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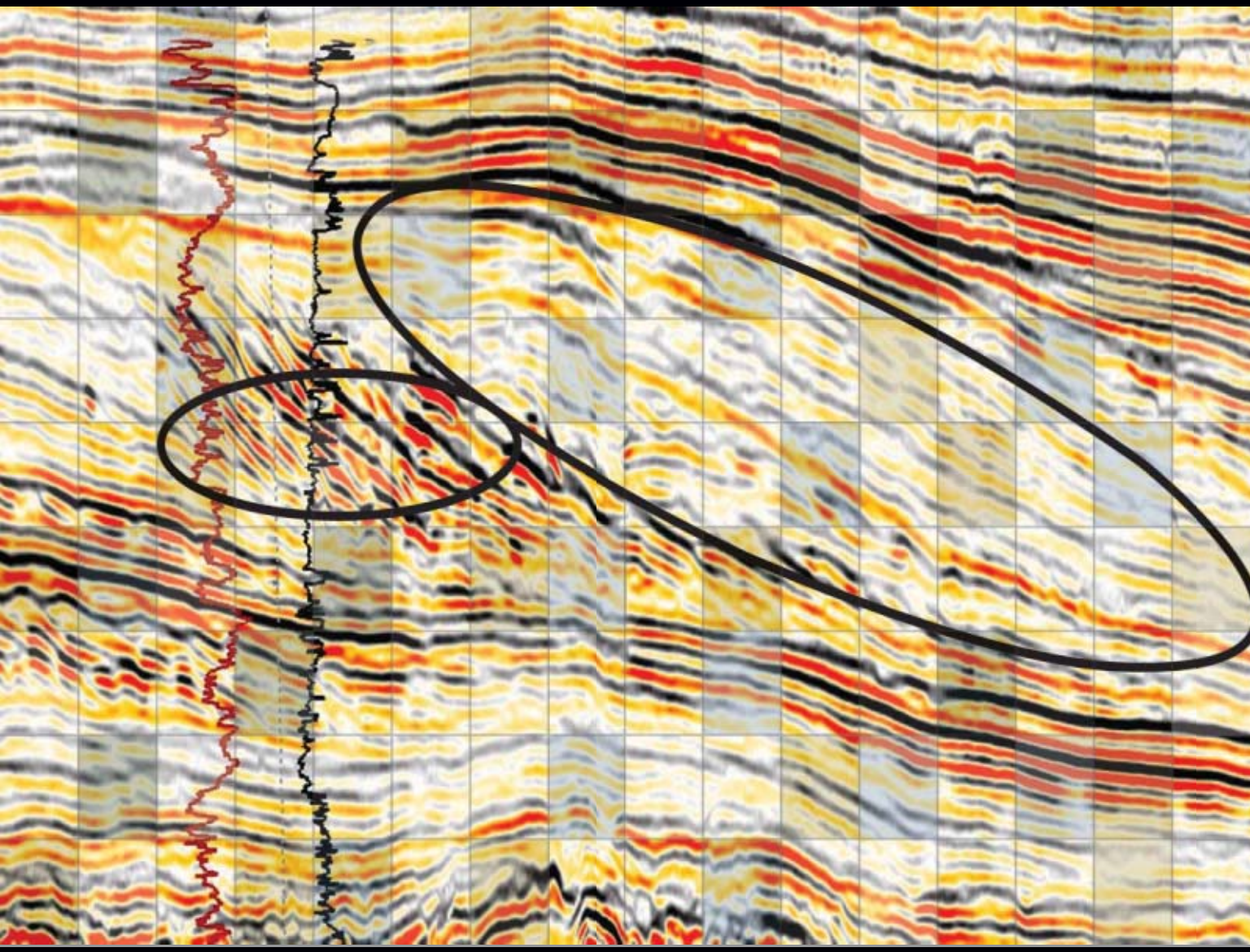


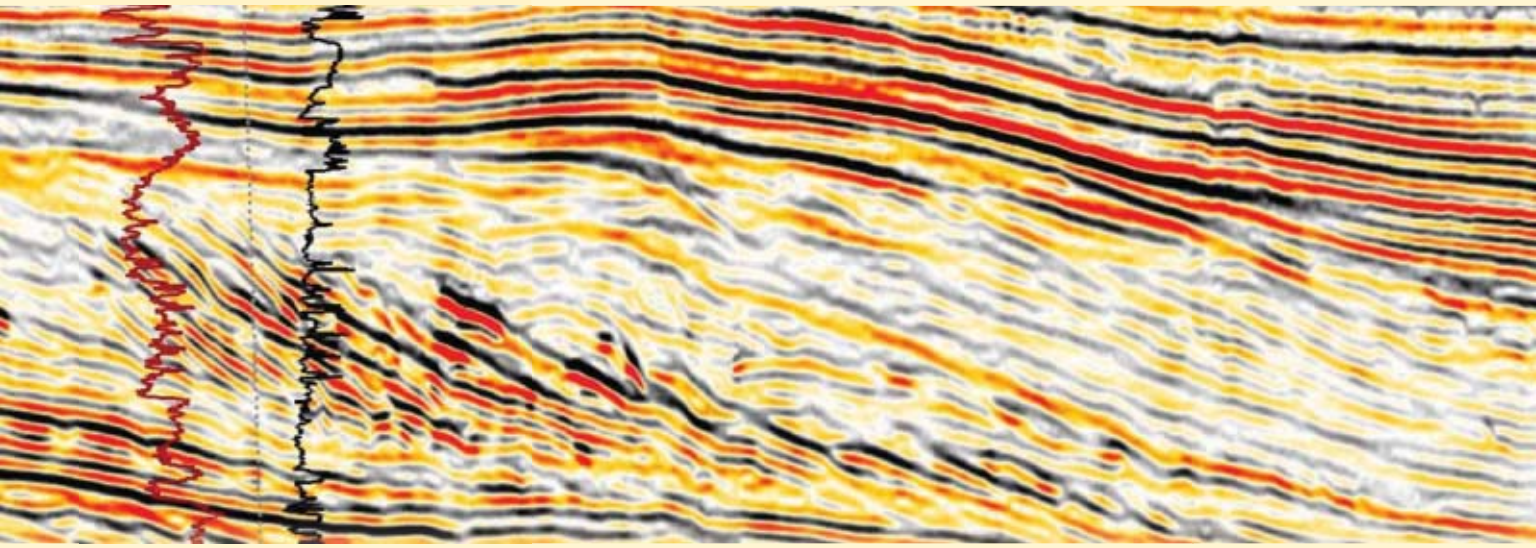
Applied Geophysics

Chinese design drilling fluids for Tuha's Jurassic sandstone
US propane inventory woes aggravated by hurricanes
Altex CEO guides newbuild sands crude transport project

OIL&GAS JOURNAL®

Nov. 3, 2008
Volume 106.41

APPLIED GEOPHYSICS



REGULAR FEATURES

COVER

A seismic interpreter can develop interpretable fuzzy outputs to build logics by investigating seismic attributes, as shown in the high-risk area and the much larger low amplitude and intermediate frequency area highlighted on this week's cover. After that, he can create unique outputs by using user-defined simple logical expressions (i.e., IF-THEN statements). An article on the method starts on p. 33 as part of OGJ's Applied Geophysics special report. Image courtesy of Dr. Gulraiz Akhter, Quaid-i-Azam University, Islamabad.

General Interest

Exploration & Development

Drilling & Production

Processing

Transportation

 Oil & Gas Journal (ISSN 0030-1388) is published 48 times per year by PennWell Corporation, 1421 S. Sheridan Rd., Tulsa, Okla., Box 1260, 74101. Periodicals postage paid at Tulsa, Okla., and at additional mailing offices. Oil & Gas Journal and OGJ are registered trademarks of PennWell Corporation. **POSTMASTER:** send address changes, letters about subscription service, or subscription orders to P.O. Box 3497, Northbrook, IL 60065, or telephone (800) 633-1656. Change of address notices should be sent promptly with old as well as new address and with ZIP code or postal zone. Allow 30 days for change of address. Oil & Gas Journal is available for electronic retrieval on Oil & Gas Journal Online (www.ogjonline.com) or the NEXIS® Service, Box 933, Dayton, Ohio 45401, (937) 865-6800. **SUBSCRIPTION RATES** in the US: 1 yr. $89; Latin America and Canada: 1 yr. $94; Russia and republics of the former USSR, 1 yr. 1,500 rubles; all other countries: 1 yr. $129, 1 yr. premium digital $59 worldwide. These rates apply only to individuals holding responsible positions in the petroleum industry. Single copies are $10 each except for 100th Anniversary issue which is $20. Publisher reserves the right to refuse non-qualified subscriptions. Oil & Gas Journal is available on the Internet at http://www.ogjonline.com. (Vol. 106, No. 41) Printed in the US. GST No. 126813153. Publications Mail Agreement Number 602914. Return Undeliverable Canadian Addresses to: P.O. Box 1632, Windsor, ON N9A 7C9.

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OGJ Newsletter

Nov. 3, 2008

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General Interest — Quick Takes

OPEC cuts oil output by 1.5 million b/d

The Organization of Petroleum Exporting Countries announced a 1.5 million b/d reduction to its oil output targets. The cuts, effective Nov. 1, would put total OPEC production at 27.308 million b/d from the 11 member countries that are bound by quotas.

The organization cited declining oil demand resulting from the financial crisis and slowing global economy as the reason behind the cut, maintaining that the market has been oversupplied with crude for some time.

OPEC noted that the recent dramatic oil price collapse may jeopardize existing oil projects and lead to the cancellation or delay of others, possibly resulting in a medium-term supply shortage.

Iraq and outgoing OPEC member Indonesia were not assigned a new production ceiling. The largest cut was assigned to Saudi Arabia, which agreed to reduce output by 466,000 b/d.

The Centre for Global Energy Studies, London, calculates that Saudi Arabia's new quota will be 8.477 million b/d, based on figures released after OPEC's November 2007 meeting. In order to comply with the new quotas, Saudi Arabia will be required to cut its actual production by more than 1 million b/d from an estimated September 2008 level of almost 9.5 million b/d, according to CGES.

Iran will have to cut its actual output by 300,000 b/d from its September level, Kuwait by 200,000 b/d, and the UAE, Algeria, and Libya each by more than 100,000 b/d. Only Angola and Nigeria were producing less than their new quota levels of output in September, CGES said.

CGES believes that OPEC's desire to push oil prices upwards from their current $60-70/bbl level stands in sharp contrast to what the organization was saying just a year ago. In a press release in October 2007, Sec. Gen. Abdalla Salem El-Badri said OPEC was concerned with the escalation in oil prices that pushed the OPEC reference basket to $80/bbl from $70/bbl over the previous month and a half. The press release went on to say that the rising oil prices were largely being driven by market speculators.

"The implication then was that oil prices at $70-80/bbl were not a reflection of market fundamentals and were unhealthily high. Twelve months on and this same level of oil prices must be protected as a floor price, despite the much weaker outlook for the global economy and fears of a global recession," CGES said.

Congress asked to address energy production

Two senior Republicans on the US House Oversight and Government Reform Committee issued a report Oct. 28 calling for an approach that addresses all facets of US energy production.

The report also affirms that US energy security and global environmental challenges cannot be effectively addressed separately, according to Thomas M. Davis III (Va.), the full committee's ranking minority member, and Darrel E. Issa (Calif.), ranking minority member of the committee's Domestic Policy Subcommittee.

"We no longer can ignore the fact that energy policy is intertwined with security policy. We can't keep pumping money into the economies of countries dedicated to opposing our interests. For that matter, we can't keep sending billions of dollars overseas every year when we have the means, the technology and the raw materials to alleviate much of our dependence on foreign energy right here at home," Davis said.

"We cannot address the root of many national security concerns, economic troubles or environmental threats without an effective energy strategy. These issues have all become deeply intertwined. An effective energy policy cannot address just the cost of energy today," Issa added.

The report by the committee's minority staff also said an energy and environmental policy "that fails to account for competitiveness concerns will cause the US manufacturing base to shift more American jobs overseas and could actually increase carbon emissions. Any meaningful international agreement to reduce carbon emissions must include the developing world since it is an essential part of the problem and the solution."

Pertamina, GMI suspects barred from travel

Indonesia's National Police, following recent allegations of corruption in the purchase of imported oil, have announced an immediate travel ban on four members of state-owned PT Pertamina and a director of PT Gold Manor International (GMI).

