could contain the CO_2 emitted.

He notes that "the means and cost of disposing of or sequestering vast amounts of CO_2 poses a significant challenge. Lastly, the cost of meeting uncertain future regulatory requirements adds significant investment risk."

No commercial leasing yet

The US Bureau of Land Management issued a final programmatic environmental impact statement (PEIS) on Sept. 4 to guide the use of public land containing oil shale and tar sands in Colorado, Utah, and Wyoming.

The document, which BLM developed under Sec. 369[d] and [c] of the 2005 Energy Policy Act, amends 12 land-use plans to set aside 1.9 million acres of public land for potential commercial oil shale development, the US Department of the Interior agency said.

The PEIS identifies the most promising areas on federal land in the three states that would be open to applications for commercial leasing.

Multiple steps have yet to be completed before any oil shale lease sale would happen, BLM has said. Spokesmen with oil companies suggest that it could take 5-10 years to finalize regulations, and that leasing might start toward the end of the next decade.

Vawter said that completion of oil shale leasing regulations would give oil companies "the ground rules on leases and bonus payments, which would help companies decide if they want to spend millions of dollars" on oil shale development.

Water, carbon balance

Researchers at the Sandia National Laboratories in Albuquerque are analyzing the lifecycle carbon footprint and the water required to fully extract hydrocarbons from oil shale, they said in comments prepared for a recent Oil Shale Symposium in Golden, Colo., organized by the Colorado Energy Research Institute and the Colorado School of Mines.

"Extracting unconventional petroleum reserves can be relatively water and energy intensive, which could result in correspondingly greater environmental impacts when the process is scaled up to the billions of gallons (and trillions globally) of potential petroleum in place," Sandia researchers said.

When considering the oil shale of Colorado, Utah, and Wyoming, it is estimated that production could require 3 gal of water or more for every barrel produced, they said, noting this would add to competition for the heavily used water in the Colorado River basin.

Researchers said they are working to develop metrics based on production of unconventional oil, including the cost per barrel, the volume of water per barrel, and the volume of CO_2 emitted per barrel depending upon which process might be used.

delivery system for that chemistry."

Researchers are looking at several different types of chemical delivery techniques. One possibility is injecting CO_2 under high pressure underground.

"There are other things that we also are evaluating at this time," he said. "CO_2 has a lot of advantages, but CO_2 by itself is not going to really solve our problems. It's the additives that we add to the CO_2 that creates the uniqueness."

The idea is for the CO_2 and additives to act as a solvent that will pull the oil from the shale. Other industries use similar approaches. The potato chip industry uses CO_2 to pull grease out of potato chips, and the coffee industry uses CO_2 to extract caffeine.

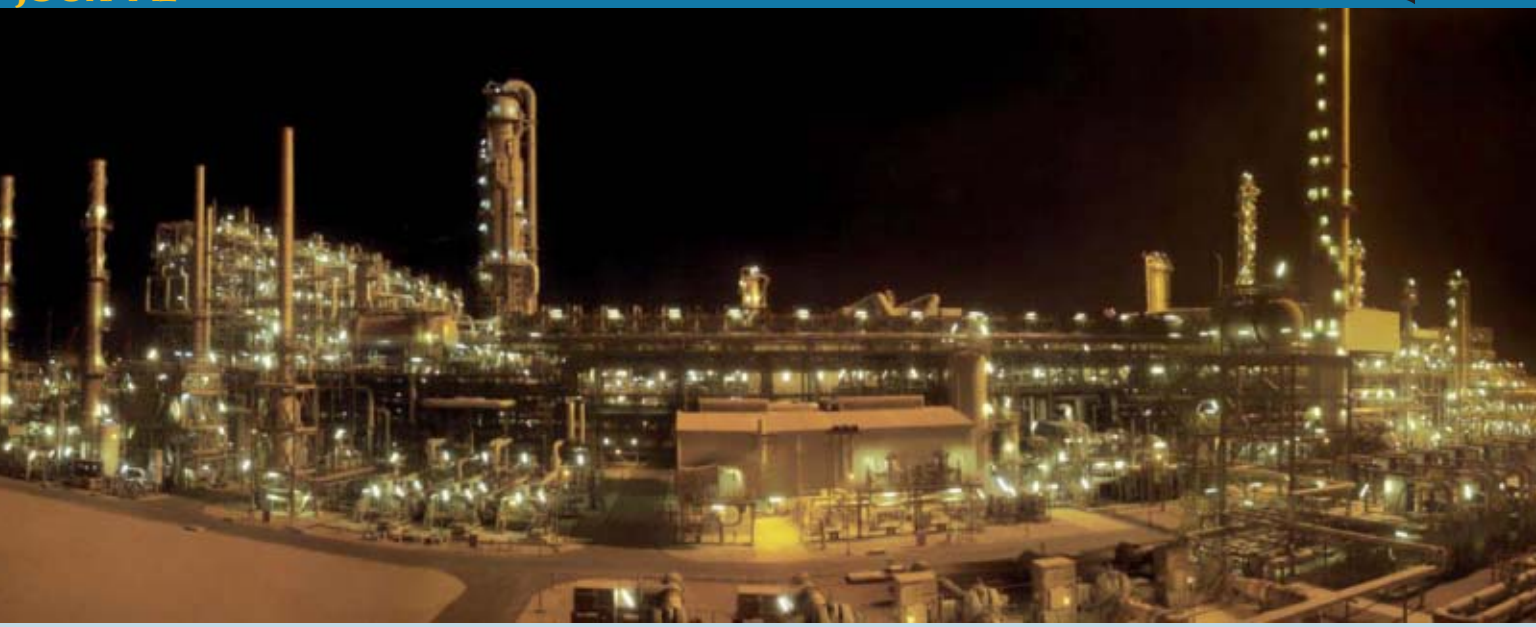
"The interest in the CO_2 for oil shale again comes back to the environmental side knowing it's a very clean, inert type product to put into the ground and there will be minimal invasiveness from an environmental perspective," Lestz said.

He said it's too early to discuss what other types of delivery techniques are being considered because that research still is in its early stages.

Lestz said commercial oil shale production "is definitely many years out… It's not a short-term solution. It's an answer for tomorrow, not an answer for today."

He is encouraged by the fact that many companies are approaching oil shale research from many different ways.

"The actual answer at the end of the day may lie between all these technologies," he said. ✦



Kazakh transport plans unfazed by Russia-Georgia strife

Eric Watkins
Oil Diplomacy Editor

Although Kazakhstan has said it plans to arrange delivery of its oil to the Baku-Tbilisi-Ceyhan (BTC) oil pipeline via Azerbaijan and on to Georgia's Black Sea port of Batumi, traders expressed fears, after the Georgia-Russia conflict, about the efficiency of the trans-Caucasus routes and about possible future pressures from Russia.

Kairgeldy Kabyldin, chief executive officer of Kazakhstan's state-owned KazMunaiGaz, recently sought to ease these concerns, speaking with journalists about the strategy of developing oil export routes from his country as well as its participation in several international oil projects.

He said the supplies will be transported via the Kazakh Caspian Transportation System (KCTS).

"KazMunaiGaz is a business structure," he said, "so we do not make political assessments of these kinds of events. I would not say today that risks of [transporting oil via] the trans-Caucasian corridor via the BTC pipeline have increased due to the Russian-Georgian conflict."

Although the pipeline was built 5 years ago and planned even earlier—some 10 years ago—he said Russia has never spoken against its direction. "It has only said it can offer a better route," he insisted. "All this is nothing but a coincidence of events. We will not change our plans for using this corridor."

On the contrary, he said, the transit of Kazakh oil in this direction would lend "an element of stability" in the region. "This is because you know that any country signing international transit agreements guarantees the stability of oil supplies and the freedom of transit. The rest is an issue for politicians."

Kabyldin said business and trade economic relations regulate political and interethnic problems in the long run. "But let us here separate the issue of the conflict from the issue of the transit and transport of oil along the Baku-Batumi corridor and the BTC pipeline."

Cheney's Georgia visit

When US Vice-President Dick Cheney recently called on Georgia and other republics of the former Soviet Union to build new export pipelines bypassing Russia, the question arose as to whether that visit generated the need for Kazakhstan to begin talks with the European Union and the US in this regard.

Kabyldin said Kazakhstan President Nursultan Nazarbayev had announced the need to create a multivector oil and gas transport system back when Kazakhstan had just gained its state independence.

"Today we are implementing projects for delivering our oil via the Caspian Pipeline Consortium (CPC) to Batumi and China," he said, but "we are not giving up those projects that were defined earlier. We are planning to use the BTC pipeline, which currently carries 37-40 million tonnes of oil/year and whose annual throughput capacity is 50 million tonnes of oil."

He said his country also is eyeing the Baku-Supsa pipeline, which can transport 10 million tonnes/year of oil and which has already been idle for 2 years. "It might not be in the interests of Georgia and Azerbaijan not to use this asset that can bring significant benefits to the two countries," he maintained.

He said Cheney's proposal, "which definitely contains a political tint" in bypassing Russia, is nothing new for Kazakhstan.

"It is logically right always to have an alternative. However, we believe that, in the conditions of having unused capacities of the existing pipelines, building new ones would be economically unjustified. But expanding or building additional capacities for the existing pipelines is another matter. Currently we are ready to pay for transit."

Selling Oman's CPC share

Asked how the issue of selling Oman's CPC share is being handled—taking into account the mutual interest of Kazakhstan and Russia to buy it—Kabyldin said that the CPC consists of two parts: one part is private companies and the other part is state companies.

"Oman's share belongs to government shareholders," he said. "Two other government shareholders—Russia and Kazakhstan—have the priority right to buy Oman's share." He said both have expressed a desire to buy Oman's share to maintain the balance of interests.

"If the share is bought by a private company, then the initial balance of interests in the CPC might be disrupted. In other words, government shareholders might lose their influence," he added.

"That is why Kazakhstan has agreed with the Russian side to preserve the balance. It is not ruled out that Oman's share will be bought by one of the countries or by both of them," he explained, adding that, in either case, the balance of interests would be preserved. "Everything depends on commercial talks."

Planned refineries

Kazakhstan still has plans to build oil refineries in Turkey and possibly Iran, Kabyldin said, noting plans to build a refinery in Ceyhan. Currently Kazakhstan and Azerbaijan are considering the Turkish side's proposal to build a modern superplant which, apart from producing oil products of European quality, could produce petrochemical products. "We have even suggested to our Russian colleagues to take part in the project," he said.

"Today we are conducting talks and considering plans for our country's

possible participation in such an oil refinery from 2013 and further," he said. Kabyldin said the Turkish side must first prepare a feasibility study and "resolve the issue of allocating land. This issue is very topical. After that we will make a decision."

He said Iran also wants Kazakhstan to take part in building an oil refinery in the north of the Caspian, which Kabyldin says is "a good idea. They offer to initiate cooperation as part of swap operations and suggest that we have a share in the refinery." The only caveat, he said, is that there are certain investment restrictions resulting from Kazakhstan's position in international politics.

"As of today, we have agreed with our Iranian colleagues that by the end of this year they will prepare a feasibility study for the oil refinery project and give it to us for studying," Kabyldin revealed.

"And why not, if this is business and, moreover, good business? If we take part in this project, we will have access to the Asian market," he said. "Currently, about 80% of Southeast Asia gets oil from the Persian Gulf." ✦

BP to flow Kazakh oil through BTC pipeline

Eric Watkins
Oil Diplomacy Editor

BP PLC plans to begin shipping oil from Kazakhstan's Tengiz oil field via the 1,770-km Baku-Tbilisi-Ceyhan (BTC) pipeline beginning later this month.

BP said the oil would be transported by barge from Kazakhstan to Azerbaijan and then loaded into the 1 million b/d BTC pipeline, with exports from Ceyhan expected to begin in mid-November. BP, whose plan is similar to one attributed last month to Tengizchevroil, did not say how much Tengiz oil would be shipped along the BTC line, only that initial rates are "expected to be relatively low in volume."

The move comes as about 60% of the 850,000 b/d crude flow through the BTC has been cut following the shutdown of two platforms on the Azeri-Chirag-Gunashli field in the Caspian Sea last month after a gas leak.

However, a BP spokesman said the flow of Tengiz oil into the BTC has long been discussed and is not a response to short-term problems at the ACG fields. "There was always spare capacity available in the BTC," he said, adding that surplus Tengiz crude will flow through the pipeline in the long term.

BP's announcement coincided with reports quoting Kairgeldy Kabyldin, chief executive officer of Kazakhstan's state-owned Kazmunaigaz, that his firm has begun talks aimed at buying BP's stake in the 565,000 b/d Caspian Pipeline Consortium (CPC).

The 1,580-km CPC pipeline transports Kazakh oil to the Yuzhnaya Ozereevka terminal at Novorossiisk on Russia's Black Sea coast.

BP, which holds an indirect 6.6% stake in the CPC consortium through its LukArco joint venture, is said to be interested in selling its stake due to an ongoing impasse with the Russian government over plans to expand the pipeline's capacity.

Oman's government also is said to be interested in selling its 7% share in the project.

Analyst Global Insight said, "One way or another, it appears that there will be a shake-up in the current composition of the CPC consortium, which appears necessary in order to move forward with the expansion of the pipeline to its design peak capacity of 1.34 million b/d."

Late last month, Tengizchevroil was reported to have made an agreement to ship up to 2 million tonnes/year of oil—possibly rising to 5 million tonnes/year—by barge across the Caspian Sea to Azerbaijan and onward by rail across Georgia to export terminals on the Black Sea (OGJ Online, Sept. 25, 2008).

Russia owns 24% of CPC shares, Kazakhstan owns 19%, and Oman 7%. Other partners include Chevron Caspian Pipeline Consortium 15%, LukArco 12.5%, Rosneft-Shell Caspian Ventures 7.5%, Mobil Caspian Pipeline 7.5%, Eni International 2%, BG Overseas Holding 2%, Kazakhstan Pipeline Ventures 1.75%, and Oryx Caspian Pipeline 1.75%. ✦

Brazil to offer fewer blocks for December auction

Eric Watkins
Oil Diplomacy Editor

Brazil's National Petroleum Agency (ANP), apparently bowing to pressure from the government, has reduced the number of exploration and production concession blocks to be auctioned at the 10th round, scheduled for Dec. 18. ANP published a notice in the Federal Register that 130 blocks in eight sectors and seven sedimentary basins would be auctioned, down from previous notification of 162 blocks in 11 sectors and nine sedimentary basins.

ANP did not disclose its reasons for reducing the acreage scheduled for the auction. However, there has been concern in the country to restrict the availability of acreage in the presalt region due to the high probability of discover-

ies based on recent finds.

The 10th round was approved by the ANP in September. At the time, Mines and Energy Minister Edison Lobao said only land blocks would be auctioned, with deepwater sea blocks held back until a government committee completes studies of possible changes to Brazil's oil legislation.

Presalt region at stake

The presalt region is at the heart of possible changes to Brazil's oil legislation, given that the area could hold massive oil reserves. The Tupi area alone, in the Santos basin, is believed to contain 5-8 billion boe.

Brazilian President Luiz Inacio Lula da Silva created a commission to study possible changes to the country's oil legislation in light of the discovery of the nation's promising presalt oil deposits.

The commission was expected to present proposals to Lula by Sept. 19, but ANP announced at the end of August that meetings would likely continue 2 additional weeks, continuing through the start of October.

According to the state news agency, the delay was occasioned by a failure of panel members to reach a consensus on how best to maximize development of the country's promising presalt oil deposits.

The panel is comprised of Chief of Staff Dilma Rousseff, Finance Minister Guido Mantega, Planning Minister Paulo Bernardo, and Development Minister Miguel Jorge. In addition, Petroleo Brasileiro SA (PBR) Pres. Jose Sergio Gabrielli, Brazilian National Development Bank Pres. Luciano Coutinho and Lima are also members of the study group.

Aim of the legislation

The aim of the new legislation, according to Lobao, is for Brazil to retain maximum returns from its concession areas instead of allowing their departure via international oil companies.

He has attempted to drum up support for the changes by promising a better distribution of the royalties around the country.

In July, Lobao defended changes in the oil legislation that would allow for better distribution of oil and natural gas exploration royalties to states and municipalities.

"While some municipalities and states get rich, others end up not benefiting from that wealth," said the minister, in an interview with the Eldorado radio station.

The idea is not to hurt the current beneficiaries of the law, he said. "We just don't want (royalties) to be concentrated (in a few states and municipalities)."

100% state-owned

International oil companies and the International Energy Agency have criticized proposed changes in Brazil's oil legislation.

They claim Brazil will need foreign investment for oil and gas exploration and criticize the apparent "resource nationalism" behind the proposed legislation.

Domestic opponents of the proposed legislative changes are concerned that royalties will most likely go to private investors. They note that Petroleo Brasileiro SA (Petrobras) has private investors who would unfairly benefit from the legislation.

Lula, determined that his country' oil resources should go towards social development, has suggested that his government might create a state-owned company to handle development of the presalt region.

That way, the government could bypass continuing arguments over revenues going to private Petrobras investors or to IOCs, and it could keep a significant slice of all future oil sector earnings to dedicate exclusively to key social sectors such as education. ✦

Brazil launches new platform, loading terminal

Eric Watkins
Oil Diplomacy Editor

Petroleo Brasileiro SA (Petrobras) has inaugurated the P-51, the company's first domestically built semisubmersible platform—a milestone event according to government and company officials.

"This platform, the first that is 100% national, also fulfilled, within international standards, the pre-established terms and costs," said Petrobras Pres. Jose Sergio Gabrielli de Azevedo.

Brazilian President Luiz Inacio Lula da Silva said, "What we want is to build, in our country, a large oil industry and naval base, so we can have a production base not only to meet Petrobras' needs, but also to meet the entire world's increasing demand for oil and gas," said the Brazilian president.

Lula said the pioneer would not be the only platform Brazil would build. "What we want in the future is to export platforms to Singapore, Venezuela, and Colombia, and satisfy the world's oil demand," Lula said.

Operations

According to Petrobras, the P-51 is expected to be installed in the Campos basin this month and will start operating late this year. It will be installed in Marlim Sul field 150 km offshore and anchored in water 1,255 m deep.

The P-51 will be interconnected to 19 wells (10 oil and gas producers and 9 water injectors) and will produce 22° gravity oil.

The platform has the capacity to process 180,000 b/d of oil and 6 million cu m/day of natural gas, accounting for 8% of Petrobras's total domestic oil

production when it reaches maximum operating capacity in 2010.

Tanker loading platform

The start-up of the P-51 platform coincides with reports that Petrobras also has begun operations at its new $837 million tanker loading terminal in the Campos basin. The loading terminal is a facet of the company's master plan to export large quantities of oil from Roncador and Marlim fields over the next 2 decades.

The Brazilian firm has commissioned the PRA-1 autonomous repumping platform in waters east of Rio de Janeiro and plans to begin oil exports through the new system this month.

The repumping platform is designed to receive crude from four deepwater floating production systems: the P-51 platform in Marlim Sul field; the P-53 floating production, storage, and offloading vessel in Marlim Leste field; and—once they are installed—the P-52 and P-55 production platforms in Roncador field.

The PRA-1 platform will offload the crude to tankers via the Modec-owned Cidade de Macae floating storage and offloading vessel, starting with oil that is coming from the P-52 platform.

Modec will operate for 20 years the Cidade de Macae, which was converted from a very large crude carrier and can store as much as 2.1 million bbl of oil.

Next year, oil will also be loaded onto tankers from two floating terminals near the PRA-1 platform, which is designed to transfer as much as 810,000 b/d of oil when all four of the deepwater production units operate at peak rates. ✦

WATCHING THE WORLD

Eric Watkins, Oil Diplomacy Editor

Blog at www.ogjonline.com

Oiling the road To Ulaanbaatar

The Japanese government, aiming to reduce the country's dependence on oil and natural gas, has cast its eyes far and wide for new sources of energy.

Oil and gas are still playing a part in Japan's energy diplomacy as in Mongolia, where a deal was struck for a 44,000 b/d refinery—the nation's first—to be built in Darhan with Japanese assistance.

The aim of the refinery is to reduce Mongolia's dependence on foreign oil products. That's a step in the right direction, perhaps, but it does not change the fact that Mongolia so far has no oil resources of its own.

As a result, Mongolia's president recently forged an agreement with his counterpart in Kazakhstan for the delivery of 1-1.5 million tonnes/year of oil for processing in the planned refinery.

Eyeing uranium

Japan's interest in Mongolia, however, goes well beyond a contract for the construction of a refinery. Indeed, even as Japanese officials were discussing the refinery, they also were eyeing Mongolia's uranium deposits.

Mongolia's uranium resources are currently estimated at 62,000 tonnes, or about 1% of the world's identified resources. But there could be more—a lot more—in those hills according to scientists who calculate that the reserves could be as much as 1.39 million tonnes, potentially the world's largest.

Very clearly, the Japanese would like to be on the ground floor if those estimates turn out to be correct.

Indeed, as one Japanese businessman put it in Ulaanbaatar last week: "It is particularly important that new uranium deposits are brought on stream because reserves at deposits currently in production are going to run down by 2020."

The rapid increase in uranium demand now expected follows a recent decision by the Nuclear Supplier's Group and International Atomic Energy Agency that will allow India to import nuclear fuel and technology.

Demand rising

Spurred by competition from India, to say nothing of China, the increased demand for uranium means that Japan is keen to finalize supply agreements with producers to meet its own import requirements of 9,000 tpy. The Japanese visit to Ulaanbaatar was clearly geared toward that end, and the refinery—without putting too cynical an edge on things—was doubtlessly a sweetener.

Still, the Japanese are canny enough not to rely on the mere possibility of increased reserves waiting to be found in Mongolia. Even as their energy diplomats were at work in Mongolia, others were forging another deal in Uzbekistan.

The Uzbek government granted Japanese trading house Sojitz exclusive rights for 18 months to develop the Chetbertoye mine, 350 km west of Tashkent. In July, Mitsui & Co agreed with Uzbekistan to look at forming a joint venture to search for uranium.

The prospects in Uzbekistan? According to the International Atomic Energy Agency, Uzbekistan holds 93,000 tonnes of deposits, equivalent to be about 3% of the world's uranium resources. ✦

US House panel's minority report disputes findings

Nick Snow
Washington Editor

The US House Natural Resources Committee's minority staff released its own report on Oct. 9 challenging one which the majority staff issued 6 months ago that has been the basis of many 2008 Democratic candidates' energy stands.

The new report, "Drilling for Truth and Coming Up Empty," highlights major flaws and inaccuracies in the committee majority staff's document which Democrats from House Speaker Nancy Pelosi (Calif.) to presidential nominee Sen. Barack Obama (Ill.) have cited, according to Rep. Don Young (R-Alas.), the NRC's ranking minority member.

The majority's report contained unsupported and undocumented extrapolations regarding oil and gas resources contained in nonproducing federal acreage that has already been leased, he continued. It illustrates a lack of knowledge about the onshore and offshore leasing process, costs to the lessee to acquire acreage, the nature of oil and gas deposits, and the time required to explore and, if a discovery is made, develop the lease, Young said.

"Our analysis pulls together all of the facts about leases issued on federal lands. These findings clearly outline the numerous misrepresentations in the majority's report," he maintained.

The minority staff's report used information from the US Department of Energy, Department of the Interior, Energy Information Administration, Minerals Management Service, Bureau of Land Management, US Geological Survey, and other federal sources, Young said.

Minority's conclusions

Young said the report shows that more domestic drilling yields more domestic resources, that the federal government profits from high oil and gas prices, that drilling for more domestic oil and gas will help lower prices and reduce US dependence on imports, and that only 4% of the total 2.46 billion-acre federal mineral estate is leased for oil and gas exploration and development.

The minority staff's report said that in 2007, committee chairman Nick J. Rahall (D-W.Va.), held hearings "to examine the rapid oil and gas development that has taken place on our nation's land in recent years." These were used to justify legislation increasing the drilling permit application process timeline from 30 to 90 days, repealing provisions in the 2005 Energy Policy Act designed to help regulatory agencies coordinate and facilitate oil and gas projects' permits, and increasing costs for producers to do business with the government and DOI in leasing administration and royalty programs.

When gasoline prices doubled in 2008 and voters began to demand more access to energy resources on federal acreage, the majority blamed "Big Oil" and claimed that the industry was stockpiling drilling permits and leases, the minority staff's report said. It challenged the majority staff report's conclusion that the increased number of drilling permits (from 3,802 in 2005 to 7,561 in 2007) shows that "the federal government has consistently encouraged the development of its oil and gas resources."

In fact, said the new report, onshore acres leased from the early 1990s to the present are less than one-third the total leased during the early 1980s, while offshore acres lease dropped dramatically after Congress began to enact moratoriums in 1982.

It also challenged the majority report's conclusion that opening additional federal acreage to leasing is not justified because producers can't keep pace with the rate of permits that are being issued. The earlier report said that BLM issued 28,776 permits to drill on public land from 2004 through 2007, but only 18,954 wells were actually drilled. "That means that companies have stockpiled nearly 10,000 extra permits to drill that they are not using to increase domestic production," the majority staff's report said.

'No incentive to stockpile'

But the minority staff's study found that before BLM issued revised Onshore Order No. 1 in 2007, federal drilling permits were good for only 1-2 years. Consequently, any issued in 2004 and 2005 which were not utilized have expired and those that were issued in 2006 will expire this year. "Anyone who was unable to use [a drilling permit] before it expired will have to reapply and wait for BLM approval before proceeding with drilling. So the life of [a drilling permit] is limited and oil prices are high; there is no incentive or ability to stockpile [drilling permits]," it said.

Onshore drilling permits which BLM issues now are good for 2-4 years, an amount of time necessary to deal with stipulations limiting when an area can be drilled to accommodate wildlife mating, nesting and migration, the minority staff's report continued.

It also questioned the majority staff's conclusions that only about 13 million of the 47.5 million onshore acres and 10.5 million of the 44 million offshore acres which the oil and gas industry has leased from the federal government are actually producing. "Oil and gas companies would not buy leases to this land without believing oil and gas can be produced there, yet these same companies are not producing oil and gas from those areas already under control," the earlier report said.

The report pointed out that the leasing, exploration, and development process goes through several stages

A politically audacious idea

The full-page, A-section advertisement in the Oct. 9 Washington Post stood out from others; it was not for a major commercial bank saying how much it appreciated its depositors. But "The Unshaken Pillar" made an important point, which has been quietly spreading.

"When key pillars of our economy—housing, banking, autos—have been shaken, one pillar stands unshaken and provides the stability that our economy so desperately needs at this critical time.... That pillar is energy," said the open letter signed by the chief executives of four large US corporations: Chevron Corp.'s David J. O'Reilly, American Electric Power Co.'s Michael G. Morris, FedEx Corp.'s Frederick W. Smith, and Dow Chemical Co.'s Andrew N. Lewis.

"Today, Americans understand that a strong and diverse energy sector is vital to our economic well-being and prosperity. They know that energy produced here at home creates good-paying American jobs, reduces our dependence on others, and spurs the necessary investment and innovation needed to develop all forms of energy," it continued.

The letter called for exploring for more oil and gas domestically, intensifying initiatives to develop alternative and renewal energy forms, and continuing to improve efficiency and conservation.

Jobs, revenues, security

Doing so would "add more high-paying American jobs across all sectors of our economy; provide billions [of dollars] in new tax revenues that can be used by local, state, and federal governments to fund important programs that are at risk due to the current credit crisis; and reduce our dependence on foreign energy sources and the outflow of US capital to foreign countries," it stressed.

Candidates aren't talking much about it now, but oil and gas industry leaders agree that energy remains a major issue in the 2008 elections and will loom large for Congress and the next president.

"Public concern over prices hasn't been this high since the oil shocks of the 1970s and with good reason. The global energy market has been reshaped in ways that are deeply affecting our economy, and those effects are intensifying. This renewed public concern presents an opportunity," O'Reilly told a Washington audience on Sept. 17.

Convincing lawmakers

The critical question, however, is whether industry leaders can persuade federal lawmakers in the next few weeks to consider the US oil and gas business more a source of new economic growth than a convenient sector to tax. American Petroleum Institute Pres. Red Cavaney thinks the oil and gas business could help the general economy recover. "It provides well-paying jobs. We could be seen as a growth industry again," he told me recently.

Discussions of how to make such a case will be on the minds of many people attending API's annual meeting Oct. 19-20 in Scottsdale, Ariz. Cavaney will remain part of the effort even though he is retiring from API Oct. 31. He will then join ConocoPhillips as senior vice-president of government affairs (p. 36). ✦

where permits are acquired, financing is obtained, and geophysical and exploratory tests are conducted. "Any one stage can take 6 months to 3-4 years to complete," it indicated. Only 1 well in 10 is successful in new onshore fields (compared with 9.5 wells in 10 in developed onshore fields), while the success rate is 1 in 3 in offshore shallow leases and 1 in 5 in deepwater tracts, the report said.

"Once a field is discovered and is determined to be economic to develop, it has to be put in production by drilling additional wells, completing the wells so they produce oil and/or gas, installing collection facilities, laying pipelines, etc. It may take several years to bring a new field into production," it added.

Sound bites, talking points

Young said that since the majority staff's report was released, no hearings were held to examine legislation which resulted from it. Democrats "appear unwilling to allow their report to be examined and questioned in open hearings by federal agencies and members of Congress," he said, adding, "Instead, the majority has relied on using it only for sound bites and talking points to defend their lack of action on our nation's energy crisis."

Young continued, "The majority's document misleads members of Congress and the American public. Our report and the federal studies provide context for questions and answers raised in the majority's report regarding the federal onshore and offshore oil and gas leasing program, outlines the complexity of the issue and, most importantly, explains why the United States is now dependent on foreign nations for more than 60% of its oil."

Rahall, the committee's chairman, did not respond to the report but issued a separate release noting that the committee has conducted more aggressive oversight of federally controlled natural resources and the agencies that manage them since he became chairman in early 2007. ✦

Egyptian court to rule in November on gas to Israel

Eric Watkins
Oil Diplomacy Editor

Egypt's State Council Administrative Court said it will issue a ruling Nov. 18 regarding a case lodged by a former ambassador and several lawyers against the export of Egyptian natural gas to Israel.

According to former Ambassador Ibrahim Yussri, the decision to export Egyptian natural gas to Israel detracts from Egypt's sovereignty and harms national interests as it set a fixed price and quantity for the exports without any changes in price or quantities supplied for 15 years.

Yussri said the matter should have been referred to the Egyptian People's Assembly and that the agreement hampers Egypt's economic development because it prevents capitalizing on international price differences. As a result, he said, Egypt loses $9 million/day.

The agreement to supply Egyptian gas to Israel was signed in June 2005 by Egyptian oil minister Sameh Fahmi and Israeli infrastructure minister Binyamin Ben Eliezer.

Under the agreement, Egypt is committed to supplying Israel as much as 7 billion cu m/year of gas. Egyptian opposition to the agreement is centered on the fact that Israel is paying less than $3/MMbtu—well below current market rates.

Although there have long been expressions of discontent over various gas export terms secured by the Egyptian government, controversy flared with the start of pipeline gas sales to Israel in May.

In June, barely a month after the start of exports, Fahmy—bowing to political pressure—said the government would review the price of its gas exports to Israel.

"We will review prices of natural gas in all agreements without any exception," Fahmy told parliament in a session specifically devoted to debate the agreement with Israel.

Fahmy's announcement met with satisfaction from the government's opponents, including Mohammed Anwar al Sadat, former MP and spokesman for the recently founded Popular Campaign against Gas Exports. "The government was finally embarrassed into partially addressing our concerns," Al Sadat said.

Since then, Israel has complained of various problems with gas from Egypt as in June when the state-owned Israel Electric Corp. (IEC) said the quality was substandard because the dew point deviated from agreed levels.

In late August gas supplies from Egypt to Israel were interrupted for technical reasons, according to the IEC. It marked the fourth time supplies had been interrupted since their start in May.

A certain level of animosity over the agreement comes from political concerns among Egyptians.

"Exporting this energy only strengthens their [Israel's] military machine," said Yehya Al Gamal, a campaigner against the agreement, saying that it "participates in suppressing the Palestinian people."

"It's not about the price of gas," said Al Gamal, "it's whether we should export it to them in the first place."

However, other Egyptians are more concerned about the need to preserve the nation's natural resources for domestic uses or to obtain market rates for it.

"Egyptian natural gas belongs to the Egyptian people, not the government," said Al Sadat. "If they're going to sell it, they should at least sell it at international prices."

Underlining that point, neighboring Lebanon—a fellow Arab nation—has also experienced delays and shortages in its Egyptian gas supplies.

In September, Egypt announced a delay in gas exports to Lebanon through the Arab Gas Pipeline until at least January 2009, after initially scheduling them to come on stream in July or August (OGJ Online, Oct. 4, 2008). ✦

Modec FSO hits 1 billion bbl offloading mark

Modec Inc.'s floating storage and offloading unit Ta'Kuntah has reached a milestone in the industry—offloading a total of 1 billion bbl of oil to 1,745 export tankers.

The FSO, owned and operated by Modec and leased to Petroleos Mexicanos Exploration & Production, celebrated 10 years of continuous operation on Sept. 14. Other achievements include its being the first FSO in the Gulf of Mexico, having 100% uptime throughout its operation, and operating with no incidents of oil pollution.

Ta'Kuntah FSO is a converted ultralarge crude carrier capable of storing more than 2 million bbl of oil. It is permanently moored in 80 m of water in Cantarell field in the Bay of Campeche off Mexico.

Sofec designed, engineered, and manufactured the mooring system, which consists of an external bow-mounted turret capable of withstanding 100-year hurricane conditions. The offloading system, designed to handle 800,000 b/d of oil, allows export tankers to moor either in tandem or side-by-side.

COMPANY NEWS

E.On secures stake in Yuzhno Russkoye gas project

Russia's state-owned OAO Gazprom has signed an asset swap agreement granting German utility E.On AG a stake in the Yuzhno-Russkoye natural gas project.

In other recent company news:

• Total SA agreed to buy Talisman Energy Inc. subsidiary Goal Petroleum (Netherlands) BV for $480 million.

• Santos Ltd., Adelaide, has purchased a 100% interest in the offshore Western Australian Carnarvon basin retention licence WA-4-R, which contains most of the undeveloped Spar gas field.

• Harding Energy Partners LLC (HEP), Dallas, reported that it acquired all core Barnett shale assets held by DDJET Ltd. LLP and subsequently sold the holdings to Chesapeake Energy Corp.

• EnCana Corp. has selected Cenovus Energy Inc. as the name for a new, integrated oil company it is creating as part of its split into two independent energy companies—an integrated oil company and a pure-play natural gas company. The companies will focus on unconventional resources.

E.On-Gazprom swap

Under the agreement, E.On will receive 25% minus one ordinary registered share in the charter capital of OAO Severneftegazprom (SNGP), owner and operator of the Yuzhno-Russkoye project in southern Russia and will participate in development of the field.

In return, Gazprom will receive 2.93% of its own shares, which were held by E.On subsidiary E.On Ruhrgas through the company ZAO Gerosgaz. E.On Ruhrgas will retain a 3.5% stake in Gazprom.

As a result of the agreement, Gazprom will hold a stake of just over 50% in SNGP, while E.On Ruhrgas and BASF SA's subsidiary Wintershall AG will each have a stake of 25% minus one share.