The five are under investigation after allegations that they profited from the procurement of Zatapi crude oil last year in violation of the country's anticorruption law, according to National Police spokesman Insp. Gen. Abubakar Nataprawira.

"They also have been named as suspects in this case, but we have yet to arrest them," said Abubakar, who declined to name the suspects. "We will determine their further status after we complete our investigations," he said.

Abubakar said the State Development Finance Comptroller is calculating the total amount of financial loss to the Indonesian state.

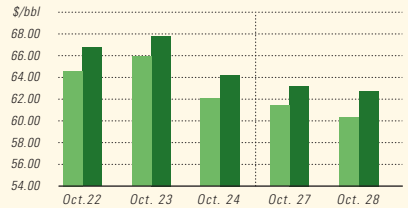
Singapore-based oil importer GMI won a Pertamina-sponsored tender to supply 600,000 bbl of Zatapi crude oil to Indonesia last December and began shipping it to a Pertamina refinery in Cilacap, Central Java, in February, 2008.

Legislators of House Commission VII overseeing energy and mineral resources later revealed that Gold Manor's tender bid was incomplete since it did not include a detailed breakdown of the contents of Zatapi oil.

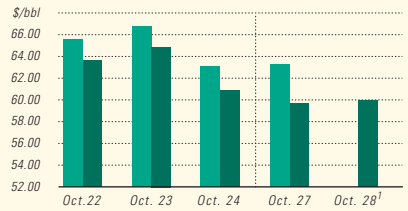
The Attorney General's Office began investigating the case on Mar.

Industry Scoreboard

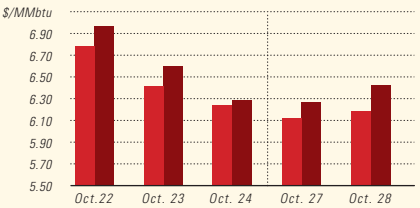
IPE BRENT / NYMEX LIGHT SWEET CRUDE



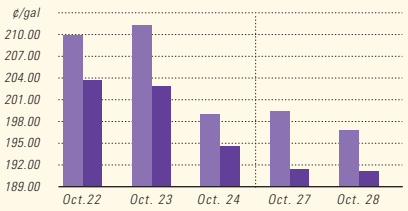
WTI CUSHING / BRENT SPOT



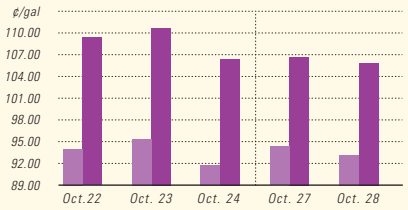
NYMEX NATURAL GAS / SPOT GAS - HENRY HUB



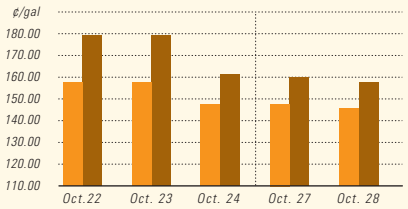
IPE GAS OIL / NYMEX HEATING OIL



PROPANE - MT. BELVIEU / BUTANE - MT. BELVIEU



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



[1]Not Available [2]Reformulated gasoline blendstock for oxygen blending. [3]Nonoxygenated regular unleaded.

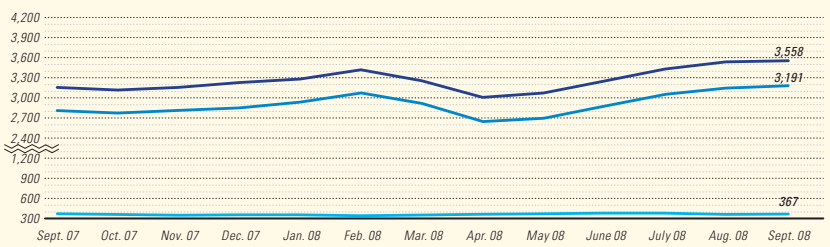
US INDUSTRY SCOREBOARD — 11/3

Latest week 10/17	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	8,845	9,244	–4.3	9,042	9,298	–2.8
Distillate	3,949	4,191	–5.8	4,008	4,208	–4.8
Jet fuel	1,447	1,593	–9.2	1,544	1,626	–5.0
Residual	413	647	–36.2	604	730	–17.3
Other products	4,062	4,775	–14.9	4,654	4,811	–3.2
TOTAL DEMAND	18,716	20,450	–8.5	19,658	20,702	–5.0
Supply, 1,000 b/d						
Crude production	4,366	4,975	–12.2	4,965	5,071	–2.1
NGL production[2]	2,214	2,435	–9.1	2,255	2,379	–5.2
Crude imports	9,974	9,979	–0.1	9,745	10,063	–3.2
Product imports	3,605	3,257	10.7	3,182	3,519	–9.6
Other supply[3]	1,361	994	36.9	1,378	1,035	33.1
TOTAL SUPPLY	21,520	21,640	–0.6	21,525	22,067	–2.5
Refining, 1,000 b/d						
Crude runs to stills	14,655	15,150	–3.3	14,655	15,144	–3.2
Input to crude stills	14,895	15,347	–2.9	14,895	15,434	–3.5
% utilization	84.9	88.0	—	84.9	88.5	—

Latest week 10/17	Latest week	Previous week[1]	Change	Same week year ago[1]	Change	Change, %
Stocks, 1,000 bbl						
Crude oil	311,380	308,198	3,182	316,577	–5,197	–1.6
Motor gasoline	196,497	193,788	2,709	193,837	2,660	1.4
Distillate	124,304	122,148	2,156	134,471	–10,167	–7.6
Jet fuel-kerosine	36,579	36,258	321	41,928	–5,349	–12.8
Residual	37,359	38,706	–1,347	36,739	620	1.7
Stock cover (days)[4]			Change, %		Change, %	
Crude	22.6	23.7	–4.6	21.0	7.6	
Motor gasoline	22.2	22.1	0.5	21.0	5.7	
Distillate	31.5	31.4	0.3	31.3	0.6	
Propane	67.6	77.2	–12.4	54.9	23.1	
Futures prices[5] **10/24**			Change		Change	%
Light sweet crude ($/bbl)	68.78	75.21	–6.43	88.27	–19.49	–22.1
Natural gas, $/MMbtu	6.60	6.70	–0.09	7.34	–0.73	–10.0

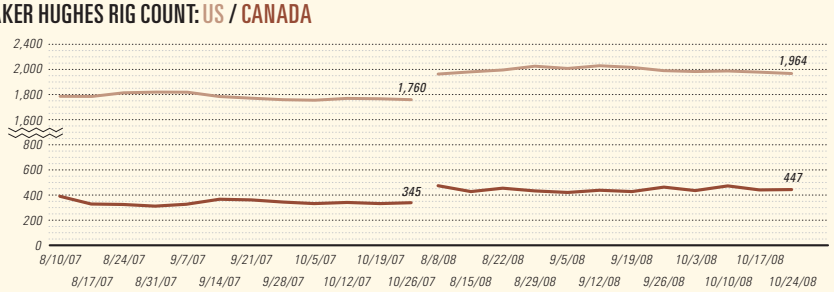
[1]Based on revised figures. [2]Includes adjustments for fuel ethanol and motor gasoline blending components. [3]Includes other hydrocarbons and alcohol, refinery processing gain, and unaccounted for crude oil. [4]Stocks divided by average daily product supplied for the prior 4 weeks. [5]Weekly average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

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



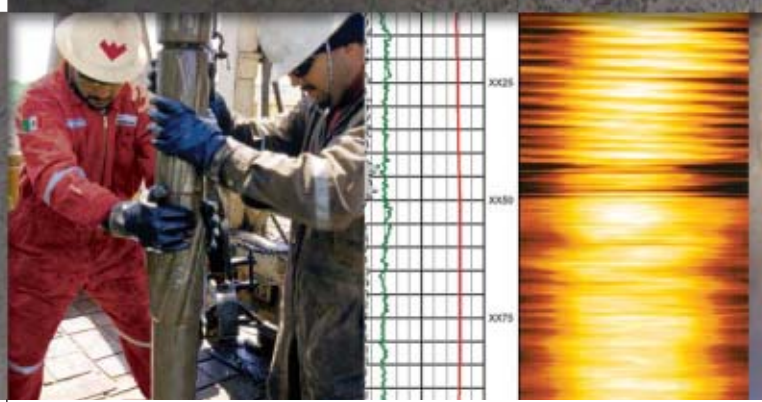
Note: Monthly average count

BAKER HUGHES RIG COUNT: US / CANADA



Note: End of week average count

Build better boreholes.



Weatherford's Revolution Rotary-Steerable Service helped BP Indonesia achieve better than anticipated production, incident-free, from a multi-well, shallow-gas, extended-reach project while saving more than $1.25 million.

Better boreholes mean better wells. Weatherford's **Revolution® Rotary-Steerable** Service integrates point-the-bit rotary-steerable technology with the industry's most robust MWD and LWD tools, global real-time operations and drilling optimization support. So, you can steer precisely and efficiently to target and leave a borehole that is smoother, cleaner and easier to case and complete. That means you can get production on line faster, with fewer problems. And, the Revolution system's compactness and design simplicity reduce cost and ease logistics – all to help you build **better recovery, better profit and better value** for your asset.

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Build...

Drilling | Evaluation | Completion | Production | Intervention

2. Last month, police named four Pertamina staff members, including a vice-president and a former director, as suspects in the case.

Pertamina Pres. Director Ari Soemarno denied any irregularities in the Zatapi imports, saying they did not cause any losses. ✦

Exploration & Development — *Quick Takes*

Solana gauges oil in Colombia's Llanos basin

Solana Resources Ltd., Calgary, reported an average flow of 5,645 b/d of 41° gravity oil from the Tertiary Carbonera formation at a discovery in eastern Colombia's Llanos basin.

Los Aceites-1, on the 16,640-acre Guachiria Block, has permeabilities in excess of 3 darcies, and the flow rate was achieved with less than a 15% drawdown, "indicative of significant incremental flow potential," the company said. Carbonera was perforated at 6,874-84 ft. TD is 7,108 ft measured depth.

The company gauged the flow through a $^{98}/_{64}$-in. choke with 75 psi tubinghead pressure. The well produced only 4 bbl of water in 48 hr.

In anticipation of pending government approval of an extended test, Solana plans to build centralized permanent facilities at the nearby Primavera-1 location, site of the company's other 2008 discovery on the block. Oil will be trucked in the short term.

The company, which is remapping the area as a result of the exceptional flow rate, said one more well may be required in the field.

Santos suspends Henry-2 DW1 gas well off Victoria

Santos is completing and suspending as a gas producer its Henry-2 DW1 sidetrack well on the Vic/P44 permit in the Otway basin off western Victoria.

The well encountered good gas shows, and logs recorded excellent reservoir quality. The well will now be tested and suspended pending production.

Henry-2 was the final well semisubmersible Ocean Patriot drilled in Santos' development program to tie in Henry gas field to Casino.

The forthcoming development will include a 17 km subsea pipeline and control umbilical to be installed from existing Casino facilities to Henry and nearby Netherby discovery plus an additional 5 km of line extending to the East Pecten location.

First gas production from the project is expected by June 2009, with flow rates expected to be 120 terajoules/day for the combined Henry and Casino production.

Virginia Huron shale gets horizontal wells

Range Resources Corp., Fort Worth, completed drilling its fifth horizontal well to Devonian Huron shale in Nora field in southwestern Virginia.

The company, which says Huron produces gas from 107 vertical wells in the field, estimated the formation's net reserve potential at Nora from horizontal drilling to 8-1.5 tcf.

The four horizontal Huron shale wells averaged initial production of 1.1 MMcfd, averaged $1.7 million/well, and continue to produce in line with expectations, the company said. The company noted that the Huron is thicker and higher pressured at Nora than in Kentucky.

Range Resources plans to drill five more Huron shale wells and two horizontal Berea wells by the end of 2008.

BC gas may offset conventional decline

Further development of shale and tight natural gas prospects in Northeast British Columbia may be able to offset an expected 7% decline in conventional Canadian gas production by 2010, said that country's National Energy Board.

The price of gas would need to climb back to $8-9 (Can.)/gigajoule for operators to maintain or accelerate current drilling levels, and board said. Producers indicated great enthusiasm for the resource potential on the deeper, less-developed western side of the Western Canada Sedimentary Basin, it noted.

The board in its 2008-10 deliverability report considered reference, low, and high-investment cases, all of which take into account the development of shale and tight gas prospects in the Horn River and Montney plays.

Gas production in the US has increased by 8%, and the global economic situation could reduce demand, the NEB noted.

Unconventional gas spurs EnCana's output

EnCana Corp. said its companywide natural gas production was up 8% to 3.9 bcfd in the quarter ended Sept. 30 on a gain of 16% in its North American unconventional gas plays.

East Texas output averaged 340 MMcfd, up 135% from the same quarter a year ago, due to new wells coming on production and a 2007 acquisition that doubled EnCana's interest in the Jurassic Deep Bossier play.

EnCana's US gas production was up 24% on drilling and operational success in the Fort Worth and Piceance basins and Jonah field in Wyoming.

In Canada, coalbed methane, Cutbank Ridge, and Bighorn increased production by 23%, partly offset by natural declines from conventional properties, resulting in an overall 16% gain in the Canadian Foothills division.

EnCana added 25,000 net acres in North Louisiana in the quarter, bringing its Haynesville shale position to 400,000 net acres of land plus 63,000 net acres of mineral rights. EnCana and its partner Shell Exploration & Production Co. have an industry-leading land position in the area, where they are running six rigs and will target drilling and completion of the first well in the mid-Bossier shale in the fourth quarter.

EnCana holds more than 700,000 acres in the Montney play in Northeast British Columbia and northwestern Alberta, and EnCana and Apache Corp. have completed seven wells this year in the Horn River basin shale play. One of the most recent wells averaged almost 8 MMcfd in the first 30 days.

Bahrain launches bid round for gas exploration

Bahrain has launched a bidding round for exploration of its onshore natural gas fields, said oil minister Abdul-Hussain Ali Mirza, who also is chairman of the country's national oil and gas authority.

Mirza said 25 international companies expressed interest in bidding and that the open bidding process will end in second quarter 2009.

Bahrain, through development of gas fields as deep as 6,096 m subsea, aims to meet rising domestic demand.

In 2007, according to Mirza, Bahrain consumed 1.3 billion cu m of gas and its consumption is expected to rise to more than 2 billion cu m in the long term. ✦

Drilling & Production — *Quick Takes*

Petrobras awards Technip offshore flexible pipelay

Petroleo Brasilerio SA (Petrobras) has awarded a contract to Technip SA for the charter of the Normand Progress vessel for 2 years. The contract includes engineering and support services and an additional 2 year option.

The vessel specializes in flexible pipeline installation. The $100 million-plus contract is a daily rate contract focusing on the installation and retrieval of flexible pipelines off Brazil in water reaching 2,000 m.

"Scheduled to be mobilized by yearend 2008, the vessel will be fitted with flexible pipelay equipment, including a 125-ton vertical lay system," Technip said.

Solstad owns the vessel, and Technip will operate it under a frame agreement.

The contract follows the charter contract for a new Brazilian pipelay vessel that Petrobras awarded to Technip earlier this year.

Horizon sees PNG condensate project

The Stanley gas-condensate reservoir on PRL 4 in western Papua New Guinea could support a large condensate stripping-gas recycling development, but an investment decision won't be made until the Stanley-2 appraisal well is drilled, said Horizon Oil Ltd., Sydney.

Consulting engineers concluded that the Stanley Cretaceous Toro reservoir, discovered in 1999, could produce 140 MMcfd of gas from two wells, yielding more than 4,000 b/d of condensate and 40 tonnes/day of LPG. The project could recover more than 8 million bbl of condensate in 10 years and support a 4-in., 40-km flow line to the Kiunga river port for shipment to customers.

A stripping plant could start up in 2010 if Stanley-2 were drilled in 2009. The well is needed because continuity and connectivity of the productive gas sand is not assessed as high based on seismic mapping, pressure buildup during the production test, and the presence of the target sandstone in surrounding wells, Horizon Oil said.

The gas would be reinjected until a power generation market develops in 5 years or so in PNG's western province and across the border in West Papua, Indonesia. That market could account for the entire Stanley gas resource, estimated independently at 260 bcf proved and probable.

Total hires Angolan drilling rig

Total E&P Angola has let a 2-year drilling contract worth $452 million to Diamond Offshore Drilling Inc. for its fourth-generation semisubmersible rig, Ocean Valiant, in Angola.

"The companies could change the contract into either a 2½ year or a 3 year agreement at the option of the operator at day rates that could earn maximum total revenue, excluding mobilization fees, totaling between $552 million and $646 million," Diamond Offshore said.

Ocean Valiant can operate in water up to 5,000 ft and can drill up to 30,000 ft. Total has interests in deepwater Blocks 14 and 17, and ultradeepwater Block 32. ✦

Processing — *Quick Takes*

Hess denies St. Lucia refinery claim

Hess Corp., amid a decision to cut the company's capital expenditure program for next year, said it has no plans to build a $5 billion refinery on the Caribbean island of St. Lucia.

"While we have the option to build the refinery in St. Lucia, we have no current plans to do so," Hess Chairman and Chief Executive John B. Hess told analysts during a conference call.

Hess's statement came just days after a member of the St. Lucia government said the New York-based firm, which operates a transshipment facility on the island, was likely to build the refinery.

"Quite a substantial amount of money has been committed to the feasibility studies, and the studies undertaken so far conclude that there will be no problems putting in the refinery," said Guy Joseph, St. Lucia's communications and works minister (OGJ Online, Oct. 28, 2008).

Earlier, Hess said it will reduce its 2009 capital expenditures budget due to the uncertain economic environment. The company did not detail the amount of the budget, saying it would provide more details in January.

Pakistan cuts duties on products to Afghanistan

Pakistan has cut by almost 50% its fixed regulatory duty on diesel and kerosine exports to Afghanistan, effective immediately.

Under the prescribed formula, price differential claims have come down owing to a sharp fall in product prices in the international market, paving the way for a substantial cut in export regulatory duties for Afghanistan. Pakistan last month had imposed the duty on diesel and kerosine exports to Afghanistan because Afghanistan was subsidizing Kabul consumers.

Total exports of petroleum products to Afghanistan stood at more than $300 million during the last fiscal year (2007-08).

Microrefineries boost Iraq's domestic output

Iraq's 20,000 b/d al-Diwaniya refinery—one of several so-

called microrefining projects now under way—will be inaugurated within the next couple of weeks, according to an official statement.

"The project comprises two units: the first one is 100% complete, while work on the second is 50% complete," Iraq's national information center said, adding that each unit has a capacity of 10,000 b/d.

Analyst Global Insight said Iraq has launched several microrefining projects since 2006 due to the amount of time it would take before the country's larger refineries could be repaired and readied for nationwide production and distribution.

Currently, Iraq's three main refineries—Dora, Shuaiba, and Beiji—are running at half or less of the 597,500 b/d of installed capacity they had before the US-led invasion in March 2003.

As a result, according to Global Insight, "the microrefineries provide their respective areas with significant respite from shortages and an opportunity to restart a local economic recovery."

Underlining that view, the Iraqi government in August approved an $81 million contract to upgrade the Samawah refinery in southern Iraq. According to unconfirmed reports, the Samawah contract was awarded to Colorado Industrial Construction Services Co.

The Samawah refinery, which lies 370 km southeast of Baghdad, was originally built in 1977 with a 30,000 b/d capacity. During the 1991 Gulf War, the plant suffered 90% damage.

The facility was used for storage until 2001, when the oil ministry partially rehabilitated it. But the refinery was looted following the 2003 invasion and was left idle until 2005, when one 10,000 b/d unit was rehabilitated.

A second 10,000 b/d unit was repaired and began production in 2006. At some point, according to local sources, a third unit is to be removed from the Dora refinery in Baghdad and added to the Samawah facility. ✦

Transportation — *Quick Takes*

Tengizchevroil to start oil shipments on BTC line

BP Azerbaijan, partially confirming earlier reports, announced that the Chevron Corp.-led Tengizchevroil consortium plans to start oil shipments this month via the BP-run Baku-Tbilisi-Ceyhan (BTC) pipeline.

"We expect to start pumping some volumes of Tengizchevroil's crude via the [BTC] pipeline in the second half of October," said company spokesman Tamam Bayatly. She did not say how much oil was expected to be delivered.

Earlier this week, BP PLC announced plans to begin shipping oil from Kazakhstan's Tengiz oil field via the 1,770-km BTC pipeline beginning later this month (OGJ Online, Oct. 9, 2008).

BP said the oil would be transported by barge from Kazakhstan to Azerbaijan and then loaded into the pipeline, with exports from Ceyhan expected to begin in mid-November.

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).

Tengizchevroil has been struggling with its joint venture partners to double the capacity of the CPC pipeline export route to 60 million tonnes/year to accommodate rising output in the Central Asian country. The pipeline runs from Kazakhstan to Russia's Black Sea port of Novorossiisk.

In September, Chevron said its Tengizchevroil affiliate had completed a major expansion at Tengiz field in Kazakhstan that will raise oil production capacity to 540,000 b/d, up 35% over the 400,000 b/d achieved earlier this year in the firm's first expansion phase.

Costs rise for Snohvit LNG project

StatoilHydro has increased the estimate of its investment costs for the first phase of the Snohvit LNG project in the Barents Sea by 3 billion kroner because of problems associated with delivering the full 4.3 million tonnes/year of LNG capacity at the onshore liquefaction plant.

On Oct. 16, the company presented a revised budget to Norwegian authorities and stressed that Snohvit was a technically challenging project that had exceeded the September 2005 estimate of 48.1 billion kroner in nominal terms. "Snohvit is still a highly profitable and attractive project," it said.

Snovhit started production last September but has struggled to regularly deliver at full capacity. Since the scheduled shutdown this summer Snohvit has maintained stable production at about 80% of its planned capacity. During a scheduled shutdown in October, it said, "A number of measures will be implemented to improve the regularity of the plant, including the replacement of seawater coolers and measures to limit the emission of nitrogen oxide and carbon dioxide," StatoilHydro said (OGJ Online, Oct. 4, 2008).

StatoilHydro will investigate different solutions to reconfigure the plant and to ensure stable and safe operations. These options could cost 2.5-5.5 billion kroner, depending on the option chosen.

StatoilHydro said it would make a final decision in 2009 after it carries out further analysis of the plant's performance.

The company has shut down production from the field for 30 days to replace two heat exchangers that contributed to the problems in reaching the plant's full capacity, a company spokesman told OGJ (OGJ Online, Oct. 15, 2008).

CGT, MarkWest report Appalachian expansion

NiSource Inc. unit Columbia Gas Transmission Corp. and MarkWest Energy Partners LP intend to jointly expand natural gas gathering and processing services to support increased production volumes in the Appalachian basin of central West Virginia.

The two companies also are discussing plans with several gas producers to provide new gathering and processing services near Columbia's Cobb aggregation system in Kanawha, Jackson, and Roane counties, W.Va.

The expansion of services includes MarkWest's previously announced expansion of its Cobb gas processing plant, increasing total capacity to about 70 MMcfd from the current 25 MMcfd by mid-2009. NGLs recovered at Cobb will continue to be fractionated at MarkWest's Siloam fractionation, marketing, and storage complex in South Shore, Ky., currently in the final stages of its own expansion. ✦

Letters

Warming debate needed

The US still has a serious energy problem, and many organizations are searching for the right energy policy, with most doing this in a fossil-fuel constrained world. However, this may be a terrible constraint as it is possible that the diagnosis on anthropogenic global warming (AGW) is erroneous. Today, as our financial and energy policies hang in the balance, citizens should demand an open debate on this fossil-fuel constraint, something that is not happening.

What do the Sloan Professor of Meteorology at Massachusetts Institute of Technology, the founder of the Goddard Institute for Space Studies, and the head of the space research laboratory in St. Petersburg, Russia, have in common? First, they are skeptics of the AGW hypothesis. They are not fans of Al Gore's An Inconvenient Truth, a part of the political science of alarmism that began 40 years ago with Paul Ehrlich's The Population Bomb. And they are all physicists: Richard Lindzen, Robert Jastrow, and Habibullo Abdussamatov.

Physicists might hold the key to this diagnosis. This commentary is based on a paper in the International Association for Energy Economics Energy Forum, third quarter 2008, entitled "Global Warming—Witnesses for the Defense of the Skeptical Perspective: Physicists."

This struggle is occurring at a time when every day brings new inputs that the concern on AGW might be fading. Examples:

- A recent headline reported, "Thirty years of warmer temperatures go poof."
- Recent papers on Greenland Ice Sheet stability bring needed reality.
- A paper on whether warming is influencing hurricanes was titled "Global warming to decrease hurricanes."
- Another publication on concerns the Gulf Stream was in danger was titled "Ocean circulation noisy, not stalling."