With this agreement, E.On aims to obtain about 6 billion cu m/year from the Russian field or some 60% of its gas-production target of 10 billion cu m/year. Yuzhno Russkoye field is considered one of the world's largest and has gas reserves of more than 600 bcm, according to E.On.

In September, Rainer Steele, a member of the Wintershall board, said gas production from Yuzhno-Russkoye field is expected to reach 25 bcm next year.

Steele said production at the field is being expanded "more quickly than initially planned" and that output from the field will reach the maximum 25 bcm/year in 2009, 2 years ahead of the original targeted 2011 timetable.

In June, Gazprom Chief Executive Alexei Miller said the firm increased its natural gas production forecast for 2008 by 2 bcm of gas to 563 bcm, or 2.6% more than last year.

"In 2007, Gazprom commissioned several large fields, which allows us to secure the necessary level of production a decade ahead," said Miller, referring to development of large new deposits at Kharvutinskoye and Yuzhno-Russkoye fields.

Total acquires Goal

Total's acquisition of Goal Petroleum remains subject to necessary government approvals. Goal's assets predominantly are in permits that Total operates.

Total E&P Nederland expects the acquisition will increase its production by 8,000 boe/d by 2011.

Santos offshore

Santos has purchased retention licence WA-4-R from the Chevron Australia-led Gorgon project joint venture, which had decided that Spar was unlikely to contribute to the proposed Greater Gorgon LNG development.

The terms and conditions of the sale are confidential, and the transaction is subject to the usual approvals.

Spar field, originally found in 1976 by West Australian Petroleum, has an estimated gas resource of up to 600 petajoules along with some 8 million bbl of condensate. It extends into production licence WA-13-L in which Santos also has a 45% interest.

Santos will now evaluate various development options for the short to medium-term production.

In related news, Santos as a participant in the Barrow Island oil field joint venture, has agreed to an access regime to facilitate the Gorgon JV plans for LNG processing and export from Barrow including a geosequestration of reservoir carbon dioxide into the Dupuy Formation under the island.

HEP-Chesapeake deal

DDJET is a partnership established in late 2006 to develop natural gas production in Tarrant, Johnson, Ellis, Dallas, Denton, Navarro, Collin, and Hill counties in Texas. ExxonMobil Corp. subsidiary Metroplex Barnett Shale LLC was the operator for DDJET.

The HEP-Metroplex partnership came about after Harding Co. identified an underutilized pipeline owned by Metroplex parent ExxonMobil. The pipeline extends from Keller through North Richland Hills, Arlington, Grand Prairie, and Midlothian to Corsicana.

HEP made the decision to sell the assets in order to more fully develop its 146,000 net acres in the James-Limestone and 65,000 net acres in the Haynesville shale, both in East Texas. The team also is exploring 50,000

acres it controls in southeastern Mississippi and its large lease position in West Texas.

Operations have been transferred to Chesapeake at the Railroad Commission of Texas. Chesapeake has contracted with HEP for a transition agreement to assure the orderly handover of operations and a land services agreement for leasing and other services in the area. Petrocasa Energy Inc. continues to lead leasing activity.

HEP did not disclose either the assets acquired by Chesapeake or the purchase price.

EnCana spinoffs

Under the proposed split, announced last May, the newly named Cenovus will be a fully integrated North American oil company with in situ oil sands properties, refineries, and an underlying foundation of oil and gas resource plays (OGJ, May 19, 2008, p. 33). The natural gas company will continue as EnCana Corp., the company said.

"Cenovus is the newest name in the North American energy business. The name Cenovus successfully captures the essence of what we want our North American integrated oil company to be—a strong enterprise with a sustainable, innovative, and bright future," said Brian Ferguson, EnCana's chief financial officer, who is the designated president and chief executive of Cenovus. Other officers were announced this summer (OGJ, July 14, 2008, p. 44).

The proposed corporate reorganization, expected to close in early 2009, will be implemented through a "plan of arrangement" and is subject to shareholder and court approval.

An information circular setting out details of the plan of arrangement will be mailed to EnCana shareholders in mid-November, followed by a shareholders' meeting planned for mid-December. ✦

PERSONNEL MOVES AND PROMOTIONS

ConocoPhillips makes management changes

ConocoPhillips made several senior management changes.

John Carrig, executive vice-president, finance, and chief financial officer, will become president and chief operating officer.

Jim Gallogly, executive vice-president, refining, marketing ,and transportation (RMT), will become executive vice-president, exploration and production.

Willie Chiang, senior vice-president, commercial, will become senior vice-president, RMT.

Greg Goff, president, strategy, integration, and specialty businesses for RMT, will become senior vice-president, commercial.

Sig Cornelius, senior vice-president, planning, strategy, and corporate affairs, will become senior vice-president, finance, and chief financial officer.

Jeff Sheets, currently vice-president and treasurer, will become senior vice-president, planning and strategy.

Red Cavaney, who will retire from his position as president and chief executive officer of the American Petroleum Institute on Oct. 31, will become senior vice-president, government and public affairs, in November.

Fran Vallejo, general manager, corporate planning and budgets, PS&CA, will become vice-president and treasurer, finance.

John Lowe, executive vice-president, E&P, will serve as assistant to the chief executive officer. He will continue to work full time until Jan. 31, 2009, then will be employed part-time.

Upstream moves

Saudi Aramco has made three new appointments.

Dawood M. Al-Dawood was named executive director of marketing supply and joint venture coordination, **Mohammed Y. Al-Qahtani** was appointed chief petroleum engineer, and **Mohammad G. Al-Zahrani** was designated general manager of drilling.

Al-Dawood joined the company in August 1982 as an engineering aide in the petroleum engineering administrative and planning services division on the company's "Fast-track" program. He most recently served as acting president and chief executive officer of Vela International Marine Ltd.

Al-Qahtani started his career in 1983 as an engineering aide in the the company's planning and administrative services division. He then began work as a petroleum engineer in reservoir engineering. He served as acting chief petroleum engineer in 2007 and became president and chief executive officer of Aramco Services Co. in Houston before returning to petroleum engineering to become chief petroleum engineer.

Al-Zahrani is a 34-year veteran of the company. He began his career with Saudi Aramco as an operator and later a supervising operator in the Abqaiq producing division, Shedgum producing division, and Ain Dar GOSP No. 1 and pump station. He most recently served as president and chief executive officer of Aramco subsidiary Aramco Gulf Operations Co. in Khafji.

Total SA has appointed **Jacques Marraud des Grottes** senior vice-president, E&P, in Africa and has named him to the management committee.

Des Grottes headed Elf Gabon during 2001-04 and most recently served as managing director in Nigeria.

Talisman Energy Inc. has appointed **James Fraser** senior vice-president,

eastern division, North American operations.

Fraser brings more than 30 years of exploration and production industry experience and has held roles in production, reservoir engineering, business development, and new venture areas. He previously was vice-president of operations, southern division, at Chesapeake Energy Corp.

BG Group PLC has appointed **Scott Reeves** as global head of its coalbed methane division.

Reeves has 25 years' experience in unconventional resources and is a recognized international expert in the field. He will use his experience and deep knowledge to help BG build a material and sustainable CBM business.

Reeves was executive vice-president in Houston for Advanced Resources International Inc., Arlington, Va.

Lundin Petroleum AB announced management changes as a result of the increasing scope of its operations in Southeast Asia.

Jeff Lobao has assumed the position of manager director, Southeast Asia, based in Singapore with responsibility for the activities in the region.

Mike Nicholson has relocated from the corporate office in Geneva as general manager for Malaysia based in Kuala Lumpur.

Benny Kwa, currently acting general manager for Malaysia, will become deputy general manager and assume responsibility for commercial and legal activities in the Southeast Asian region.

Rosetta Resources Inc. has named **Ellen R. DeSanctis** executive vice-president of strategy and development. DeSanctis's responsibilities will include strategic planning, business development, and Rosetta's corporate giving programs.

DeSanctis has been an independent consultant advising companies in the areas of strategic planning, investor relations, and leadership development since 2006. Prior to that, she served as vice-president, corporate communications and strategic planning, for Burlington Resources Inc.

Black Elk Energy LLC, Houston, has appointed **Terrell Clark** executive vice-president and chief technology officer and **Joe Matthews** vice-president, land.

Clark has 28 years of experience in reservoir engineering and field exploitation. He joins Black Elk following the sale of his privately held, Houston-based petroleum consulting company Atlantis E&P Services Inc. to Hamilton Engineering in 2007.

Prior to joining Black Elk, Matthews was manager of business development for Callon Petroleum Operating Co. in Houston where he was responsible for identifying, evaluating, and executing joint venture and partnering opportunities. In his new position, Matthews will focus primarily on opportunities in the Gulf of Mexico and onshore South Louisiana.

Separately, Black Elk has named **Douglas W. Fehr** as chief operating officer.

Fehr recently retired from BP Americas as technical director for a major pipeline system and marine terminal in Turkey. He has 29 years of experience in the oil and gas industry.

Lucas Energy Inc. appointed **W.A. (Bill) Sikora** president, chief executive officer, and a member of the board.

Prior to this position, Sikora provided financial and business advisory services to Lucas on matters ranging from acquisitions, financial reporting, and overall business strategy. He has also provided these services to executive management teams of publicly owned and privately held companies with an emphasis on the energy industry since 1982.

Sikora was executive vice-president of TransMontaigne Inc. during 1996-99 and in recent years served as a board member for several independent E&P companies.

Endeavour International Corp. has named **Carl D. Grenz** as executive vice-president of operations.

Grenz has 33 years of experience in the oil and gas industry. He previously served as chief of global production for BHP Billiton.

Downstream moves

Saudi Aramco Total Refining & Petrochemical Co. has appointed **Salem H. Shaheen** as president and chief executive officer.

The company also previously announced that it is planning to offer Saudi nationals 25% of the company shares in an initial public offering on the premise that the two founding partners will each retain 37.5% of the equity.

Aramco and Total signed the JV partnership agreement June 22.

These agreements were regarded as a significant step for initiating the construction works of a 400,000 b/d world-class refinery, based in Madinat al-Jubail al-Sina'iyah (Jubail Industrial City) in the Eastern Province of Saudi Arabia.

The refinery, slated to come on stream by yearend 2012, will process heavy oil. Aramco and Total will share the marketing of the refinery products.

Motiva Enterprises LLC, a refining and marketing joint venture owned by affiliates of Royal Dutch Shell PLC and Saudi Aramco, has named **Bob Pease** as president and chief executive officer.

Pease has 30 years of experience in the oil and gas industry. He served as president of Shell Trading Co. since 2004 and was responsible for Shell's oil trading business in the US as well as a majority of Shell's worldwide trading operations in both oil and gas.

Atlas Energy's Marcellus program delivers 60 MMcfd in Pennsylvania

Atlas Energy Resources LLC, Philadelphia, is the largest producer of gas from Devonian Marcellus shale in the Appalachian basin and has drilled more than 80 wells, almost all of them vertical, the company said in a webcast Oct. 8.

A sweet spot in the emerging play occurs in the same area as the company's gas gathering system, and Atlas Energy is moving 60 MMcfd, said Richard D. Weber, president and chief operating officer. The company is expanding the system's capacity to 150 MMcfd by the end of 2008 and 250 MMcfd by the end of 2009 from the present 120 MMcfd.

Atlas Energy previously said it could ultimately recover 4 to 6 tcf of gas from the Marcellus on its properties mostly in southwestern Pennsylvania (OGJ, Mar. 3, 2008, p. 40).

The play falls in the midst of Atlas Energy's historic acreage position. It controls 580,000 acres, including 280,000 acres in a sweet spot in the play in southwestern Pennsylvania.

The initial 24-hr flow rate has averaged 1 MMcfd, and the company assigned average reserves of 1 bcf/well. Initial flows have ranged from 300 Mcfd to 3.6 MMcfd.

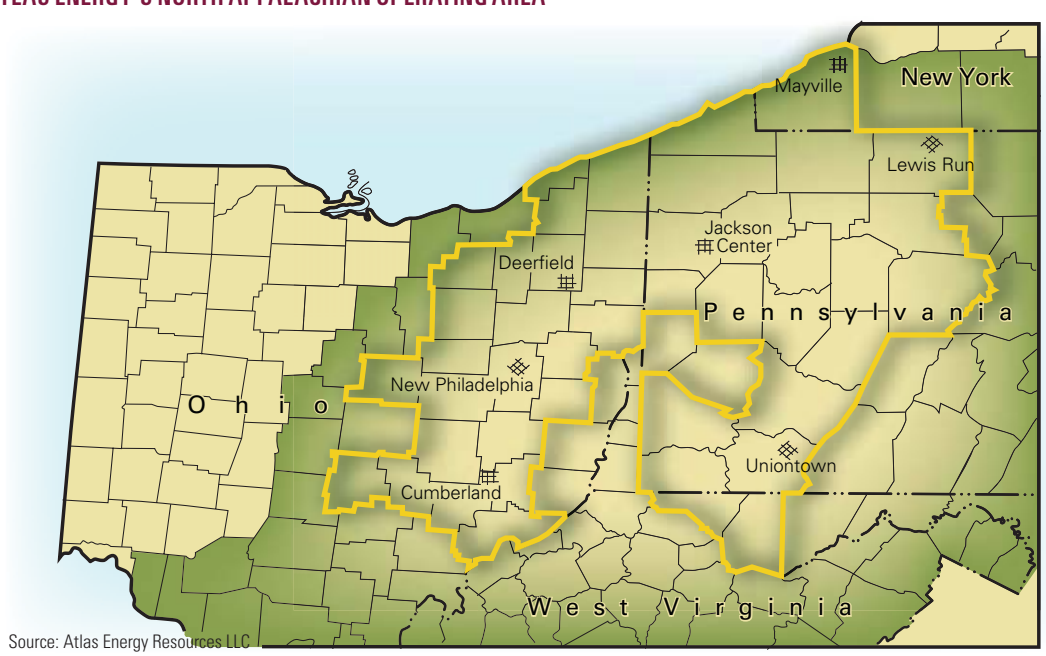
Atlas Energy, which claims to be advanced in its understanding of the Marcellus reservoir, said it has lately eliminated many of the low-end wells. It expects the play to be developed with horizontal wells and has drilled one horizontal penetration which was a success although costs were unacceptably high.

The company plans to drill four horizontal wells this fall in a 50-50 joint venture in Washington County, Pa., offsetting acreage held by Range Resources Corp., Fort Worth. The Marcellus in this area is lower pressured and less geologically complex than in the areas Atlas Energy has drilled thus far.

The company plans to have 150 vertical wells on production by mid-2009 and by then expects to be able to assess whether to begin a bias toward horizontal wells, Weber said.

It does not believe the Marcellus play will be productive continuously across its entire extent (see map, OGJ, Oct. 6, 2008, p. 50). It sees another sweet spot in northeastern Pennsylvania in Sullivan and Lycoming counties, where little infrastructure exists. ✦

ATLAS ENERGY'S NORTH APPALACHIAN OPERATING AREA



Source: Atlas Energy Resources LLC

MMS plans central gulf sale for March 2009

The US Minerals Management Service has scheduled Lease Sale 208 for the Central Planning Area (CPA) in the Gulf of Mexico for Mar. 18, 2009.

MMS estimates the proposed sale could result in production of 0.807-1.336 billion bbl of oil and 3.365-5.405 tcf of natural gas. The acreage lies 3-230 miles offshore in 3-3,400 m of water.

The sale encompasses 6,200 unleased blocks covering more than 33.5 million acres off Louisiana, Mississippi, and Alabama. This area includes 5.8 million acres in the southeastern part of the CPA known as the 181 South Area, which will be offered for lease for the first time since 1988.

"What makes Sale 208 noteworthy is the addition of the 181 South Area," said MMS director Randall Luthi. "The states of Alabama, Mississippi, Louisiana, and Texas will share in all revenue from leases in this new area."

The Gulf of Mexico Energy Security Act of 2006 mandates that the 181 South Area be offered for lease and that the four gulf producing states share in the revenues. ✦

Eni signs exploration deal with Papua New Guinea

Italy's Eni SPA has signed an agreement with Papua New Guinea for a long-term partnership to pursue sustainable development of the country's untouched hydrocarbon resources.

Eni will establish an office in that country to run a detailed exploration study and outline a data acquisition program across all regions in the country that are either not currently under permit or are completely unexplored wildcat areas.

The aim of the program is to better determine the country's remaining hydrocarbon potential. The data and any subsequent outcome will be the property of Papua New Guinea, while Eni will have first option to identify the areas of interest.

Eni also wants to engage with local communities to look at joint development of oil and gas projects that can be brought on stream in the near term.

Eni says many promising areas remain unexplored, and the potential for huge gas finds means there could be four LNG trains operating in the country under this project.

The company intends to support the creation of a trust fund for future generations and will provide training initiatives to bolster local technical and managerial skills in oil and gas. ✦

Oil service executive sees fast exploration growth

Exploration services are likely to grow much faster than the overall oil field services market worldwide for years, Schlumberger Ltd. Chairman and Chief Executive Officer Andrew Gould said.

Absent a global recession, he is optimistic about the long-term outlook for oil and gas.

"We are now in the fifth year of an up cycle in E&P investment," Gould said in a recent speech, noting that supply remains flat because of a declining mature production base, cost inflation, the time for exploration to translate to production, and increasing numbers of complex, capital-intensive projects in deep water or targeting unconventional resources.

"It is unrealistic to think that 5 years of increased spending in an inflationary environment can compensate for 20 years of underinvestment," he said. He foresees continuing increased spending on exploration worldwide.

"The number of exploration blocks awarded has also been increasing substantially. This part of the business is most influenced by geopolitics and access to reserves," he said. More than 12,000 exploration licenses were awarded during 2003-07 worldwide.

Meanwhile, the offshore drilling fleet is growing. Current construction plans will increase the existing fleet by 29% by 2012, he said, noting that a significant share of the newbuilds are designed for high-specification deepwater operations.

"Among these newbuild rigs are 44 new drillships, which will almost exclusively be involved in exploration and delineation work," Gould said. "In addition, there are 81 new semisubmersibles capable of drilling in ultradeep water—defined as being deeper than 5,000 ft. These will probably double the number of deepwater rigs involved in exploration activity." ✦

Argentina

The Roch SA-operated LF-1010 well in Los Flamencos field in Tierra del Fuego, Argentina, stabilized at more than 10 MMcfd of gas from Cretaceous Springhill at pressures consistent with original reservoir pressure.

LF-1010, which cut 16 m of gas pay with no oil or water leg, extended Los Flamencos west of the LF-1005 well that tested at 8 MMcfd. Tests are pending at the LF-1011 and LF-1012 wells, which further extended the field westward, said 25.78% working interest owner Antrim Energy Inc., Calgary.

Gas deliveries from eastern Los Flamencos field to the mainland via the San Martin pipeline started in September, and gathering lines are being laid to the four wells in the western part of

the field. Deliveries from the concession are to rise to 40 MMcfd in mid-2009 from 20 MMcfd in mid-2008.

Georgia

Frontera Resources Corp., Houston, hopes to establish production of 250 b/d of oil from Mtsare Khevi field in western Block 12 in former Soviet Georgia.

At least 40 more wells are to be drilled in 2009. The first six wells have revealed a structure larger in area than previously thought and confirmed the presence of a substantial gas cap, the company said.

The first two wells are producing a combined 31 b/d of 21° gravity oil from Horizon I of the Upper Pliocene Akchagil formation. Horizons II and III will shortly be added to production. The three horizons total 20-30 m of gross pay 200-315 m deep.

A 2007 field study indicated as much as 5 million bbl recoverable. Further potential exists in Miocene sandstones as deep as 1,100 m.

Iraq

Addax Petroleum Corp., Calgary, acquired a 33.33% interest in the Sangaw North Production Sharing Contract in Iraq's Kurdistan region 80 km southeast of Addax's Taq Taq oil field.

Sterling Energy PLC operates Sangaw North, which covers 121,600 acres. A 310 line-km 2D seismic survey is planned in November 2008, and the first exploration well is to spud in mid-2009.

Addax said an assignment to Korean National Oil Corp. will reduce its interest to 26.67%, and the later assignment by the Kurdistan Regional Government of an interest to a government nominated entity will reduce Addax's interest to 20%.

Kenya

East African Exploration & Upstream Petroleum Services Ltd. took a farmout from Lion Petroleum Inc. of Canada on 33,000-acre Block 1 in northeasternmost Kenya.

Subject to government approval, EAX will operate the block on behalf of the EAX-Lion joint venture and will have the right to earn up to 80% equity in some circumstances.

The work program will include extensive gravity and magnetic surveying and as much as 1,200 line-km of 2D seismic in two phases, said EAX, affiliated with Black Marlin Energy Group of Dubai.

The block covers the western Mesozoic Madera-Lugh basin, representing the western Ogaden basin of Ethiopia and Somalia.

EAX also holds 40% equity in Block L17/L18 in the Lamu basin off Mombasa.

Newfoundland

NWest Energy Inc., St. John's, expanded to 1,459 sq km from 900 sq km its imminent 3D seismic survey in the Gulf of St. Lawrence off west-central Newfoundland.

The expanded program will hike the number of prospects surveyed from four to six of the property's top 11 prospects. The Geophysical Service Inc. GSI Pacific seismic vessel will conduct the survey starting in mid-October.

NWest holds licenses 1097, 1098, 1103, and 1104 along the coast northeast of the Port au Port peninsula that extend 20-50 km from shore in 80-200 m of water. The four licenses total 6,599 sq km.

Quebec

Quebec independents Petrolia, Junex, and Gastem completed 3D seismic and soil geochemistry surveys on 13 sq km around the Petrolia Haldimand-1 oil and gas discovery well near the tip of Quebec's Gaspe Peninsula.

The surveys are part of a $5 million exploration effort to better understand the area's geology before drilling more wells, possibly late this year.

Haldimand-1, 2 km west of Gaspe harbor, recovered 491 bbl of 47° gravity oil in 15 days with small amounts of gas from a Devonian sandstone perforated at 950-1,090 m in mid-2006.

Interests in the acreage are Petrolia and Junex each 45% and Gastem 10%.

Oregon

Torrent Energy Corp., Portland, which filed bankruptcy June 2, 2008, is seeking a buyer or joint venture partner and will be sold to YA Global Investments LP unless it receives a better offer by Oct. 31.

The company holds 107,000 acres in Oregon and 76,000 acres in Washington. It has drilled 12 wells in three pilot projects in Oregon and one in Washington.

Torrent Energy ran apparently successful fracs on five coalbed methane wells at Coos Bay, Ore., that have begun dewatering and were totaling 356 b/d of water and 48 Mcfd of gas during September.

Texas

Panhandle

Palo Duro Energy Inc., Vancouver, BC, took a further impairment on its Palo Duro basin acreage in the Texas Panhandle, where it had been pursuing gas in the Pennsylvanian Bend and Permian Wolfcamp shales.

The company originally held 130,912 net acres in the basin and to Sept. 30, 2008, had reduced that to 89,903 net acres.

Following a $4.4 million impairment for lost acreage and development costs through June 30, the latest loss of further acreage will result in $5.6 million of impairment, the company said.

The company is discussing with its partner the best course of action for its remaining land position in the basin.

Palo Duro Energy said it is working on a project in the Barnett shale in McLennan County, Tex., with Aspect/Abundant Shale LP, which has a 400,000-acre position.

Successful fast-track project brought Su Tu Den field on stream

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Following the Su Tu Den discovery in Block 15-1 off Vietnam, a fast-track field development program culminated in first oil production only 2 years and 82 days after declaration of the field's commerciality.

This goal was achieved with an excellent safety record of no lost time accidents in more than 3.6 million man-hr of exposure.

The Cuu Long Joint Operating Co, (CLJOC) was awarded Block 15-1 in late 1998. CLJOC began aggressive exploration that resulted in the first exploration well discovering Su Tu Den (Black Lion) field in October 2000.

Block 15-1

The Cuu Long Joint Operating Co. was established on Oct. 28, 1998, for the purpose of operating Block 15-1. The coventurers include PetroVietnam Exploration & Production, 50%; ConocoPhillips (UK) Cuu Long Ltd., 23.25%; Korea National Oil Corp., 14.25%; SK Energy, 9%; and Geopetrol SA, 3.5%.

Block 15-1 is at the north end of the Cuu Long basin, about 180 km east-southeast of Ho Chi Minh City (Fig. 1). Water depth ranges from 35 to 60 m.

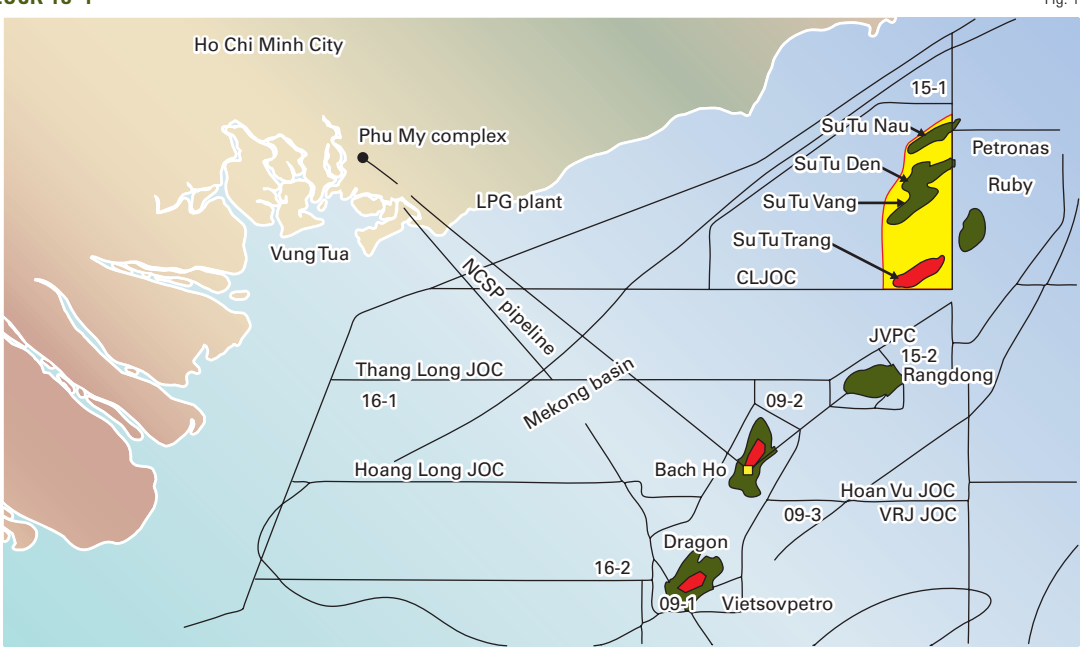
The initial exploration area encompassed about 4,600 sq km. Three relinquishments during the exploration program reduced the area to the 807 sq km held as production acreage.

Producible hydrocarbons in Block 15-1 are in the fractured granite basement, B-10 Miocene and C-30 Oligocene clastic zones. Each horizon contains sweet, medium gravity, high paraffin, low-sulfur crude that commands a premium price to the regional benchmark.

The fractured granite basement contains the majority of the recoverable reserves and is the primary productive horizon. The basement reservoir complexity and the wide range of uncertainty about reserves were key elements in the risk-based development planning process.

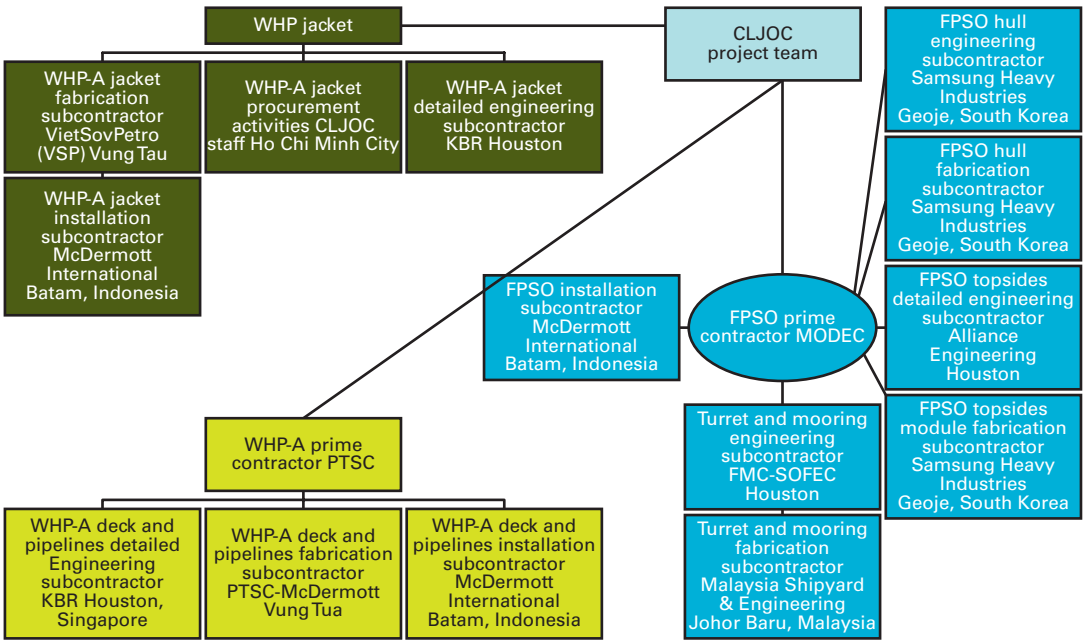
Block 15-1

Fig. 1



SU TU DEN PROJECT CONTRACT STRUCTURE

Fig. 2



CLJOC spudded the first well, 15-1-SD-1X, on the Su Tu Den (Black Lion) prospect on Aug. 6, 2000, and completed it as a discovery on Oct. 6, 2000. Well 15-1-SD-2X/ST established minimum economic reserves, allowing the Su Tu Den Southwest field area to be declared commercial on Aug. 8, 2001.

Development concept

A brief conceptual engineering study from July through October 2001 defined the project's design basis and scope. The optimum field development plan used a risk-based approach. The complexity of the basement reservoir, reserves uncertainty in Su Tu Den Southwest field, and the overall potential of Block 15-1 led to a development plan consisting of a floating production, storage, and offtake (FPSO) vessel and a wellhead platform.

In addition to reservoir complexity, reserves uncertainty, and block potential, the following points figured prominently in development configuration decision:

- Perception that an FPSO project could be brought on stream faster than a conventional field development.
- The belief that an FPSO could be configured with flexibility for future expansion more readily than a jacket-based facility.
- A lease-purchase contract strategy for the FPSO could be structured partially to mitigate downside impact of poor reservoir performance while preserving the upside in the event that additional discoveries were made. If the reservoir failed to perform, the FPSO lease could be terminated. If further exploration was successful, then the FPSO could be used in an expanded development.

Preliminary engineering

CLJOC conducted preliminary engineering in two parts between November 2001 and mid-March 2002. A design competition was held among three qualified FPSO general contractors with the objective of developing a preliminary design while simultaneously preparing a bid for the FPSO scope of supply. The scope of this contract included the FPSO, turret, moorings, and flexible risers.

The FPSO was specified as a permanently moored double-sided SuezMax class tanker equipped with an external turret. The topsides facility design capacity was set at 65,000 bo/d, 75,000 b/d of injection water, 130,000 b/d of produced water, and 30 MMscfd of lift gas compression. Useful vessel storage capacity was 980,000 bbl of oil.

Parallel to the FPSO design competition, CLJOC performed preliminary engineering to define further the wellhead platform, with focus on jacket design. The objective was to define the deck configuration and weight and complete a detailed jacket design in time to fabricate and install the jacket before the weather window closed in late 2002.

While CLJOC recognized that this approach could result in a suboptimum jacket design due to poor definition of the deck, the benefits of early jacket installation far outweighed any savings from design optimization. Early jacket installation allowed predrilling six wells in a dry-tree configuration prior to deck installation. However, tree guards were required, and extra caution was needed during deck installation to prevent damaging the wellheads.

The wellhead platform, WHP-A, is a 24 slot-28 well, four-pile, 890-tonne jacket with a 2,000-tonne deck equipped with production, test, lift gas, and injection water manifolds, two-phase production and test separators, and a flare system. Power is supplied by an umbilical from the FPSO.

Four pipelines link WHP-A to the FPSO. These are a 14-in. produced liquid, a 14-in. low-pressure gas, an 8-in. lift gas, and a 12-in. water injection line.

Contracting strategy

The CLJOC management committee and coventurer companies sanctioned Su Tu Den field development in early March 2002. The CLJOC project team was tasked with the following goals:

- Executing and delivering the project safely with no company and contractor lost-workday cases.
- Achieving a first-oil target date of Apr. 15, 2004, with a stretch goal of Nov. 6, 2003.
- Designing the facility to ramp-up to full capacity within 90 days of first oil.
- Adhering to the project budget, ±10%.
- Achieving long-term average direct operating efficiency of at least 92%.

CLJOC developed a fit-for-purpose contracting strategy designed to achieve the project goals in the most efficient way possible. This strategy utilized multiple contracts with several contractors across the globe. Fig. 2 shows the relationship among CLJOC, the prime contractors, and each subcontractor.

WHP-A jacket

As stated, CLJOC performed preliminary engineering with the objective of designing, fabricating, and installing the WHP-A jacket before the 2002 weather window closed. CLJOC used KBR in Houston for the initial design work, along with internal CLJOC staff to procure and free-issue materials to the jacket's fabrication contractor.

CLJOC selected VietSovPetro (VSP) of Vung Tau, Vietnam, as that fabrication contractor, based on its expertise in fabricating small jackets and its ability to bring local content to the project.

VSP subcontracted jacket installation to McDermott International. The fabricator cut first steel on May 2, 2002, and McDermott completed installation of the jacket on Sept. 8, well before the 2002 weather window closed.

A crane barge lifted the 2,000-tonne deck on to the 24 slot-28 well, four-pile, 890-tonne jacket (Fig. 3).

WHP-A deck, pipelines

CLJOC awarded the WHP-A deck and pipelines engineering, procurement, construction, and installation (EPCI) contract to Petroleum Technical Services Corp. (PTSC). PTSC in-turn nominated KBR to perform detailed engineering. KBR began work in Houston and moved the job to Singapore in August 2002.

CLJOC discipline engineers split their time between the FPSO topsides and WHP-A deck detailed engineering offices before the move to Singapore.

The PTSC-McDermott alliance based at Vung Tau performed procurement and fabrication, and McDermott served as installation contractor for the deck and pipelines.

Deck fabrication began at the PTSC Vung Tau yard in October 2002. The deck sailed in late September 2003 with installation completed a few weeks later on Oct. 2.

The deck was mechanically complete at sail-away, and most precommissioning activities were closed out.

Fig. 3 shows the WHP-A Deck installation lift in progress.

FPSO topsides

CLJOC selected MODEC Inc. of Tokyo as prime contractor for the FPSO EPCI contract. MODEC selected Alliance Wood Group Engineering (AWGE) of Houston as the FPSO topsides module detailed engineering subcontractor. For fabricator of both the FPSO hull and topsides modules, MODEC nominated Samsung Heavy Industries (SHI) of Geoje, South Korea.

FMC-SOFEC of Houston received the turret EPCI contract and subcontracted the turret fabrication to Malaysia Shipyard and Engineering at Johor Baru, Malaysia. McDermott International acted as FPSO installation contractor.

MODEC mobilized a project team to the AWGE project office in Houston where they resided until January 2003. Work at AWGE began in late March 2002 and continued through April 2003. CLJOC maintained a significant oversight presence in the design office to ensure the FPSO topsides design met specifications. AWGE also provided procurement support to MODEC for major equipment and selected bulk items used in the topsides modules.