One might wonder how a barely discernable 0.6° C. increase since the late 19th century can gain acceptance as the source of weather catastrophes. Answer: Those with a vested interest in climate alarmism have cranked up the propaganda.

This interest in physicists started with a 2006 Houston Chronicle interview with Chris Rapley of the British Antarctic Survey. He asked, "If carbon is increasing, how can you deny there's going to be warming?" Rapley stated if you knew how physics worked, you would stop arguing on AGW.

How then do physicists see AGW? As openers, a 1990 analysis by Jastrow, plus William Nierenberg and Frederic Seitz (all now deceased), showed a range of 0.4-1.8° C. for the next century. This was much lower than the United Nations Intergovernmental Panel on Climate Change reported in 1990, a range of 1.5-4.5° C. The above physicists viewed this as alarmist. They agree, if the assumptions they used are valid, there will be some warming—but nowhere as big as the IPCC would like the public to believe. Then the IPCC report in 2001 boosted the range to 1.4-5.8° C.

Lindzen, the MIT professor, noted in 1993 that model predictions depend on large increases in carbon dioxide plus mechanisms within the models that amplify the climatic response to increasing CO_2. These amplifications need to be debated. In 2006 Lindzen also noted that alarmists intimidate dissenters, saying scientists who deviate from alarmism have seen their funds disappear.

Abdussamatov reported that Mars also has global warming. But parallel warmings on Mars and Earth can only be a result of an increase in the one factor common to both planets: solar irradiation. Abdussamatov now believes this has peaked and sees deep cooling by 2040.

Two additional witnesses, of the 17 covered in the energy economics paper, are cited below.

Sherwood Idso, a former research physicist at the US Water Conservation Lab in Phoenix and an adjunct professor of botany at Arizona State University, has argued that increasing CO_2 levels are beneficial due to an increase in photosynthesis, leading to significant increases in crop and forest growth.

Hendrick Tennekes, former director of research, Royal Dutch Meteorological Institute, lost his post due to his views on climate modeling. He is concerned with the monopoly that modeling has on climate research. An example of the many shortcomings with models: They don't include feedbacks between changing farming and forest practices and atmospheric circulation. For this and other reasons they can't agree on precipitation patterns, a far more relevant factor to food production than a tiny increase in temperature. Tennekes concluded: "We only understand 10% of the climate issue."

Several conclusions follow:

- The claim that we face an imminent catastrophe is unfounded and terribly inappropriate.
- The views of 17 physicists/mathematicians are proof of a serious debate on AGW.
- The claim that "all scientists agree" is juvenile at best, fraudulent at worst.
- All scientists need to reconsider the position of Thomas Huxley: Skepticism is the highest of duties for scientists, blind faith the one unpardonable sin.

Indeed, with all of this testimony against the AGW hypothesis and climate alarmism, one might ask if it is not time to have this issue tossed out of court.

Gerald T. Westbrook
Houston

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.

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)

Calendar

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.

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.oilandgasmaintenance.com. 19-21.

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

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

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

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

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

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

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

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

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

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

FEBRUARY

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

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

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

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

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

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

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

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.

Oil shale promise

Guntis Moritis
Production Editor

Many countries in the world look towards oil shale as a source for future energy needs. Oil shale is an abundant resource that can satisfy a part of the world's expected long-term growth in energy demand.

Estimates place the world's oil shale resource base as being at least 2.6 trillion bbl, of which 2 trillion bbl are in the US.

A recent symposium at the Colorado School of Mines in Golden, Colo., provided a look at projects and technologies for exploiting these resources in various countries.

Estonia, China, and Brazil have commercial-sized oil shale projects that have operated for many years. Countries that have planned projects include Jordan, Morocco, and Australia.

In the US, several research and demonstration projects are underway in Western Colorado and Eastern Utah. An OGJ article (OGJ, Oct. 20, 2008, p. 22) describes this US activity.

Commercial operations

Estonia has processed oil shale since the 1920s. Currently most of its oil shale goes to fuel pulverized combustion and circulating fluidized-bed boilers for generating electric power, but because of Estonia's need for liquid fuels, companies have plans to convert more oil shale to liquid fuel and gas.

For instance, Eesti Energia plans to build a new shale oil plant and increase the sale of shale oil to 500,000 tonnes/year by 2010. All Estonian shale oil producers have expansion projects under way.

Currently Estonia has three retorts producing shale oil, and the output of Eesti Energia's two plants is about 2,500 b/d of shale oil.

China has several active oil shale projects. In 2007, Fushun Mining Group Co. in Liaoning province produced 300,000 tpy of shale oil with 180 Fushun-type retorts each processing 100 tonnes/day of oil shale. The oil shale is a by-product of coal mining.

The company plans to add 40 more retorts by yearend. It also will add a 6,000 tpd Alberta-Taciuk Processor (ATP) rotary retort by yearend 2009.

Other ongoing or planned oil shale projects in China are in Jilin, Guangdong, Heilongjiang, and Gansu provinces.

Petroleo Brasileiro SA (Petrobras) has produced about 20 million bbl of shale oil from its commercial-sized Petrosix vertical shaft gas combustion retort in Brazil. The retort is the world's largest surface oil shale pyrolysis reactor. It processes mined oil shale at Sao Mateus do Sul into products such as fuel oil, shale naphtha, fuel gas, and sulfur.

Potential projects

Jordan, Morocco, and Australia are three countries with possible projects. Both Jordan and Morocco import most of their energy needs. Even Australia has a deficit in oil production. Its oil production is about 565,000 b/d, while its oil demand is 908,000 b/d.

Central Jordan possesses more than 65 billion tonnes of oil shale that is at shallow depth and suitable for mining and surface retorting. Although Jordan had actively sought companies for developing these resources, in August it placed an 18-month freeze on all oil shale activities within central Jordan, including the Attarat Um Ghudran and Wadi Maghar regions, so that the government could explore for and exploit uranium deposits.

But several companies have completed feasibility studies on developing oil shale in Jordan. For instance Eesti Energia's feasibility study, released in May, indicated that just one of Jordan's 20 locations containing oil shale could produce 36,000 b/d of shale oil.

Morocco again is seeking to start oil shale exploitation. It had a pilot plant operating in the 1980s in the Timahdit area, but shut it down because of the low oil price at that time. Recently it signed an agreement with Petrobras and Total SA to evaluate a shale oil producing facility in Timahdit that uses Petrosix technology.

In Australia, QER Pty. Ltd. has acquired an oil shale resource base in Queensland that it estimates holds almost 16 billion bbl of oil in place. The area includes the Stuart site that for a few years produced shale oil through an ATP retort. QER has decommissioned the ATP retort, and its plans are to use a Paraho process to retort the Queensland shale.

The company plans first to have a pilot plant sized to produce about 5,000 b/d of shale oil followed by a commercial plant, in the next 10 years, that produces about 100,000 b/d of shale oil. Timing also depends on what regulations Queensland enacts. ✦

Editorial

The whipsaw effect

Extreme swings in the price of oil are bad for everyone. Price-related political mistakes compound the damage.

Before the middle of last July, the searing question was how high the price of crude might go. The answer, based on futures trading on the New York Mercantile Exchange: $147/bbl. Now the question is how low the crude price might go. The answer: Who knows? The recent low for the weekly average New York Mercantile Exchange price came the week of Dec. 11, 1998, at $11.09/bbl. Does that seem impossibly low? It did then, too.

In a business whose basic commodity can change in value by a factor of 13 in a decade's time, investment planning is difficult enough. It becomes many times more so when governments react to price movements under the classically mistaken assumption that trends of the moment last forever.

Dissolving comforts

Official excess is playing out dramatically—but by no means uniquely—in Russia. Afloat in oil revenue when crude prices were $100/bbl and rising, Moscow turned against democratization and privatization. A newly prosperous and always nationalistic population cheered the authoritarian relapse.

With crude prices now barely above $60/bbl and falling, Russian comforts are dissolving. The country's stock market is collapsing. Inflation is transporting the pain of macroeconomic distress to consumers. Political problems for iron-fisted Prime Minister Vladimir Putin are not out of the question. Internationally, Putin has lost standing by, among other things, using military troops and gas exports to bully neighbors. Lately he has wooed blowhard President Hugo Chavez of Venezuela, which has misappropriated its oil bounty even more severely and soon will learn the hard way what depletion and depreciation mean.

Mistakes made when oil prices rise don't correct themselves when prices fall. The international industry will not soon forget Moscow's abuse of Royal Dutch Shell in the Sakhalin-2 oil and gas project in the Russian Far East. Complaining about delays and cost hikes that were not unique to Sakhalin-2, the government used trumped-up environmental complaints to wrestle controlling interest away from Shell and its partners and into the hands of state-owned Gazprom. Since then, Moscow has shaken down international companies in other Russian ventures.

Russia isn't alone in having groped for riches when oil prices were high. It's simply, like Venezuela, among the most brazenly extortionate. Other countries renegotiated agreements or otherwise changed terms of participation by private investors to raise the state claim on proceeds of oil and gas production. Not all of them are centralized powers like Russia and Venezuela.

Benign Alberta, for example, changed its royalty regime in response to complaints that the state wasn't receiving a fair share from oil sands development and conventional production. The increased government take now amplifies the effects of plunging commodity prices. The Canadian gas industry is shriveling, therefore, and operators are reconsidering oil sands investments. The US, too, raised the royalty on production from new federal offshore leases and more recently, in a nasty manifestation of pique over high gasoline prices, denied oil and gas companies access to tax relief due other American industries.

To some extent, companies expect governments to grab resource wealth when oil and gas prices rise. And to some extent, depending on how agreements are written, rising prices do ease the damage to project economics.

Extreme grabs

The latest grabs by governments, however, were as extreme as the price surge that precipitated them. Venezuela's crackdown represented nothing less than renationalization of the oil and gas business. Moscow's reassertion of control fundamentally changed the Russian investment climate—and not for the better. While not nearly as harsh as those moves, Alberta's royalty change damages fragile oil sands economics in a down market and thus slows an important engine of provincial growth. And the US is fast showing itself to be officially hostile to oil and gas.

By discouraging investment in future supply beyond the effects of slumping prices, developments like these will aggravate the next market cycle. While prices will always fluctuate, the governmental whipsaw effect helps no one. Moderating it should become a new priority of government-industry relations. ✦

POINT OF VIEW

New SEG chief keeps eye on nonseismic advances

Bob Tippee
Editor

Moving new seismic methods from theory to practice can require attention to progress in separate but related scientific and engineering disciplines, says the incoming president of the Society of Exploration Geophysicists.

"A lot of time it takes experience with other data sets" to bring a new geophysical method into commercial application in the field, says Larry Lines, professor of geophysics at the University of Calgary.

The most innovative geophysical techniques often can take a decade to implement, notes Lines, who becomes president at SEG's annual meeting in Las Vegas this week.

"Sometimes this involves the implementation of methods in a simple, robust manner," he explains. "Sometimes there are issues of cost."

In simplifying new techniques to the level required by everyday practice, "The key is to be aware of advances in other areas," such as electronics, computing, other areas of science.

It was progress in computing technology, for example, that made possible the most important advance Lines has seen in his career: the widespread use of 3D seismic methods.

Within that category of practice there have been important strides in acquisition, processing (especially 3D prestack depth migration), and interpretation, with the advent of seismic workstations. (Prestack depth migration moves seismic reflections to their correct locations in space in areas where subsurface sound velocities undergo unusually rapid changes. Because the processing occurs before a summing of reflection data known as stack, the step requires considerable computing power.)

"At the beginning of my career in the 1970s, these methods were in their infancy, while today 3D seismic surveys are the norm," Lines says. "These advances came about when we realized the limitations of conventional methods in oil and gas exploration."

Advances in computer technology made 3D imaging feasible, he notes, adding, "It is instructive for us to keep abreast of advancing technologies to obviate our restrictive methods of the past."

Improved simulation

With 17 years of experience with a major oil company and 15 years in academia, Lines has a broad view of past and current progress in seismic and other geophysical methods.

"In terms of oil and gas production," he says, "I think that the most important area is the application of reservoir geophysics to reservoir engineering."

Techniques such as time-lapse (4D) seismology and the use of rock physics to estimate significant parameters in reservoir simulation have become standard but ever-improving enhancements to oil-field decision-making.

"The improved reservoir simulations and matching of production history should allow us to understand

the scheduling of infill drilling and enhanced oil recovery processes," Lines says.

Inevitably, progress in some areas seems to have stalled.

"I have always wondered why the vector borehole gravimeter was not promoted or utilized more widely for finding density anomalies due to natural gas deposits," Lines says.

Unlike the traditional instrument, the vector borehole gravimeter doesn't assume only an anomalous vertical gravity field component and thus can identify density variations between masses positioned laterally in the subsurface.

"Perhaps this is a question of well spacing or the fact that people feel that seismic methods are adequate," Lines says of the limited use of the vector gravimeter.

Promising areas

Asked about promising areas of geophysical progress, the new SEG president points to:

- *Elastic wave description of the earth through multicomponent recording.*

Multicomponent technology allows geophones to record reflections of sonically induced elastic waves in which particle motion is not only parallel to the direction of travel (compressional waves) but also perpendicular to the direction of travel (shear waves). Interpretation based on a combination of compressional (P) and shear (S) wave data can provide a fuller picture of the wave's movement through the subsurface than is available from traditional work based on P-wave data alone.

Multicomponent recording has improved through the application of microelectromechanical system (MEMS) technology to accelerometers, which enables geophones to record a broader spectrum of sonic frequencies than was available from earlier systems, Lines says. Greater bandwidth means more information about the subsurface.

From information on elastic-wave behavior available via multicomponent recording, interpreters now can make deductions about rock types and other formation characteristics. But multicomponent data, while nearly as cheap to acquire as P-wave-only data, are much more costly to process and interpret. A reason for this, Lines explains, is that S-wave reflections typically have more-limited bandwidth, lacking high frequencies, "basically due to Mother Earth."

Lines notes an irony in modern seismic work: Much productive multicomponent recording is done offshore. S-waves don't propagate through water, but advances in ocean-bottom instruments allow for the recording of data from what geophysicists call converted waves, which are S-waves induced when P-waves in water impact the seabottom.

- *Wide-angle 3D surveys.*

With broad receiver arrays and many receivers per shot, seismic contractors sample more of the reflected wave field than is available through conventional, more-oblong survey designs. The improvement in survey geometry enhances the ability of multicomponent recording to describe the elastic wave field in the earth.

- *Generalized wave-equation imaging through reverse-time migration.*

In reverse-time migration, interpreters model both downward-traveling sonic impulses and upward-traveling reflections through use of the wave equation, which describes the position of the seismic wave at any given time. Conventional wave-equation migration models only the impulse wave down to reflecting points in the subsurface.

Because it's computationally intensive, reverse-time migration strains computer capacities. But it enables interpreters to use much more of the information available from seismic recording than they can with other migration methods. It thus improves imaging of subsurface features involving steep dips and abrupt changes in sonic velocities, such as salt bodies.

Geophysicists made limited use of reverse-time migration 25 years ago, Lines says. But the technique was costly because of the computational load.

"Now computers have caught up with the algorithm," he says, noting "huge interest in this area" and adding, "Some of us feel vindicated."

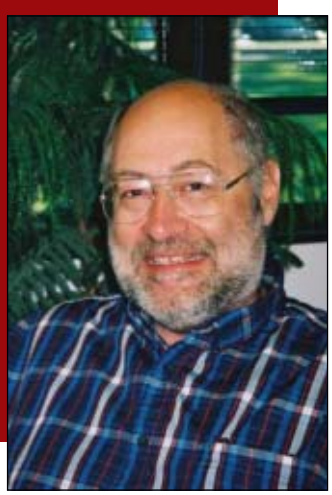
- *Extensions to rock physics models.*

As the ability of geophysicists to describe rock layers improves with advances in techniques such as multicomponent recording, Lines says, basic tools of rock physics need to improve as well.

He cites Gassman's equation, a tool for analyzing wave propagation that assumes a crucial elastic property, shear modulus, is the same for saturated and dry rock.

"We now see different rock physics problems that go beyond that model," Lines says. "We need to go

"It is instructive for us to keep abreast of advancing technologies to obviate our restrictive methods of the past."
—Laurence (Larry) Lines, professor of geophysics, University of Calgary



Career highlights

Laurence (Larry) Lines is a professor of geophysics at the University of Calgary.

Employment

Lines became a university professor in 1993 after working for 17 years with Amoco Corp. in Tulsa and Calgary. He was NSERC/Petro-Canada chair in applied seismology at Memorial University of Newfoundland in 1993-97 and became chair in exploration geophysics at the University of Calgary in 1997. At the same university, he served as head of the Department of Geology and Geophysics in 2002-07.

Education

He holds BSc and MSc degrees in geophysics from the University of Alberta and a PhD in geophysics from the University of British Columbia.

Affiliations

With SEG, Lines has served as editor of Geophysics, distinguished lecturer, Geophysics associate editor, translations editor, publications chairman, and member of The Leading Edge editorial board. He has served as editor and associate editor for Canadian Society of Exploration Geophysicists.

Lines and coauthors won SEG's Best Paper in Geophysics Award in 1986 and 1998 and won honorable mention for best paper in 1986 and 1998. He is an honorary member of SEG, CSEG, and the Geophysical Society of Tulsa.

He also is a member of the Association of Professional Engineers, Geologists, and Geophysicists of Alberta, Canadian Geophysical Union, European Association of Geoscientists and Engineers, and American Association of Petroleum Geologists.

beyond Gassman."

He sees the need for more measurements able to improve understanding of key factors of interpretation such as attenuation, or the earth's filtering effect on seismic energy, and elastic moduli.

Lines calls rock physics the "key link between what we measure seismically and what we read in reservoir simulation."

- *Use of electromagnetic methods and high-resolution potential field measurements.*

Controlled-source electromagnetic imaging (CSEM), which makes use of resistivity differences between saline fluids and hydrocarbons, "is beginning to look productive," Lines says.

He also notes improvements in resolution of aeromagnetic and aerogravity data, which like CSEM can "nicely complement the seismic methods" and help interpretation when rock properties differ from what seismic data show.

All these areas of promise, Lines says, "extend the conventional methods for geophysical exploration and obviate restrictions of conventional methods."

Classrooms full

Integration of geophysics with other disciplines is important for reasons beyond the application of new methods, according to Lines.

It also raises the appeal of geophysics as a career to students and young professionals.

"The geophysics profession is more exciting than it has ever been when considering the potential to integrate with other fields in geoscience and engineering, not only in the oil industry but in other branches of earth sciences as well," Lines says.

He cites the increasing combination of energy with environmental topics as an enrichment that students like.

For oil companies and geophysical contractors, the benefits of integrating disciplines offer a lesson: "It is imperative for us to share information within the geosciences and engineering," Lines says. "We should not worry about proprietary restrictions too much."

The industry needs more geophysical professionals and seems to be getting them.

"As a professor, I see burgeoning geoscience student populations with record enrollments," Lines says. "The big challenge will be to provide such large classes with a quality education that will provide them with the tools needed by geophysical professionals."

Important to that goal is communication between industry, academia, and government, which can help set teaching goals and prevent "reinventing the wheel," Lines says.

And as scientific subjects develop and the importance of integrating them grows, the need for such communication becomes doubly important.

"You can't know everything," Lines says. ✦

FTC moves to stop Newpark Environmental US unit sale

Nick Snow
Washington Editor

The Federal Trade Commission voted on Oct. 23 to challenge CCS Corp.'s proposed $85 million acquisition of Newpark Environmental Services Inc.'s US operations, claiming it to be an antitrust violation.

Commissioners authorized FTC's staff to file a complaint in federal court seeking a temporary restraining order and preliminary injunction to block the cash transaction, which the two companies announced in April after an earlier proposed sale to Trinity TLM Acquisitions LLC fell through.

Newpark Environmental Services is based in Metairie, La. and is a subsidiary of Newpark Resources Inc., which has its headquarters in The Woodlands, Tex., north of Houston. CCS is based in Calgary and is owned by Red Sky Holdings LP.

The two companies both provide offshore oil and gas exploration and production waste disposal services along the Louisiana Gulf Coast, according to the FTC.

It added that, in response to concerns the federal agency raised, CCS sent a letter Oct. 15 informing the commission that it would have to shut down its Gulf Coast operations and leave the area if it could not acquire Newpark's US environmental services operations.

The agency said CCS made that claim only after the antitrust review process was well under way and it appeared that the commission would challenge the transaction. It said that nothing in CCS's business files supports the argument that the company's Gulf Coast business is not viable or that CCS's survival depends on the acquisition of Newpark Environmental Service's US operations.

"There is ample evidence that this transaction would allow CCS to eliminate its primary and closest competitor and that the merging parties' customers would face higher prices and diminished service as a result. CCS's last-minute threats to shut down its entire Gulf Coast business if the merger is challenged are mere pretext and cannot justify this anticompetitive transaction," said David P. Wales, acting director of the FTC's Bureau of Competition.

The FTC's complaint contends that the proposed transaction would violate Section 7 of the Clayton Act and Section 5 of the FTC Act by eliminating vigorous direct competition between CCS and Newpark Environmental Service which has led to lower prices and better service for their customers. The companies are the only major offshore production waste disposal services operating in the ports of Fourchon, Venice, Morgan City, and Intracoastal City, La., it noted.

FTC alleged that the proposed acquisition makes it more likely that CCS would raise prices or reduce the quality of its services on its own, especially to customers who prefer its waste disposal methods. Additionally, with only two firms remaining and the presence of market conditions conducive to competitor coordination, the FTC said, the proposed transaction threatens to make coordinated interaction between the two companies more likely.

Newpark studies options

In a statement following the FTC's announcement, Newpark Resources said it disagrees with the agency's conclusions and is evaluating its options. It said that it would provide more information regarding the transaction's status during the company's third-quarter conference call Oct. 31.

"In light of public statements released by the FTC, CCS is currently reviewing whatever legal remedies may be available," a spokeswoman for Newpark Resources wrote OGJ in an e-mail dated Oct. 23. "Until we receive all anticipated communication from the FTC, we are unable to comment further," she said.

In its latest 10-Q filing with the US Securities and Exchange Commission for the 3 months ending June 30, Newpark Resources said it decided to consider selling its environmental services operations in 2007 following a company-wide review of its operations. The company said it continues to operate two business segments: fluids systems and engineering, which serve the oil and gas business, and mats and integrated services, which has utilities, municipalities, and government sectors as its customers.

It said it initially agreed to sell its US environmental services business to Trinity TLM Acquisitions in October 2007 for $81.5 million in cash, plus potentially another $8 million which could be earned under a 5-year earn-out provision. Trinity terminated the agreement in April 2008 when it could not get the necessary financing due to tightening credit markets, Newpark Resources said. Newpark reached an agreement to sell the operations to CCS for $85 million cash soon afterwards.

FTC said the complaint would be filed in US District Court for the Southern District of Texas by Oct. 23, and would be posted online at the FTC's web site. ✦

GAO finds agencies using oil products to fuel AFVs

Nick Snow
Washington Editor

Federal government agencies are meeting requirements to acquire alternative fuel vehicles (AFVs), but they currently are running them on petroleum products, the US Government Accountability Office said Oct. 23.

"As they have over the past 4 years, agencies will likely continue to acquire the mandated percentage of AFVs. However, they will likely find it more difficult to meet both the requirement to fuel AFVs only with alternative fuel and the goal of increasing alternative fuel use by 10%/year because of the limited availability of alternative fuels," GAO said in a report.

The congressional government watchdog service examined 21 agencies and their vehicle fleets, which were trying to meet energy objectives for fiscal 2007. It found that all of the agencies satisfied a requirement under the 2002 Energy Policy Act that AFVs account for 75% of new light-duty acquisitions for fleets of 20 or more vehicles in metropolitan statistical areas with populations of 250,000 or more.

But it also found that none of the 21 agencies were solely using an alternative fuel in their AFVs as mandated by the 2005 Energy Policy Act. The law gives the US Department of Energy authority to waive the requirement if it deter-

mines that operating on alternative fuel is not feasible. DOE defines this as alternative fuel not being available within 5 miles or 15 minutes, or if it costs 15% more than gasoline, GAO said.

"To help agencies more effectively use their resources to increase use of alternative fuel and decrease use of petroleum, Congress should consider aligning the federal fleet AFV acquisition and fueling requirements with current alternative fuel availability and revising those requirements as appropriate," it said.