The FPSO topsides includes six modules plus the motor control center (MCC)-switchgear building and lease automatic custody transfer (LACT) unit. The topsides module total weight exceeds 4,100 tonnes.

The project procured equipment worldwide. Production separators, scrubbers, and the glycol dehydration system were fabricated in South Korea, and the MCC-switchgear building was sourced from Japan. The balance of the major equipment, including gas compression, power generation, seawater and produced-water treating systems, and the control system were supplied by US manufacturers.

Procurement became a significant problem in Autumn 2002 when a labor dispute on the US West Coast halted

shipments from the Port of Los Angeles. The situation arose just as major equipment deliveries started. Rerouting many of the packages through the Port of Houston and transporting them to South Korea on a dedicated cargo ship resolved this problem.

Consequently, all equipment arrived at the shipyard in time for integration into modules without disrupting the module's fabrication schedule.

Module integration for the FPSO occurred at the SHI yard in Geoje, South Korea (Fig. 4).

FPSO hull, module fabrication

Theh initial FPSO bid was based on using a refurbished tanker hull; however, this approach could not meet the desired project schedule. During the bidding process, Samsung Heavy Industries offered the prime contractor a shipyard slot to fabricate a new-build hull, greatly reducing the schedule risk. Fabricating the hull and topsides modules at the same location eliminated the need for multiple module lifts, seaborne transport, and allowed the project to use the time better than if it had to dedicate time for module transportation.

The decision to pursue a newbuild hull greatly reduced the risk of scope, schedule, and cost growth associated with refurbishing an existing vessel and was a key for ensuring project success.

CLJOC personnel arrived at the SHI Geoje yard in September 2002. SHI held the FPSO hull steel cutting ceremony on Oct. 4, 2002, after which construction began on the major hull sections. The yard laid the keel on Mar. 10, 2003, and the hull left dry-dock on May 3, 2003.

Topsides module steel cutting started on Dec. 20, 2002. Following turret integration, SHI set the process modules and the MCC-switchgear building on the deck in late-April to early-June 2003. Module integration and mechanical completion activities progressed throughout the summer and into September 2003. Fig. 4 shows the module integration activities in summer 2003 as seen from the turret's support structure looking aft.

The greatest challenge associated with the contracting strategy was the number of worksites and the management of communications between them. At peak load in late 2002, the project had six sites operating worldwide. These included FPSO topsides engineering in Houston, turret fabrication in Malaysia, FPSO hull fabrication in South Korea, WHP deck engineering in Singapore, WHP deck fabrication in Vung Tau, and the CLJOC project management office in Ho Chi Minh City.

Finally, the ship was christened as the FPSO Cuu Long MV-9 on Sept. 8, 2003.

Typhoon Maemi

Even after the project team overcame the fast-track schedule, operating multiple sites worldwide, and labor disruptions to equipment procurement, nature dealt the project team one final hurdle.

Typhoon Maemi, one of the largest storms to hit the region in recent history, passed directly over Geoje Island on Sept. 13, 2003. The storm damaged many vessels, but the FPSO Cuu Long MV-9 remained relatively unscathed and sailed away from the shipyard as planned on Sept. 28, 2003.

Project safety

Excellent safety performance was the most important objective achieved by the project.

CLJOC, its contractors, and subcontractors expended more than 3.6 million man-hr between Mar. 20, 2002, and Oct. 29, 2003, on the project. The project did not incur a single lost-time accident and only had six recordable incidents, thus achieving the primary project goal.

This achievement was possible only with the relentless commitment to safety by CLJOC, MODEC, their respective subcontractors, and the individual workers who made the job a success.

Project execution, operations

The FPSO arrived at Su Tu Den field on Oct. 13, 2003. Installation and hookup activities progressed as planned and first oil flowed on Oct. 29, 2003, 6 months ahead of the sanction schedule and 8 days ahead of the stretch goal of Nov. 6, 2003. Fig. 5 shows the Cuu Long MV-9 anchored in Su Tu Den field.

Production reached facility capacity 22 days after first oil and consistently equaled or exceeded facility capacity 42 days after first oil, thus achieving the goal of ramping up production in the first 90 days of operation.

The total final project cost (excluding the FPSO lease cost) exceeded the authorized budget by 4.4%, well within the 10% overrun band. This result was considered a success.

Direct operating efficiency for Su Tu Den field, tracked since April 2004, has consistently exceeded the 92% target.

Lessons learned

Despite their general reputation for providing fast-track developments, FPSOs are notorious for schedule delays and cost overruns. In a study by a prominent benchmarking organization,[1] less than a third of FPSOs were delivered within budget, only about a

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quarter met schedule, fewer than a fifth achieved operability requirements, and none achieved all three objectives. The FPSO Cuu Long MV-9 achieved all three targets.

The project had seven key success factors that may apply to other major projects, particularly FPSOs:

1. *Newbuild hull decision.* The CLJOC project management team clearly understood the benefits and risks associated with the hull decision. On average, there is little schedule and cost benefit for converting an existing tanker hull to FPSO service. A conversion has the potential for significant scope creep, schedule slippage, and cost overruns if the end-user is unfamiliar with the vessel.

In many older vessels, asbestos mitigation can dictate where vessel modification can take place. Fortunately, the newbuild hull option offered during the bid process greatly improved the ability to achieve the project schedule by eliminating uncertainties associated with vessel refurbishment.

2. *Common fabrication site, FPSO topside modules and hull.* The decision to fabricate the hull and topsides modules at a common location further mitigated schedule risk. This eliminated the need to transport the hull or modules to an integration site, removed risks associated with additional lifting and transportation, and effectively increased the productive work time without extending the project's schedule. The time that would have been used for module transportation was used for integration and mechanical completion activities.

3. *Early jacket installation.* Early installation of the WHP-A jacket allowed predrilling six wells in a dry-tree configuration. Consequently, this reduced well costs by eliminating mud-line suspension and tieback costs and risks, and the need for a subsea template. It also eliminated the time, cost, and risk associated with aligning and installing a jacket over a template containing suspended wells. Finally, the dry-tree configuration allowed quick ramp up of production.

FPSO Cuu Long MV-9 is a double-sided SuezMax class tanker equipped with an external turret (Fig. 5).

4. *Common WHP and FPSO design and commissioning resources.* CLJOC used a common set of discipline engineers for the WHP-A and FPSO detailed engineering and commissioning activities. Most of the engineering staff were familiar with details of both systems and therefore were able to interact and stand-in for each other with minimal disruption during start-up. This greatly reduced interface problems between the FPSO and WHP.

5. *Operations staff integration into the project team.* CLJOC operations personnel were seconded into the project team from the start of detailed engineering. They played key roles from design development through commissioning and start-up. The mechanical completion and commissioning process served as a hands-on familiarization and training period for many of the operations personnel.

6. *Cross-functional resource assignment.* The general contractor based key members of the SHI topsides division in the AWGE design office during topsides module detailed engineering. This allowed SHI to understand better the design and procurement issues and become familiar with AWGE's design practices and facilitated SHI's participation in constructability reviews. This also allowed SHI to gain an understanding of procurement-related issues that might affect the schedule.

Similarly, key AWGE personnel were based at the shipyard during module fabrication. This improved communication, eased the transition from detailed engineering to fabrication, and reduced interface problems between the hull and topsides.

7. *Having the right people on the project at the right time.* A properly staffed project management team is critical to the success of any project. The best solution is to have a group of highly experienced professionals who work together as a cohesive team.

Project success lies with the people; the people make the difference.

Despite the project's challenges and the general historical performance of FPSO projects, the team delivered a high quality project on budget and ahead of schedule.

Additional approved Block 15-1 projects

CLJOC has two additional oil developments on Block 15-1. Facilities fabrication nearly is complete and installation is under way for the Su Tu Vang (Golden Lion) field.

Detailed engineering and procurement for a second wellhead platform, WHP-B, is in progress. This platform will be installed in the northeast area of Su Tu Den field. The Su Tu Vang facility will supply injection water and lift gas and process produced fluids from WHP-B.

Future potential developments

CLJOC has made two additional discoveries on Block 15-1: Su Tu Trang (White Lion) gas-condensate field, discovered in November 2003, and Su Tu

Nau (Brown Lion) oil field, discovered in September 2005.

The Su Tu Trang discovery, at the south end of Block 15-1, is a gas-condensate field with significant potential to play an important role in the domestic Vietnamese gas market. The field currently is under appraisal, various development scenarios are under study, but commerciality has yet to be established.

Su Tu Nau field, at the north end of Block 15-1, contains a low GOR medium-gravity oil. The field is currently under appraisal, and commerciality has yet to be established.

Acknowledgments

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C.J. Wall was project manager for Su Tu Den field development. He is seconded as deputy development manager to the Cuu Long joint operating company by ConocoPhillips with project management responsibility for additional developments on Block 15-1. He is also a major project manager with ConocoPhillips. Wall began his career in 1972 with Conoco (U.K.) Ltd.

US may become net gasoline exporter by 2010, study says

Shifts in energy demand and biofuels capacity will disrupt the global refining industry, potentially turning the US into a net exporter of gasoline by 2010.

An analysis by Booz & Co. entitled "Refining Trends: The Golden Age or the Eye of the Storm? Part IV: Tough Choices" examines the effect of rising gasoline and diesel demand in Asia and other countries, biofuel mandates, and alternative fuel vehicles on the global refining industry.

These factors create opposing forces on worldwide refiners. The study says that, in the short term (2008-13), overall margin levels have already topped out and will move lower. In addition, a recession could accelerate the downward trend in margins. Finally, trade flows could shift margins to Asia.

In the long term, through 2025, the study says that global demand for transportation fuels will continue to grow, despite the emergence of alternative-fuel vehicle technologies, due primarily to increasing economic growth in Asia.

Long-term margin levels will depend on economic growth in developing economies. This is a shift from refining margin cycles of the recent past, which were solely a factor of how fast refining capacity was added.

In addition, regulations on dieselization, high-efficiency vehicles, and biofuels will influence refining margins.

Short-term demand

Despite sustained high prices, demand for transportation fuels has continued to grow due to worldwide economic growth, according to the study. Fig. 1 shows that US demand, however, has started to decrease. High gasoline prices and economic fears prompted US consumers to use less gasoline in the first 9 months of 2008.

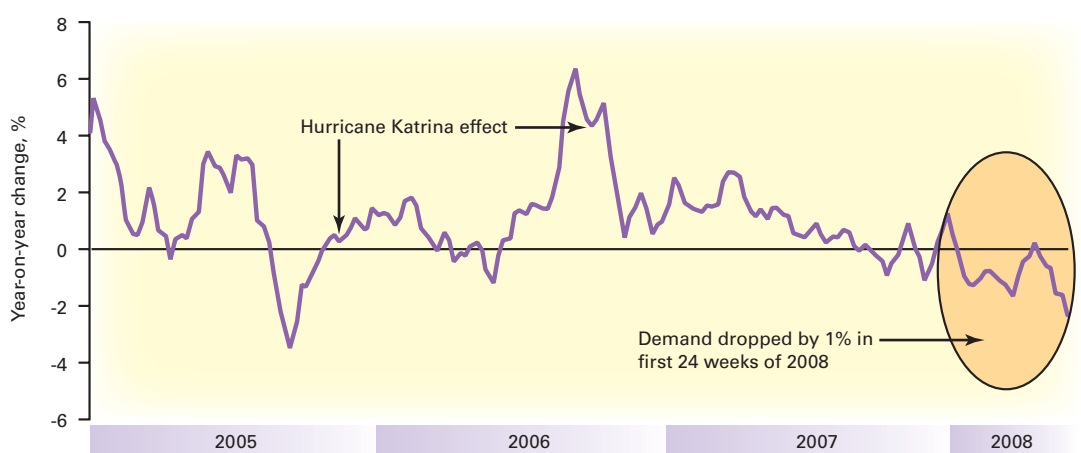
The study's analysis shows that gasoline consumption is correlated highly with consumers' personal disposable income (PDI), which varies due to economic growth and inflation. Increases in PDI raise gasoline consumption overall and reduce individual sensitivity to price changes.

In the last 3 decades, while gasoline spending as a percentage of PDI has dropped, the absolute price elasticity of gasoline in the US has decreased by an order of magnitude. This fact, until recently, dampened the effect on demand of historically high real gasoline prices in the US, according to the study.

In terms of demand, the short-term effect of alternative fuel technologies will be limited because it takes so long to replace the vehicle fleet.

US GASOLINE DEMAND

Fig. 1



Source: Energy Information Administration, Booz & Co.

Short-term supply

Refining capacity 2003-07 increased by about 3-4 million b/d of distillation capacity, and more than 9 million b/d in

capacity via other processes. The pace of construction has accelerated significantly—capacity of crude distillation and other processes under construction more than doubled to 3.0 million b/d in spring 2008 from 1.2 million b/d in spring 2007.

The study says that distillation capacity will increase about 6 million b/d during 2008-12, based on capacity announcements and the likelihood of completion.

New aggressive biofuels mandates enacted in the 2008 US energy bill represent an increase of 600,000-700,000 b/d of biofuels demand by 2012. This is equivalent to as much as 7% of the total US transportation fuel demand in 2012, and more than the total gasoline demand growth during 2007-12, the study says.

The overall percentage of biofuels in the gasoline pool by 2012 will be slightly more than 10%, implying that only a small penetration of E85 vehicles into the vehicle fleet will be required.

The study says that all these recent events have changed an imminent, although modest, global supply crunch into an oversupply. In addition, the US may become a net exporter of gasoline by 2010. This is particularly likely if an economic slowdown or recession further lowers demand (Fig. 2).

Such a shift would change global supply and demand balances, Europe will need to import more diesel, and Asia will continue to demand fuels in general. More gasoline from Europe and possibly from the US will flow to Asia.

Europe, exporting longer distances to Asia, will have lower gasoline netbacks relative to exporting to the US. For the US, this change could mean gasoline would be priced at export parity rather than import parity, reducing gasoline crack spreads by $4-6/bbl, according to the study.

Lower relative gasoline prices would, for the same crude price, reduce the differential between light and heavy products, thereby reducing refining margins. Refiners will have three choices: ship gasoline, shift operating modes to produce more diesel, or reduce runs.

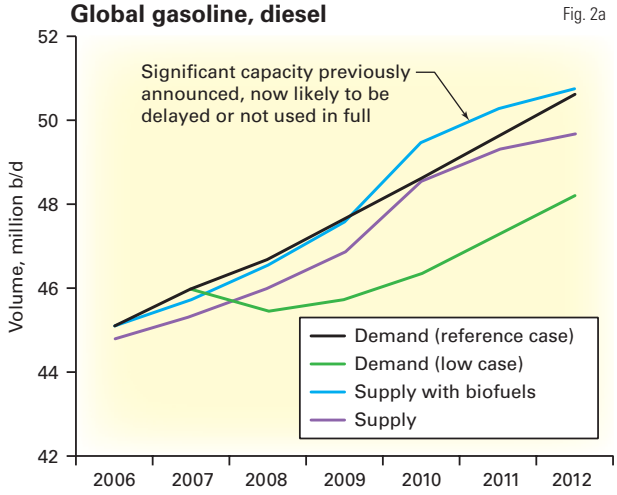
The study says that, in the short term, the refining industry in the US and EU could experience a shake-up, even if the industry continues to do well in Asia.

SHORT-TERM SUPPLY, DEMAND

Fig. 2

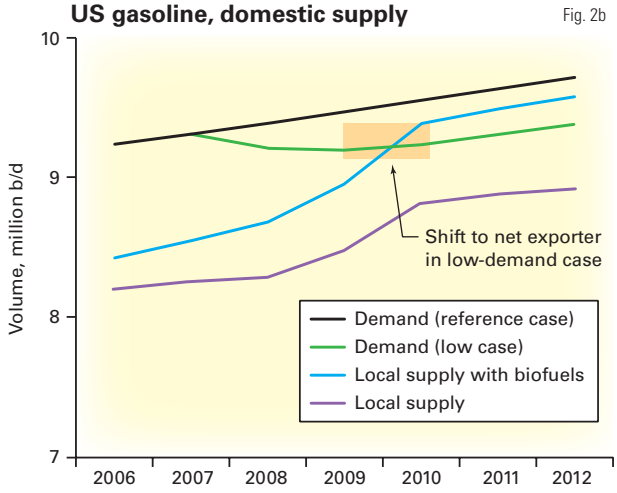
Global gasoline, diesel

Fig. 2a



US gasoline, domestic supply

Fig. 2b



Supply is domestic only; rest of demand is fulfilled with imports.
Source: Energy Information Administration, International Energy Agency, Booz & Co.

Long-term demand

Many economic and political factors could influence long-term demand, the study says. Small changes in economic growth in emerging markets would significantly change demand—an additional 1%/year growth in GDP in Brazil, Russia, India, and China (BRIC countries) would add 3 million b/d of demand for gasoline and diesel by 2025.

The adoption of ultra-cheap vehicles, such as Tata's $2,500 car, would increase fuel demand.

A different scenario would have the opposite effect. Entirely new auto technologies such as plug-in hybrids may decrease demand for ground transportation fuels. It, however, takes about 15-20 years to replace the vehicle fleet, significantly delaying the effect of new technologies.

The study evaluates four demand scenarios (see table):

- Robust economic growth with continuous fleet efficiency improvements.
- Robust economic growth with high penetration of alternative vehicle technologies.
- Moderate economic growth with continuous fleet efficiency improvements.
- Moderate economic growth with high penetration of alternative vehicle technologies.

The study leaves biofuels out of the demand scenarios and considered them as part of supply.

The likelihood of a given demand scenario depends on future fuel prices. High prices would deter global economic growth while favoring a high penetration of alternative technologies. Low prices favor global economic growth and reduces the attractiveness of alternative vehicles.

LONG-TERM DEMAND SCENARIOS

Scenario			Alternative technologies	
Growth		Economy	Hybrids	Plug-in hybrids
Robust	Continuous fleet efficiency improvement	Strong real GDP growth globally: US: 2.4%/year Europe: 1.9%/year China and India: 8.0%/year fading down to 3.0%/year Other: 1-4%/year	Continuous limited penetration	Continuous limited penetration
	High penetration of alternative vehicle technologies		From 1% of new vehicles in 2008 to 25% of new vehicles by 2032	From 0.1% of new vehicles in 2012 to 25% of new vehicles by 2042
Moderate	Continuous fleet efficiency improvement	75% of Robust growth GDP scenario	Continuous limited penetration	Continuous limited penetration
	High penetration of alternative vehicle technologies		From 1% of new vehicles in 2008 to 25% of new vehicles by 2032	From 0.1% of new vehicles in 2012 to 25% of new vehicles by 2042

Note: All cases include the effect of ultracheap cars similarly.
Source: Booz & Co.

Limited availability of crude feedstocks will support high prices.

The study's demand forecast (Fig. 3) highlights the emergence of two centers of demand moving in opposite directions. One demand center consists of developed economies where demand growth is slow and will eventually turn negative as new technologies become entrenched. The other center consists of developing economies, particularly in Asia, that will increase demand growth even after new technologies become available.

Demand will peak much earlier in developed economies. This is particularly true for US gasoline consumption, which will likely peak in the next 15-20 years, according to the study. Diesel demand will continue to grow for another decade after that.

The dieselization trend is global—the worldwide gasoline:diesel demand ratio will move to 45:55 in 2030 from 50:50 in 2007.

Long-term supply

Increased scrutiny on biofuels and concerns about adverse effects on food prices could slow biofuels' penetration into fuel markets, substantially limiting their adoption. The study assumes that EU and US will meet their biofuel mandates.

For the study's scenario of moderate economic growth, the world will need 3 million b/d of distillation capacity by 2025 beyond what is already announced (Fig. 4). If the global economy experiences strong growth, 16 million b/d of additional distillation capacity will be needed.

There is a significant regional imbalance, however, in two areas. The Middle East is adding more capacity than is required for local demand. Conversely, Asia is adding insufficient capacity for local demand due to the sheer volume of expected demand growth.

The study says that two factors are influencing the refining industry—the speed at which capacity (biofuels and refining) is added and the cycles of economic growth in developing economies. These trends are different from past cycles, which varied due to the overbuilding of refining capacity against a backdrop of consistent and predictable demand growth.

Industry implications

The study says that the global refining industry will experience a "severe dislocation" due to changing regional supply-demand balances, which will change global trading flows and, therefore, refining margins. The entire industry depends on demand growth in Asia.

Although the outlook for global demand is positive for the next 20 years, the study says, refining margins could drop and never recover due to demand destruction and alternative supplies.

Refiners must consider:

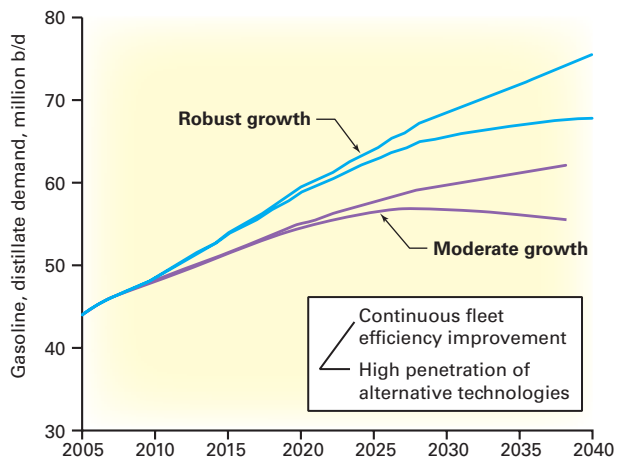
- Canceling or delaying investments in expansion projects in developed economies.
- Expanding into Asia.
- Adjusting refinery configuration to favor diesel or to gain more operational flexibility.
- Finding a material way to participate in biofuels.
- Improving operational performance to maximize the value of existing assets.

The study advises refiners to cancel or delay investments in capacity additions in developed economies; at least until the biofuel supply situation becomes clearer. In these countries, only investments related to improving the competitive advantage of specific refineries is advisable.

There may be opportunities for consolidation in mature economies, the study says. Some refiners may wish

OVERALL DEMAND SCENARIOS

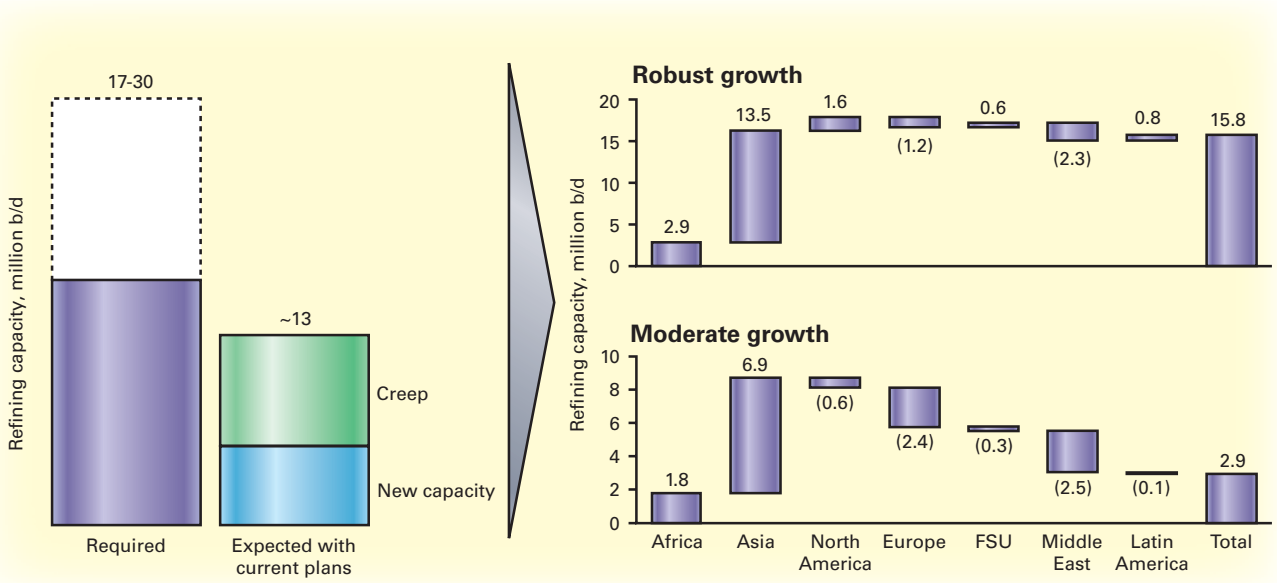
Fig. 3



Source: OGJ, Booz & Co.

ADDITIONAL REQUIRED REFINING CAPACITY BY 2025*

Fig. 4



*Assumes EU and US biofuels mandates are met.
Source: Booz & Co.

to preserve some cash for consolidations if the industry hits bottom again. US refiners must consider this if the market forces margins down and presents acquisition opportunities.

Conversely, the study says, Asia and emerging economies will increase demand for transportation fuels; refiners will need to establish a firm presence in these regions to increase the likelihood of solid returns. Currently, local refiners are capturing most opportunities in Asia to the degree that local price regimes allow.

In addition, regardless of geography, when refiners invest in capacity, they should favor diesel instead of gasoline production. Refiners should aim for increasing operational flexibility, the study says.

Refiners must also consider expanding their energy portfolios to include biofuels; several of the skills required to succeed in biofuels, such as process engineering, transportation, optimization, and marketing, are core competencies of refiners. ✦

FRACTURE PROPAGATION—1

Fracture-arrest prediction requires correction factors

Robert Eiber
Robert J. Eiber Consultant Inc.
Columbus, Ohio

The Batelle two-curve method of fracture-arrest prediction for X70 and X80 high toughness steels requires correction factors based on the steel's grade and toughness level. Data illustrate the impossibility of developing influence coefficients to define the effect of changes in rich gas compositions on Charpy V-notch (CVN) toughness required for fracture arrest. The ideal gross gas heating value appears to maintain a rough relationship to arrest fracture toughness, although there is some scatter.

Factors not incorporated into the fracture-arrest prediction equation include the effects of backfill. Recent data show the moisture content of soil exhibits a rough correlation with fracture speed, suggesting higher soil moisture contents relate to lower fracture-arrest toughness. This is an area of research requiring further pursuit to improve fracture-arrest predictions.

This first part of two articles will present background information and raw data from fracture-arrest tests on X70 pipe, sorting the data by where arrest or propagation occurred and assessing it vs. available prediction methodologies. X70 steels are addressed herein, with the X80 steels presented in the concluding article next week.

Background

Fracture propagation control in natural gas pipelines requires high fracture toughnesses as strength of steel pipe increases, as diameter increases, as applied pressure increases, and as the gas composition increases in richness.

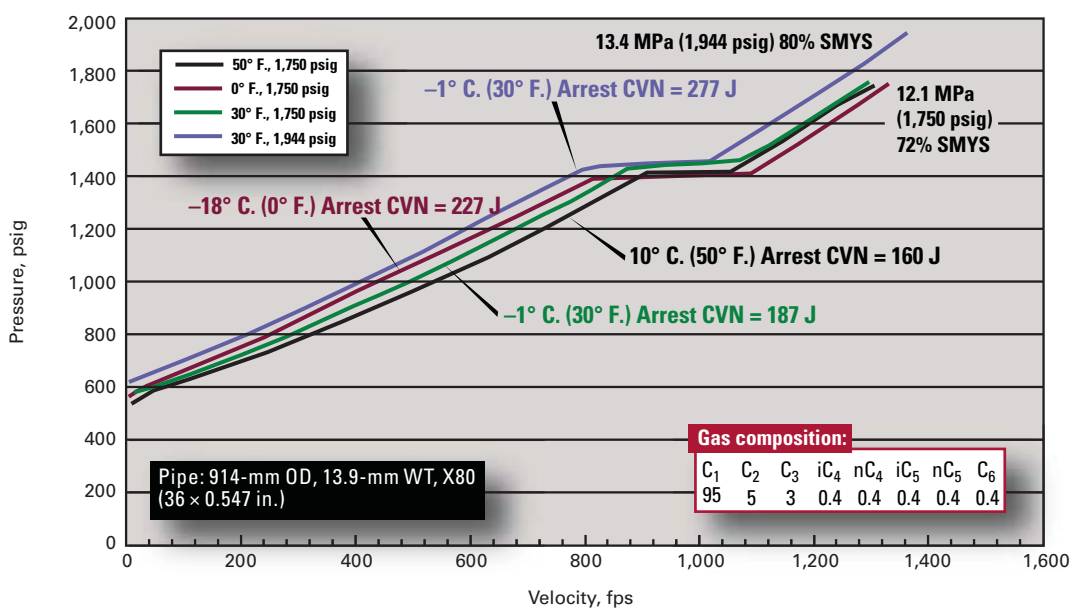
Propagation control seeks to prevent long fracture propagation in a ductile mode, which has occurred several times, with fracture lengths up to 488 m (1,600 ft). Pipe steel for a given line has historically needed to exhibit a specified CVN impact energy at its lowest operating temperature. The difficulty in predicting the CVN energy required for arrest stems from essentially all prediction formulations usable for specifying pipe toughness being empirically developed and calibrated with full-scale fracture-arrest experiments. Any application of an experimentally validated formulation produces scatter in the results, making extrapolation difficult.

Factors affecting required fracture-arrest toughness are:

- Transition temperature of the pipe. The pipe must be operating above its transition temperature for arrest to be practically possible at a 72% or 80% specified minimum yield stress (SMYS) operating stress level.
- OD, WT, design factor, and grade of pipe.

Rich gas decompression behavior

Fig. 1



• Pressure and temperature used to transport the natural gas.

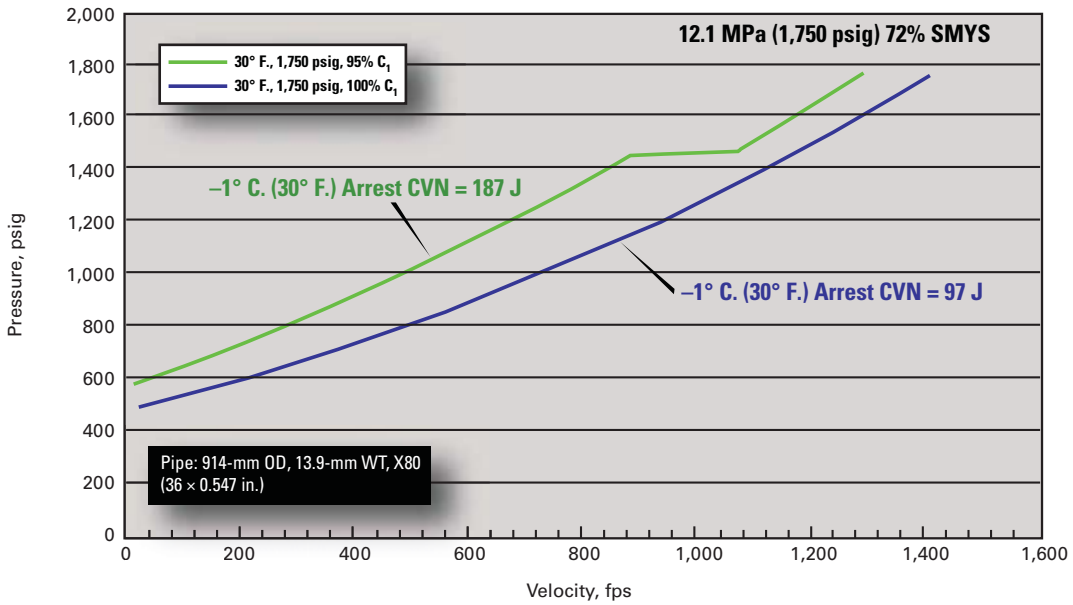
• Gas composition; a factor in defining the pressure driving the fracture.

• Backfill or material surrounding the pipe; air, soil, or depth of water for offshore pipelines.

The available decompressed pressure available to drive a fracture at a given speed must be lower than the pressure required to drive the fracture at that speed. If the two pressures are in equilibrium, a fracture can propagate long distances.

Methane decompression, 95% vs. 100%

Fig. 2



Propagation factors

Each of the factors affecting propagation and arrest toughness bear examination.

• Transition temperature of pipe steel. The transition temperature of the pipe steel needs to be below the operating temperature of the pipe. If the steel is not operating below its transition temperature, it will exhibit various amounts of brittleness and the fracture speed will be higher than predicted for a steel failing in a ductile manner and with a given toughness level. Ensuring the proper transition temperature thus becomes the primary concern in ensuring ductile fracture.

• OD, WT, design factor, and grade of pipe. The larger the OD, WT, design factor, and pipe grade, the higher the steel's toughness must be to ensure fracture arrest at a given pressure. Equation 1, developed for X52 to X65 steels and a lean natural gas applied at pressures sufficient to create a hoop stress in the pipe in the range 60 to 80% SMYS, shows the fracture-arrest formulation underpinning this relationship in a simplified form.

As σ increases, the required CVN energy increases by the power of 1.5 to 2 on σ. And, since the hoop stress is the product of the design factor and the SMYS, as the design stress and SMYS increase, the required CVN for arrest also increases.

• Pressure, temperature. Pressure and temperature of the gas, especially for rich gas, determine the starting conditions, for the gas' decompression and affect the pressure where the gas enters the two-phase region. shows examples of gas decompression curves for the

Equations

CVN Energy (1/1) = $A\sigma^2(Rt)^{1/3}$ (1)

Where: CVN energy is the full thickness Charpy V Notch impact energy that is measured with a specimen where the fracture propagates in the axial direction of the pipe. σ is the applied hoop stress in the pipe, in ksi or MPa

R is the radius in inches, or mm

t is the pipe wall thickness in inches or mm

A is an empirical coefficient, 0.0108 for US units and 0.0000357 for metric units.

Ideal gas heat

value = $C_1 * 1010 + C_2 * 1769.6 + C_3 * 2516.1 + iC_4 * 3251.9 + nC_4 *$ (2)
$3262.3 + iC_5 * 4000.9 + nC_5 * 4008.9 + (C_6+) * 4755.9$

Where: C_1 C_6 are in mole percent

Ideal gas heat value is in BTU/ft^3

$CVN_{TCM - Leis} = CVN_{TCM} + 0.002\ CVN_{TCM}^{2.04} - 21.18$ (3)

Where: CVN_{TCM} is the Charpy energy predicted for arrest using the TCM, J.