A mixed record

GAO also examined the agencies' compliance during fiscal 2007 with three goals established under Executive Order 13423, which US President George W. Bush issued on Jan. 24, 2007. It found that 11 of the 21 agencies, or 52%, increased overall alternative fuel by at least 10%/year, relative to the 2005 baseline. It said 14 of the agencies, or 67%, were reducing petroleum consumption by 2% annually relative to the 2005 baseline. Finally, said GAO, none of the agencies were acquiring plug-in hybrid electric vehicles because they were not available yet.

"It is unclear whether agencies will be able to reduce petroleum consumption annually by 2% in the near future, primarily because they will not be able to rely on alternative fuel to displace significant amounts of petroleum fuel," the report said.

"Furthermore, without better data, it will be difficult to judge agencies' progress in increasing alternative fuel use and reducing petroleum consumption. Some agencies have taken steps to address these issues and improve data quality, but with limited success," it continued.

GAO recommended that agencies no longer be allowed to count AFV acquisitions that are not subject to the requirement, creating a false impression that the agencies are greatly exceeding the requirement. It also urged that the president require the US Energy Secretary to report annually on agencies' compliance with EPACT's alternative fueling requirement. The president should order the Energy Secretary and the General Services Administration administrator to continue ongoing efforts to resolve data quality issues in these areas, it said.

GAO's report came in response to a request by US Senate Homeland Security and Government Affairs Committee Chairman Joseph I. Lieberman (I-Conn.) and two of its members, Mark L. Pryor (D-Ark.) and John W. Warner (R-Va.) for an evaluation of the extent to which the agencies met their alternative fuel vehicle requirements during fiscal 2007, and of their prospects for meeting the objectives in the future. ✦

AGF study finds US can compete in global LNG market

Nick Snow
Washington Editor

The US will find that it is able to compete in global LNG markets as worldwide supplies grow and markets stabilize, a study commissioned by the American Gas Foundation concluded.

In the short term, however, US LNG imports will not increase until worldwide supplies rise more, and US natural gas demand climbs, the analysis by Benjamin Schlesinger Associates said. US gas reserves have risen steadily in the last 10 years, which has helped make US LNG imports fall 50% year-to-year from late 2007 through mid-2008, Schlesinger told reporters on Oct. 28.

"It's clear we're going to need a fair amount of LNG in the future," he stated. "The power-generation sector is looking increasingly to natural gas for growth. Its capital costs are low. It's relatively clean. And it can run steadily compared to renewable sources such as wind and solar."

The foundation, which is associated with the American Gas Association but operates independently, commissioned the study to determine whether world LNG capacity was sufficient to contribute to future US gas demand and whether the US will be able to compete for LNG with other countries. "We're trying to understand the LNG market's potential as a supply component going forward," said Chris McGill, AGA's managing director for policy analysis.

Other countries often are willing to pay more, Schlesinger conceded. But the size and depth of the US market, its considerable underground gas storage system and the commodity gas trade's innate flexibility make the US a desirable and dependable destination, he said.

Near-term uncertainty

Near-term prospects are less certain not only for LNG but also for other natural gas sectors, as some producers reduce their exploration and production budgets in response to a weakening general economy, McGill said. Canadians also are exporting less gas to US customers, and Congress could pass carbon legislation that would increase demand, he indicated. "A carbon remediation strategy could require all supply sources to meet its requirements," he said.

Schlesinger stopped short of saying that the US won't need more LNG import capacity in the next 2-3 years. "But it could be delayed. This could happen if a terminal is only 20% completed. If it's 90% built, that would be another matter. I'd be surprised to see too many terminals begin construction in North America. They tend to come in waves," he said.

Reduced capital availability could have a bigger impact on overseas LNG export projects, he continued. "They're incredibly expensive. An import terminal represents only about 15% of

WATCHING GOVERNMENT

Nick Snow, Washington Editor

Blog at www.ogjonline.com

Sustainability close to home

When voter unrest over $4/gal gasoline prices made Congress consider expanding US offshore oil and gas development late last summer, one group already was asking specific questions about the US coastal area where a lot of energy development has taken place.

America's Energy Coast (AEC) is a coalition of organizations that often don't talk to each other. The coalition does, however, recognize that Gulf Coast sustainability issues must be constructively addressed.

It includes major oil companies, business and transportation interests, environmental organizations, sporting and recreational groups, and state and local officials from Louisiana, Mississippi, Alabama, and Texas.

"Coastal communities which provide a workforce for Outer Continental Shelf development are literally disappearing," said Sidney Coffee, a senior advisor to America's Wetland Foundation and a former chairwoman of the Louisiana Coastal Protection and Restoration Authority who has worked on Louisiana coastal issues for more than 10 years.

Common sustainability issues

The foundation established AEC to bring every affected stakeholder together to work out solutions, she told me during a mid-October visit to Washington. The group is trying to bring common sustainability issues into the national energy conversation. It issued a sustainability accord on July 24 and will hold a policy forum on Dec. 2 in Washington.

"This is more than simply deciding what's needed. We're trying to identify conflicting policies among the four states. We're also looking at national policies which hinder states' efforts. This may be the best way to solve these serious problems," Coffee said.

There are still disagreements within the group over strategies, she continued. Some representatives want to take immediate mitigation steps, while others back adaptation measures. There also is no climate change consensus, but Coffee said everyone has kept talking.

Oil and gas industry support is not surprising. Roughly 90% of the US Gulf of Mexico's production passes through the area. A huge pipeline network is anchored on barrier islands protected by wetlands there, Coffee noted. Hurricanes Katrina and Rita took out 218 miles of coastline in 2005, she continued.

High on 2009 agenda

Congress and the administration of President George W. Bush were working on a general economic rescue when I spoke with Coffee, but she was optimistic that federal lawmakers and the new president would be looking at these issues early in 2009.

"Hurricane Ike literally was a game-changer. It's no longer just a New Orleans issue. When this region is even partially shut in, it can have far-reaching effects. Ask anyone who had to wait to buy gasoline in Atlanta recently," she explained.

She has been invited to visit some North Carolina coastal communities in November that are considering supporting OCS development, and that want to learn more about the Gulf Coast's experience. "My message will be that the challenges are big, but they're not insurmountable. You just have to go in with your eyes open," Coffee said. ✦

the total LNG system costs. Tankers and liquefaction plants account for the rest. Qatar alone is spending $21 billion for its project," Schlesinger said.

The current 25 bcfd of worldwide LNG capacity could grow by 50% by 2015, he forecasts. "Additional projects are behind this, although the world credit crisis could lead to some delays," he said.

Reliable deliveries at the lowest prices are the long-term bottom line, according to Bill Cooper, president of the Center for LNG. "LNG fits into the mix. Once an exporter starts a liquefaction train, it has to keep running. The LNG needs to find a home and the US is a huge gas market," he said following the briefing. ✦

CFTC asked about energy commodity swaps' effect on prices

Nick Snow
Washington Editor

Three US House Energy and Commerce Committee Democrats on Oct. 24 asked the Commodity Futures Trading Commission new questions about the potential impact of unregulated energy commodity swaps and futures on prices.

Committee chairman John D. Dingell (Mich.) and the chairman of two subcommittees, Rich Boucher (Va.) of Energy and Air Quality and Bart Stupak (Mich.) of Oversight and Investigations, noted that the CFTC issued a special call in June to investment banks and index funds for end-of-month data on swaps and index positions beginning Dec. 31, 2007.

The CFTC's staff report on commodity swap dealers and index traders that was issued on Sept. 11 "summarized a small portion of the data it received on commodity index investments made by pension funds, endowments, sovereign

wealth funds, index funds, and other institutional investors in 33 energy and agricultural commodities," the three committee members said in a letter to Acting CFTC Chairman Walter L. Lukken.

But the report raises more questions than it answers, they continued, after conceding that the CFTC staff was under pressure "to analyze massive amounts of data in a matter of weeks to meet the commission's Sept. 15 deadline."

"First, CFTC collected 7 months of data but only summarized 3 months of data in its report. It also left out data on the size of the investments in each 'brand' of index. Second, CFTC requested data on single commodity swaps positions but presented no information on these positions. Third, there is no evidence that CFTC validated the data it received," the three federal lawmakers said.

Their questions included how swaps were classified in the report; whether the CFTC or reporting entities such as swap dealers or investment banks assigned the commercial and noncommercial designations; what led to the CFTC's reclassifying a major market participant as a result of the special call, and whether other market participants have been reclassified; and whether the CFTC or the swap dealers made the "futures equivalent" calculations used in the report. ✦

Russia, China leaders agree on ESPO oil pipeline spur

Eric Watkins
Oil Diplomacy Editor

Russia's state-owned OAO Transneft and China National Petroleum Corp. have signed a landmark agreement calling for the construction of a 67-km, 300,000 b/d pipeline spur from the East Siberian Pacific Ocean pipeline.

The agreement came after talks between Chinese Prime Minister Wen Jiabao and Russian Prime Minister Vladimir Putin, and it is to be seen as part of a broader effort at cooperation between the two countries on energy.

"We should deepen cooperation in the energy sphere," Wen said, ahead of his talks with Putin. "Long-term cooperation [on energy] will help economic development and stability on world markets," he said.

"We have to aim for real results," said Zhang Guobao, China's top energy official. "We've discussed this for many years but the results do not correspond to what they should be for two neighboring powers," said Zhang.

"We need to build oil and gas pipelines, increase downstream and upstream cooperation, and increase cooperation in the nuclear sphere," said Zhang.

According to analyst Global Insight, the pipeline spur agreement binds Russia and China tighter economically and marks "a significant step forward in their blueprint to increase their energy cooperation."

The long-awaited agreement about construction of the spur coincided with an announcement by Russian Deputy Prime Minister Igor Sechin that the Chinese government will provide Russian oil firms with "considerable" loans in return for increased oil supplies.

"Financing is required to realize major projects," said Sechin, who added, "The sum of the loans will be determined by the projects."

Sechin's remarks underline a condition the Russians have long insisted on, claiming that the pipeline would not be commercially viable unless new oil fields are developed to supply it.

Sechin did not detail the amount of the loans on offer from the Chinese, saying that Russian and Chinese energy companies would submit a proposal for cooperation by Nov. 25.

"It's still early to speak of the credit agreement but work will be spread over production, refining, sales, and transportation," Sechin said.

However, industry sources said the two countries were in talks to secure $20-25 billion in Chinese loans in exchange for greater supplies of Russian oil.

Such a deal would give the Chinese access to some 300 million tonnes of Russian oil over the next 20 years. That comes to 15 million tpy, which is precisely the capacity of the pipeline spur.

"For the Chinese, it is about securing a strategically vital land route for oil imports, while for the Russians it is about the money," Alfa Bank analysts said in a note.

The pipeline spur, which will cost an estimated $800 million, will branch off the ESPO pipeline at the Russian town of Skovorodino and extend to the Chinese border. There, it will join the Chinese pipeline network to reach the oil hub of Daqing in northern China.

"Transneft has prepared blueprints for the spur, whose technical details are in the phase of being agreed with the Chinese side," Sechin said earlier this week, ahead of meetings with Chinese energy officials.

The ESPO is being built in two phases and aims at exporting Russian crude oil to the Asia-Pacific region.

Phase one involves construction of a 30 million tpy oil pipeline from Taishet to Skovorodino. Phase two will see construction extended from Skovorodino to the port of Kozmino on Russia's Pacific Coast, increasing capacity to 80 million tpy.

Until the completion of Phase 2, oil will be delivered by pipeline from Taishet to Skovorodino and then by rail from Skovorodino to Kozmino where an export terminal is already under construction.

Earlier this month, Russian Energy Minister Sergei Shmatko, while acknowledging a new agreement to sell oil to China, stated that the projected ESPO pipeline spur sought by the Chinese would not be ready before 2009 (OGJ Online, Oct. 23, 2008). ✦

WATCHING THE WORLD

Eric Watkins, Oil Diplomacy Editor

Blog at www.ogjonline.com

Flash Gordon backs down

British Prime Minister Gordon Brown has very rarely been viewed as a friend of the oil and gas industry, but his lack of popularity took a new low last week.

It started when Brown called for an international oil summit to be held in London this coming December, but failed to invite the leaders of several members of the Organization of Petroleum Exporting Countries.

OPEC Sec. Gen. Abdalla el-Badri drew attention to the slight on Oct. 28, saying that some of the group's ministers had not received invitations from Brown to the proposed meeting.

As a result of the oversight, el-Badri said the group would boycott Brown's conference unless invitations were extended to all the heads of state of individual OPEC countries. Brown's people quickly backtracked.

'Ignore my U-turn'

The UK's Department for Energy and Climate Change confirmed that Brown's summit idea had been dropped and that a ministerial-level meeting would be held instead.