$CVN_{TCM-Wilk} = 0.056(0.1018CVN_{TCM} + 10.29)^{2.597} - 16.8$ (4)

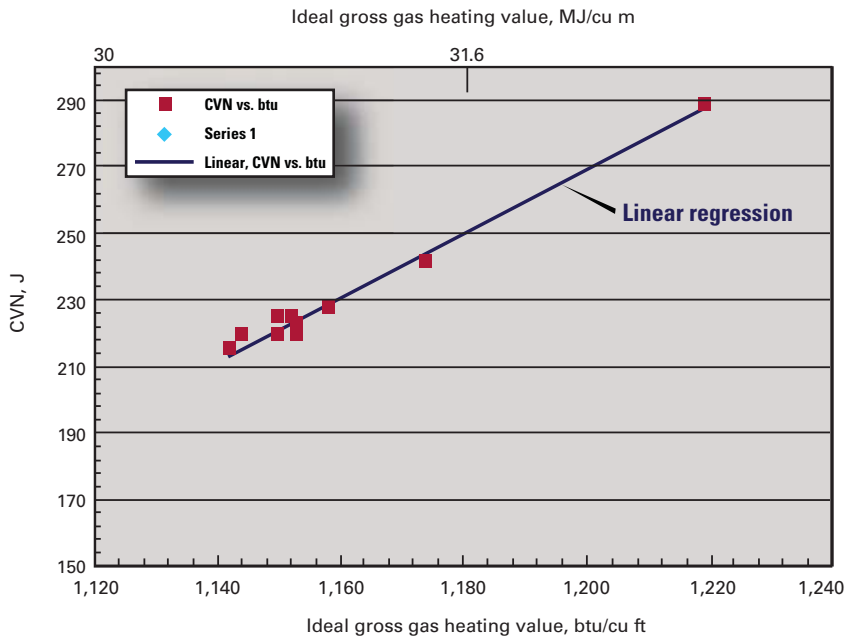
C_1-C_3 effect on arrest CVN

Table 1

	Gas 1	Gas 2	Gas 3	Gas 4
C_1	90	89	86	86
C_2	5	6	9	3
C_3	3	3	3	9
iC_4	0.4	0.4	0.4	0.4
nC_4	0.4	0.4	0.4	0.4
iC_5	0.4	0.4	0.4	0.4
nC_5	0.4	0.4	0.4	0.4
C_6+	0.4	0.4	0.4	0.4
Arrest CVN, J	225	225	242	289

GAS HEATING VALUE VS. ARREST CVN

Fig. 3



C_4-C_6 EFFECT ON ARREST CVN

Table 2

	Gas 5	Gas 6	Gas 7	Gas 8	Gas 9	Gas 10	Gas 11	Gas 12
C_1	90	90	90	90	90	90	90	90
C_2	5	5	5	5	5	5	5	5
C_3	3	3	3	3	3	3	3	3
iC_4	0	0.8	0.4	0.4	0.4	0.4	0.4	0.8
nC_4	0.8	0	0	0.8	0.4	0.4	0.4	0.4
iC_5	0.4	0.4	0.8	0	0	0.8	0.4	0.4
nC_5	0.4	0.4	0.4	0.4	0.8	0	0	0.4
C_{6+}	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0
CVN, J	220	220	220	220	220	220	222	220

same gas composition decompressing from two different pressure levels.

Gasdecom, based on the BWRS equation of state, predicted the curves shown.[1] The 12.1 MPa (1,750 psig), –1° C. (30° F.), and 10° C. (50° F.) curves start decompressing from about the same velocity, but the –18° C. (0° F.) curve has a higher initial velocity.

The level of pressure decay in the bottom portion of the decay after the gas has penetrated into the two-phase region stands as the important feature of the three curves. The lowest-temperature curves on the 1,750 psig (12.1 MPa) plot have the highest pressures available to drive a fracture. Comparing the 1,944 and 1,750 psig curves at -1° C. (30° F.) shows the higher-pressure curve having a higher pressure in the lower portion of the decay, as would be expected.

These curves provide an example of the sensitivity of gas decompression to starting temperature and pressure and how it affects the fracture toughness required for fracture arrest. Predicting fracture-arrest toughness with the Battelle Two Curve Model (TCM) 1 shows the higher the pressure the greater the fracture toughness required for arrest.

The CVN arrest toughnesses predicted for arrest (with no correction factor) are:

- 277 J for the 13.4 MPa, –1° C. curve.
- 227 J for the 12.1 MPa, –18° C. curve.
- 187 J for the 12.1 MPa, –1° C. curve.
- 160 J for the 12.1 MPa, 10° C. curve.

Arrest toughness is sensitive to the initial temperature and pressure in a pipeline.

- Gas composition. Gas composition also affects gas decompression. Fig. 2 shows two gas compositions, one the same composition shown in Fig. 1 and the other 100% methane (C_1), decompressing from the same pressure and temperature (12.1 MPa, –1° C.), demonstrating the richer the gas the higher the pressure driving the fracture and the greater the toughness (187 J vs. 97 J) required for fracture arrest.

An attempt to assess the effect of composition changes for all of the individual elements in natural gas sought to develop a relative ranking of the significance of the composition effect on the fracture-arrest toughness. Examination of the effort, however, proved it to be impossible.

Tables 1 and 2 show examples of the assessments. Table 1 shows an attempt to assess the effect of C_1, C_2, and C_3 on the arrest CVN for the gas examined in Fig. 1 at 12.1 MPa (1,750 psig) and 10° C. (50° F.).

Comparing Gas 1 and 2, the decrease of C_1 to 89% from 90% and increase of C_2 to 6% from 5% did not change the arrest CVN, suggesting 1% of C_1 and C_2 have an equal effect on arrest toughness. Comparing Gas 2 and 3, however, shows decreasing methane to 86% from 89% and increasing ethane to 9% from 6%, keeping all other factors constant, increased the arrest toughness to 242 J from 225 J, illustrating the non-linear effect of the composition. Holding C_1 constant at 86% but decreasing C_2 to 3% from 9% and increasing C_3 to 9% from 3% increased the arrest toughness to 289 J from 242 J.

Table 2 shows the effect of changing C_4, C_5, and C_6 compositions. C_1, C_2, and C_3 stayed constant, along with pressure and temperature. Normal levels of C_4 through C_6 are usually less than 0.2%, but even changing the amounts to 0.4%

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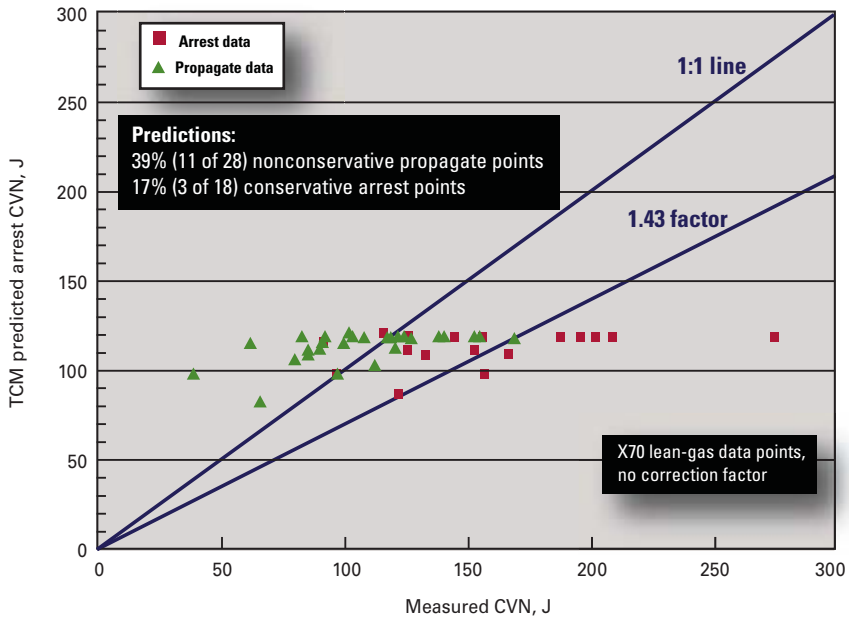
X70 LEAN-GAS DATA VS. PREDICTED CVN

Fig. 4



did not affect arrest toughness, with CVN values of 220-222 J.

A second attempt to find an approximate predictor for the arrest toughness based on composition used the ideal gas heating value shown in Fig. 3. Equation 2 provides the basis of the gas heating value.

Fig. 3 shows a roughly linear relationship between the ideal gas heating value and the arrest CVN energy, providing perhaps one of the best ways of assessing a given gas composition's effect on fracture-arrest energy. This approach needs further examination, but appears promising.

Surrounding material

The type of backfill material (backfill) above and below the pipe, i.e., air, soil, or water, affects the required fracture toughness for arrest. Rudland and Wilkowski reported the results of research studying the effect of soil properties on fracture speed.[2] The correlation in results of their small-scale fracture propagation tests, plotting fracture speed vs. soil density, suggests a trend of fracture speed being lower for higher density soils, but it is rough at best and needs additional study.

Plotting fracture speed against moisture content shows a clear trend toward decreasing fracture speed with increasing moisture content. The effect of moisture content (as opposed to soil type), however, is not clear as to whether the increase in density or some other parameter is responsible. Plotting different soil types with the same moisture content would help clarify its role. The data reinforce the need to study the effect of different soil types, depths of soil, moisture contents, and density to help reduce scatter in future full-scale fracture-arrest tests.

X70 FULL-SCALE LEAN GAS TEST DATA SOURCES

Table 3

Organization	Test numbers
Centro Sviluppo Materiali	1, 2, 4, 5, 9
Battelle	GA1
Japanese Iron and Steel Institute	A1, A2, A3, B1, B2
American Iron and Steel Institute	SF8

X70 FULL-SCALE RICH GAS TEST DATA SOURCES

Table 4

Organization	Test numbers
Foothills Pipelines	3, 4, 5, 6, 7
Alliance Pipeline	1, 2
JISI	C_1, C_2
Battelle, Canadian Artic Study Group Ltd.	2

A pipe submerged underwater to sufficient depth will arrest a fracture at a lower CVN level than a similar fracture backfilled with soil. Maxey postulated releasing gas into the water creates an external pressure on the pipe reducing the effective driving pressure in the pipe.[3] Water transmits the exiting gas pressure at a velocity of 1,463 m/sec (4,800 fps), 3.7 times faster than the gas pressure in the pipe can decay, roughly 396 m/sec. The water has sufficient mass to restrain temporarily the exiting gas pressure, allowing it to apply external pressure on the pipe for a long enough time to assist in fracture arrest.

No existing fracture-arrest prediction method used to specify CVN fracture-arrest toughness has incorporated the effect of backfill in a way allowing variations to be effective on the calculated arrest toughness. This area needs additional research to accurately predict arrest toughness levels and, one hopes, reduce scatter in future correlations with full-scale fracture-arrest tests.

X70 predictions

Most formulations for prediction of fracture-arrest toughness emerged 1970-90 and are generally based on X52-X65 grade pipe steels. These steels characteristically had relatively low constant upper plateau energy levels and most were relatively thin (6-12 mm), prompting use of two-thirds thickness CVN specimens to measure toughness of the steels and develop arrest-prediction models for fracture toughness assessments.

Newer steels, X70-X100, used at higher operating pressures, 10.3-34.5 MPa (1,500 to 5,000 psig), have sufficient WT to allow use of full-thickness CVN specimens for fracture toughness assessment. Some of the X70 and X80 steels also exhibited rising upper shelf energies and the interpretation of the arrest toughness for these steels using CVN specimens has not been defined.

This portion of the article will

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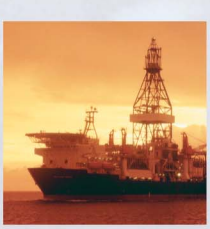

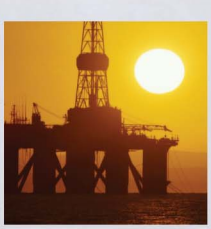

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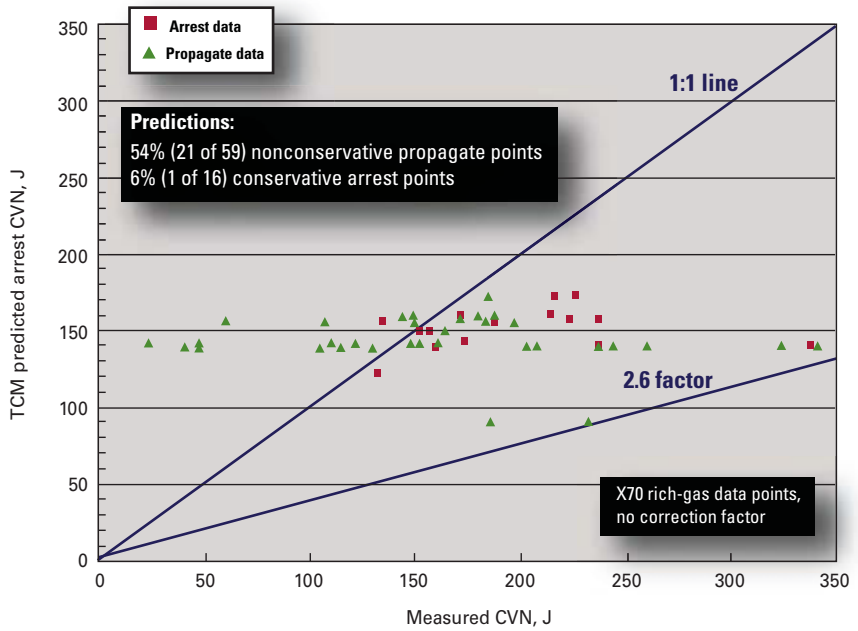
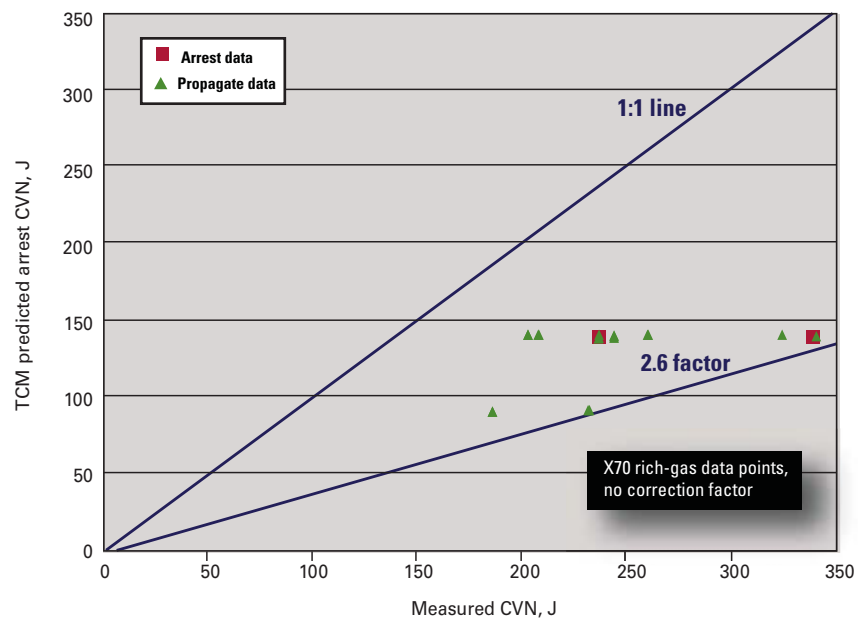
X70 RICH-GAS DATA VS. PREDICTED CVN

Fig. 5



X70 RICH-GAS DATA, 2.6 FACTOR CONTROLLED

Fig. 6



present raw data from full-scale burst fracture-arrest tests on X70 pipe, sorting the data by where arrest or propagation occurred and assessing it against available prediction methodologies.

The X70 data consist of tests involving both lean gas and rich gas. The rich-gas tests showed discontinuity in the decompression curve, while the lean-gas tests exhibited a continuous decompression curve.

The X70 lean gas full-scale fracture arrest data come from 12 tests encompassing 101 data points on individual pipe lengths (Table 3). The tests cover 42-56 in. OD and 15.7-20 mm WT. The Battelle TCM provided the basis for all of the predicted fracture-arrest toughness values.2

Fig. 4 shows the X70 lean gas fracture-arrest data. Measured CVN values from the test pipe lie on the X axis and the TCM-predicted arrest CVN values on the Y axis. Thirty-nine percent of the propagate data lie on the right side of the 1:1 line, which are nonconservative propagate points. Seventeen percent of the arrest data lie on the left side of the 1:1 line, which are conservative arrest points.

The TCM predictions are too low to match the test results. Eliminating all the nonconservative propagate points, i.e., moving them above the 1:1 line, would require a 43% increase in the predictions or use of 1.43 multiplier factor.

Fig. 5 shows similar data from rich gas tests on X70 pipe (Table 4), representing nine fracture-arrest tests with 75 individual pipe lengths.

Fig. 5 shows 54% of the propagate data on the right side of the 1:1 line (nonconservative) and 6% of the arrest data on the left side of the 1:1 line (conservative). TCM predictions are even further in error for the X70 rich-gas test results. Eliminating the nonconservative propagate points would require applying a 2.6 multiplier factor to the predicted toughness levels, raising a question as to why such a stark difference between the lean-gas and rich-gas data points exists.

Examination of the data revealed one outlying rich gas data set as controlling the 2.6 factor. These data, shown in Fig. 6, represent tests conducted in the 1980s with results well outside the scatter of the other data points. These tests could have used rising upper shelf CVN energy steels, the type of X70 steel produced at the time, but this is speculation. A lack of knowledge regarding how to assess the toughness of rising upper shelf steel CVN energies requires full-scale tests to define their fracture-arrest characteristics.

Removing the earlier data shown in Fig. 6 from Fig. 5 reduces the 2.6 factor to the 1.43 shown in Fig. 4.

Three correction equations have been proposed to eliminate the error identified in Figs. 4 and 5. Equation 3 shows the Leis correction equation.

Wilkowski developed another equation (Equation 4), using the same terms used in Equation 2.

CFER proposed the third correction factor of 1.7 times the CVN TCM prediction.[4]

Equation 3 appears to provide the most reasonable approach for X70 steels. This is also suggested for application to high CVN-energy (>70 ft-lb) X65 steels. ✦

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The author

Bob Eiber (reiber@columbus.rr.com) is president of Robert J. Eiber Consultant Inc. in Columbus, Ohio. He has served on the ASME B31.8 committee, API Line Pipe committee, and was chairman of the ASTM (ISO) committee preparing a DWTT Standard for ISO. He was the director of pipeline transmission research at Battelle when he retired. He holds BS and MS degrees from Case Western Reserve University and is a member of ASME and ASTM.

New software lets energy teams share data securely

PetrisWINDS iShare is a new, improved collaboration software solution suited for energy teams that need to share information securely.

Based on Microsoft Corp.'s SharePoint platform, iShare is scalable to multiple companies, multiple users, and large data sets.

With iShare, teams can manage a range of energy-related information assets. Applications of iShare include property asset marketing (online data rooms), due diligence collaboration, postmerger data transfer, sharing of project data (joint venture production data for example)—anything where you want users to have easy access to data of all types from one browser based interface.

The iShare software application is offered as a web hosted solution and as a customer installed site. The hosted version allows fast setup and implementation; project teams that are diversely located can begin using iShare within minutes, the company notes. All iShare data are securely stored on servers in a Class A, SAS 70 certified data center. iShare may also be installed inside the fire wall for companies that want to manage the system on their own Microsoft SharePoint platform.

Source: **Petris Technology Inc.,** 1900 St. James Pl., Suite 700, Houston, TX 77056.

New units measure mass flow rates of underwater wells

Two new products are designed to measure the mass flow rates of fluids or gas in underwater production and injection wells—a single phase meter (SPM) and a single phase sensor (SPS).

The new SPM takes advantage of the company's DualQ downhole pressure measurement technology, measuring absolute and differential pressures across a venturi. Features include high accuracy, reliability, extreme pressure tolerance, and simple underwater installation.

The SPS, which is based on the firm's Force technology, measures the deflection of an intrusive probe caused by the flowing media. The measurement output from the SPS is intended to enhance or replace traditional calculations based on choke settings, the firm notes.

Source: **Roxar AS,** Gamle Forusvei 17, Box 112, 4065 Stavanger, Norway.

New well cement resistant to carbon dioxide

New EverCRETE carbon dioxide-resistant cement is specifically engineered to ensure long-term zonal isolation in wells with high concentrations of CO_2 in either wet or gaseous states.

The cement can be prepared in a standard bulk plant, and its density can be tailored to most well requirements. The new system can be pumped as a tail slurry across the CO_2 injection zone or used as a lead slurry to protect the casing string from CO_2 attack in front of any reservoir with CO_2 content, all using standard equipment.

Source: **Schlumberger,** 5599 San Felipe, 17th Floor, Houston, TX 77056.

Swagelok Co.,

Solon, Ohio, has announced that ASM International (formerly the American Society for Metals) elected Sunniva R. Collins, a senior research fellow at Swagelok, a Fellow of the society. Collins was selected for her contributions to technical advances in stainless steels used in fluid systems applications. The peer-selected honor of Fellow was established by ASM International to provide recognition of members for their distinguished contributions to materials science and engineering and to develop a broad forum of leaders to serve as advisors to the society. Collins joined Swagelok in 1995 as a research metallurgist and has served in several engineering management positions, most recently as technical director for Swagelok Technology Services Co. In her current position, as the company's first senior research fellow, she coordinates the company's academic and governmental research initiatives. Collins received her doctorate and master's in materials science and engineering from Case Western Reserve University and her bachelor's from the University of Michigan.


Collins

Swagelok develops and provides fluid system solutions, including products, assemblies, and services for the oil and gas, power, petrochemical, alternative fuels, research, instrumentation, pharmaceutical, and semiconductor industries.

Geoservices Group,

Le Blanc Mesnil, France, has acquired Broussard, La.-based Production Wireline & Cased Hole Services Group LLC. The Production Wireline management team remains in place and continues to operate the company. Geoservices sees the acquisition serving as its entry into the US well intervention market and future growth in North America. The allied companies will focus on growth of slickline-deployed services and technologies, many of which are not currently available in the US market.

Geoservices provides a range of oil field services that help evaluate hydrocarbon reservoirs and optimize field exploration, development, and production. It serves oil and gas companies worldwide through a network of bases in 53 countries, covering all the main areas where oil or gas is to be found. Its services include mud logging, well intervention, and field surveillance.

Production Wireline provides slickline services to it clients throughout the Gulf of Mexico and Gulf Coast region from four bases across Texas and its main facility in Broussard.

Baker Hughes Inc.,

Houston, has appointed Clifton Triplett vice-president and chief information officer. He reports to Martin Craighead and David Barr, Baker Hughes group presidents. Triplett joins Baker Hughes from Motorola, where he served as vice-president and CIO for their Network and Enterprise Group and most recently as vice-president, Global Services. Prior to that, he held a variety of IT leadership roles with General Motors, Allied Signal, and Entergy Services. Triplett has a bachelor's in engineering from the US Military Academy and spent the first 10 years of his career in the military, in and outside the US. He also has a master's in computer information systems from Boston University.

Baker Hughes provides reservoir consulting, drilling, formation evaluation, completion, and production products and services to the worldwide oil and gas industry.

Knight Oil Tools,

Lafayette, La., has added three new members to its corporate sales staff: Donald Bishop, Jerry LaFour and Mark Pester.


Bishop

Bishop previously was a field sales representative in Southeast Texas for Knight. He has an associate's degree from ITT Technical Institute in computer drafting and attended Southwest Texas State University. He is a member of the American Association of Drilling Engineers. Bishop will be based in Knight's Dallas office to serve companies in the Dallas, Fort Worth, and Tyler, Tex., areas.


LaFour

LaFour brings several years of oil field experience to Knight. He attended high school in Victoria, Tex., and is a member of the Corpus Christi, Tex., chapter of the American Petroleum Institute (API). LaFour will be based in the Corpus Christi office.


Pester

Pester previously was a corporate representative with a major operator. He has a BBA from the former Texas A&I University and is a member of API and the Society of Petroleum Engineers. Pester will also work out of Knight's Corpus Christi office.

Knight Oil Tools is the largest privately held rental and fishing tools business in the oil and gas industry, with 30 locations in eight oil and gas producing states.

Zedi Inc.,

Calgary, has signed a letter of intent to acquire all issued and outstanding shares of OAS Oilfield Accounting Service Ltd. through its wholly owned subsidiary Zedi Canada Inc. for $6.24 million (Can.) cash. OAS is a Calgary-based private corporation providing chart reading and integration services to the oil and gas industry. Subject to completion of due diligence, the transaction is expected to close on Oct. 31, 2008. The acquisition of OAS strengthens Zedi's position as the Canadian leader in gas measurement. This acquisition will add about 25,000 wells measured with charts to the 10,000 wells that are currently monitored electronically, for a total well surveillance and measurement count of over 35,000 wells. Given the gas industry's current installation base of orifice meters with chart recorders, chart processing is a natural extension to the existing surveillance and optimization suite of products and services Zedi currently offers. The combination of the two organizations will consolidate the gas measurement market in Canada and will contribute about $5.4 million annually to Zedi's recurring revenue base.

Zedi specializes in production operations management, delivering systems and services that help oil and gas producers efficiently manage people, assets, and information.

Broadpoint Inc.,

Houston, has named Jerome DeCuir vice-president of engineering. He will leverage 20 years of engineering experience to help Broadpoint develop cutting-edge communications technologies that will improve its customers' productivity and profitability. Previously, DeCuir served as the director of network engineering for McLeodUSA (now a part of Paetec). He also worked as the engineering director for both On Fiber Communications and Broadwing, leading communications companies in Austin. DeCuir began his career with Williams Cos., where he held positions ranging from planning engineer to systems engineering director throughout his 10-year tenure. DeCuir has a bachelor's in electrical engineering from the University of Louisiana at Lafayette and has studied power and computing systems at the master's level.

Broadpoint is a full-service telecommunications and network solutions company offering cellular, satellite, and 2-way radio communications; custom-engineered solutions; and antenna and tower services to the maritime, energy, and government sectors. Broadpoint also operates and maintains the first GSM/GPRS/Edge offshore wireless network, which covers more than 100,000 miles in the Gulf of Mexico.

Honeywell International,

Morris Township, NJ, has announced that Jack Bolick, president of Honeywell Process Solutions, has been named Frost & Sullivan's 2008 North American Process Automation Lifetime Achievement Award winner. The honor is given each year to an individual whose career is characterized by a legacy rich in accomplishment and positive influence in the industry he or she serves. In 1998, Bolick joined Honeywell with more than 20 years of diverse business experience focused on semiconductor and manufacturing materials supply, global marketing, and manufacturing strategies that support high-growth markets. He became president of Honeywell Process Solutions in October 2002. In recent years, Bolick has focused on transforming Honeywell's image from a distributed control system manufacturer to a total solutions provider. Bolick has a master's from North Carolina A&T State University, a bachelor's in industrial engineering from Western Carolina State University in North Carolina, and a Six Sigma black belt certification.


Bolick

Honeywell Process Solutions is part of Honeywell's Automation and Control Solutions group, a global leader in providing product and service solutions that improve efficiency and profitability, support regulatory compliance, and maintain safe, comfortable environments in homes, buildings, and industry.

Honeywell International is a diversified technology and manufacturing leader, serving customers worldwide with aerospace products and services; control technologies for buildings, homes and industry; automotive products; turbochargers; and specialty materials.

American International Industries Inc.,

Kemah, Tex., has acquired 100% of the assets of Shumate Machine Works Corp. from Shumate Industries Inc. for $6.4 million cash. Those assets are now owned by American International's wholly owned subsidiary Shumate Energy Technologies Inc., which operates a 30,000 sq ft plant in Conroe, Tex., that provides valve products to the oil and gas service and supply industry. Larry Shumate, formerly CEO and chairman of Shumate Industries, will now serve as president of Shumate Energy Technologies.

American International expects synergistic benefits between Shumate Energy Technologies and its other energy-related subsidiary, Delta Seaboard Well Service Inc.

American is a diversified holding company with holdings in oil and gas and other industries, as well as in finance and real estate in Houston and surrounding areas.

Conroe-based Shumate Industries has announced that it expects to adopt a new name to reflect its focus on expanding its Hemiwedge Valve Corp. (HVC) subsidiary and its proprietary Hemiwedge valve technology. Shumate Industries also named Ken Chickering, currently director and president of HVC, chairman and CEO of Shumate Industries. Chickering previously served as president of Daniel Valve and chairman of the Valve Manufacturers Association.

Aker Solutions,

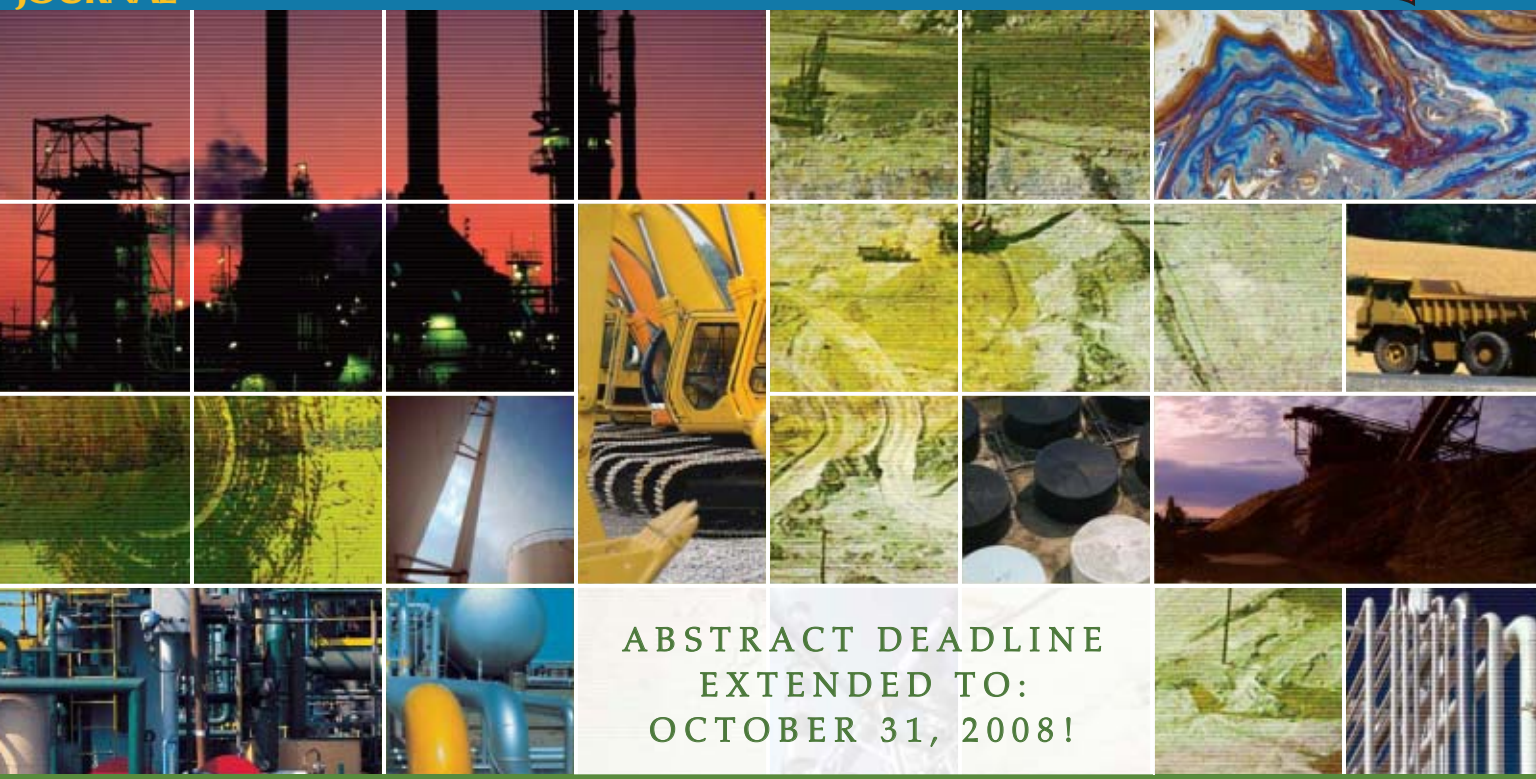
Oslo, has announced plans to invest in its Brazilian subsea tree operations in order to increase manufacturing capacity ahead of the future wave of subsea developments in the Brazilian presalt layer. Plans call for doubling production capacity for subsea trees at Aker's Curitiba, Brazil, manufacturing plan by 2010. Over the past 3 years, Aker has invested about $30 million in its Brazilian subsea business area, generating about $500 million in orders. Those orders include frame agreements with Brazilian state oil company Petrobras for the delivery of 45 deepwater subsea trees for $223 million, delivery of manifolds to Petrobras for $50 million, and four contracts for drilling riser systems to Queiroz Galvão Oleo e Gas SA, worth a total of $140 million.

Aker Solutions is a unit of Aker Solutions ASA, a leading global provider of engineering and construction services, technology products, and integrated solutions to the oil and gas, refining and chemicals, mining and metals, and power generation industries.

ABS,

Houston, and St. Petersburg-based Russian Maritime Register of Shipping (RS) have launched a joint training program covering survey of Arctic LNG carriers for a team of surveyors drawn from both societies. Classroom instruction in early October at St. Petersburg is to be followed by a prolonged period of field training at shipyards for new construction and on ABS-classed, trading LNG carriers for in-service surveys.

ABS and RS are two of the leading international classification societies devoted to promoting the security of life, property, and the marine environment through development and verification of standards for design, construction, and maintenance of marine-related facilities



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Imports of crude and products

	Districts 1-4 10-3 2008	Districts 1-4 9-26 2008	District 5 10-3 2008	District 5 9-26 2008	Total US 10-3 2008	Total US 9-26 2008	Total US *10-5 2007
	1,000 b/d						
Total motor gasoline	1,432	1,222	2	39	1,434	1,261	1,323
Mo. gas. blending comp.	958	927	0	39	958	966	697
Distillate	122	195	43	0	165	195	385
Residual	270	206	162	169	432	375	307
Jet fuel-kerosine	132	122	19	23	151	145	246
Propane-propylene	64	243	15	9	79	252	154
Other	572	397	54	86	626	483	582
Total products	**3,550**	**3,312**	**295**	**365**	**3,845**	**3,677**	**3,694**
Total crude	**9,229**	**8,020**	**1,117**	**969**	**10,346**	**8,989**	**9,869**
Total imports	**12,779**	**11,332**	**1,412**	**1,334**	**14,191**	**12,666**	**13,563**

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

Purvin & Gertz LNG netbacks—Oct. 10, 2008

Receiving terminal	Liquefaction plant: Algeria	Malaysia	Nigeria	Austr. NW Shelf	Qatar	Trinidad
	$/MMbtu					
Barcelona	10.14	8.54	9.95	8.42	9.22	9.86
Everett	5.99	3.76	5.60	3.83	4.37	6.30
Isle of Grain	12.47	9.94	11.71	9.82	10.64	11.74
Lake Charles	4.23	2.35	3.98	2.50	2.71	4.88
Sodegaura	9.89	12.22	10.14	12.09	11.28	9.07
Zeebrugge	11.52	9.05	10.79	8.92	9.74	10.80

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	13,032	45,347	26,261	8,179	47,713	13,727	4,342
PADD 2	59,026	47,806	18,256	6,933	27,622	1,447	24,893
PADD 3	165,327	60,419	28,282	11,100	32,943	17,545	29,073
PADD 4	14,812	6,599	2,341	523	2,704	308	[1]2,568
PADD 5	50,390	26,644	20,829	10,048	11,619	4,782	—
Oct. 3, 2008	**302,587**	**186,815**	**95,969**	**36,783**	**122,601**	**37,809**	**60,876**
Sept. 26, 2008	**294,464**	**179,640**	**92,852**	**36,050**	**123,090**	**36,228**	**58,083**
Oct. 5, 2007[2]	**320,081**	**193,000**	**87,575**	**41,353**	**135,324**	**36,566**	**60,516**

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

Refinery report—Oct. 3, 2008

District	Refinery operations: Gross inputs	Refinery operations: Crude oil inputs	Refinery output: Total motor gasoline	Refinery output: Jet fuel, kerosine	Refinery output: Fuel oils: Distillate	Refinery output: Fuel oils: Residual	Refinery output: Propane-propylene
	1,000 b/d		1,000 b/d				
PADD 1	1,429	1,435	2,095	111	472	127	68
PADD 2	3,230	3,203	2,203	222	963	69	225
PADD 3	6,286	6,120	2,764	611	1,865	231	578
PADD 4	546	544	291	20	178	1	[1]154
PADD 5	2,760	2,722	1,583	471	551	153	—
Oct. 3, 2008	**14,251**	**14,024**	**8,936**	**1,435**	**4,029**	**581**	**1,025**
Sept. 26, 2008	**12,726**	**12,452**	**8,690**	**1,274**	**3,678**	**401**	**792**
Oct. 5, 2007[2]	**15,326**	**15,111**	**8,932**	**1,391**	**4,171**	**644**	**1,104**
	17,610 Operable capacity		**80.9 utilization rate**				

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

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

OIL&GAS JOURNAL online research center

OGJ crack spread

	*10-10-08	*10-12-07	Change	Change, %
	$/bbl			
SPOT PRICES				
Product value	92.56	89.71	2.86	3.2
Brent crude	82.02	79.20	2.82	3.6
Crack spread	10.54	10.51	0.03	0.3
FUTURES MARKET PRICES				
One month				
Product value	90.99	88.58	2.41	2.7
Light sweet crude	86.22	81.47	4.75	5.8
Crack spread	4.77	7.11	–2.34	–32.9
Six month				
Product value	99.12	92.83	6.29	6.8
Light sweet crude	86.47	78.46	8.01	10.2
Crack spread	12.65	14.38	–1.73	–12.0

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

OGJ GASOLINE PRICES

	Price ex tax 10-8-08	Pump price* 10-8-08	Pump price 10-10-07
	¢/gal		
(Approx. prices for self-service unleaded gasoline)			
Atlanta	311.5	358.0	280.6
Baltimore	320.5	362.4	266.9
Boston	316.2	358.1	263.9
Buffalo	292.1	353.0	279.9
Miami	303.4	355.0	299.8
Newark	315.4	348.0	260.9
New York	297.1	358.0	278.9
Norfolk	314.0	352.4	261.9
Philadelphia	309.4	360.1	275.9
Pittsburgh	273.0	323.7	275.9
Wash., DC	284.3	322.7	278.9
PAD I avg	303.4	350.1	274.9
Chicago	288.0	352.4	292.9
Cleveland	279.8	326.2	276.6
Des Moines	313.9	354.3	270.3
Detroit	300.3	359.7	288.1
Indianapolis	295.2	354.6	286.6
Kansas City	310.4	346.4	274.6
Louisville	324.1	365.0	286.7
Memphis	309.0	348.8	256.4
Milwaukee	308.4	359.7	295.5
Minn.-St. Paul	312.8	356.8	289.4
Oklahoma City	293.1	328.5	266.3
Omaha	285.4	330.7	269.9
St. Louis	309.7	345.7	261.2
Tulsa	301.2	336.6	262.5
Wichita	298.0	341.4	264.9
PAD II avg	302.0	347.1	276.1
Albuquerque	316.5	352.9	273.2
Birmingham	311.3	350.6	262.3
Dallas-Fort Worth	300.2	338.6	261.3
Houston	320.4	358.8	266.4
Little Rock	307.9	348.1	262.4
New Orleans	320.4	358.8	268.3
San Antonio	312.6	351.0	264.1
PAD III avg	312.8	351.3	265.5
Cheyenne	306.3	338.7	278.9
Denver	331.3	371.7	285.9
Salt Lake City	306.5	349.4	281.0
PAD IV avg	314.7	353.3	282.0
Los Angeles	294.5	361.6	285.6
Phoenix	310.8	348.2	295.5
Portland	309.8	353.2	294.5
San Diego	301.7	368.8	297.5
San Francisco	307.2	374.3	293.5
Seattle	302.4	358.3	290.5
PAD V avg	304.4	360.7	292.9
Week's avg.	**305.4**	**351.0**	**276.8**
Sept. avg.	**322.7**	**367.2**	**280.4**
Aug. avg.	**330.8**	**375.3**	**280.8**
2008 to date	**310.6**	**354.6**	—
2007 to date	**229.7**	**273.3**	—

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

REFINED PRODUCT PRICES

	10-3-08 ¢/gal		10-3-08 ¢/gal
Spot market product prices			
Motor gasoline (Conventional-regular)		Heating oil No. 2	
New York Harbor	230.00	New York Harbor	261.28
Gulf Coast	227.50	Gulf Coast	258.15
Los Angeles	254.50	Gas oil	
Amsterdam-Rotterdam-Antwerp (ARA)	226.62	ARA	277.46
Singapore	233.40	Singapore	246.67
Motor gasoline (Reformulated-regular)		Residual fuel oil	
New York Harbor	224.50	New York Harbor	180.29
Gulf Coast	244.25	Gulf Coast	193.38
Los Angeles	259.75	Los Angeles	237.45
		ARA	214.66
		Singapore	195.71

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

BAKER HUGHES RIG COUNT

	10-10-08	10-12-07
Alabama	4	6
Alaska	9	5
Arkansas	56	48
California	45	41
Land	45	40
Offshore	0	1
Colorado	106	111
Florida	2	0
Illinois	1	0
Indiana	2	2
Kansas	12	14
Kentucky	12	11
Louisiana	197	146
N. Land	79	56
S. Inland waters	23	25
S. Land	32	27
Offshore	63	38
Maryland	0	1
Michigan	2	1
Mississippi	16	12
Montana	9	13
Nebraska	0	1
New Mexico	95	66
New York	8	6
North Dakota	74	46
Ohio	10	14
Oklahoma	205	200
Pennsylvania	22	18
South Dakota	1	1
Texas	935	847
Offshore	10	6
Inland waters	0	1
Dist. 1	27	27
Dist. 2	35	29
Dist. 3	64	59
Dist. 4	89	79
Dist. 5	180	178
Dist. 6	138	128
Dist. 7B	29	41
Dist. 7C	61	58
Dist. 8	129	124
Dist. 8A	30	20
Dist. 9	44	36
Dist. 10	99	61
Utah	44	45
West Virginia	30	31
Wyoming	79	70
Others—NV-4; OR-1; TN-2; VA-6; WA-1	14	11
Total US	**1,990**	**1,767**
Total Canada	**470**	**343**
Grand total	**2,460**	**2,110**
Oil rigs	429	319
Gas rigs	1,548	1,442
Total offshore	78	46
Total cum. avg. YTD	**1,876**	**1,760**

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	10-3-08 Percent footage*	Rig count	10-5-07 Percent footage*
0-2,500	89	5.6	59	5.0
2,501-5,000	133	49.6	110	59.0
5,001-7,500	276	18.1	219	22.8
7,501-10,000	461	3.0	440	2.7
10,001-12,500	459	1.3	435	2.2
12,501-15,000	362	—	276	—
15,001-17,500	155	—	111	—
17,501-20,000	88	—	68	—
20,001-over	31	—	33	—
Total	**2,054**	**6.8**	**1,751**	**7.9**
INLAND	25		39	
LAND	1,977		1,661	
OFFSHORE	52		51	

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

Source: Smith International Inc.
Data available in OGJ Online Research Center.
Data not available at press time.

OGJ PRODUCTION REPORT

	[1]10-10-08	[2]10-12-07
	1,000 b/d	
(Crude oil and lease condensate)		
Alabama	20	20
Alaska	662	672
California	645	657
Colorado	60	66
Florida	6	6
Illinois	27	27
Kansas	101	105
Louisiana	865	1,180
Michigan	15	15
Mississippi	57	59
Montana	95	95
New Mexico	162	160
North Dakota	125	128
Oklahoma	171	171
Texas	1,225	1,328
Utah	50	54
Wyoming	148	149
All others	61	74
Total	**4,495**	**4,966**

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

US CRUDE PRICES

	10-10-08 $/bbl*
Alaska-North Slope 27°	110.67
South Louisiana Sweet	80.75
California-Kern River 13°	64.55
Lost Hills 30°	73.25
Wyoming Sweet	63.70
East Texas Sweet	73.75
West Texas Sour 34°	66.75
West Texas Intermediate	74.25
Oklahoma Sweet	74.25
Texas Upper Gulf Coast	70.75
Michigan Sour	67.25
Kansas Common	73.00
North Dakota Sweet	64.00

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

WORLD CRUDE PRICES

$/bbl[1]	10-3-08
United Kingdom-Brent 38°	96.20
Russia-Urals 32°	92.91
Saudi Light 34°	92.37
Dubai Fateh 32°	91.47
Algeria Saharan 44°	96.21
Nigeria-Bonny Light 37°	99.57
Indonesia-Minas 34°	98.10
Venezuela-Tia Juana Light 31°	95.33
Mexico-Isthmus 33°	95.22
OPEC basket	95.47
Total OPEC[2]	93.24
Total non-OPEC[2]	93.55
Total world[2]	93.38
US imports[3]	91.70

[1]Estimated contract prices. [2]Average price (FOB) weighted by estimated export volume. [3]Average price (FOB) weighted by estimated import volume.
Source: DOE Weekly Petroleum Status Report.
Data available in OGJ Online Research Center.

US NATURAL GAS STORAGE[1]

	10-3-08	9-26-08	10-3-07	Change, %
	bcf			
Producing region	867	832	981	–11.6
Consuming region east	1,899	1,855	1,895	0.2
Consuming region west	432	423	439	–1.6
Total US	**3,198**	**3,110**	**3,315**	**–3.5**
	July 08	**July 07**	**Change, %**	
Total US[2]	**2,516**	**2,894**	**–13.1**	

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

International rig count

Region	Land	Sept. 2008 Off.	Total	Sept. 07 Total
WESTERN HEMISPHERE				
Argentina	84	—	84	75
Bolivia	4	—	4	4
Brazil	29	29	58	40
Canada	434	2	435	351
Chile	3	—	3	1
Colombia	41	—	41	42
Ecuador	14	—	14	11
Mexico	76	26	102	104
Peru	6	2	8	7
Trinidad	1	4	5	3
United States	1,942	72	2,014	1,783
Venezuela	65	13	78	73
Other	1	—	1	3
Subtotal	**2,700**	**148**	**2,848**	**2,497**
ASIA-PACIFIC				
Australia	16	16	32	24
Brunei	1	3	4	5
China-offshore	—	20	20	21
India	54	22	76	85
Indonesia	51	9	60	62
Japan	3	—	3	3
Malaysia	—	14	14	15
Myanmar	4	1	5	7
New Zealand	4	2	6	5
Papua New Guinea	3	—	3	2
Philippines	3	1	4	—
Taiwan	—	—	—	—
Thailand	2	11	13	8
Vietnam	—	8	8	6
Other	—	4	4	3
Subtotal	**141**	**111**	**252**	**246**
AFRICA				
Algeria	26	—	26	30
Angola	—	4	4	3
Congo	1	2	3	3
Gabon	1	1	2	3
Kenya	—	—	—	—
Libya	16	—	16	14
Nigeria	3	4	7	11
South Africa	—	—	—	—
Tunisia	3	1	4	5
Other	3	3	6	4
Subtotal	**53**	**15**	**68**	**73**
MIDDLE EAST				
Abu Dhabi	8	3	11	14
Dubai	2	—	2	1
Egypt	48	16	64	51
Iran	—	—	—	—
Iraq	—	—	—	—
Jordan	2	—	2	1
Kuwait	12	—	12	11
Oman	54	—	54	49
Pakistan	23	—	23	19
Qatar	1	10	11	13
Saudi Arabia	62	14	76	78
Sudan	—	—	—	—
Syria	20	—	20	19
Yemen	15	—	15	16
Other	1	—	1	1
Subtotal	**248**	**43**	**291**	**273**
EUROPE				
Croatia	—	—	—	1
Denmark	—	2	2	2
France	—	—	—	1
Germany	11	—	11	5
Hungary	5	—	5	2
Italy	3	1	4	5
Netherlands	—	3	3	4
Norway	—	21	21	15
Poland	—	—	—	2
Romania	15	3	18	3
Turkey	6	—	6	5
UK	2	20	22	25
Other	7	—	7	7
Subtotal	**49**	**50**	**99**	**77**
Total	**3,191**	**367**	**3,558**	**3,166**

Definitions, see OGJ Sept. 18, 2006, p. 42.
Source: Baker Hughes Inc.
Data available in OGJ Online Research Center.

Oil import freight costs*

Source	Discharge	Cargo	Cargo size, 1,000 bbl	Freight (Spot rate) worldscale	$/bbl
Caribbean	New York	Dist.	200	231	1.96
Caribbean	Houston	Resid.	380	255	2.43
Caribbean	Houston	Resid.	500	246	2.34
N. Europe	New York	Dist.	200	420	5.74
N. Europe	Houston	Crude	400	253	5.12
W. Africa	Houston	Crude	910	170	3.77
Persian Gulf	Houston	Crude	1,900	102	4.20
W. Africa	N. Europe	Crude	910	173	2.84
Persian Gulf	N. Europe	Crude	1,900	86	2.58
Persian Gulf	Japan	Crude	1,750	113	2.75

*Sept. 2008 average.
Source: Drewry Shipping Consultants Ltd. Data available in OGJ Online Research Center.

Waterborne Energy Inc. US LNG imports

Country	Oct. 2008	Sept. 2008	Oct. 2007	Change from a year ago, %
	MMcf			
Algeria	—	—	—	—
Egypt	3,030	2,980	3,020	0.3
Equatorial Guinea	—	—	—	—
Nigeria	—	2,690	—	—
Norway	—	—	—	—
Qatar	—	—	—	—
Trinidad and Tobago	24,330	20,760	28,840	–15.6
Total	**27,360**	**26,430**	**31,860**	**–14.1**

Source: Waterborne Energy Inc.

Propane prices

	Aug. 2008	Sept. 2008	Aug. 2007	Sept. 2007
	¢/gal			
Mont Belvieu	165.09	153.00	118.61	129.50
Conway	158.42	149.72	118.64	128.76
Northwest Europe	162.61	162.01	119.28	124.72

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

Muse, Stancil & Co. refining margins

	US Gulf Coast	US East Coast	US Mid-west	US West Coast	North-west Europe	South-east Asia
	$/bbl					
Sept. 2008						
Product revenues	134.25	118.47	130.71	120.91	115.93	109.64
Feedstock costs	–108.69	–103.00	–100.59	–98.89	–100.27	–101.15
Gross margin	25.56	15.47	30.12	22.02	15.66	8.49
Fixed costs	–2.10	–2.43	–2.37	–2.76	–2.37	–1.84
Variable costs	–2.17	–1.46	–1.93	–3.43	–4.13	–1.18
Cash operating margin	**21.29**	**11.58**	**25.82**	**15.83**	**9.16**	**5.47**
Aug. 2008	7.05	3.73	15.29	11.75	5.52	0.04
YTD avg.	10.19	3.28	12.16	14.35	6.49	3.39
2007 avg.	12.60	6.65	18.66	20.89	5.75	2.26
2006 avg.	12.54	6.38	14.97	23.69	5.88	1.06
2005 avg.	12.53	6.98	12.31	20.55	5.51	1.52

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

Muse, Stancil & Co. gasoline marketing margins

Aug. 2008	Chicago*	Houston	Los Angeles	New York
	¢/gal			
Retail price	403.51	368.13	404.82	394.81
Taxes	63.87	38.40	67.20	55.59
Wholesale price	326.03	299.82	319.36	301.17
Spot price	315.94	287.11	302.33	288.33
Retail margin	13.77	29.91	18.26	38.05
Wholesale margin	10.09	12.71	17.03	12.84
Gross marketing margin	**23.86**	**42.62**	**35.29**	**50.89**
July 2008	35.17	41.76	55.10	50.59
YTD avg.	24.14	24.97	20.18	33.67
2007 avg.	26.96	23.12	19.05	31.10
2006 avg.	19.74	20.34	18.03	27.90
2005 avg.	19.77	16.26	20.39	27.13

*The wholesale price shown for Chicago is the RFG price utilized for the wholesale margin. The Chicago retail margin includes a weighted average of RFG and conventional wholesale purchases.
Source: Muse, Stancil & Co. See OGJ, Oct. 15, 2001, p. 46.
Data available in OGJ Online Research Center.
Note: Margins include ethanol blending in all markets.

Muse, Stancil & Co. ethylene margins

	Ethane	Propane	Naphtha
	¢/lb ethylene		
September 2008			
Product revenues	87.43	138.27	171.71
Feedstock costs	–33.29	–87.22	–156.19
Gross margin	54.14	51.05	15.52
Fixed costs	–5.38	–6.36	–7.19
Variable costs	–5.93	–7.03	–9.50
Cash operating margin	**42.83**	**37.66**	**–1.17**
Aug. 2008	31.69	39.09	4.59
YTD avg.	21.22	22.96	–12.50
2007 avg.	14.41	14.14	–7.42
2006 avg.	19.53	22.44	1.34
2005 avg.	14.43	20.68	1.28

Source: Muse, Stancil & Co. See OGJ, Sept. 16, 2002, p. 46.
Data available in OGJ Online Research Center.

Muse, Stancil & Co. US gas processing margins

Sept. 2008	Gulf Coast	Mid-continent
	$/Mcf	
Gross revenue		
Gas	7.31	4.17
Liquids	1.52	3.99
Gas purchase cost	8.14	5.60
Operating costs	0.07	0.15
Cash operating margin	**0.62**	**2.41**
Aug. 2008	0.77	2.16
YTD avg.	0.60	1.94
2007 avg.	0.44	1.47
2006 avg.	0.26	0.97
2005 avg.	–0.06	0.25
Breakeven producer payment % of liquids	57%	38%

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

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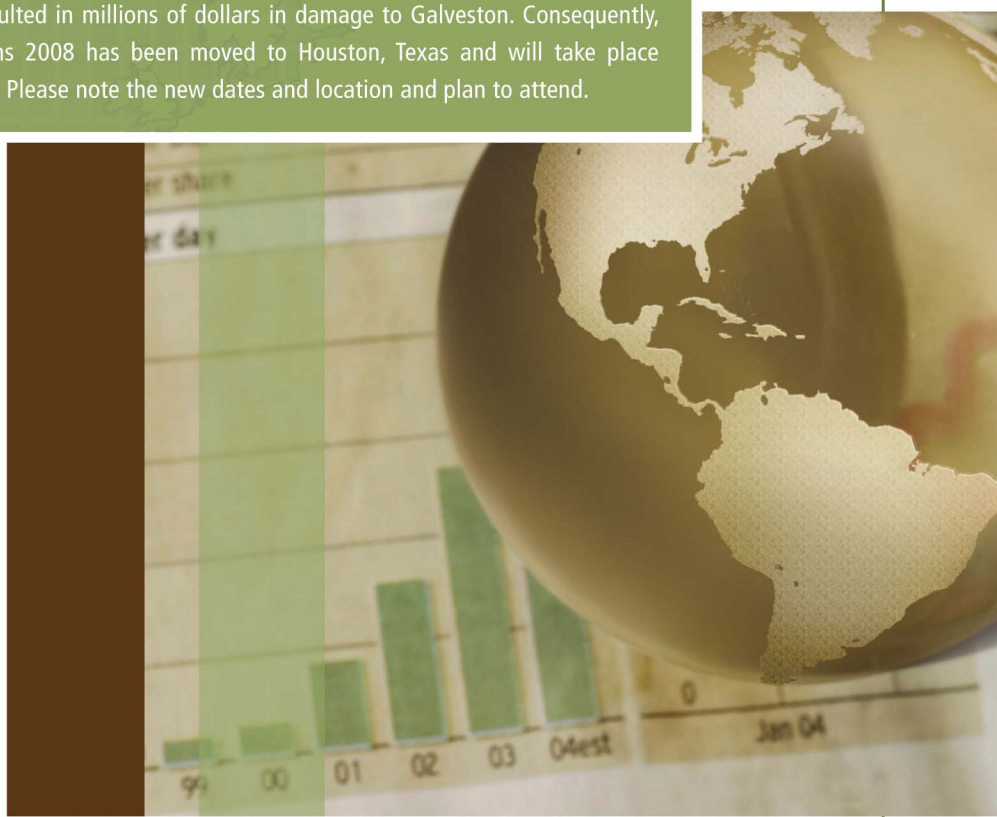

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To be certain of full consideration, a letter of interest and CV should be received by November 15, 2008. We strongly encourage applications from women and other minorities. Please forward your materials to the Energy Search Committee Coordinator Tina Borja at energyrecruit@rice.edu. Rice University is an equal opportunity/affirmative action employer

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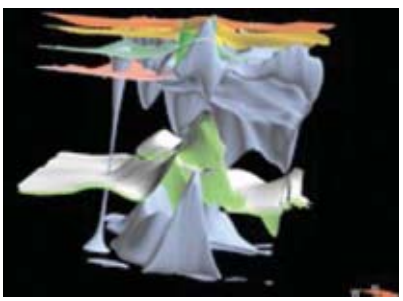
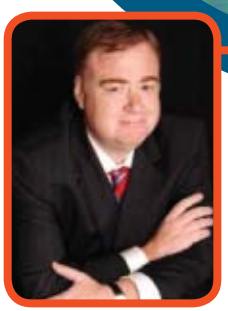


FREE WEBCAST

Tuesday

October 21, 2008

1:00 pm Central



Key Presenter:
Francisco Ortigosa
Director of Geophysics
Repsol-YFP

Francisco Ortigosa has dedicated 21 years to the petroleum industry holding geophysics related positions in Spain, Venezuela, Colombia, Russia, Kazakhstan, Egypt and currently USA.

He is particularly focused on the value added to the E&P Business by new technologies in the field of Geophysics. He recently created the Kaleidoscope Project that has been recognized by IEEE Spectrum as one of the most innovative projects for 2008. The Kaleidoscope Project is also a finalist for the Petroleum Economist awards 2008, Project Innovation of the Year.

Repsol, together with 3DGeo, a Houston-based imaging company formed by Stanford University professor and seismic imaging pioneer, Biondo Biondi, and the Spanish government-owned Barcelona Supercomputer Center (BSC), have created **The Kaleidoscope Project**. The Kaleidoscope Project is a "dream team" partnership of top geophysicists, computer scientists and organizations from around the world that are creating a major advance in computerized techniques for seismic imaging.

The Kaleidoscope Project now makes possible the full realization of the next generation seismic imaging technology, including a specialized technique called Reverse Time Migration (RTM), that *accelerates and streamlines oil and gas exploration by several orders of magnitude* compared to current industry standards.

On Tuesday, October 21, Francisco Ortigosa will present, in an exclusive Offshore webcast, an overview of this exciting new program that promises to change the future of oil and gas exploration. The webcast will be moderated by Offshore Managing Editor David Paganie.

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Oil industry helps ease the new load on US taxpayers

Congress has allowed the oil and gas business to ease the extra load taxpayers will assume from the vote-winning part of the economic rescue package signed into law Oct. 3.

That's one way for an industry to look at being singled out for tax increases.

The Emergency Economic Stabilization Act of 2008, providing for the public

The Editor's Perspective

by Bob Tippee, Editor

purchase of hundreds of billions of dollars' worth of distressed loans, didn't pass until Congress packed it with vote bait.

It added, for example, the Energy Improvement and Extension Act of 2008 (EIEA), an array of energy gifts President Bush threatened to veto when it first appeared in May. Having latched onto a bill widely seen as the last defense against financial-system collapse, however, this monument to the corruption of US energy policy is now law.

The Joint Committee on Taxation of Congress estimated the costs.

During 2009-18, it said on Oct. 1, "energy production incentives" will cost the national treasury $10.9 billion. These are new and extended tax breaks for exotic energy forms such as wind and geothermal and for conservation and carbon-mitigation projects. "Transportation and domestic fuel security provisions," including help for biofuel and cellulosic-ethanol plants, electric vehicles, and alternative-fuel service stations, will cost $2.6 billion over 10 years.

And the 10-year price of the EIEA's "energy conservation and efficiency provisions" will be a tidy $3.5 billion.

Part of what Congress takes from taxpayers to make producers of uneconomic energy happy, the oil industry will give back.

When the manufacturer's tax deduction rises to 9% for most American businesses in 2010, it will stay at 6% for oil and gas companies. The 10-year take for taxpayers (and cost to shareholders of the companies involved): $4.9 billion.

Adjustments in rules about tax treatment of non-US oil and gas production will cost the industry $2.2 billion. And an increase in the excise tax rate for the Oil Spill Liability Trust Fund will cost $1.7 billion.

On balance, the EIEA will cost taxpayers $61 billion through 2018. The whole package added to the emergency measure to win passage will cost $110.4 billion.

But who's counting?

(Online Oct. 10, 2008: author's e-mail: bobt@ogjonline.com)

Market Journal

by Sam Fletcher, Senior Writer

Crude prices lowest in a year

The November contract for benchmark US light, sweet crudes hit new lows for the year, trading as low as $77.09/bbl Oct. 10 before closing at $77.70/bbl, down $8.89 for the day on the New York Mercantile Exchange.

That market finished its first full October week with a 17% loss as international equity markets reeled in the current financial crisis and energy prices were undercut by indications of flagging demand.

Olivier Jakob at Petromatrix, Zug, Switzerland, said Oct. 10: "The volatility on equities is currently higher than on crude oil, and the stock markets remain the greater input into the current flat price fluctuations on West Texas Intermediate. There is blood on the street, and the stampede continues with equities currently in a self-perpetuating corrective cycle linked to the higher volatility. The sentiment is driven by the main equity indices, but most of them (such as the Dow Jones Industrial Average) have too few companies making the index. As the result of the historically high volatility, the attack on just one company will bring the whole index sharply lower and then panic selling comes in."

At Barclays Capital Inc. in London, analyst Paul Horsnell said, "The worsening in conditions over the past few weeks has been so acute and so dramatic that the situation has now led to a widespread, sudden, and severe downwards lurch in growth expectations. The corporate bond market is not functioning in anything like a normal way, and credit in all forms has become much more expensive. We have begun to see the impact of these financing constraints in the flow of [energy] data. Given these developments, we think the corporate sector is set to pull back on investment spending and hiring more significantly than has occurred so far in this cycle."

Economic growth reduced

As a result, Barclays Capital reduced its economic growth projection for the US to 1.6% for 2008, down from 2.1% previously, and to 0.8% for 2009, down from 2.5%. Growth forecasts for other key regions also are being cut; Barclays Capital reduced its 2009 growth forecast for China's gross domestic product to 9% from 9.5% previously.

The company's projection for global demand growth in 2008 is just barely positive at 150,000 b/d—the weakest annual growth rate since 1993 when energy demand collapsed in the former Soviet Union.

Horsnell said, "There are many different ways of putting this, but one way to think of it is that outside the Middle East, oil demand is set to fall this year. Our oil market balances now show year-over-year declines in global demand in both the third quarter and the current quarter, the first consecutive quarters of global demand decline since the fourth quarter of 2001 and the first quarter of 2002."

He said, "In terms of 2009 oil demand, following the GDP forecast downgrades, our projection is now for growth of just 330,000 b/d." Demand is expected to be down only slightly from year-ago levels in the first quarter of 2009, with weather likely determining whether quarterly declines in oil demand continue.

There have been sharp reductions in other consensus views of a possibly more severe economic slowdown, with the US Energy Information Administration making large downward revisions to both 2009 demand and non-OPEC supply.

US inventories

Meanwhile, US crude inventories have continued rising and were close to their 5-year average in early October, while oil product inventories remained extremely stretched. "The US system has started to show some more meaningful hurricane recovery, with runs starting to pick up and with delayed imports starting to arrive," Horsnell said.

He reported Oct. 10: "Crude imports into the Gulf Coast have rebounded back to a more normal 6.2 million b/d from the extreme low of 2.7 million b/d hit 2 weeks ago, as the delayed cargoes continue to work their way back into the data. Further up the pipelines, crude inventories at Cushing, Okla., remain low, reaching a new low for the year in the latest data [through Oct. 3]. The gasoline supply system is returning to normal, with pipelines being refilled.... Gasoline imports reached 1.4 million b/d in the [Oct. 3] data, as a small armada arrived in the south to bring the system back to a more even keel. All we need to know about demand is that it is very weak." September may have been the month of weakest US demand for oil so far this year, providing "the first very tentative measure" of "a severe 5.9%" decline in US oil demand across the third quarter.

(Online Oct. 13, 2008; author's e-mail: samf@ogjonline.com)

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BAKER HUGHES INTEQ

ALBERTA

SECURING TOMORROW'S PROSPERITY

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contents

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Alberta Poised to Meet Global Energy Demand

Province puts out welcome mat for investors in booming market

By any standard of measurement, the worldwide demand for energy is far from peaking with consumption forecasted to more than double over the next two decades. While supplies remain firm, most prognosticators agree that ever-increasing demand and the higher prices accompanying it will eventually force consumers to look outside traditional energy sources.

In its definitive *International Energy Outlook 2008*, the U.S. Department of Energy's Energy Information Administration (EIA) predicts that in the best-case scenario global energy consumption is poised for no less than a 50% increase between 2005 and 2030. The outlook is even more eye-opening when considering countries outside the Organization for Economic Cooperation and Development (OECD), which includes the burgeoning economies of China and India. There, cumulative consumption is expected to grow a staggering 85% over the 25-year period examined.

"As the government we are the trustee on behalf of all Albertans and it is our responsibility to get a return on the province's resources."
Ed Stelmach, Alberta Premier

The EIA said fossil fuels will continue to provide the bulk of energy consumed worldwide, putting continual pressure on conventional supplies of oil, natural gas and coal. In its January 1, 2008 supply forecast, the *Oil & Gas Journal* estimated that proven world oil reserves stand at 1,332 billion bbl with 54% located in the Middle East. While on the natural gas side, the EIA says worldwide consumption will increase from the 104 tcf used in 2005 to 158 tcf in 2030. Non-OECD countries are expected to account for 90% of the increased gas production that will be needed. Those estimates include only conventional sources of fossil fuels, meaning unconventional resources such as oil sands, extra-heavy crude oil, biofuels, coal-to-liquids (CT), gas-to-liquids (GTL) and others, are predicted to become even more competitive over the next few years. So much so that the EIA forecasts that global production of unconventional sources, which totaled 2.5 million bbl/day in 2005, will soar to more than 9.7 million bbl/day over the next two decades. This being the case, on the basis of current estimates, that volume would account for 9% of the total world's liquid supply on an oil-equivalent basis.

With growing concern over global future energy supplies, Alberta has positioned itself as one the world's most attractive providers. Owing to its secure and abundant natural resources, investment-friendly business and legal framework, a highly developed infrastructure, unparalleled government transparency and strategic location in the heart of the world's energy markets, the world is looking to Alberta as a predominate supplier of current and future energy requirements. More importantly, the province has become a world leader in striking a balance between world-class production and environmental stewardship.

Alberta is home to the second largest proven concentration of oil in the world. The vast majority of those reserves are trapped within the oil sands and while some may see producing this unconventional resource as a daunting, expensive and

Creebum Lake is located immediately west of the Muskeg River Mine.

environmentally suspect enterprise, the provincial government and industry have joined forces to make Alberta a vanguard for efficient and clean energy production.

The provincial government is quick to point out that complementary to its enormous resources and industry-leading environmental technologies, Alberta is the continent's most attractive investment opportunity. They say companies looking to expand will find the only debt-free jurisdiction in North America and one with no sales tax and the continent's lowest income and corporate taxes. Furthermore, while its attractive conventional and unconventional fossil fuel reserves will remain at the forefront for the foreseeable future, Alberta Premier Ed Stelmach acknowledges that rising commodity prices will make clean alternative energy sources more attractive. Accordingly, the province is taking a lead in the development of clean alternative energy sources.

"With increasing oil prices, we are seeing solar, geothermal, biomass, ethanol and biodiesel become more competitive in the overall energy mix" he said in an exclusive interview.

In the meantime, with proven fossil fuel reserves totaling an estimated 1.5 billion bbl of conventional oil, 41 tcf of natural gas, as much as 500 tcf of coalbed methane and another 34 gigatonnes of coal, which represents 70% of Canada's resource, it appears that the province will have little difficulty financing aggressive research and social enhancement programs.

Those numbers become even more staggering when considering the 1.73 trillion bbl the *Oil & Gas Journal* estimates are in place in the oil sands of the northeast. Second only to the heavy oil deposits of Venezuela's Orinoco Basin in worldwide unconventional reserves, the Alberta oil sands in 2007 produced nearly 1.2 million bbl/day, according to the Canadian Association of Petroleum Producers (CAPP) of the potential 1.184 million bbl/day marketable production estimated by the *Oil & Gas Journal*. The oil sands were the highest contributor to Canada replacing Saudi Arabia in 2007 as the number one exporter of crude oil and refined products to the U.S.

On top of that, Alberta is also Canada's largest developer of petrochemicals while simultaneously becoming the first jurisdiction in North America to legislate greenhouse gas (GHG) emissions at oil sands, refineries and other large industrial facilities.

Royalty, GHG levy helps fuel booming economy

Alberta's booming resource-rich economy is expected to expand appreciably early next year, thanks in no small part to a revised Royalty Framework unveiled in October 2007. The new royalty scheme, which is scheduled to take effect in January 2009, is expected to pump an additional $1.74 billion into Alberta's revenue base in this fiscal year alone.

Energy Minister Mel Knight said the revision was long overdue. The new framework replaces an archaic two-tier structure that existed untouched for about 15 years and was based on oil and gas prices that have long gone the way of the dinosaurs, never to return. He explained that the new framework comprises sliding scales for oil and gas, based on more realistic commodity prices.

"In the days the royalty regime was formulated, there were very few people thinking about $100, $120, or $130 oil. Generally speaking, I think even industry players understand that you need to readjust to set yourself on different levels as you go ahead," he said.

Since its introduction, the royalty program has been amended to include incentives for operators of gas and oil wells 2,500 m and 2,000 m deep, respectively, and other cost-intensive developments.

"As the government we are the trustee on behalf of all Albertans and it is our responsibility to get a return on the province's resources." adds Premier Stelmach.

Led by the oil sands, those resources most definitely are seeing the return he envisioned and have helped fuel a thriving

Alberta is Canada's largest developer of petrochemicals.

economy that shows no sign of cooling anytime soon. In its 2008 mid-year update on the province's economic outlook, the Alberta Ministry of Finance and Enterprise said that with strong commodity prices, economic growth is forecast at 3.1%, second only to Saskatchewan. In addition, the Alberta unemployment rate was 3.6% in May 2008, near its lowest level in 30 years.

"Alberta essentially is at full employment," the report concluded. Thanks in large part to the soaring energy prices the Alberta economy is poised for a near-record $8.5 billion surplus this fiscal year. The provincial government says increased revenues from the new royalty regime and the carbon levy, which goes into an environmental technology fund, are being allocated to improve the lives of Albertans. While enhancing the infrastructure, diversifying the economy and increasing multi-disciplinary research have received widespread attention, priority is being given to reducing the footprint of its energy production and improving environmental quality on all fronts.

During a recent meeting in Jackson Hole, WY with the state's governor and other officials, the premier said they appeared surprised to learn that Alberta holds the distinction of being the first jurisdiction in North America to put a price on the disproportionate generation of carbon dioxide (CO_2). "I came back with the definite feeling that with respect to what we are doing with greenhouse gas emissions, our work on alternative energy sources, our water for life policy and air quality policy, that Alberta is far ahead of all other jurisdictions in North America."

The province's earlier efforts to reduce greenhouse gas (GHG) emissions have shown the most palatable results. Oil sands production today accounts for 5% of Canada's GHG emissions and a mere one-tenth of 1% of all global releases. The effort was fortified in 2007 with an unprecedented legislation that requires existing industrial facilities that emit more than 100,000 tons of GHG a year reduce the amount by 12% or pay a $15/ton levy.