Brown's office said, "Given the fact that there will be a world leaders' meeting anyway on Nov. 15 to discuss the international economic situation and no doubt oil will be discussed as part of that, we decided to revert to the form of approach taken at the Jeddah meeting, which was that this should be a meeting primarily of energy ministers."

Brown did not limit his unpopularity with the oil and gas industry to members of OPEC. In fact, he decided to take on international oil companies as a whole, saying that energy firms should make reductions in gasoline and home fuel bills to reflect the currently falling price of oil.

Brown said, "There has been more than a halving in the price of oil and, just as when the price goes up people see it immediately reflected in the petrol pump prices, we want to see the falling price reflected in the petrol pump prices, and we are determined to see that happens."

City Spy weighs in

He could probably do that very easily by following some advice from the City Spy column in London's Evening Standard newspaper.

"Gordon Brown is banging on again about high petrol prices and oil companies making too much money," City Spy wrote on Oct 29. "At the moment it's BP, next it will be Shell."

But who is really making the killing at the pumps?

"Yes," said City Spy, "you guessed it, the PM and his Chancellor Alistair Darling, who take two-thirds in fuel duty and Value Added Tax."

"That's right, a whopping two-thirds—more than 66 pence with petrol at £1/l. If Flash Gordon really wanted to help struggling families and businesses through the economic downturn, how about starting here."

City Spy was not the only one to notice Brown's cant.

"He just wants to blame somebody and he is blaming OPEC," said al-Badri, who dismissed Brown's criticism of the group's decision to cut oil production as "hypocritical." ✦

Arctic-class shuttle tanker performance to be tested in 2009

Eric Watkins
Oil Diplomacy Editor

The American Bureau of Shipping, ConocoPhillips, Sovcomflot Ltd., and Samsung Heavy Industries Ltd. are jointly participating in a pioneering study to measure the effect of ice loads on Arctic-class shuttle tanker performance.

The US Congressional Information Bureau Daily Maritime Bulletin said the joint project will provide researchers with important data regarding stresses shuttle tankers experience when operating in ice-covered waters.

"We have considerable experience measuring ice loads on ice breakers and smaller ships, but the scale effect of large ships operating in heavy ice conditions is not as well defined," said Aleksandr Iyerusalimskiy, part of ConocoPhillips's project services section.

The study will be conducted on the 70,000-dwt Shturman Albanov during its initial two winter seasons operating in the Barents Sea.

The Shturman Albanov is the third in a series of Arctic shuttle tankers scheduled for delivery from SHI, and is due in February 2009. CIB said a state-of-the-art monitoring system will employ fiberoptic sensors within the ice belt at two locations in the bow and stern quarters to measure and record ice pressures and loads.

The system also will compute ice-induced responses of the hull structure at highly loaded locations, while a bridge display depicting a color plot of the pressure distribution over each area includes an alarm to alert crews of large impacts.

"The goal is to provide real time feedback to operators, reducing the uncertainty that can exist today, and then use this information to mitigate

the risks involved," said ABS's research & development manager Han Yu.

"As vessel requirements change to meet industry needs, research continues to assess the practicality of these new designs in more extreme operating conditions. It is a fundamental element in the cycle of ship design."

Sovcomflot took delivery of Russia's first Arctic shuttle tanker, the Vasily Dinkov, from SHI last year.

The Vasily Dinkov, along with sister tankers Shturman Albanov and Kapitan Gotsky has an ice-enhanced hull structure, designed in accordance with LU6 (1A Super) ice-class, under the classification of the Russian Register of Shipping.

The ships will be able to operate in temperatures of –40° C. and in breaking ice as thick as 1.5 m without an icebreaker escort.

The Vasily Dinkov is said to be one of the most advanced Arctic oil tankers in the world. One end of the ship is fitted with an ice-breaking bow, the other with a more conventional open-sea bow. The propeller system can rotate 360° so the tanker can pass through the open sea or plow through ice without sacrificing fuel efficiency.

Earlier this year, the tanker's design passed a major test when it delivered a shipment of oil from the Varandey oil terminal in the Barents Sea to the port of Come by Chance, off the coast of Newfoundland.

It was the first time such a shipment was made from the icy waters of the Barents Sea without an icebreaker escort.

"Our company has created a unique sea-export system which makes it possible to transport large quantities of oil to Polar regions," said Vagit Alekperov, chief executive officer of Lukoil, which owns the terminal. "It is unrivalled in the world."

Meanwhile, production of the tankers is moving ahead as Russia's Admiralty Shipyard plans to move an enhanced ice-class tanker, the Mikhail Ulyanov, from a dry dock to a wet dock on Oct. 31 for the final stages of construction work.

The St. Petersburg-based shipyard is building Sovcomflot two 70,000 dwt enhanced ice-class tankers, designed to ship oil from Prirazlomnoye, an Arctic oil field operated by OAO Gazprom subsidiary Sevmorneftegaz.

Construction of the Mikhail Ulyanov started in 2007 and is to be completed in the summer of 2009, while the second tanker, the Kirill Lavrov, will be launched in 2009. ✦

Chevron on trial in San Francisco for rights abuses

Eric Watkins
Oil Diplomacy Editor

Chevron Corp. is at the center of a legal case before federal court in San Francisco that will ask jurors to decide whether the firm sanctioned human rights abuses that resulted in the deaths and injuries of protesters at its Nigerian facilities, or whether the company was simply protecting its employees from belligerent kidnappers.

The lawsuit—identified as Bowoto vs. Chevron, No. C99-2506SI (N.D. Calif.)—alleges that Chevron, in conjunction with the Nigerian military, engaged in torture, assaults, and the killing of two protesters over Chevron's environmental record and its failure to hire locals in the delta region near its oil drilling operations.

Both sides in the current case recognize that the impending courtroom battle, described by one observer as "epic," has legal implications that reach far beyond a single incident by one corporation operating in Nigeria.

"This case could have serious ramifications for workers in developing parts of the world," said Charles A. James, Chevron vice-president and general counsel.

"If plaintiffs had their way, a company could not report hostage-taking to law enforcement authorities without facing the threat of a lawsuit in the US," James said.

Dan Stormer of Hadsell, Stormer, Keeny, Richardson & Renick in Pasadena, Calif., is representing the plaintiffs, a group of Nigerians who were injured during protests on a Chevron offshore oil platform in 1998.

Stormer said his firm is trying to hold a corporation liable for its bad actions in another country, even if it is committed by their surrogates, a wholly owned subsidiary, or by the Nigerian government.

According to Chevron, the hostage-taking incident occurred 10 years ago on oil facilities operated off the Nigerian coast by Chevron Corp. subsidiary Chevron Nigeria Ltd. (CNL). More than 100 CNL workers and contractors were held for ransom and threatened with acts of violence.

Chevron said the incident began when plaintiff Larry Bowoto and other members of the Concerned Ilaje Citizens, an unsanctioned Nigerian community group, threatened CNL with violence and sea piracy if the company did not pay them money and give them jobs. Weeks later, according to Chevron, they followed through on their threats by seizing the oil platform, an adjacent barge, and a tug boat on May 25, 1998, holding CNL employees and contractors hostage and demanding money and other considerations. CNL attempted to negotiate a resolution without success.

"Although plaintiffs say they were peaceful protestors, eyewitnesses have testified in deposition that the hostage takers poured diesel fuel on the barge and threatened to set it on fire," Chevron said.

Fearing for the safety of its workers, and with tensions mounting, CNL asked for assistance from the Nigerian Navy.

Under Nigerian law, only the country's military can provide armed security.

"Now the hostage takers are suing Chevron, claiming that CNL should not have reported the matter to Nigerian law enforcement officials and that the Nigerian authorities used excessive force in rescuing the workers," Chevron said.

According to the National Law Journal, the case against Chevron is one of a handful in recent years that have used a 200-year-old law, created originally to provide redress to the victims of piracy at sea, and known as the Alien Tort Claims Act.

The NLJ said a body of law has since developed that allows people injured in other countries to seek redress in US courts.

Royal Dutch Shell PLC faces a similar trial in the Southern District of New York on Feb. 9, 2009, in a pair of cases charging it with human rights violations and racketeering in Nigeria. ✦

Financial meltdown threatens Nigeria gas development

Judy R. Clark
Senior Associate Editor

Uchenna Izundu
International Editor

News reports from Nigeria indicate that the current global financial meltdown, with its lower oil and gas prices and financial lending uncertainty, is threatening Nigeria's December deadline for developing its natural gas antiflaring program. Delays would cause the country to continue losing money in lost gas sales.

Meanwhile, Total Exploration & Production Nigeria Ltd. (TEPN), on behalf of senior joint venture partner Nigerian National Petroleum Corp. (NNPC), this month awarded contracts totaling $3 billion to implement Phase I of the OML 58 lease upgrade project in Rivers State, Nigeria, to help implement the gas development program.

A Saipem SPA-led consortium, which includes Ponticelli Nigeria Ltd. and Desicon, was awarded the main engineering, procurement, supply, construction, and commissioning of the new facilities. Holding a 60% share in the Phase I consortium, Saipem said its share of the contract is valued at $700 million.

The upgrade project has multiple goals: It is expected to implement the government's anti-flaring policy by utilizing gas that previously was flared; to increase gas supply to the Nigeria LNG project in Bonny; to boost domestic gas supply for industry and cooking; to enhance the safety of workers and area citizens; and to create jobs for local Rivers State companies and personnel.

The upgrades

The Block 58 facility is in the Egi community in Rivers State, 85 km northwest of Port Harcourt. It comprises a 35,000 boe/d oil and condensate flow station, which will be upgraded, and a 10.65 million standard cu m/day (MMscmd) gas treatment facility that will be expanded to 15.65 MMscmd with the addition of a new train and interconnecting pipelines and utilities. The upgrade project also includes implementing condensate stabilization and upgrading the water injection process.

The first phase of the upgrade focuses on engineering, procurement, construction, and commissioning services for the flow station and for improving overall safety of plant operations. Phase I of the 3-4 year project is scheduled to be completed by early 2011, and the entire project, by mid-2012.

As part of the upgrade project, "an additional 2.50 MMscmd of gas capacity will be constructed to supply gas to the domestic market," Saipem said.

Nigeria's gas goals

Nigeria is intent on developing the nation as a modern economy and an industrialized nation, balancing domestic gas use with exports, which, when combined, are expected to increase gas demand to a peak of more than 16 bcfd by 2013 (OGJ, Dec. 10, 2007, p. 30).

Gas demand for domestic power generation and industrial use will grow to more than 12 bcfd by 2013 from less than 2 bcfd in 2007, says NNPC. Gas-fired electric power generation will be expanded to nearly 15 Gw by 2012, requiring more than 6 bcfd by 2011.

Nigeria has estimated gas reserves of 184 tcf of proved natural gas reserves, seventh largest in the world (OGJ, May 26, 2008, p. 20). However, Nigeria still flares about 40% of the natural gas it produces and re-injects 12% to enhance oil recovery. Official Nigerian policy is to end gas flaring completely by yearend.

Shell, one of Nigeria's contracted upstream gas producers, estimates that about half of the 2 bcfd/year of associated gas produced in Nigeria is flared. The new industry strategy is to collect the associated gas and process it into LNG for export and domestic industrial use and natural gas liquids (NGL) for cooking, greatly enhancing Nigerian natural gas revenues while simultaneously reducing carbon dioxide emissions.