Natural gas plant, Alberta.

Hydroelectric plant, Belly River.

SunBridge windpower project, Saskatchewan.

The province has a strict air quality monitoring mandate and has enhanced its long-standing commitment to reduce industrial water usage, both of which are well ahead of other North American programs. In addition, its stringent land reclamation legislation is designed to reclaim property used for industrial purposes and transform it to beneficial reuse.

The province has also committed itself financially to the North America climate change initiative to the tune of an unprecedented $2 billion investment in a comprehensive Carbon Capture and Storage (CCS) program.

In addition, the government says it aims to take the equivalent of thousands of Alberta vehicles off the streets and highways through an additional $2 billion investment in public transit investments. The Green Transit Incentives Program (Green TRIP) will promote the use of local, regional and inter-city public transit. Funds for the two initiatives will come from this year's surplus, which the province expects will be significantly larger than predicted.

Further, the government has joined forces with private industry to invest more than $1 billion to continue to improve the efficiency and environmental footprint of oil sands development.

"We want people to understand that we are taking positive steps towards absolute reduction of emissions in Alberta and that we have been doing it for a number of years," said Energy Minister Knight.

In his role as Chair of the Alberta Economic Development Authority (AEDA),

Terry Gomke, for one, said those investments definitely will produce more benefits in the years to come.

"The Alberta oil sands are a very key, strategic resource and it is a global supply that is stable and secure. More importantly, the operators have a strong commitment to safeguarding the environment," he said.

Concurrent with the increase in development is a public infrastructure enhancement program that will total $22.2 billion over the next three years, by far the largest such plan of any jurisdiction in Canada. A key component of that ambitious plan is the flagship 'Building Canada" program that advances national priorities important to all Canadians, including a stronger economy, a cleaner environment and better communities, while addressing local and regional infrastructure needs.

"The additional revenue from the royalty framework will be going back into three-tiered areas – public services, health and education, infrastructure – and the remaining one third will go into savings for future generations," said the Premier.

"We have the best education system you will find on the North American continent and amongst the finest health care systems in the world."
Iris Evans, Minister of Finance and Enterprise

Many of those planned improvements will be allocated to Fort McMurray where the massive influx of workers into the oil sands strains available housing and municipal services. Accordingly, the province has implemented new policies through a public/private partnership with a significant investment in housing, including making 20,000 acres available for new housing developments, with another $450 million earmarked for potable water and sewage treatment.

"In the days the royalty regime was formulated, there were very few people thinking about $100, $120, or $130 oil."
Mel Knight, Minister of Energy

To facilitate the effort, a secretariat is now stationed in Fort McMurray with the objective of organizing and overseeing the construction of the remodeled infrastructure that includes not only housing, sewer and water enhancements, but also schools, hospitals and long-term care, the Premier explained.

Aided by a project announced in late 2007 to improve the transparency and accountability of the government's agencies, boards and commissions, a business responsive legal system with very low corporate tax rates, and a $100 million enterprise fund to attract companies to Alberta, the province has positioned itself as an ideal place to establish a company and a family.

"We have the best education system you will find on the North American continent and amongst the finest health care systems in the world" says Finance and Enterprise Minister Iris Evans. "The standard of life here is pretty darn special. And that is why I think a lot of people come here and then choose to stay."

Alberta: A Region of Diverse, Abundant Resources:

Conventional, CBM, shallow gas, renewables comprise wide-ranging energy mix

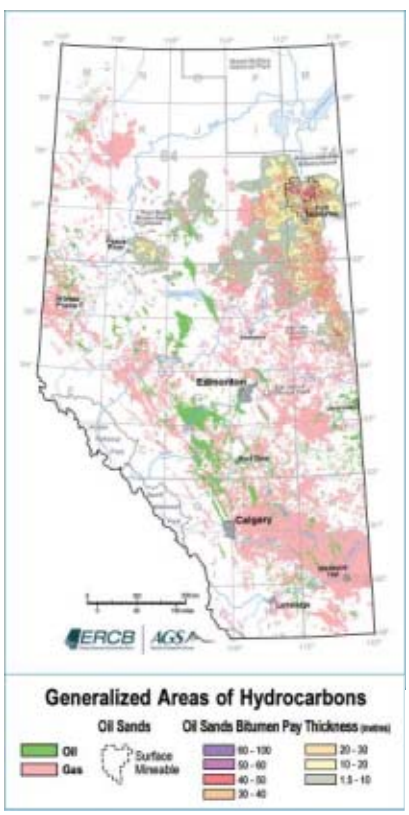
With considerable oil and gas resources putting Alberta squarely in the global limelight, investing in alternative energy sources may appear to be an unwarranted enterprise. Alberta Premier Ed Stelmach, however, says doing so is both a necessity and an obligation. "If there is a jurisdiction in North America that should do it, it is Alberta because we have the resources for the research," he says.

As the province continues to take the lead in alternative energy, the focus on exploiting Alberta's conventional and unconventional reserves remains strong. Taking into account conventional and oil sands, the Canadian Association of Petroleum Producers (CAPP) reports that total western Canada crude production was 2.4 million bbl/d last year and by 2020 is expected to increase anywhere between 4.4 to 5.0 million bbl/d.

Much of that will come from the Alberta oil sands, which CAPP said last year accounted for nearly 1.2 million bbl/day. In 2006, oil sands production for the first time exceeded conventional oil, which has been declining steadily since the late 1990s.

Western Canada, likewise, is the principal contributor to Canada's ranking as the world's third largest natural gas producer. With its 2006 acquisition of Burlington Resources, ConocoPhillips became a top-three natural gas producer in Canada more than doubling its reserves, wells and production in the region, it says.

Like conventional oil, drilling for traditional sources of natural gas also has declined in recent years. However, 2008 promises to be the exception as many operators, facing the impending inauguration of the new royalty regime, attempt to drill and produce as quickly as possible to generate peak production before the new royalties take effect. Consequently, PriceWaterhouseCoopers, in its *2008 Canadian Energy Survey,* said the gas prospects for the remainder of this year "is very positive."



Minister of Energy Mel Knight said revisions to the framework awarding incentives to high-investment projects have helped put the industry and government on the same page.

"We have had very good discussions with industry and other interested parties who are stakeholders in Alberta. I think we have arrived at a situation that is positive in all directions," he said.

Unconventional activity strong

From all indications, operators concentrating on shallow gas campaigns in the southeast are doing their part to offset the decline in conventional gas drilling. Harold Wilson, Executive Director of the Economic Development Alliance of Southeast Alberta, said exploration in an area rich in low permeability shallow gas sands is expected to expand considerably. New drilling activity in tandem with workovers and increased use of infield drilling technology is helping southeast Alberta "enjoy record oil and gas activity levels," adds Randy Humphrey, President of the Medicine Hat Oilmen's Association.

Another non-traditional fuel source with a growing fan base is the bright prospects for methane deposited within coal seams, principally throughout southern and central Alberta. The Alberta Geological Survey (AGS) estimates there could be as much as 14 trillion cubic meters, or about 500 tcf, of coalbed methane (CBM) trapped in Alberta's vast coal seams. A joint study by the Energy Resources Conservation Board (ERCB) and the National Energy Board (NEB) in 2006 estimated the ultimate potential of marketable CBM in Alberta to be between 205 and 253 tcf with an additional 101 tcf estimated for the remaining ultimate potential.

Western Canadian companies are also increasing their interests in the flourishing Bakken oil shale that reaches from neighboring Saskatchewan to across the border, into Montana and North Dakota. Heralded by some as the second coming of the Alaskan North Slope, the Bakken is estimated to hold upwards of 400 billion bbl of crude. Petrobank Energy and Resources Ltd. President and CEO John D. Wright said his company, which holds 137,000 net acres in southeastern Saskatchewan will operate or participate in drilling more than 150 prospects this year, making it "the most active driller on the play."

With its 2006 and 2007 acquisitions of major Bakken operators Mission Oil and Gas Inc. and Innova Exploration Ltd., respectively, Crescent Point Energy Trust became the second largest producer in the play. More than 75% of Crescent Point's production is in southern Saskatchewan and in December 2007 the operator reported its holdings in the

Natural Gas rig.

Bakken may contain up to 3 billion bbl of original oil in place.

Despite the maturity of the region, Alberta Minister of Finance and Enterprise Iris Evans said opportunities for securing promising acreage remains. "There are many possibilities, for example, with conventional deep oil well drilling. There are other opportunities also available for various players to get involved," she said.

Renewable energy

Concurrent with the industry's emphasis in tapping into known traditional and non-traditional energy sources is the province's leadership role in developing alternative energy technologies. Alberta leads Canada and much of the world in investments for exploring new energy technologies from hydroelectric power and biomass to wind-generated electricity. Wind energy already powers some 90% of all Alberta government buildings.

Energy Minister Knight said the administration is developing an integrated energy strategy, entailing not only the province's large hydrocarbon resource base, but its emerging alternative energy technologies.

"It is a small business at the moment, but it is there. There is tremendous opportunity for bio generation – both from wood, waste and agriculture byproduct – and from geothermal operations in the province."

Many international operators with global alternative energy research programs, likewise, have brought their expertise to the province. Shell Canada said its worldwide renewable energy effort extends to Alberta, where the operator focuses primarily on wind power generation. President and Country Chair Dave Collyer, the incoming 2008 CAPP President, said the company is also heavily involved in biofuels research. "Shell globally is focused on wind and biofuels. Both of those are represented in terms of our business activity in Canada" he said.

Nexen Inc., likewise, is heavily involved in the renewable energy effort, focusing on wind power with a 50% interest in the Soderglen project and plans to commit to a second project southeast of Calgary, said President and CEO Charles Fischer. "When we look at all the renewables, we think wind is the most cost-effective," he said.

The hydropower industry also is gaining steam with the Canadian Hydropower Association estimating that water power already delivers two-thirds of the electricity generated in the nation with more projects on the boards. Of the latest projects to be proposed, in late 2007, Canadian Hydro Developers Inc., through its wholly owned subsidiary Glacier Power Ltd., proposed the construction of a 100-MW, low-head, run-of-river hydroelectric facility on the Peace River near Dunvegan, Alberta.

> "Shell globally is focused on wind and biofuels. Both of those are represented in terms of our business activity in Canada."
>
> Dave Collyer, Shell Canada President and Country Chair

Nevertheless, the oil sands remain center stage in the regional and world energy scene.

Oil Sands Development Continuing at Brisk Pace

Bitumen production increases with major expansions, emerging technologies

Not that long ago, Fort McMurray was a bucolic trapping outpost of 7,000 residents at the confluence of the Clearwater and Athabasca Rivers. Today, it is a genuine boomtown with a population exceeding 80,000 stretching an infrastructure ill-equipped to accommodate the invasion. All because of a substance seeping into the river beds that trappers used to mix with resin to caulk their canoes.

Today, the majority of the Canadian oil sands, which were first investigated in 1875, are situated in the Athabasca-Wabiskaw, Cold Lake and Peace River deposits in northern Alberta. The trio holds a combined resource base estimated at 1.73 trillion bbl of crude oil.

While commercial production of the oil sands first began in 1967 with the now-Suncor mine, it was not until this decade that improving technical efficiencies and sky rocketing oil prices turned the sands into a thriving undertaking.

How it is produced

Naturally occurring bitumen is the prime feed stock for the synthetic crude produced from the oil sands. A mixture of organic liquids that are highly viscous and composed of highly condensed polycyclic aromatic hydrocarbons, bitumen is so thick that it must be heated or diluted before it will flow.

In its infancy, oil sand production was dominated by near-surface mining, which remains cost-effective with an 80% to 90% recovery rate. With the identification of deposits too deep for conventional mining, the advent of in-situ extraction techniques opened the door for cost-effective production of deeper reserves while removing many of the environmental concerns of surface extraction. Today, only 20% of the known reserves in Alberta are recoverable through mining with the remaining 80% is produced by Steam Assisted Gravity Drainage (SAGD), Cyclic Steam Stimulation (CSS) or other in-situ methods.

The SAGD enhanced oil recovery (EOR) technology is an advanced form of steam stimulation where CO_2 is injected into existing reservoirs to extract more resource. In SAGD a pair of horizontal wells is drilled into the reservoir, one just above the other. Low pressure gas-generated steam is injected continually into the upper wellbore to heat the bitumen, thus reducing its viscosity. The heated oil is drained into the lower wellbore, where it is pumped out and transported to an upgrader for refinement into commercial oil. Though employed considerably over the past 25 years, SAGD is an inherently water and gas-intensive technology.

Prior to the development of SAGD, Imperial Oil developed the CSS technology that still accounts for the majority of its Cold Lake production. A multi-step process, CSS begins with steam injection, followed by a waiting period of up to several weeks while the steam soaks the heavy oil, which precedes a recovery phase before the crude can be sent to an upgrader.

Theoretically, the ability to produce continually would appear to make SAGD a much more viable option, but Imperial says the older CSS technology is more efficient in zones with good horizontal permeability.

One of the newest in-situ technologies is the toe-to-heel air injection (THAI™) process, owned by Petrobank Energy and Resources Ltd. and its wholly-owned Whitesands Insitu Inc. subsidiary. Petrobank President and CEO John D. Wright said the new technology, will be employed to produce the estimated 2.6 billion bbl of bitumen-in-place at the Whitesands May River Project in the Conklin region.

Petrobank is also awaiting regulatory approval for an additional three wells to test

Gasifier and Hydrocracker, Long Lake Project.

both THAI™ and its complementary CAPRI™ technology, which uses chemical catalysts to lower the viscosity and improve the quality and flow characteristics of the produced oil. Mr. Wright said the CAPRI™ expansion is expected to come on-stream by the end of the year.

"Combining these two processes in a typical heavy oil opportunity gives us the chance to significantly increase the amount of oil we expect to recover from a given project and through the chemical reactions that occur in the reservoir, we are actually able to enhance the quality of the crude oil that is produced," he said.

Other emerging in-situ technologies include pulse technology and vapor recovery extraction (VAPEX).

Processing challenges

Along with extraction, processing bitumen and heavy oil into a commercial commodity poses a host of technical and design challenges, says Aker Solutions, which handles an estimated 700.000 bbl/day of oil sands production. Vice President of Business Development Matthew Hamer said the acquisition of a company that had been processing heavy crude in Kern County, CA since the 1950s gives Aker Solutions a unique position in the oil sands.

"We have a great deal of experience in processing upstream heavy oil. We also have technologies for taking care of some of the effluent streams that are produced as part of the treatment process that is necessary to clean up the water so it can be reinjected into the well or recirculated into the facility," he explained.

Basically, Aker Solutions' responsibility is to take unusable bitumen or heavy oil and convert it into a sellable product. This requires removing an array of contaminants, including gas, H_2S, water, sand and other sediments. Mr. Hamer said it is critical that operators engage heavy oil processing experts early in the development of an oil sands project.

"This is especially true with SAGD operations," adds President and Canada Country Manager Michael Hambly. "These projects normally start out very small and build up over time. What we really want to emphasize to the client is to work with us early, so that we can design a plant that develops with the evolution of their business."

Oil sands in demand

Regardless of the extraction or processing technologies employed, the 1.2 million bbl/day produced from the massive oil sands of Alberta is welcomed desperately at a time when rising costs and demand coupled with concerns of future supplies being held by less stable regimes, combine for a nervous market. Closer to home, the intensity of oil sands development is offsetting the continual decline in western Canadian conventional drilling activity.

The Canadian Association of Oilwell Drilling Contractors predicts 38% fewer conventional wells will be drilled between 2006 and 2008. However, the outlook is far brighter for the Alberta oil sands with the

One of the province's emissions reduction projects.

National Energy Board (NEB) expecting daily production to jump to 2.8 million bbl by 2015.

The portfolio of investments in the oil sands suggests there will be no downturn in activity anytime soon. Between 2000 and 2007, an estimated $67 billion was invested in oil sands projects with another $170 billion earmarked for projects already in the planning stages. Of that, contracts valued at $2.6 billion were awarded to aboriginal-owned companies between 1998 and 2007, says Don Thompson, President of the Oil Sands Developers Group.

"The growth continues to be in the oil sands, which is very welcomed when you look at the decline in conventional light oil supply. North America needs to have a stable source of future supplies and clearly the oil sands play an important role in that," said Pierre Alvarez, outgoing CAPP President.

"In my mind, heavy oil is the future of the oil and gas industry. Most of the easily accessible conventional reserves simply are not there anymore. So, we have to look at more challenging and unconventional sources and heavy oil definitely is one of the answers," adds Aker Solutions President Hambly.

Prospects for the oil sands are even more promising when the carbonate play for heavy crude trapped in rocks is taken into account. Many have called it one of the world's next giant plays and Osum Oil Corp., a 100% privately held firm, is already laying the groundwork for developing the so-called Saleski carbonates in the Wabasca region. The operator plans production trials this year in anticipation of a potentially producing more than 150,000 bbl/d.

In the meantime, expansion is continuing at a frenzied pace at a number of high-profile projects.

Albian Sands

A major upgrade is underway at the Albian Sands operation, which is a joint venture of Shell, Chevron and Marathon. Located just north of Fort McMurray, the field produces about 155,000 bbl/d and is integrated with the upgrader located adjacent to the Shell refinery at Scotford, east of Fort Saskatchewan. The integrated process produces the bitumen at Fort McMurray, where it is mixed with diluents and shipped via pipeline to Scotford.

Expansion 1 of the Athabasca Oil Sands Project (AOSP) now under construction will increase capacity at the Albian Sands mining operation and Scotford Upgrader by 100,000 bbl/day by 2010, Shell says.

"We upgraded the Scotford facility so it is an integrated package. The expansion we currently have underway will expand that project by about 100,000 bbl/day bringing it to 255,000 bbl/day," said says Dave Collyer, President and Country Chair of Shell Canada, which owns 60% of the Albian operation. Regulatory applications have also been filed to expand both the mine and upgraders that could bring production up to 700,000 bbl/day.

Oil sand.

Extraction separation cell.

Coker towers.

Long Lake

Up-front engineering is underway for the Phase 2 upgrader expansion at the Long Lake Project in the Athabasca oil sands of northern Alberta. Operated in a 50/50 joint venture between Opti Canada Inc. and Nexen Inc., Long Lake became the fourth major integrated oil sands project in western Canada when it began production of 58,500 bbl/day of 39° API sweet crude from 81 SAGD well pairs. Long Lake holds an estimated 2 billion bbl of recoverable reserves.

Opti Canada President and CEO Sid Dykstra said Long Lake was the first to combine SAGD with the company's proprietary OrCrude™ hydrocracking and gasification technology to produce, what he termed, "one of the highest quality synthetic crude oils ever produced from the Canadian oil sands with very low operating costs."

Dykstra said Phase 2 of the integrated project, which includes a new upgrader, has the potential to be sanctioned later this year.

Christina Lake and Foster Creek

Expansions underway at the Foster Creek and Christina Lake projects in northeast Alberta promise to increase bitumen production to 200,000 bbl/day, says Operator EnCana and partner ConocoPhillips.

Expansion at Foster Creek, completed in 2007, raised production by 60,000 bbl/d, while the next two phases will add an additional 60,000 bbl/day. The twin-expansions will come on line this year and in 2015, respectively.

Productive capacity at Christina Lake is expected to grow to 18,000 bbl/day this year,

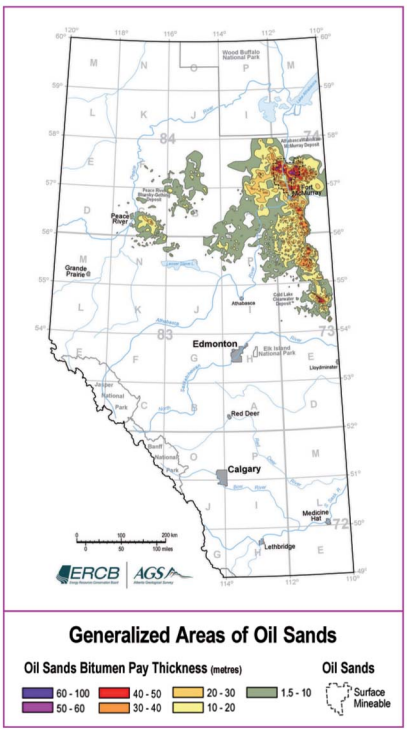
while development is underway for an additional 40,000 bbl/day expansion planned to come on stream by 2011.

ConocoPhillips significantly increased its stake in the Foster Creek and Christina Lake properties with the January 2007 completion of the FCCL Oil Sands Partnership agreement with EnCana. In addition to the company's interest in Syncrude, the Surmont joint venture and undeveloped resources in the Saleski, Thornbury and Clyden areas, this new partnership significantly increases the company's Canadian oil sands resource holdings.

EnCana Executive Vice President of Corporate Relations Gerry Protti said the twin expansion will further reinforce EnCana's position as a leader in conserving water used in oil sands development. "We have the lowest steam-oil ratio of all the operators in Alberta and we have the lowest use of natural gas to produce a barrel of bitumen. With our Weyburn project in Saskatchewan, we also have the world largest carbon CO_2 sequestration facility".

Whitesands

Petrobank's President Wright said the use of THAI™ and CAPRI™ technologies at the Greenfield May River Project at Whitesands will minimize considerably the environmental footprint, while ultimately delivering 100,000 bbl/day. The first module of the project, which will be completed in stages, will have the initial capacity to produce 10,000 to 15,000 bbl/d of partially upgraded bitumen.



Unlike SAGD, the THAI™/CAPRI™ technologies, which require only one horizontal well and one vertical well, essentially eliminates the need for bulky steam generators, large water handling and clean up facilities and settling tanks. "Our footprint is reduced dramatically because our process requires none of those facilities. We simply install an oil battery at one end and in the vertical wells we put a conventional, off- the-shelf air compressor and inject atmospheric air," said Mr. Wright.

"We plan to rapidly increase productive capacity and it will look nothing like a traditional oil sands operation. More importantly, we consume no water or natural gas, in fact, we are a net producer of usable water," he added.

Jackfish

With the original Devon Energy Jackfish project up and running since July 2007, regulators have now approved plans for Jackfish 2, says Devon Canada President Chris Seasons.

24 hours a day, 365 days a year these trucks carry raw ore to the extraction plant.

In September 2008, Devon received regulatory approval for its second oil sands project in Alberta. Jackfish 2 has recoverable reserves of 300 million bbl and the construction of the 100% Devon-owned project will begin immediately.

Once fully operational in 2012, Jackfish 2 will produce about 35,000 bbl/day.

"We have a target of hitting 100,000 bbl/day of thermal heavy oil and plans afoot to bring a third project on line," he said.

As importantly, the Devon Canada chief said 95% of the 100,000 - 120,000 bbl of water used in the production of 35,000 bbl/day of bitumen is either saline or recycled. "The company has met its objective of using no fresh water," he said. "Devon sees this project as a success from an environmental stewardship, business, and operational perspective. We look forward to using similar principles at Jackfish 2."

Other projects

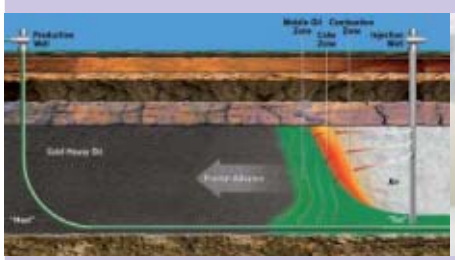
In other developments, PetroCanada, with a 60% interest, is developing its Fort Hills Project in partnership with UTS Energy and Teck Cominco and, if approved this year, upgraders will begin production in 2012. PetroCanada says the project, currently estimated at $23.8 billion for the first phase of the development will be the largest capital project the company has ever undertaken and "one of the largest in Canadian history."

Fort Hills is adjacent to Syncrude's North Aurora Mine and just north of the Albian Sands Muskeg River Mine. The well-defined resource holds an estimated 4 billion bbl of reserves, the operator said. During 2007/2008, the partnership planned to further delineate the project to support a detailed mine and regulatory application, according to UTS.

In 2007, a host of regulatory filings for upcoming projects were submitted, including, among others, Suncor Energy's Voyageur South Project, EnCana Energy's first Phase of its Borealis SAGD Project, and TOTAL E&P Canada's request for approval of a 200,000 bbl/day upgrader in Strathcona County.

"In my mind, heavy oil is the future of the oil and gas industry." Michael Hambly, President and Country Manager of Aker Solutions

THAI™/CAPRI™ IN-SITU TECHNOLOGY



Petrobank Energy and Resources Ltd. holds a unique place in the industry with its patented and field-proven THAI™ toe-to-heel air injection technology, which has created a paradigm shift in the extraction of bitumen from the oil sands.

Today, THAI™ is being combined with the complementary CAPRI™ technology, which is designed for partial catalytic upgrading of the bitumen in-situ. This combination essentially creates a cost-effective and environmentally sound in-situ extraction process that partially upgrades the bitumen.

In the extraction process, THAI™ combines a vertical air injection well with a horizontal production well. Air is injected continuously into the injection well, thus initiating combustion in the oil sands formation. At the leading edge of the combustion front, partial upgrading of the bitumen occurs. The heavy portion of the bitumen remains in the reservoir, providing the fuel to support the advancing combustion front. The now-mobile bitumen and the combustion gases, including light hydrocarbons, drain to the horizontal well by gravity and the pressure differential between the reservoir and production well, where hot bitumen and vaporized reservoir water are collected and flow to the surface.

Benefits:

- *Higher Resource recoveries*
- *Lower Capital Costs*
- *Lower Operating Costs*
- *Partially Upgraded Product*
- *Lower greenhouse gas emissions*
- *Sulphur and Heavy metals reduced*
- *No water or gas fuel required during production*
- *Net water production of industrial quality*
- *Much smaller surface footprint*

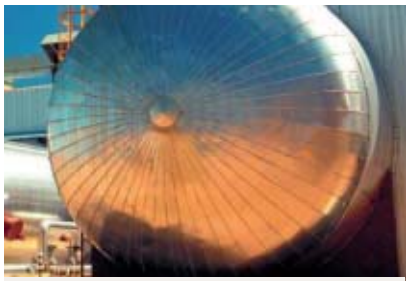
Addressing environmental concerns

Minimal effect on the environment and responsible development are the catch words for everyone engaged in the Alberta oil sands. While acknowledging the synthetic crude produced from oil sands has a higher carbon content than traditional sources, insiders point to the government-mandated carbon capture and storage program and other unprecedented industry initiatives as proof positive of their environmental commitment.

"I think a lot of the environmental community wants to use oil sands as the poster image of an off-oil campaign because they want to see the end of oil. But we have absolute transparency, unlike many parts of the world, so the public can see and have input into what the industry and government are doing to safeguard the environment. We all report on our own performance," said Mr. Alvarez.

Advanced technologies are critical in not only improving operational efficiency and increasing production, but also in optimizing environmental performance, say operators and government officials.

"Developing oil sands is technology-intensive. This means there is what we call a technological upside. In other words, there are many opportunities for continuous improvement. For SAGD, this would mean less steam and therefore, lower CO_2 emissions. Though companies are steadily increasing their investments in researching new technologies, we believe there is always room for improvement in this area," said President of StatoilHydro Canada Geir Jøssang. That is precisely the reason, he said, that the local entity has established a Heavy Oil Technology Centre in western Canada. "This is the first time we have located an arm of our research centre based in Trondheim, Norway outside of Norway. We are in the early stages of the establishment of the center, but it is already operative and we have started to recruit local experts to supplement those relocated from Norway," he said.



Aker Solutions separation unit.

Inside a flotation cell at Aurora facility.

StatoilHydro and other oil sands operators say they are also heavily involved in the province's proposed Integrated CO_2 Network (ICO_2N). The initiative would further development in the capture, transport and storage of carbon dioxide. Its membership comprises a wide group of industry representatives.

In its environmental update, CAPP said the industry is constantly researching new technologies to reduce GHG emissions further.

Along with impressive results from the carbon capture and levy programs, industry leaders also point to other revolutionary legislative and on-the-ground measures to protect the air, land and water during production of this essential natural resource.

Shattering the 'myth' of dirty oil

CCS, water sustainability, land reclamation help refute critics

Mention "dirty oil" in Alberta and be prepared for a lecture on the ground-breaking government and industry initiatives, they claim, have made the province a global leader in environmental stewardship.

As evidence, they point to the one-of-a-kind Carbon Capture and Storage (CCS) program enacted earlier this year that is only one component of a multi-pronged effort to fight climate change. The province has earmarked a $4-billion investment in controlling climate change, but government and industry efforts to date have effectively reduced oil sands exploration-related emissions by 45% per barrel produced since 1990. With much of the criticism, especially from the U.S., leveled at the carbon-intensive Alberta oil sands, regulators and industry alike say the world-class technologies being employed to slash carbon emission and water use, along with transforming once-industrial acreage to pastoral recreational areas, clearly nullifies the protests.

"This issue of dirty oil is a myth," Alberta Premier Ed Stelmach says matter-of-factly. "The fact is, we have reduced carbon (emissions) by 45% per barrel and with further technologies we would like it to be next to zero. We will continue to take a leadership role in the environment and we would like to be the world's cleanest energy producer. Our goal is to reduce the carbon from the oil sands to lower than conventional oil and gas."

"It is very interesting to me what is dirty," questions Pierre Alvarez, outgoing President of the CAPP. "If you look at the emissions from California heavy crude, it is exactly the same as the emissions profile of oil sands production."

Alberta remains the only jurisdiction in North America and much of the world to enact a formal CCS program for harnessing and permanently storing greenhouse gas emissions of carbon dioxide (CO_2). In July 2008, the government, through its sanctioned Alberta Carbon Capture and Storage Development Council, contributed $2 billion to new CCS projects as part of the province's sweeping 2008 Climate Change Strategy.

Particularly relevant to the carbon-intensive oil sands, the CCS process entails separating the harmful CO_2 from other emissions. Afterwards, it is dehydrated, compressed and transported to one of the many impervious salt caverns scattered throughout the province, many of which are abandoned mining sites. Once the salt is pumped out, the captured CO_2 will be injected safely and permanently deep into the porous rock.

Transporting captured carbon is a key element of the Integrated CO_2 Network (ICO_2N) now in the developmental stage. One proposal is to develop an integrated CO_2 capture and storage pipeline network that would link multiple capture facilities and end-use applications. Under the scheme, the pipeline would consist of a large main line connecting the Swan Hills/Pembina/Red Deer market and storage locations, which would be connected to CO_2 supply lines from Fort McMurray, Fort Saskatchewan and Red Deer.

While the CCS process is being employed successfully elsewhere in the world, Alberta is somewhat unique in that it possesses abundant storage capacity. To increase the capacity even more, the Alberta Saline Aquifer Project (ASAP), a broad-based initiative comprising a Who's Who of the province's energy industry, in early 2008 announced a broad-based project to identify even more locations suitable for long-term sequestration.

In conjunction with the CCS program, Alberta also holds the distinction of being the only region, at least in North America, to impose a levy on excessive CO_2 emissions. Under the program, industrial complexes emitting more than 100,000 tons of greenhouse gases annually must reduce intensity by 12%. Companies failing to do so have the option of buying a carbon set-off or pay an emissions levy of $15/ton that goes directly into an

Change for Tomorrow

THE BEAHR PROGRAM

In early 2008, **Shell** sponsored the **Environmental Monitor Training Program** in Fort Chipewyan. This program was designed and developed through **Building Environmental Aboriginal Human Resources (BEAHR)**, an initiative to increase Aboriginal employment in the environmental sector. The company worked with Northern Lakes College to help fly in instructors to this remote northern Alberta Aboriginal community.

The program consisted of seven weeks of training focused on environmental monitoring, covering health and safety, technical skills, local knowledge, basic ecology and monitoring effects. The overall goal was to provide graduates with the skills to participate in community-based environmental monitoring programs, or to further their studies through accredited environmental programs at schools like Keyano College in Fort McMurray. Nine students from Fort Chipewyan completed the program.

A key success factor was the program's "in the community" delivery so students had family and community support during their studies. Local community Elders also helped train the students ensuring traditional knowledge was shared and incorporated into the program curriculum.

Continuous environmental monitoring.

environmental technology fund to support GHG-reducing research in the province.

Geir Jøssang, President of StatoilHydro Canada, for one, is no stranger to CCS operations. His global company operates two of the world's four largest CCS projects at its Sleipner and Snøhvit platforms in the North Sea and that experience will see benefits in Alberta. "We are a world leader in CCS and we participate in several industry initiatives in Canada, such as the ICO_2N, which is aimed at advancing CCS technology and infrastructure," he said.

ConocoPhillips contributed to the reduction with a then-pilot program in 2006 to locate and eliminate so-called "fugitive gases" at its Alberta and Canadian processing facilities missed by conventional cameras. Using newly developed infrared video technology, the operator located 144 fugitive emissions, resulting in an 18% reduction in GHG emissions at its local facilities.

According to the industry, the CCS program also opens the door for even further advancement of technology for improving air quality. "Research is being done on biological treatment of CO_2, but I think what the CCS does in the short term is to allow us to take some initial first steps to push the limits of technology and begin to establish CO_2 management as a day-to-day priority within companies." says Mr. Alvarez.

Today, around-the-clock monitoring of air quality through the Wood Buffalo Environmental Association (WBEA) shows that since 1999 emissions of carbon monoxide, nitrogen dioxide, ozone, fine particulate matter and sulphur dioxide – the five pollutants used to calculate an air quality index – have either dropped or showed no change. In early 2007, the WBEA augmented its 24 hours-a-day, 365 days a year monitoring program by signing a three-year contract with Earth Tech of Long Beach, CA to provide real-time information on ambient air quality at the Athabasca oil sands.

In its *2007 Stewardship Report,* which annually measures progress on a number of environmental, safety and social fronts, CAPP said the emphasis on continuous improvement has shown marked progress, particularly in air quality. For instance, the analysis revealed that sulphur recovery rates were the highest since reporting began in 1999, while benzene emissions from glycol dehydrators dropped 25% compared to 2001 levels.

Crane Lake reclamation

"We are firmly of the view that carbon capture and storage is going to be a significant part of the solution and we are very supportive of the Alberta initiative," says President and Shell Canada Country Chair Dave Collyer.

Though it may be the most visible, the CCS strategy is only one component of a multi-faceted government, industry and academia environmental strategy that addresses everything from virtually eliminating the tailings ponds from oil sands operations to protecting the province's precious water supply. Owing to its emphasis on transparency, the province has engaged a host of non-government organizations, including end consumers, who everyone agrees has a stake in the process.

"I think what most people forget is that 80% of the emissions related to a barrel of oil comes from end-use consumption, the jet engine, the car, the truck, you name it," says Mr. Alvarez.

One element of the comprehensive environmental strategy directly impacting oil sands production is the government-enacted water conservation strategy.

Provincial Water Strategy

In March 2003, Alberta formally adopted a far-reaching water strategy with the release of *"Water for Life: Alberta's Strategy for*

Wood Bison grazing at Syncrude's reclaimed land.

Sustainability." With the aim of reducing water usage, the multi-faceted strategy mandates that all existing or approved oil sands projects may withdraw less than 3% over the average annual flow of the Athabasca River. CAPP and others point out that going back to 2006 withdrawal has averaged a scant 0.4% and emerging technologies promise to lower the volume even more.

The new-generation THAI™ in-situ extraction process, for instance, uses air injection, rather than steam to create an automatic process in the well, thereby generating negligible water use. Devon says a uniquely engineered steaming operation at its Jackfish development gives Devon Energy the distinction of being the only SAGD operator to use no fresh water in the process. Rather, Devon designed the facility to employ otherwise-unusable saline water from an aquifer in the Grand Rapids formation. The saline water used has a total dissolved solids (TDS) count of 6,000 to 8,000 ppm, well above the 4,000 ppm minimum for water suitable for drinking, livestock or irrigation and meets Devon's objective of using no fresh water in its steaming operation, says Devon Canada President Chris Seasons.

"Devon Energy is committed to the responsible management of water in its daily operations. Working under the principals of minimization of use, conservation and recycling, the company actively seeks new and more effective ways to approach water use," he said.

The same with Shell Canada, which says it recycles about 90% of the water it uses.

A 2007 update of monitoring undertaken by the Regional Aquatics Monitoring Program (RAMP) encompassing the entire Regional Municipality of Wood Buffalo showed "no detectable changes in aquatic resources related to oil sands development," it reported.

Tailings ponds

In June, the Energy Resources Conservation Board of Alberta (ERCB) released its draft *"Tailings Performance Criteria and Requirements for Oil Sands Mining Scheme"* that sets forth a number of objectives for managing the residue from production operations. According to ERCB Chairman Dan McFadyen, the directive establishes new requirements for mineable oil sands tailings operations and is only one component of a larger initiative to regulate tailings management.

Jackfish Project.

Using saline water for steam.

Land reclamation, Gateway Hill.

Similar in appearance to the reserve waste pits that dot much of the western U.S. drilling landscape, tailing ponds comprise a mixture of water, clay, sand and residual bitumen produced through the extraction process. The compounds are stored in large ponds where the clay/water mixture is left to settle. Over the life of an oil sands operation, the tailing ponds, many of which are discontinued mining pits, are used to continually recycle water.

A key component of the ERCB directive is not only to minimize, but eventually "eliminate, the long-term storage of fluid tailings in the reclamation landscape," which many outside critics allude to in their critiques of the oil sands.

In its *"Environmental Challenges and Progress in Canada's Oil Sands,"* published last April, CAPP said industry and academia alike have joined forces to address the issue from developing technologies to eliminate them altogether to converting the material into beneficial re-use. For example, ongoing research at the Canadian Oil Sands Network for Research and Development (CONRAD) examines new methods for accelerated separation of water and fine silts, faster recycling of water and new reclamation processes. For another, chemical engineer Pedro Pereira Almao, co-director of the University of Calgary's Alberta Ingenuity Centre for In-Situ Energy (AICSE), developed a nano-catalyst, he believes, holds the potential to upgrade bitumen in its natural underground reservoir, thus eliminating the need for tailing ponds.

Land use and reclamation

The management of tailings is an integral constituent of the Alberta Environmental Protection and Enhancement Act – Conservation and Reclamation Regulation that mandates all industrial land must be returned to its native condition, or better, after the operation ceases. Addressing both in-situ and mining operations in and around the 3.2-million km² Boreal Forest region, the revised act takes effect this fall.

"We have world standards with respect to air quality, water quality and now with a new land use framework coming into play this fall, it will pretty much close the loop," said Alberta Minister of Finance and Enterprise Iris Evans.

Under Alberta's policy, the province must approve a reclamation plan before a producer can get the go-ahead to begin operations. Once the land has been restored, it is returned to the province under a reclamation certificate.

In March 2008, the 30-year-old Syncrude Gateway Hill operation north of Fort

McMurray became the first reclaimed area to receive government certification. The long-time mine has since been converted into a rolling forested area replete with hiking trails and lookout points.

As part of its in-situ reclamation program, EnCana initiated a number of pilot projects to determine the most effective way of reforesting its oil sands well sites and access roads. Use of a natural regeneration process, the company says helps it ensure indigenous plant species remain in the area.

Be it improving the air and water quality or reclaiming land, Mr. Seasons of Devon Canada said all Albertans have a personal investment in optimizing environmental quality.

"Most people in Alberta are here to enjoy the outdoors. Amongst what the province really has to offer is its natural beauty. We want to be proud of what we leave behind for our children and grandchildren".

The bird deterrence system helps keep birds away from the Muskeg River Mine's tailings pond.

Injury rates slashed

In a related development, CAPP's Stewardship Report also reported a marked decline in injuries, despite the massive influx of energy workers and more hours on the job. It reported that the total recordable injury frequency for Alberta energy workers in the previous year was at its lowest rate since 1999, when the association first began reporting injuries. That, despite working a total of more than 75.7 million total hours, compared to the 56 million hours reported at the start of the decade.

BP Canada Western Operations recorded a remarkable 78% drop in accidents after instituting its Make a Difference Today program. The program, which originated at the BP Empress Gas Plant in Alberta, has since evolved to the point that every rig BP operates in the province has been transformed into a classroom where crew members take turns leading roundtable safety discussions. The success of the program resulted in it migrating to other BP international operations. "Our fundamental goal is to have everyone go home safely," adds NAL Resources Health and Safety Coordinator Keith Keck. "We do this by involving our people, the contractors and communities and by working with industry groups."

"We are a world leader in CCS and participate in several industry initiatives in Canada, such as ICO_2N, which is aimed at advancing CCS technology and infrastructure."

Geir Jøssang, President of StatoilHydro Canada

Drilling Technology: Unlocking the Potential

Automated drilling rigs, stacked fracs improving drilling efficiency, costs

While the technological advances in the oil sands grab most of the attention, industry leaders are quick to point out the technologies developed in the province to improve overall drilling efficiency. Improvements in horizontal well construction, which made the drilling of SAGD wells in the oil sands possible, and optimized fracture stimulation, including the Packers Plus "StackFRAC" technology used extensively in the Bakken Shale play, is evidence of the innovative technical developments engineered by Alberta companies.

Chief among those is the automated drilling rig (ADR™) developed by Ensign Energy Services, the largest oilfield services company in Canada. The ADR™ is defined by a four-point philosophy: automated computer-controlled driller's console; automated safe and efficient tubular handling; drilling torque applied via top drive and fast and efficient rig moves. Ensign Energy Services President and COO Bob Geddes said one of the biggest advantages of the ADR™ is reducing the time and costs associated with moving the rig from one location to another.

"These units rig up in arguably a quarter of the time it takes a lot of our competitors. We spend a great deal of time on the design and construction phases, using smart ideas like PLC cables that control different parts of the rig. These rigs self-move, by using our Ensign jack pads that move the rig in a four-foot stroke. Therefore, we can move it in any direction without the need for any truck. With the mast standing with the entire pipe, we just move over and we are ready to drill right away, as all the pipe is still in the mast," said Mr. Geddes.

Today, 54 ADRs are working worldwide with 30 operating in Western Canada. Mr. Geddes said the units also are unique in that they were the first to employ the Tesco portable top-drive system, adding Ensign will unveil an ADR™ next year capable of drilling to 6,000 m (19,680 ft).

Automated, safe handling.

Automated drilling rig (ADR™).

Precision Drilling Trust, meanwhile, says its Super Series Rigs, likewise, are designed to reduce the time required to rig down and rig up. With 240 single, double and triple rigs, along with coiled tubing units, Precision is Canada's largest drilling contractor. In August 2008 with approval of a definitive agreement to acquire giant U.S. contractor Grey Wolf Inc., giving the company a presence in virtually every drilling basin the U.S. and Canada, said CEO Kevin Neveu. With its Super Series units, Mr. Neveu said a full rig move can be accomplished in less than two hours. "Our Super Series rigs offer the industry leading mobility with significantly fewer loads. Since no cranes are required, drilling can commence much faster."

Complementing the technical advances in drilling rig efficiency, is improved fracture stimulation being employed extensively in the booming Bakken play that reaches from southern Saskatchewan to Montana and North Dakota and is said to hold upwards of 400 billion bbl of recoverable oil. Much of the horizontal and frac enhancements in the Bakken were developed by giant Halliburton Energy Services, but until its acquisition by Crescent Point Energy Trust in 2006, Mission Oil & Gas was credited with playing a substantial role in pioneering the use of fracture-stimulated horizontal wells.

In 2006, Petrobank Energy and Resources was one of the first to focus on sequential fracturing technologies to improve production rates and enhance recoveries. By modifying the application of existing fracture stimulation techniques, the operator said it "achieved production results that exceeded expectations by a wide margin."

The Petrobank approach involves sequential fracturing in isolated high quality portions of the reservoir and allows improved concentration and containment of the frac within the formation. Historically, previous frac techniques intruded the zone, causing an immediate influx of water from surrounding formations and a rapid decline in production rates.

Terry Gomke, in his role as Chair of the AEDA, is a prime spokesman for the technologies developed in the province.

"I have traveled the world with Canadian technologies and they are second to none. I am a firm believer that our technologies will continue to lead the world," he said.

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Increased Refinery Demands Spur Major Pipeline Expansions

Capacity to swell as new systems, expansions move more crude into U.S., Canada

Reflecting the increase in global consumption, refiners of western Canada petroleum, likewise, are steadily increasing their demands, prompting a frenzied rush to develop more pipeline capacity out of the province.

The most extensive projects currently in various stages of construction are expansions of the giant Enbridge inter-provincial pipeline and TransCanada Keystone systems. Expansions of these two networks, both of which are planned for completion in 2010 and 2009, respectively, will increase cumulative capacity by 1 million bbl/d, CAPP said in its June 2008 *Crude Oil Forecast, Markets & Pipeline Expansions.* These two networks and the Kinder Morgan Trans Mountain pipeline comprise the three primary trunklines delivering Alberta crude throughout Canada and the US.

With the expansions now underway to deliver more Alberta crude, CAPP reports approximately 1.1 million bbl/d of pipeline capacity is being added through the end of 2010.

As President and CEO of multi-faceted Gibson Energy, Terry Gomke says the growth prospects of his company directly reflect the diversity and continual growth of the Alberta energy sector. The largest midstream company in Canada, each year delivering millions of barrels of crude oil and other energy supplies to Canadian and US markets, Gibson was acquired in August 2008 by Riverstone Holdings, which manages a group of energy-focused private equity funds. Shortly after the acquisition, the company announced a growth projection nothing short of remarkable.

"Clearly, Riverstone's goal is to double or triple the size of Gibson over the next three to five years," said Mr. Gomke. "The opportunities are there and if we continue to provide good service and competitive skills, I think we have the opportunity to achieve this."

With all the expansions on the boards to increase carrying capacity, there is little doubt that everyone involved with moving production from the wellhead to increasingly thirsty refineries will have ample opportunities.

By far, the most extensive expansion is centered around the Enbridge network that transports liquid hydrocarbons from Edmonton to the Midwestern U.S. and eastern Canada. With a number of expansions over the years, the Enbridge network now runs 13,500 km (8,500 miles), making it the world's longest pipeline system. Enbridge's Alberta Clipper, a new 36-in. pipeline running from Alberta to Wisconsin, initially will increase capacity of the system by 450,000 bbl/day, eventually increasing to 800,000 bbl/day. Enbridge explained the pipeline will include both new construction and the conversion of existing pipe currently used to transport natural gas.

The pipeliner has also proposed a two-phase program to increase western Canadian crude to eastern US refineries. When it begins operation in the fourth quarter of 2010, Phase 1 would increase capacity to 120,000 bbl/d to address growing demand by Marathon's refinery in Detroit, while the second phase, which could be operational by 2013, would serve Toledo and Lima, Ohio refineries with capacity increasing to 430,000 bbl/day.

Enbridge added that its Waupisoo Pipeline, which began operation this year, now links oil sands producers to their upgraders and refineries in the Edmonton area as well as connecting with Canada's interprovincial oil pipeline systems. The company is also looking at delivering to the refinery-rich U.S. Gulf Coast.

In August, Enbridge and BP Pipelines (North America) Inc. entered into an agreement to develop a new delivery system to transport Canadian heavy crude oil from Illinois to Houston and Texas City, TX. The new system is expected to be in service by late 2012 with an initial capacity of 250,000 bbl/day.

"This proposed project offers timely and economic access for shippers to the U.S. Gulf

Bitumen is transported to the Scotford Upgrader, near Fort Saskatchewan.

Coast market," said Enbridge Executive Vice President, Liquids Pipelines Steve Wuor. "The new system would be a continuation of our phased approach to Gulf Coast market access, which has the objectives of minimizing capital cost and financial commitments required of shippers, maximizing use of existing pipelines and rights-of-way and ensuring attractive producer netbacks."

Enbridge is far from alone in expanding capacity to help move Alberta petroleum into the market.

The TransCanada Keystone pipeline project will create a new link from Hardesty to terminals in Wood River and Patoka when it is expected to enter service in December 2009 with an initial capacity of 435,000 bbl/d.

Gibson's original facility with a then-2,000-bbl capacity, Hardesty now surpasses Edmonton as the largest hub in the Enbridge network. Hardesty remains the primary hub for oil sands production, connecting with lines running south from Fort McMurray and branching into the U.S. through the Enbridge or Kinder Morgan network. Upon its completion, the TransCanada's Keystone Pipeline Project will provide Hardesty access to three different routes into the U.S.

The 3,456-km Keystone Pipeline will transport crude from Hardesty and into Illinois and Oklahoma. In July, 2008, 110-year-old Canadian mechanical construction contractor Lockerbie & Hole was awarded a $53 million contract to construct eight pumping stations for the pipeline. In addition to providing ample product to feed pipelines, the exploding unconventional oil sand and Bakken Shale plays are also creating booming activity for marketers and distributors of well site fluids.

"With the new technology being developed for horizontal fracturing and horizontal drilling, this business became very interesting and we have grown to be one of the largest well site fluid producers and distributors in the country. We have achieved around 50% of the market and we are continuing to develop that business, not only in fracturing fluids, but recycling as well," said Mr. Gomke. "We recycle and reprocess some of the fluids as they come back from the wells and turn them into an environmentally acceptable product so that they can be reused."

Diversification key to Gibson Energy growth

From its origins as an independent marketing company in 1953, Gibson Energy Services has matured to become the premier midstream company in Canada. For 55 years, Gibson has played a significant role in the country's petroleum industry by linking upstream producers with downstream refiners.

Gibson's inter-related business divisions produce synergies between its services, including marketing and transportation, as well as distribution and processing of energy products. Gibson also provides wholesale and retail propane service through its affiliate Canwest Propane and is now the second largest distributor in Canada.

The company annually moves millions of barrels of energy products to market through a continually expanded network of facilities and infrastructure that include terminals, pipelines, tank storage and more than 1,000 trucks. At its Edmonton facility, for instance, Gibson handles all the rail car transport of PetroCanada's diesel refinery.

Its Moose Jaw Refinery is a major producer of road asphalt, roofing flux, well site fluids and light products which are distributed across Canada and the US. In addition, Gibson has become a leading specialist in the blending and handling of heavy oil, including the processing of diluents required for oil sands and other heavy crude.

With its focus on diversity, Gibson's Edmonton terminal has been transformed into a multi-products facility, distributing asphalt, heavy crude, propane, distillates, natural gas liquids, butane. The terminal is easily accessible to all the major pipelines running through the Edmonton hub.

"Clearly, Riverstone's goal is to double or triple the size of Gibson over the next three to five years."

Terry Gomke, President and CEO of Gibson Energy

The interconnection with the company's marketing, transportation and tourmaline businesses provide synergies that give Gibson unprecedented advantages for the Alberta market. In the future, Gibson will continue to develop its advantages into new opportunities for future developments, both from the oil sands and new markets, while investigating ways it can help meet the province's sweeping environmental strategy.

The company's unique position and strategic location gives it the capability of responding effectively to a wide range of client requests from blending to distribution.

Alberta Securing Tomorrow's Prosperity Today

Pro-business province a model for global energy investment

With worldwide oil and gas demand ever rising, Canada, led by resource-rich and investment friendly Alberta, has positioned itself as one of the worlds most stable and bountiful future energy suppliers.

While the province leads the way in investments for alternative energy research, global energy experts agree the world will have to depend on fossil fuels for decades to come. With global supplies becoming increasingly controlled by unpredictable and often unstable governments, the world's consumers can look to Alberta and Canada as a plentiful, transparent, democratic and politically stable energy supplier.

The Alberta oil sands, whose proven reserves are the second largest in the world, have become the fuel for the thriving Canadian economy, creating thousands of jobs throughout Alberta and Canada, generating record revenue and spurring technology, innovation and research. At a time where global reserves of light and easily accessible supplies are dwindling rapidly, the enormous heavy reserves of the oil sands have given Alberta a predominate role on the world's energy stage.

Attracted by the oil sands, nearly all of the major oil and gas operators have a presence in Alberta, bringing their international experience to the province. More importantly, the technological advancements created by Albertan and Canadian companies, such as their innovations in hydraulic fracturing for horizontal well developed for the booming Bakken Oil Shale campaign, are now finding applications around the world.

Alberta also has evolved into a center of excellence when it comes to developing technologies for clean production of the oil sands. Revolutionary in-situ extraction techniques and engineering designs to dramatically reduce water consumption have served to minimize the environmental footprint of the oil sands, while helping

The road ahead is promising.

increase production and optimize operational efficiency. Many of those innovations focus on balancing economic prosperity with world-leading environmental stewardship. The provincial government, working hand-in-hand with industry and citizens alike, has invested heavily in the development of global-leading environmental technologies and programs, many of which are applicable to developing nations. The unique Carbon Capture and Storage (CCS) program, which is only one component of the province's all-inclusive Climate Change Strategy, has the ambitious goal of capturing and safely sequestering 100% of the CO_2 emitted into the atmosphere from the oil sands and other Alberta industrial facilities. While some may see this as an overly ambitious target, the government and industry say they are committed to working together to someday make Alberta a zero emitter of carbon.

Complementing the CCS program are comprehensive initiatives to protect the province's water supplies and return once-industrial land to a pristine landscape, effectively debunking what those in the administration and industry proclaim as the "myth of dirty oil."

For companies locating bases in Alberta, the province offers its employees one of the most desirable living environments the world has to offer. From unsurpassed natural beauty and a host of outdoor recreational opportunities, including nearby Banff National Park, the province boasts one of the finest educational and medical systems in North America.

On top of all that, Alberta, the only debt-free jurisdiction in North America, offers investors a completely transparent and business-friendly environment with the lowest income and corporate tax rates on the continent.

But, Alberta is not resting on its past and present successes. Rather, the province is working tirelessly to ensure the prosperity of today is secured for tomorrow. Its $22-billion infrastructure plan, by far the highest such investment in North America, is earmarked to improve housing, roads and municipal services. Much of that investment is being destined for Fort McMurray to enhance an infrastructure affected by the rush to the oil sands. Furthermore, the province, through its Ministry of Aboriginal Relations, has undertaken a host of initiatives to protect the rights of its indigenous people.

Even as the province strives to secure its future prosperity, Premier Ed Stelmach says it will never do so by compromising its deeply held commitments to the environment and its people.

"While we work to expand trade and investment opportunities, we remain committed to being good stewards of the environment and that will never change."

CANADA & ALBERTA GENERAL DATA

- *Country Official Name:* Canada
- *Capital:* Ottawa (-5 GMT)
- *Government:* Constitutional monarchy (UK)
- *President:* Stephen Harper
- *Administrative division:* provinces (10) + territories (3)
- *Official Languages:* English and French
- *Location & Geography:* North America
- *Total Area:* 9,984,670 km^2/3,855,102 sq mi
- *Land Area:* 9,093,507 km^2/3,511,003 sq mi
- *Population:* 33.390.141 (July 2008 est.)
- *Currency:* Canadian Dollar (US$ 0,97 09/08)
- *GDP/PPP:* $1.266 trillion (2007 est.)
- *GDP per capita:* $38.400 (2007 est.)
- *Province:* Alberta
- *Capital:* Edmonton (-7 GMT)
- *Government:* Progressive Conservative
- *Premier:* Ed Stelmach
- *Land Area:* 661,848 km^2 / 255,541 sq mi
- *Population:* 3.512.000
- *Alberta inflation:* 5% 2007 (3,2% 04/08)
- *Real economic growth 2002-07:* 4,7%
- *Alberta real GDP:* $189,5 billion (2007)
- *Alberta GDP per capita:* $74.825 (2007)
- *Unemployment:* 3,5%
- *Alberta main industries:* Agriculture, forestry, telecommunications and oil & gas

ALBERTA ENERGY OVERVIEW 2007

Total value of energy resource production:
$78,592 million (2007)
$108,588 million (2008 est)

Established Reserves / Production:

- *Oil sands:*
  1,73 trillion bbl / 1,2 million bpd
- *Conventional oil:*
  1,5 billion bbl / 525 thousand bpd
- *Total Natural Gas (incl. CBM):*
  540 tcf / 5,72 tcf
- *Coal:*
  34 gigatonnes / 32,2 megatonnes

Total Crude oil exports:
1.62 million bpd

Natural gas exports US:
2,5 tcf

OIL SANDS OVERVIEW

- *Total Oil sands area:*
  140,200 km^2 (14 million ha)
- *Disturbed by mining:*
  42.000 ha (0,3 %)
- *Represents:*
  43 % of Canada total crude output
- *Investment 2002-2007:*
  $67 billion
- *Investment 2008 (est.):*
  $19 billion
- *Upgraders:*
  Suncor, Syncrude, Scotford
- *Value Projects proposed:*
  $170 billion
- *Production:*
  Mining: 18 %
  In situ: 82 %
- *Average Athabasca river water use:*
  0,4 %
- *Value contracts First Nations People:*
  $2,6 billion
- *Total effect on employment (2000-2020):*
  174.000 full time positions

Sources: Alberta Ministry of Finance and Enterprise, ERCB, Ministry of Energy, CAPP

CAPP STEWARDSHIP

CAPP defines stewardship as a commitment to responsible resource development and continuous improvement. It is an integrated approach that instills sound planning and operating practices to ensure continuous improvement. To CAPP members, stewardship is an integral and intrinsic component of how they conduct all aspects of their operations. Stewardship drives the belief that good is never good enough. It promotes the development of best practices, fosters innovation and encourages mutually beneficial relationships among all stakeholders.

To the industry, CAPP says stewardship means responsibly developing hydrocarbons to meet current needs while respecting future needs through the efficient use of natural resources. It also means communicating openly and honestly with stakeholders about issues that matter to them. Commitment to stewardship is a mandatory requirement of CAPP membership.

reference webs

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www.alberta.ca

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www.energy.gov.ab.ca

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www.environment.alberta.ca

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www.finance.gov.ab.ca

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www.aboriginal.alberta.ca

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https://aeda.alberta.ca

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www.ercb.ca

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www.auc.ab.ca

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www.aeri.ab.ca

Alberta Geological Survey
www.ags.gov.ab.ca

Alberta Chamber of Resources
www.acr-alberta.com

Alberta Water Strategy
www.waterforlife.gov.ab.ca

Alberta's Oil Sands
www.oilsands.alberta.ca

Canada Oil Sands
www.canadasoilsands.ca

Centre for Energy:
www.centreforenergy.com

The Wood Buffalo Environmental Association
www.wbea.org

Canadian Association of Petroleum Producers
www.capp.ca

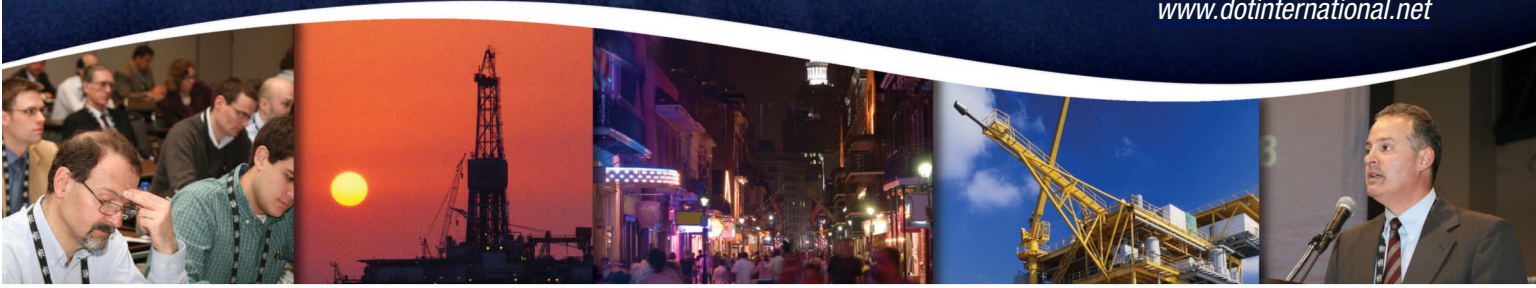
PRELIMINARY EVENT GUIDE

DOT™ INTERNATIONAL

GO DEEP

DEEP OFFSHORE TECHNOLOGY INTERNATIONAL CONFERENCE & EXHIBITION

Ernest N. Morial Convention Center
New Orleans, Louisiana, USA
February 3-5, 2009
www.dotinternational.net



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WELCOME LETTER

Dear Colleagues,

As Director of PennWell Offshore Conferences, it is my pleasure to welcome you to the 2009 Deep Offshore Technology International Conference & Exhibition in New Orleans.

The theme of this year's conference – Go Deep – captures the spirit of the international offshore exploration and production industry, which faces new deepwater challenges every year. More than ever, the offshore industry must rely on innovation in technology to unlock deepwater assets.

DOT leads the way

DOT is recognized as the premier event where operators, equipment manufacturers, contractors, and service-providers introduce deepwater solutions. From drilling and production equipment to subsea trees and pipelines, and from seabed separation systems to arctic E&P challenges, the list of technology advancements that have debuted at DOT conferences is long and diverse.

This year's DOT in New Orleans provides a forum that addresses the technical challenges to safely and cost-effectively develop deepwater resources. The conference provides a unique networking opportunity for attendees to discuss issues with experts in their respective fields and to understand the changes taking place within those technologies.

Opening new US OCS development

As a new addition to the program, special panel discussions this year will address the technology and regulatory changes that will be needed to open and develop more of the US Outer Continental Shelf.

The panel sessions include speakers from the US Geological Survey, Minerals Management Service, and others to address the issues surrounding the development of new offshore US resources. Industry interest in this increasingly important topic is higher than ever. These sessions are must-attend events.

On behalf of the Advisory Board, PennWell and Offshore, the world's leading offshore oil and gas magazine, I am pleased to welcome industry leaders from around the world to this unparalleled opportunity to exchange ideas, share solutions, and learn from each other's experiences.

Eldon Ball

Director, Offshore Conferences

PennWell Corporation

Entering its 28th year, DOT International provides industry professionals more current information on what occurs in the deepwater exploration and production arena—more than any other industry event.

With technical sessions covering the most topical and current deepwater areas, 150 exhibitors representing over 35 different countries and expected attendance over 2,500, you should plan on participating in both the conference and exhibition.

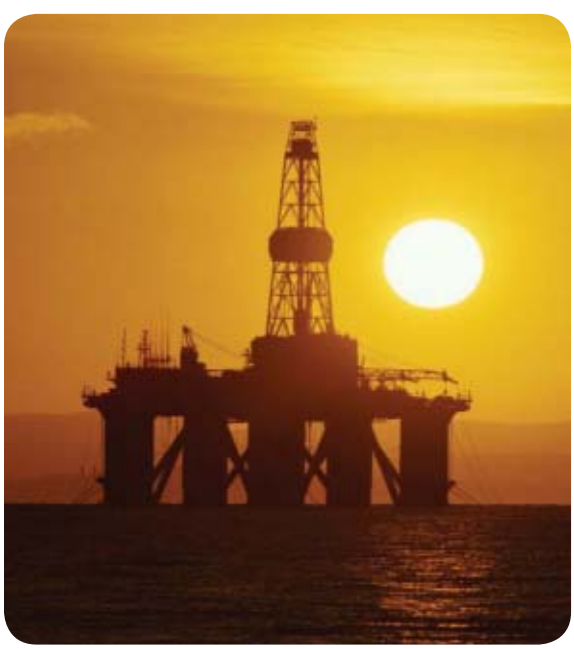
EVENT OVERVIEW

DOT is the leading deepwater technology event in the world. It offers a unique gathering of the world's senior executives, managers, and engineers from major and independent E&P companies. Key personnel from various industry segments will deliver reports on the current and future state of offshore exploration and production technology.

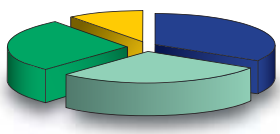
As the industry explores further out, there is a growing focus on the ultra-deepwater spectrum between 1,500 and 3,000 meters – with case studies and reports on first-application technologies. Input from major, independent, and state–owned operators and producers will explore the technical and economic influences shaping the deepwater theaters around the globe.

WHO ATTENDS DOT:

DOT is vital to industry leaders seeking the information and emerging technology it takes to plan future deepwater operations. DOT has a multi-national audience that provides a professional setting for making contacts and other business arrangements. DOT exhibitors have consistently recognized this conference as having the highest caliber of professionals in attendance. Exhibitors are exposed to technical specialists, key department managers, operating vice presidents, and leaders who influence purchasing decisions and bid lists.

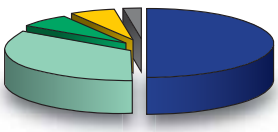


DEEP OFFSHORE TECHNOLOGY 2008 HOUSTON ATTENDEE PROFILE



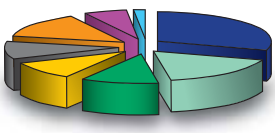
By Purchasing Responsibility:

- 34% Recommend
- 28% Approve
- 25% Other
- 18% Specify



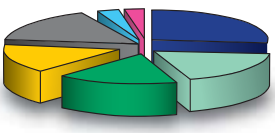
By Job Function:

- 50% Management (CEO, Pres, VP, Partner, Director, etc.)
- 35% Engineering / Technical / Geoscience
- 7% Other
- 6% Purchasing / Consulting
- 2% Superintendent / Field Professional / Foreman



By Company Type:

- 30% Engineering / Construction
- 18% Oil / Gas
- 11% Other
- 10% Service / Supply
- 9% Contractor
- 14% Consulting
- 6% Oil / Gas (Independent)
- 2% Government / Education / Library



By Area of Interest:

- 26% Production
- 19% Pipeline / Transportation
- 17% Drilling
- 15% Exploration
- 17% Gas Processing / Petrochemical / Refining
- 3% Financial
- 3% Other

DOT 2009 EXHIBITING COMPANIES (AS OF SEPTEMBER 19, 2008)

3M Gas & Oil
A.P.P./E.P.I.
Aerovironment Inc.
AIMS International, Inc.
ASSETPOINT LLC
Baker Hughes Centrilift
Balltec Ltd.
Bayou Flow Technologies, LLC
Bennett & Associates (MINDOC)
BJ Services
BMT Scientific Marine Services, Inc.
BPP Technical Services
Bredero Shaw
Bureau Veritas Marine Inc.
C&C Technologies, Inc.
CCS Midstream Services
CD-Adapco
Compressor Tech Two
Cortec
Cross Group Inc.
Cudd Energy Services
Deep Marine Technology, Inc.
Deepsea Engineering & Management Ltd.
Det Norske Veritas
Direct Drive Systems
Energy Industries Council
Fastorq Bolting Systems
Flotation Technologies
Fluor Enterprises, Inc.
Galvotec Alloys, Inc.
Gulf Engineering Co. LLC
Helix Energy Solutions
HFG Engineering US
HI-CAD America, Ltd.
I.O.S. Offshore AS
INTEC Engineering
Intermoor
Jambon Boat Rentals
Knighthawk Engineering
Lankhorst/Mouldings
MAKO Rentals
MCS
Merwede Valves B.V.
MMR Offshore Services, Inc.
Moody International, Inc.
NATCO Group, Inc.
ODIM
OPE INC.
Optical Metrology Services
Pegasus International
Ramnas Bruk AB
RathGibson
Rotech Subsea USA
Royal Purple, Ltd.
RTI Energy Systems
Saipem America
Samson
SBM Offshore Group
Scandpower Petroleum Technology
Schlumberger
Seacon Brantner Associates, Inc.
Siemens Water Technologies
SPT Energy Group
Taper-Lok Corporation
Techlam
Technical Industries Inc.
Thrustmaster of Texas
Trelleborg Offshore
Trinity Tools Rentals LLC
Veolia ES Environmental Services, Inc.
Versabar Inc.
Vryhof Anchors B.V.
Wachs SubSea LLC
Welldynamics

DOT 2008 GEORGE MURRAY AWARD RECIPIENTS:

1. **Best Presentation**
   Presenter: Roy Shilling Company: *BP USA*
   Presentation: **Developments in Riser Technology for the Next Generation Ultra-Deep HPHT Wells**
2. **Best Technical Innovation Award**
   Presenter: Mauro Costa de Oliveira Company: *Petrobras*
   Presentation: **Offshore Platforms Sizing Optimization Through Genetic Algorithms**
3. **George Murray Memorial Young Engineer Award**
   Presenter: Nathan Ames Company: *EWI*
   Presentation: **Embedded Sensor for Offshore Component Life Extension**

SCHEDULE OF EVENTS

SUNDAY, FEBRUARY 1, 2009

3:00 p.m. – 8:00 p.m.	Exhibitor Move-In	Exhibit Hall B

MONDAY, FEBRUARY 2, 2009

7:00 a.m. – 6:00 p.m.	Exhibitor Move-In	Exhibit Hall B
1:00 p.m. – 6:00 p.m.	Registration Open	Exhibit Hall B

TUESDAY, FEBRUARY 3, 2009

8:00 a.m. – 6:00 p.m.	Registration Open	Exhibit Hall B
8:30 a.m. – 10:00 a.m.	Opening Session	R06 & R07
10:00 a.m. – 6:00 p.m.	Exhibit Hall Open	Exhibit Hall B
10:00 a.m. – 10:45 a.m.	Coffee Break	Exhibit Hall B
10:45 a.m. – 12:15 p.m.	Conference Session	Level 2 Meeting Rooms
12:15 p.m. – 1:45 p.m.	Delegate Lunch	Exhibit Hall B
1:45 p.m. – 2:45 p.m.	Conference Session	Level 2 Meeting Rooms
2:45 p.m. – 3:15 p.m.	Coffee Break	Exhibit Hall
3:15 p.m. – 4:15 p.m.	Conference Session	Level 2 Meeting Rooms
4:15 p.m. – 5:45 p.m.	Exhibition Hall Networking Reception	Exhibit Hall B

WEDNESDAY, FEBRUARY 4, 2009

8:00 a.m. – 6:00 p.m.	Registration Open	Exhibit Hall B
8:30 a.m. – 9:30 a.m.	Conference Session – Panel Session	Level 2 Meeting Rooms
9:30 a.m. – 6:00 p.m.	Exhibit Hall Open	Exhibit Hall B
9:30 a.m. – 10:15 a.m.	Coffee Break	Exhibit Hall
10:15 a.m. – 11:45 a.m.	Conference Session	Level 2 Meeting Rooms
11:45 a.m. – 1:15 p.m.	Delegate Lunch	Exhibit Hall B
1:15 p.m. – 2:15 p.m.	Conference Session	Level 2 Meeting Rooms
2:15 p.m. – 2:45 p.m.	Coffee Break	Exhibit Hall B
2:45 p.m. – 3:45 p.m.	Conference Session	Level 2 Meeting Rooms

THURSDAY, FEBRUARY 5, 2009

8:30 a.m. – 1:30 p.m.	Registration Open	Exhibit Hall B
8:30 a.m. – 9:30 a.m.	Conference Session – Panel Session	Level 2 Meeting Rooms
9:30 a.m. – 2:00 p.m.	Exhibit Hall Open	Exhibit Hall B
9:30 a.m. – 10:15 a.m.	Coffee Break	Exhibit Hall B
10:15 a.m. – 11:45 a.m.	Conference Session	Level 2 Meeting Rooms
12:00 p.m. – 1:30 p.m.	Delegate Lunch & Closing Session	Exhibit Hall B
1:45 p.m. – 2:00 p.m.	Exhibit Floor Giveaway	Exhibit Hall B, PennWell Booth
2:00 p.m. – 9:30 p.m.	Exhibitor Move-Out	Exhibit Hall B

DOT MISSION STATEMENT

DOT is recognized as the leading forum addressing technical issues related to exploration, development, and production of oil and gas in deep and ultra deepwater basins around the world. As our industry confronts new challenges, the sharing of deepwater experience will play a critical role in improving the quality, safety, and economics of future endeavors.

The mission of DOT is to provide an annual forum dedicated to the advancement of the deepwater exploration & production. The conference addresses the technical challenges to safely and cost-effectively develop deepwater reserves, and encourages the development of young professionals.

Deep Offshore Technology International 2009 Conference Program Detail

TUESDAY, FEBRUARY 3, 2009

8:30 a.m. – 10:00 a.m OPENING PLENARY SESSION
WELCOME & INTRODUCTION
CHAIRMAN'S REMARKS
KEYNOTE ADDRESS
INDUSTRY PERSPECTIVE

10:00 a.m. – 10:45 a.m. COFFEE BREAK SPONSORED BY: FLUOR

10:45 a.m. – 12:15 p.m. SESSION 1

TRACK 1 Floating Production Systems • Construction & Installation • Flowlines & Pipelines • Well Construction/Drilling Operations SPONSORED BY: DNV

FLOATING PRODUCTION SYSTEMS – Chair: Derek Disney – *KBR* / Co-Chair: Ernst den Hartigh – *Shell E&P Company*

10:45 a.m. – 11: 15 a.m. **Novel TLP Concept for Ultra-Deepwater Field Development**
Dr. Homayoun Heidari – *SBM-Atlantia*
A new TLP concept that enables ultra deepwater drytree field development is presented.

11:15 a.m. – 11:45 a.m. **Spectral Fatigue for FPSO Conversion**
Mr. Vincent Bonniol – *Bureau Veritas*
From motion analysis to the final damage computation Bureau Veritas has developed an advanced spectral fatigue methodology and carried out a large number of SF analyses to assess the behavior of the hulls on sites everywhere around the globe.

11:45 a.m. – 12:15 p.m. **Optimizing Sea Keeping Behavior of Large Floating Systems**
Dr. Lothar Birk – *University of New Orleans*
An automated optimization procedure allows the design of offshore structure hulls with superior sea keeping characteristics for a target area of operation.

ALTERNATE: **An Innovative Deepwater Floater Concept to Support Drytree Production in Ultra Deepwater Applications**
Dr. Nagan Srinivasan – *DSI*
This paper discusses a state of the art drytree support floater for ultra deepwater harsh environments.

TRACK 2 Subsea Technology • Operational Lessons Learned & Innovative Solutions • New Technology & Equipment SPONSORED BY: DNV

SUBSEA TECHNOLOGY 1 – Chair: Ronny Hanssen – *TOTAL E&P USA* / Co-Chair: Kevin Kennelley – *BP E&P Inc.*

10:45 a.m. – 11: 15 a.m. **SESV (Subsea Equipment Support Vessel): An Alternative Resource for Rig Operations**
Rafeal Nicacio – *Petroleo Brasileiro-SA Petrobras*
The use of fiber rope for subsea equipment installation.

11:15 a.m. – 11:45 a.m. **FAMUS: A Novel Tool for Integrating Flow Assurance Effects in Subsea System Performance Forecasting – Theory & Application**
Siegfried Eisinger – *DNV Norway*
This paper presents the FAMUS method and discusses a pilot project (subsea development project in the Norwegian Sea), wherein the results from the pilot project demonstrate the superior decision support when including flow assurance issues in performance forecasting.

11:45 a.m. – 12:15 p.m. **Finding the Optimum Wet Gas Metering Solution, Offshore Egypt**
Mohamed Bydoun – *Roxar*
This paper will explain the flow assurance challenges in the Simian, Sienna and Sapphire fields, where 16 subsea wet gas meters have been installed.

TRACK 3 Risers • Field Architecture/Development Concepts • HSE & Environmental Solutions

Field Architecture – Chair: Bob Lewis – *Devon Energy* / Co-Chair: Steve Bledsoe – *MCS*

10:45 a.m. – 11:15 a.m. **Value Realized through an Integrated Approach to Crude Analysis**
Julia Taravella – *Shell*
Early collaboration between upstream, downstream and research groups can lead to large savings in heavy oil offshore developments and potentially make these challenging developments economically feasible.

11:15 a.m. – 11:45 a.m. **Global Performance Optimization of an Ultradeep Production System**
Dr. Roger Lu – *Aker Solutions*
The semi-submersible and steel catenary riser performance is analyzed for optimal system performance.

11:45 a.m. – 12:15 p.m. **Technologies and Strategies to Enable Commercial Exploitation of Lower Tertiary Gulf of Mexico Reserves**
Richard D'Souza – *Granherne Americas/KBR*
The commercial development of challenging lower tertiary Gulf of Mexico reserves would require implementation of new technologies on multiple fronts to maximize well productivity and recovery, manage difficult fluids and develop optimized field development plans.

ALTERNATE: **Key Commercial Considerations to Enable Efficient Deepwater Production Handling Agreement Negotiations**
Dr. Jorge Tabares – *BP*
This paper presents findings and lessons learned from multiple production Handling Agreement negotiations, from the perspective of both the tieback owner and the platform owner.

12:15 p.m. – 1:45 p.m. LUNCH

1:45 p.m. – 2:45 p.m **SESSION 2**

TRACK 1 Floating Production Systems • Construction & Installation • Flowlines & Pipelines • Well Construction/Drilling Operations **SPONSORED BY:** DNV

WELL CONSTRUCTION / DRILLING OPERATIONS 1 – Chair: John Murray – *FloaTEC* / Co-Chair: Todd Stevens – *ExxonMobil*

1:45 p.m. – 2:15 p.m. **Moving Load – The Challenge**
Alberto Carlos Caldeira Costa Coelho – *Petrobras*
There is no second chance. Just performance.

2:15 p.m. – 2:45 p.m. **Subsea Reliability and Intervention Requirements – An Integrated Risk Management Approach**
Bjorn Oiungen – *DNV*
Subsea intervention optimization.

TRACK 2 Subsea Technology • Operational Lessons Learned & Innovative Solutions • New Technology & Equipment **SPONSORED BY:** DNV

OPERATIONAL LESSONS LEARNED & INNOVATIVE SOLUTIONS 1 – Chair: Matt Lamey – *Anadarko Petroleum Corporation* / Co-Chair: Lee Norris – *SPT*

1:45 p.m. – 2:15 p.m. **The Lower Tertiary Trend and the Oil Export Economic Prize**
Peter Lovie – *Devon Energy Corporation*
Pipeline or tanker: comparison of the technical aspects, economics, risks and business models for oil export from the remote ultra deepwaters of the lower tertiary region in GoM.

2:15 p.m. – 2:45 p.m. **Sand Management Experience, Matterhorn Field, Deepwater Gulf of Mexico**
Ronny Hanssen – *TOTAL E&P USA*
Presentations of sand management challenges and its impact on production and design.

TRACK 3 Risers • Field Architecture/Development Concepts • HSE & Environmental Solutions

RISERS 1 – Chair: Richard D'Souza – *Granherne Americas/KBR* / Co-Chair: David Walters – *2H Offshore*

1:45 p.m. – 2:15 p.m. **Accounting For VIV for Deepwater Riser Interference**
Dr. Jean-Francois Saint Marcoux – *Acergy*
The paper describes the experimental measurements, description of the wake, proposed wake model, comparison of the measurements and model.

2:15 p.m. – 2:45 p.m. **Greater Plutonio Block 18 Hybrid Riser Tower Results and Recent Experience with a Comprehensive Riser Tower Integrity Monitoring System**
Roderick Edwards – *BMT Scientific Marine Services Inc*
The paper describes the design, manufacture, testing, installation and performance to date of the Integrity Monitoring System that has been installed since September 2007 on the BP Greater Plutonio Block 18 Hybrid Riser Tower.

2:45 p.m. – 3:15 p.m. **COFFEE BREAK** **SPONSORED BY:** FLUOR

Deep Offshore Technology International 2009 Conference Program Detail

3:15 p.m. – 4:15 p.m. **SESSION 3**

TRACK 1 Floating Production Systems • Construction & Installation • Flowlines & Pipelines • Well Construction/Drilling Operations **SPONSORED BY:**

WELL CONSTRUCTION / DRILLING OPERATIONS 2 – Chair: John Murray – *FloaTEC* / Co-Chair: Todd Stevens – *ExxonMobil*

3:15 p.m. – 3:45 p.m. **Monitoring of Drag Anchor Embedment Parameters**
Roderick Ruinen – *Vryhof Anchors BV*
Description of a tool to monitor in real time the embedment of drag anchors.

3:45 p.m. – 4:15 p.m. **Y-Method – New Concept for Subsea Equipment Installation**
Cassiano Neves – *Subsin*
Y-method is a new concept for subsea equipment installation, minimizing the costs, enabling the operation utilizing two AHTS and small adaptations and contemplating the security and operational demands.

ALTERNATE: **True Matching of Bit and Multi Diameter String Tools Delivers Optimized Drilling Performance in GoM Salt Applications**
John Clegg – *ReedHycalog*
This paper describes the theoretical relationship between bit and reamer and modeling the relative agressivity and stability of both tools, building on already established indices for predicting and comparing the performance of bits.

TRACK 2 Subsea Technology • Operational Lessons Learned & Innovative Solutions • New Technology & Equipment **SPONSORED BY:**

OPERATIONAL LESSONS LEARNED & INNOVATIVE SOLUTIONS 2 – Chair: Matt Lamey – *Anadarko Petroleum Corporation* / Co-Chair: Lee Norris – *SPT*

3:15 p.m. – 3:45 p.m. **Strategic Alliance; A Sure Way to Ensuring Local Content (A Case Study of the TOTAL E&P AKPO Project)**
Omudu Robert – *TOTAL E&P NIGERIA LIMITED*
In this paper, the writers share the high point of the project with particular emphasis on the actualization of the Nigerian content portal and the benefit of a strategic alliance for the development of local content potentials of the host country.

3:45 p.m. – 4:15 p.m. **A Systems Approach to Deepwater Initial Startup Planning**
ENGR. Jorge Garduno – *GATE, LLC*
This paper will provide an overview of the systems engineering approach used for the initial startup planning of deepwater facilities and will discuss critical lessons learned from previous startups.

ALTERNATE: **Learnings from 10 Years West of Shetlands Experience**
Craig Matheson – *Subsea 7*
This paper discusses lessons learned from 10 years of ROV and construction support vessel operations on BP's West of Shetlands fields, coping with extreme weather, strong currents and an ever-changing seabed infrastructure.

TRACK 3 Risers • Field Architecture/Development Concepts • HSE & Environmental Solutions

RISERS 2 – Chair: Richard D'Souza – *Granherne Americas/KBR* / Co-Chair: David Walters – *2H Offshore*

3:15 p.m. – 3:45 p.m. **Installation Analysis of Spar Top Tensioned Risers**
Dr. Hengliang Yuan – *Technip USA Inc.*
Presents a new enhanced installation analysis methodology for spar top tensioned risers.

3:45 p.m. – 4:15 p.m. **Flexible Riser Integrity Management – Areas of Concern and Applications**
Mateusz Podskarbi – *Schlumberger Subsea Surveillance*
This paper is focused on monitoring techniques employed and available to detect particular types of failure mechanisms.

ALTERNATE: **Closed Form Seabed Interaction Models For Steel Catenary Risers**
Dr. Christopher Bridge – *Schlumberger*
Examination of stress and fatigue damage of a steel catenary riser at the touch down point using closed form modeling.

4:15 p.m. – 5:45 p.m. **EXHIBITION HALL NETWORKING RECEPTION**

WEDNESDAY, FEBRUARY 4, 2009

8:30 a.m. – 9:30 a.m. **PANEL DISCUSSION**

Expanding Exploration of the US OCS

Government and industry experts discuss the pros and cons of opening more areas of the US Outer Continental Shelf to oil and gas exploration and production.

9:30 a.m. – 10:15 a.m **COFFEE BREAK** SPONSORED BY: FLUOR

10:15 a.m. – 11:45 a.m. **SESSION 4**

TRACK 1 Floating Production Systems • Construction & Installation • Flowlines & Pipelines • Well Construction/Drilling Operations SPONSORED BY: DNV

CONSTRUCTION & INSTALLATION – Chair: Todd Stevens – *ExxonMobil* / Co-Chair: Lee Norris – *SPT*

10:15 a.m. – 10:45 a.m. **Clothesline Initiation of a Flowline under a Drilling Rig on the Cottonwood Project**
Donald Hervey, Jr. – *J. Ray McDermott, Inc.*
Engineering and lessons learned from successfully initiating a PLET underneath an active drilling rig using a single construction vessel.

10:45 a.m. – 11:15 a.m. **Field Knowledge Management for Drilling Optimization**
Dr. Carlos Damski – *Genesis Petroleum Technologies*
The paper presents a method for well engineering experts to systematically apply relevant information from past wells into the design of future infill wells.

11:15 a.m. – 11:45 a.m. **Exploration Potential Offshore the Republic of Guinea**
James Spear – *Hyperdynamics*
This presentation will outline the current exploration program for the country of the Republic of Guinea.

ALTERNATE: **New Solution for Dual Gradient Drilling**
Dr. Ola M. Vestavik – *Reelwell*
The paper discusses new drilling tools and procedures that improve downhole pressure control. Optional drill-in liner for immediate lining the new section being drilled. *Elimination of problems with lost circulation and hole cleaning.*

TRACK 2 Subsea Technology • Operational Lessons Learned & Innovative Solutions • New Technology & Equipment SPONSORED BY: DNV

SUBSEA TECHNOLOGY 2 – Chair: Kevin Kennelley – *BP E&P Inc.* / Co-Chair: Matt Lamey – *Anadarko Petroleum Corp.*

10:15 a.m. – 10:45 a.m. **Enhanced Subsea Compensators**
Brent Boyce – *InterMoor*
This paper presents an alternative to current subsea compensators used for the installation and recovery of subsea hardware (i.e. jumpers, trees and manifolds).

10:45 a.m. – 11:15 a.m. **Autonomous Vehicle Meets New Challenges**
James Jamieson – *Subsea 7*
The presentation will provide the delegates with a picture of how the technology will be used and will show the latest results that demonstrate how close the technology is to being delivered.

11:15 a.m. – 11:45 a.m. **Taking Light Well Intervention from 1500 to 8500 Feet**
Cecilie Drange – *Aker Oilfield Services*
Well intervention from DP vessel in deep waters.

ALTERNATE: **Development of a Deepwater Large Bore Steel Tube Umbilical**
Dr. Alan Dobson – *DUCO*
The paper outlines the various challenges when developing complex umbilical structures for deep water service.

TRACK 3 Risers • Field Architecture/Development Concepts • HSE & Environmental Solutions

HSE/ ENVIRONMENTAL SOLUTIONS – Chair: Ernst den Hartigh – *Shell E&P Company* / Co-Chair: Gene Kliewer – *Offshore*

10:15 a.m. – 10:45 a.m. **Lifecycle Energy Modeling for Upstream Field Development: Rationale and Methodology**
Theo Mallinson – *Siemens Oil & Gas*
The presentation will review a set of life cycle cost criteria considered of growing importance in early design project stages, especially related to energy usage and emissions modeling.

10:45 a.m. – 11:15 a.m. **Monitoring For Compliance – The Spread of MARPOL Annex VI**
Keith Macaluso – *Kittiwake Americas*
Compliance with legislation for the prevention of air pollution from fuel oils.

11:15 a.m. – 11:45 a.m. **Emergency Repair of Critical Asset in Deepwater, MMS Safety Alert 264, Avoiding Flooding and Dewatering Deepwater Risers**
Rush Selden – *TDW Offshore Services*
Introduction of an emergency repair system that allows repair of critical assets (risers/pipelines), and assists compliance with MMS Safety Alert 264, while avoiding flooding and recommissioning the asset.

ALTERNATE: **Effective Systems for Safe Deepwater Drilling**
Sally Ekeng – *Addax Petroleum Dev. Co. Ltd.*
This paper discusses some of the practical steps to be taken for accident free operations, including management commitment, effective and practical safety policy, well understood safety standards, and performance measurements.

11:45 a.m. – 1:15 p.m. **LUNCH** SPONSORED BY: Bennett & Associates

Deep Offshore Technology International 2009 Conference Program Detail

1:15 p.m. – 2:15 p.m. **SESSION 5**

TRACK 1 Floating Production Systems • Construction & Installation • Flowlines & Pipelines • Well Construction/Drilling Operations **SPONSORED BY:** DNV

WELL CONSTRUCTION / DRILLING OPERATIONS 3 – Chair: Jen-hwa Chen – *Chevron* / Co-Chair: Nico Vandenworm – *OPE, Inc.*

1:15 p.m. – 1:45 p.m. **Innovative Plug Setting Method Helps Reduce the Time and Costs Associated with Solving Unplanned Events During Drilling Operations**
Hank Rogers – *Halliburton*
This paper documents several unplanned event types that require plug cementing operations to be performed.

1:45 p.m. – 2:15 p.m. **New Method to Reduce the Cost of Well Construction Compared to Convention (Wells of the Future)**
Paul Howlett – *Caledus*
The paper will describe the development, prototype testing, test well full system test, and field trials of an evolutionary well construction system.

TRACK 2 Subsea Technology • Operational Lessons Learned & Innovative Solutions • New Technology & Equipment **SPONSORED BY:** DNV

NEW TECHNOLOGY & EQUIPMENT 1 – Chair: Uri Nooteboom – *INTEC WorleyParsons Group* / Co-Chair: Ronny Hanssen – *TOTAL E&P USA*

1:15 p.m. – 1:45 p.m. **Permanent-Magnet Motors for Subsea Applications**
Dr. Daniel Saban – *Direct Drive Systems*
This paper is a technology overview of permanent-magnet (PM) motors for subsea applications, which offer a significant benefit over induction motors.

1:45 p.m. – 2:15 p.m. **Development of Subsea Grouted Tee Hot Tap Technology**
Paul Booth – *Subsea 7*
The paper will present the qualification program and demonstrate that this grouting technology is deemed a suitable alternative for tees and repair clamps and other applications.

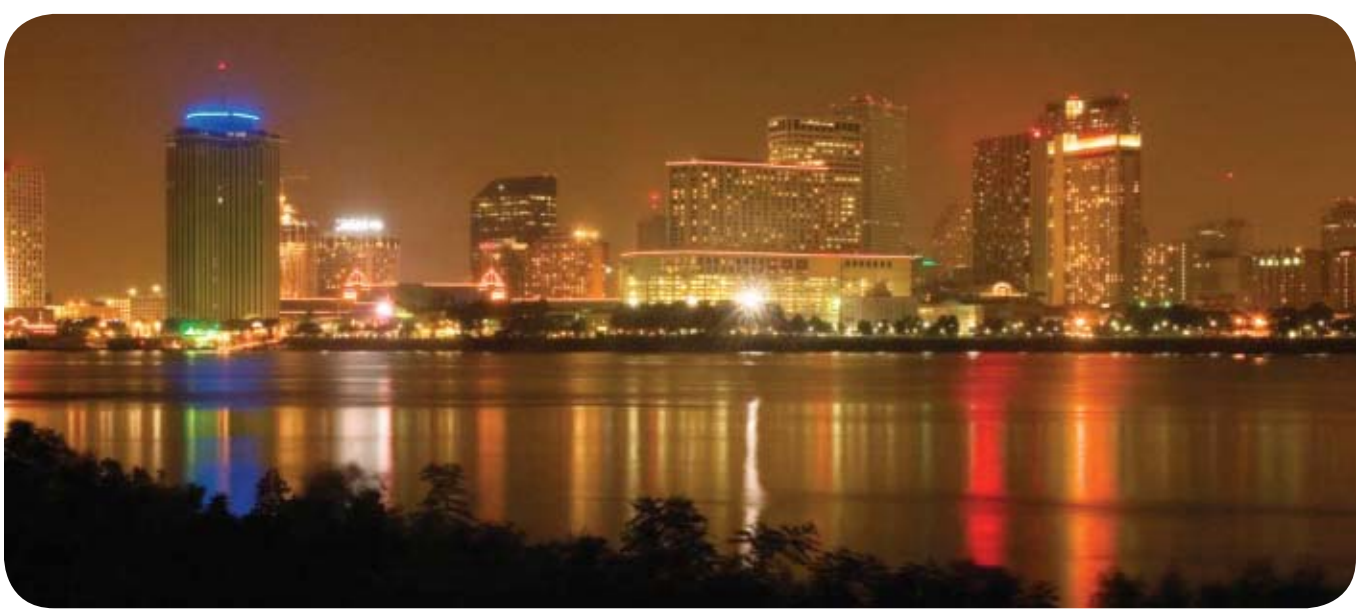
TRACK 3 Risers • Field Architecture/Development Concepts • HSE & Environmental Solutions

RISERS 3 – Chair: Steve Bledsoe – *MCS* / Co-Chair: Richard D'Souza – *Granherne/KBR*

1:15 p.m. – 1:45 p.m. **Riser Tower Fabrication Lessons Learned**
Blaise Seguin – *Acergy*
Lessons learned and way forward, from experience on fabrication of the largest riser tower.

1:45 p.m. – 2:15 p.m. **Safer Connections for Flexible Risers and Umbilicals on Deepwater Platforms**
Paul Hughes – *First Subsea Ltd.*
An overview and study of proven connection systems for the installation and operation of flexible risers and umbilicals in deepwater applications.

2:15 p.m. – 2:45 p.m. **COFFEE BREAK** **SPONSORED BY:** FLUOR



2:45 p.m. – 3:45 p.m. **SESSION 6**

TRACK 1 Floating Production Systems • Construction & Installation • Flowlines & Pipelines • Well Construction/Drilling Operations **SPONSORED BY:** DNV

WELL CONSTRUCTION / DRILLING OPERATIONS 4 – Chair: Jen-hwa Chen – *Chevron* / Co-Chair: Nico Vandenworm – *OPE, Inc.*

2:45 p.m. – 3:15 p.m. **Qualification of Cutting Edge Deepwater Drilling Technologies**
Afzal Hussain – *Det Norske Veritas (USA)*
Generally, new technology is not adequately covered by established codes and procedures. Therefore it must be qualified by following a systematic process where the required functionality and reliability is documented.

3:15 p.m. – 3:45 p.m. **Every Minute Counts – Deepwater Completions, Offshore Brazil**
Francisco Pineda – *BJ Services*
This paper reviews the current conventional application and describes the next generation of the application, already used offshore deepwater in Brazil, with completion time greatly reduced.

ALTERNATE: **No More Minifrac**
Sustin Irvin – *Halliburton*
This paper discusses a new process for designing the frac treatments that resulted in an estimated total savings of ~$1,000,000 as well as eliminating the injection of ~110,000 gal of gel into the formation.

TRACK 2 Subsea Technology • Operational Lessons Learned & Innovative Solutions • New Technology & Equipment **SPONSORED BY:** DNV

NEW TECHNOLOGY & EQUIPMENT 2 – Chair: Uri Nooteboom – *INTEC WorleyParsons Group* / Co-Chair: Ronny Hanssen – *TOTAL E&P USA*

2:45 p.m. – 3:15 p.m. **Deepwater Synthetic Lowering and Lifting Lines with Enhanced Cyclic Bend Fatigue Resistance**
Robert Thomas – *Samson*
A summary of the development of new synthetic rope technology that delivers dramatically increased bending fatigue life.

3:15 p.m. – 3:45 p.m. **Deep Offshore Sour Gas Challenges**
Dr. James Hyne – *HYJAY R&D Ltd.*
Identification of and possible responses to encountering high hydrogen sulfide gas in deep, high pressure, high temperature off-shore formations.

ALTERNATE: **Deepwater Developments – Successful Application of New Technology**
Havard Brandt – *Det Norske Veritas*
This paper discusses how to assess the business impact and commercial performance of adopting new technology, with emphasis on assessing reliability, availability, and maintenance (RAM) analysis to demonstrate the commercial performance of a given concept.

TRACK 3 Risers • Field Architecture/Development Concepts • HSE & Environmental Solutions

RISERS 4 – Chair: Steve Bledsoe – *MCS* / Co-Chair: Richard D'Souza – *KBR/Granherne Americas*

2:45 p.m. – 3:15 p.m. **Development of Welding and Associated Processes for SCR Fabrication**
Tony Clough – *Subsea 7*
This paper discusses a variant of the GTAW process that offered acceptable production rates and much higher weld quality. It is presented as a solution to the needs of the SCR market.

3:15 p.m. – 3:45 p.m. **Qualification of Heavy Wall Riser Connectors for Drytree HPHT Systems**
Roy Shilling – *BP America*
The paper presents latest results and information on the developments of heavy wall threaded riser connectors and materials for HPHT drytree systems.

ALTERNATE: **Rising to the Challenge**
Dr. Jonathan Wylde – *OMS*
This paper draws on experience gained in deepwater pipe-welding operations in recent projects.

Deep Offshore Technology International 2009 Conference Program Detail

THURSDAY, FEBRUARY 5, 2009

8:30 a.m. – 9:30 a.m. **PANEL DISCUSSION**
US OCS Energy Potential
Government and industry speakers examine the potential for hydrocarbons in various areas of the unexplored US Outer Continental Shelf, including offshore Alaska, East Coast, Florida, and California.

9:30 a.m. – 10:15 a.m. **COFFEE BREAK** SPONSORED BY: FLUOR

10:15 a.m. – 11:45 p.m. **SESSION 7**

TRACK 1 Floating Production Systems • Construction & Installation • Flowlines & Pipelines • Well Construction/Drilling Operations SPONSORED BY: DNV

FLOWLINES & PIPELINES – Chair: Kevin Kennelley – *BP E&P Inc.* / Co-Chair: Ian Cobban – *Subsea 7*

10:15 a.m. – 10:45 a.m. **A Comparative Study of Hydrate Management Techniques and Their Cost Analysis for Deep/Ultra Deepwater Development**
Rama Alapati – *Champion Technologies*
This paper discusses several hydrate management methods for a generic deepwater/ultra-deepwater development, including the pros and cons for each of the options, to provide guidelines for future developments.

10:45 a.m. – 11:15 a.m. **Installation of Rigid Pipeline under Extremely Challenging Seabed**
Engr. Ole Petter Hjelmstad – *Subsea 7*
This paper describes the challenges associated with the installation of subsea pipelines that allows the flow of gas/oil from the deepwater areas up to facilities close to shore, providing interface between live productions fields and auxiliary units.

11:15 a.m. – 11:45 a.m. **Introduction to Submersible Suspension Pressure-Equaliser Pipeline**
Kasra Zarisfi – *Andrew Palmer & Associates*
Its purpose is to provide a safer, faster and more financially advantageous alternative to gas transmission via LNG.

ALTERNATE: **Novel Composite Pipe-in-Pipe Solutions for Ultra Deepwater Field Developments**
Engr. Jean-Philippe Arbey – *Saipem*
SAIPEM and EADS are developing an original concept of sandwich steel-composite inner pipe for Pipe-In-Pipe applications in deepwater.

TRACK 2 Subsea Technology • Operational Lessons Learned & Innovative Solutions • New Technology & Equipment SPONSORED BY: DNV

SUBSEA TECHNOLOGY 3 – Chair: Lee Norris – *SPT* / Co-Chair: Uri Nooteboom – *INTEC WorleyParsons Group*

10:15 a.m. – 10:45 a.m. **Development and Selection of a High Temperature Resistant Subsea Insulation**
Simon Shepherd – *Alderley Materials Limited*
This paper will discuss the qualification of a high temperature resistant material for the Statoil Kristin field in the Norwegian North Sea.

10:45 a.m. – 11:15 a.m. **Fatigue Design Criteria for Deepwater Risers, Umbilicals and Pipelines**
Dr. Kim Mørk – *DNV*
Based on recent experience, this paper gives an overview of the key issues and challenges with a reliable fatigue design related deepwater risers, umbilicals and pipelines.

11:15 a.m. – 11:45 a.m. **The Role of Thermoplastic Umbilicals in Deepwater Subsea Systems**
Evelyn Lundhild – *DuPont Advanced Fiber Systems*
Discussion of the current technical capabilities of thermoplastic umbilicals and the future of thermoplastic hose development.

ALTERNATE: **Lean Duplex for Dynamic Steel Tube Umbilicals**
John McManus – *RathGibson*
This paper discusses the recent qualification test program for a second lean duplex option, Alloy 2101 (UNS S32101), which will extend the working pressure range of the product line to 15,000 psi.

TRACK 3 Risers • Field Architecture/Development Concepts • HSE & Environmental Solutions

RISERS 5 – Chair: Bob Kipp – *WorleyParsons Sea* / Co-Chair: Majid Al-Sharif – *Helix Energy Solutions Group, Inc.*

10:15 a.m. – 10:45 a.m. **Benefits of a Free Standing Drilling Riser in the GOM**
Dr. Rupak Ghosh – *BP Exploration*
The paper discusses the advantages of a free-standing drilling riser for hurricane abandonment operation in the GoM.

10:45 a.m. – 11:15 a.m. **Design Options for Lightweight Deepwater Drilling Risers**
Mr. Harry Zonker – *Alcoa Inc.*
This paper reviews design approaches to reduce drilling riser weight which can increase the water depth rating of existing drilling vessels.

11:15 a.m. – 11:45 a.m. **Single Independent Riser for Future Ultra Deepwater Field Developments**
Loic Delebecque – *Saipem*
Novel riser for deep and ultra deep water projects.

ALTERNATE: **SCR Evolution and Installation Assessment On Turret Moored FPSO In West Africa Ultra Deepwater**
Mason Wu – *Acergy*
This paper discusses high level selections of top hang-off methods, the SCR laying procedure, including VIV strakes, buoyancy modules, and SCR hand-over procedures from installation vessel to FPSO.

11:45 a.m. – 12:45 p.m. **LUNCH**

CHAIRMAN'S CLOSING REMARKS
INDUSTRY CLOSING
AWARDS CEREMONY
CLOSING REMARKS AND PASSING OF THE TORCH TO THE 2010 HOST COMPANY

1:45 p.m. – 2:00 p.m......EXHIBIT FLOOR GIVEAWAY

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DEEP OFFSHORE TECHNOLOGY INTERNATIONAL CONFERENCE & EXHIBITION

FEBRUARY 3-5, 2009

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2009 Registration Form

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First Name: _____

Last Name: _____

Title/Position: _____

Company: _____

Address: _____

City/State _____

Country: _____

Postal Code: _____

Telephone: _____

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Email: _____

Confirmations will be sent by e-mail if a unique e-mail address is given.

1. Type of Company or Organization:

- ☐ 10 Oil/Gas company
- ☐ 20 Consulting Company
- ☐ 30 Contractor
- ☐ 40 Engineering/Construction
- ☐ 50 Financial
- ☐ 60 Service/Supply
- ☐ 65 Government/Library/Education
- ☐ 70 Other _____

2. Job Function:

- ☐ 02 Management (CEO, Pres. VP)
- ☐ 05 Engineering/Technical/Geoscience
- ☐ 06 Superintendent/Field Professional/Foreman
- ☐ 10 Purchasing/Consulting
- ☐ 12 Other _____

3. Areas of Interest/Involvement:

- ☐ 10 Exploration
- ☐ 05 Drilling
- ☐ 01 Production
- ☐ 29 Gas Processing
- ☐ 23 Pipeline/Transportation
- ☐ 19 Petrochemical
- ☐ 15 Refining
- ☐ 39 Financial
- ☐ 46 Other _____

4. Purchasing Role:

☐ Specify ☐ Recommend ☐ Approve ☐ None

For information on corporate packages for 21 or more attendees contact:
Cary Shipley / Phone: +1 918 831 9160 / Email: carys@pennwell.com

3 ways to register:

Pre-register on line before January 6, 2009.

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1 **Fax:**
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Conference Fees: *(All Delegate Registrations Include)*

Includes:
- Access to all Conference Sessions
- Access to the Exhibition Hall, including both the Opening & Networking Receptions
- Coffee Breaks in Exhibition Hall
- Delegate Lunch on Tuesday, Wednesday and Thursday (Ticketed)
- Conference Proceedings

1. Individual Delegate (3-Day Registration)*

☐ Paid By Jan. 6, 2009 ..... US$ 1,825 ☐ Paid After Jan. 6, 2009 ..... US$ 1,925

2. Corporate Plan (10 delegates)

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3. Exhibitor Delegate

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4. Student Delegate *(Student ID Must Be Provided)*

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6. Exhibition Only ..... US$ 30

☐ Does not include conference sessions, proceedings or delegate luncheons

7. Single Day Delegate

Includes conference sessions and delegate lunch on corresponding day.
Does not include Proceedings.

☐ Tuesday ..... US$ 950 ☐ Wednesday ..... US$ 950 ☐ Thursday ..... US$ 950

8. Additional Lunch Tickets (for non-delegates)

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- ☐ Thursday ( ) @ US$ 35.00/day

TOTAL PAYMENT AMOUNT (In U.S. funds only) = US$ _____

*Your full-price registration fee includes a one-year paid subscription to Oil & Gas Journal (US$ 89.00 value).

Payment must be received prior to conference. If payment in not received by the conference date, the registration fee must be guaranteed on charge card until proof of payment is provided. Make check payable to Deep Offshore Technology 2009.

Method of Payment:

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2009 Hotel Booking Form

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Hotel Reservation Form

To make your hotel reservation, contact **Preferred Convention Services**. DO NOT contact the hotel directly. Discounted rates are available only through our office and are guaranteed until January 6, 2009. You may book your reservation any of the following ways:

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Mail: Deep Offshore Technology International 2009
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Please number your hotels in order of preference: ***Both hotels are 100% non-smoking!***

☐ **Courtyard Convention Center**
$167 Single; $167 Double
Tax: 13% + $2 per room, per night occupancy tax
Convention Center: 1 block
Airport: 12 miles
Hotel Services: Breakfast Restaurant, 24 Hour Food Market, Complimentary Internet, Fitness Center, Outdoor Heater Pool, Whirlpool
Parking: $16 Self
Cancellation Policy: A $40 processing fee will be charged on all cancellations 30 days or less from arrival. Hotel will charge one night's room & tax for cancellations made 7 days or less prior to arrival

☐ **New Orleans Marriott Convention Center**
$187 Single; $187 Double
Tax: 13% + $2 per room, per night occupancy tax
Convention Center: Across the street
Airport: 14 miles
Hotel Services: Restaurant, Lounge, Room Service, Fitness Center, Rooftop Outdoor Pool, Day Spa
Parking: $28.00 Valet
Cancellation Policy: A $40 processing fee will be charged on all cancellations 30 days or less from arrival. Hotel will charge one night's room & tax for cancellations made 7 days or less prior to arrival

CHECK ONE:
Exhibitor ☐ Attendee ☐ Other ☐ _____

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