To meet its goal of exporting more than 11 bcfd of gas by 2014, Nigeria Liquefied Natural Gas Ltd.'s (NLNG's) Train 7 is scheduled to come on line in 2013. NNPC said NLNG-T7 capacity is planned to be 8.5 million tonnes/year of LNG and 2.1 million tonnes/year of NGL, adding some $1 billion/year to government revenues "at modest LNG prices," according to Chris Haynes, NLNG chief executive and managing director. Eni has signed an agreement to purchase, for 20 years, 1.375 million

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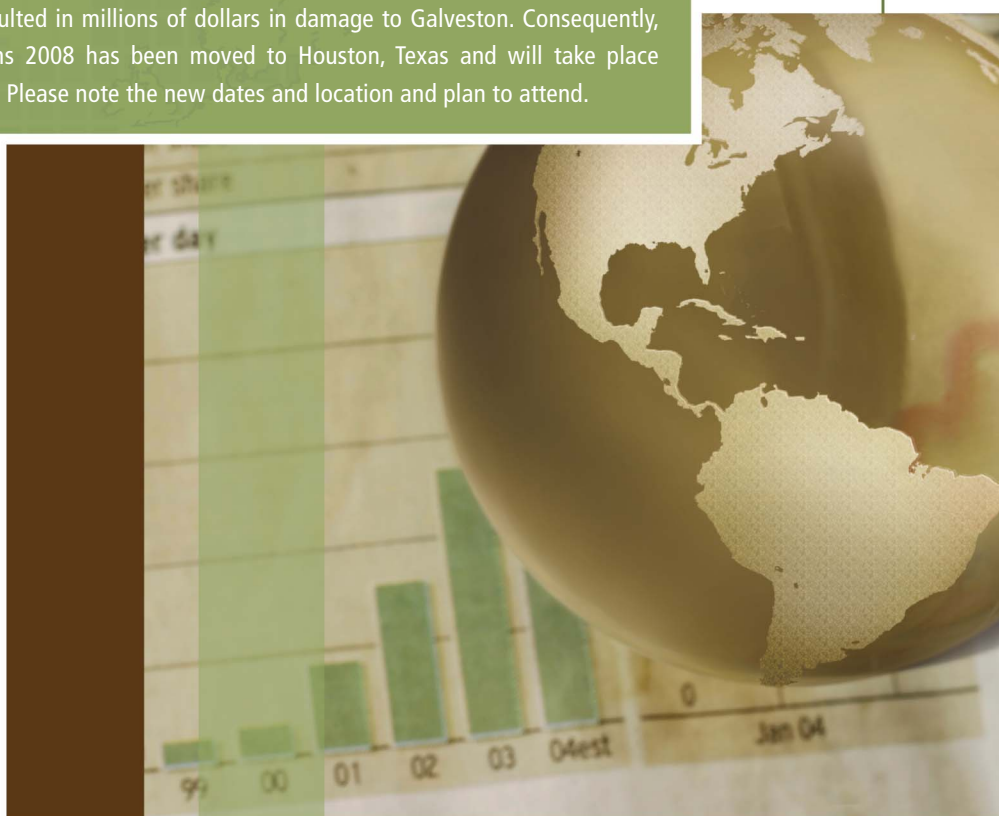

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tonnes/year (equivalent to 2 billion cu m/year) of LNG from the Train 7 volumes.

NLNG submitted in January an environmental impact assessment (EIA) for construction of NLNG-7Plus, which included the seventh and a potential eighth train, also with an 8.5 million tonnes/year capacity, and 12 new LNG carriers to export the LNG to the US and, to a lesser extent, Europe. The decision to construct Train 8 will come later, Haynes said in the assessment, and the eighth train would be another 2-5 years in development. The EIA process was started in parallel with the front-end engineering, he said.

NNPC holds 49% interest in NLNG, with Shell Gas holding 25.6%, Total 15%, and Eni International 10.4%.

In addition to NLNG, Brass LNG Train 1 and OKLNG Trains 1-4 are also scheduled to start up in 2013. All are expected to reach peak production of 11 bcfd in 2014, according to NNPC.

Nigeria also is in talks with Algeria's Sonatrach to provide gas for the jointly proposed 1,300-km Trans Saharan Gas Pipeline from Warri, in Delta State, to Algeria for distribution into Europe's gas grid. "Adequate (gas) reserves have been set aside for the TSGP for the first 25 years of operation," said Emmanuel Olatunde Odusina, Nigeria's Minister of State for Energy (Gas) earlier this year.

Nigeria's other major goal is to increase "local content"—the training and contracting of local workers, consultancies, suppliers, contractors, shippers, insurers, and financial institutions to boost the country's gross national product. NLNG-T7 alone reportedly would provide 10,000 local content jobs.

The government's goal is 70% local content by 2010. ✦

Malaysia downplays territorial dispute with Indonesia

Eric Watkins
Oil Diplomacy Editor

The Malaysian government, attempting to downplay recent concerns about a possible military conflict with Indonesia, said the Bukat Block, operated by Italy's Eni SPA, falls outside the territory disputed with Indonesia.

"The Bukat Block is located outside Malaysian territory, based on the 1979 Malaysian map," said Mohd Norhisyam Mohd Yusof, first secretary for bilateral and regional cooperation at the Malaysian embassy in Jakarta.

In making his announcement, Norhisyam said some parties had wrongly referred to the block as part of the maritime area of Ambalat, off eastern Kalimantan, which is thought to contain huge reserves of oil and gas.

Indonesia's Energy and Mineral Resources Minister Purnomo Yusgiantoro last week said Eni had sought government protection in building a floating LNG plant on Bukat Block due to concerns of an ongoing dispute over the area between Indonesia and Malaysia.

"Eni has found big oil and gas reserves in the block. They are now planning to build a floating LNG plant in the area. For this, the company is asking the government to provide certainty for its operations," said Purnomo after meeting with visiting Eni Chief Executive Paolo Scaroni.

Indonesia and Malaysia have long been involved in a dispute over the Ambalat territory, which consists of the Ambalat Block and the East Ambalat Block.

In 2007, Malaysia sent naval ships and warplanes into Indonesian waters to protect its ND-6 and ND-7 Blocks, which overlap the Ambalat Block.

In 2005, Eni suspended exploration on both Bukat Block and Ambalat Block when tensions between the two countries rose over the territory.

At the time, Eni had drilled three wells on the Bukat Block that indicated large reserves of oil, according to Kardya Warnika, then head of Indonesia's oil and gas executive board (BP Migas).

Tensions have recently resurfaced, with both sides adding to them.

On Oct. 21, Indonesia's Armed Forces commander Gen. Djoko Santoso said elements of Malaysia's armed forces were committing territorial violations in and around Ambalat Block.

Santoso said Malaysia was continuing to claim the block as part of its territory and that Indonesia would respond by intensifying maritime and air patrols around the block to match the presence of Malaysian troops.

According to analyst Global Insight, "the growing buildup of troops in the region raises the possibility of disruption to Eni's development plans as well as armed clashes, which would scupper ongoing negotiations between the two countries on demarcating a mutually acceptable maritime border for the disputed zone." ✦

Logical expressions a basic tool in reservoir characterization

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In this research the basic aspects of applying logical expression as fuzzy logic to a seismic data set and its application in reservoir characterization are proposed.

In addition, the simple understanding, placement, and role of simple logical expressions will be briefly highlighted using examples. Combining a number of sections through fuzzy logic can not only enhance focus but also reveal insights and improve interpretation in a presentable way.

It is a general approach of meta-attribute visualization and interpretation of the seismic data by integrated techniques. One can create a number of sections describing specific objects, e.g. direct hydrocarbon indicators, sand cube, and carbonate cube (e.g., reef), based on transformed cubes (gamma ray, density, acoustic impedance, etc.).

Introduction

Logical expressions are mathematical treatments to the data set.

The functionality of utilizing such expression is normally available in mapping and other geoscientific software. To our knowledge simple logical treatment to a seismic data set has not yet been perfectly introduced for seismic object detection and reservoir characterization.

Dealing with seismic data at each sample value is basically an application of seismic attributes. Too many seismic attributes are available in literature since 1960,[1] and most of them are redundant[2] with general pitfalls in seismic attributes analysis.[3]

De Groot[4] has highlighted the role and application of multiple attributes volumes in the industry standard solution of dGB Earth Sciences (OpendTect). Generally, three basic attributes, amplitude, frequency, and phase, can easily be extracted from seismic data, and any subsequent attribute available for interpretation is basically a derived attribute.

Many methods are available in the literature to combine several attributes by using fuzzy logic and neural networks as meta-attributes, such as the patented FaultCube[5] and patented ChimneyCube[6] methods.

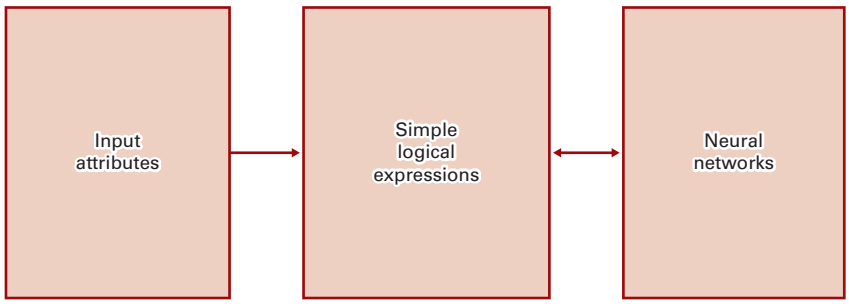
For the case of general application of meta-attributes in reservoir characterization, the need is to have enough data, perfection, and enough knowledge to interpret the defined classes because the result is a combination of several input attributes.

The methods of combining several attributes (e.g., 1 dozen) by using supervised or unsupervised neural networks for particular purposes are actually very highly technical and superior. But before finalizing the results, one can create logical outputs by combining a number of interpreted attributes and visualizations with simple logic to reduce uncertainties.

On the other hand, sometimes an interpreter is unable to bridge the gaps between isolated information (attributes) and final resultant classes. Such gaps can be filled by using simple logical (IF-THEN) statements. Such techniques should be termed as "self-filtering techniques by using logical expressions."

APPLYING LOGICAL EXPRESSIONS

Fig. 1



Note: A proposed stage where logical expression can be helpful in interpretation. Simple logical expressions can be applied on input attributes as well as the results of neural networks as filters of interpretations.

We are focusing logical expressions as self-filters because these are related to the interpreter's knowledge of the data and the outputs are descriptive of the expression used for the specific subsurface feature.

Logical expressions

Zadeh[7] first proposed the basic idea of using logical expressions as a fuzzy set.

Such sets can be combined by using AND/OR operators. The AND operator creates an output (e.g., true = 1) where both conditions satisfy equation 1, while the OR operator creates an output (e.g., true-1) where either condition satisfies equation 2.

Aminzadeh and de Groot[8] have already sketched the application and role of fuzzy sets by using several approaches, mainly neural networks. The uses of such operators depend on the situation and the nature of the results to be filtered out.

The AND operator is generally applied in mandatory situations such as DHI indicators that can be expressed as logical conditions separated by an AND operator over high amplitude, phase reversal (180°), low frequency, etc.

A simple example of logical expression is highlighted in equation 3. In this expression a1, a2, and a3 are the input information (seismic attributes) and x1, x2, and x3 are the real respective values of input attributes.

This expression has been applied at seismic sample level to combine different results as a meta-result. That is an output which is a descriptive of a number of inputs. Thus a user can not only combine information but can also create new output by using such expressions that define a particular subsurface condition.

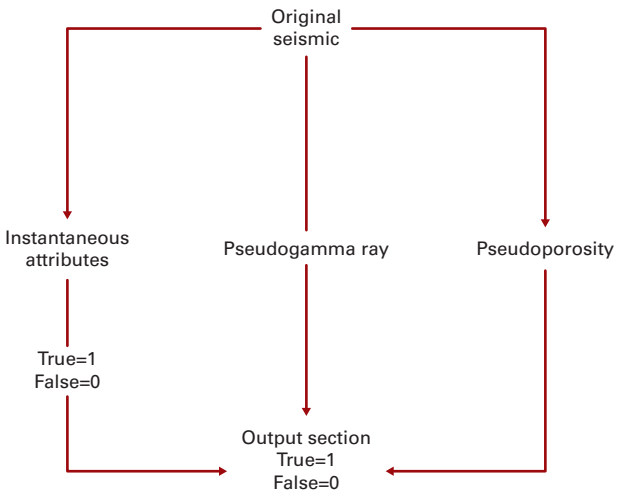
IF (condition 1) and (condition 2) then set 1 else 0 (eq-1)

IF (condition 1) or (condition 2) then set 1 else 0 (eq-2)

IF ((a1 <x1) and (a2 <x2) or (a3 >x3) or so on)) then set 1 else 0 (eq-3)

THE APPLICATION

Fig. 2



Where expressions can stand

The recent advances in technology deal with the interpretation of a number of input seismic versions.

An interpreter generally works on different seismic versions (unmigrated stacks, migrated stacks, simple attribute cubes, spectrally decomposed, impedance cubes, predicted/inverted cubes, etc.). How many versions can one superimpose by setting transparencies just to invoke one reservoir character, e.g., just separating high risk areas and low risk areas?

The answer to such question is not simple and direct. It is sometimes good and sometimes bad to interpret a cube/section that is descriptive of a number of acoustic properties. But if an interpreter wants to filter out selective information from each seismic input section/cube and he uses such filtered information as one output, the logical expression can resolve such problems. A simple case of such information has been highlighted in Fig. 2.

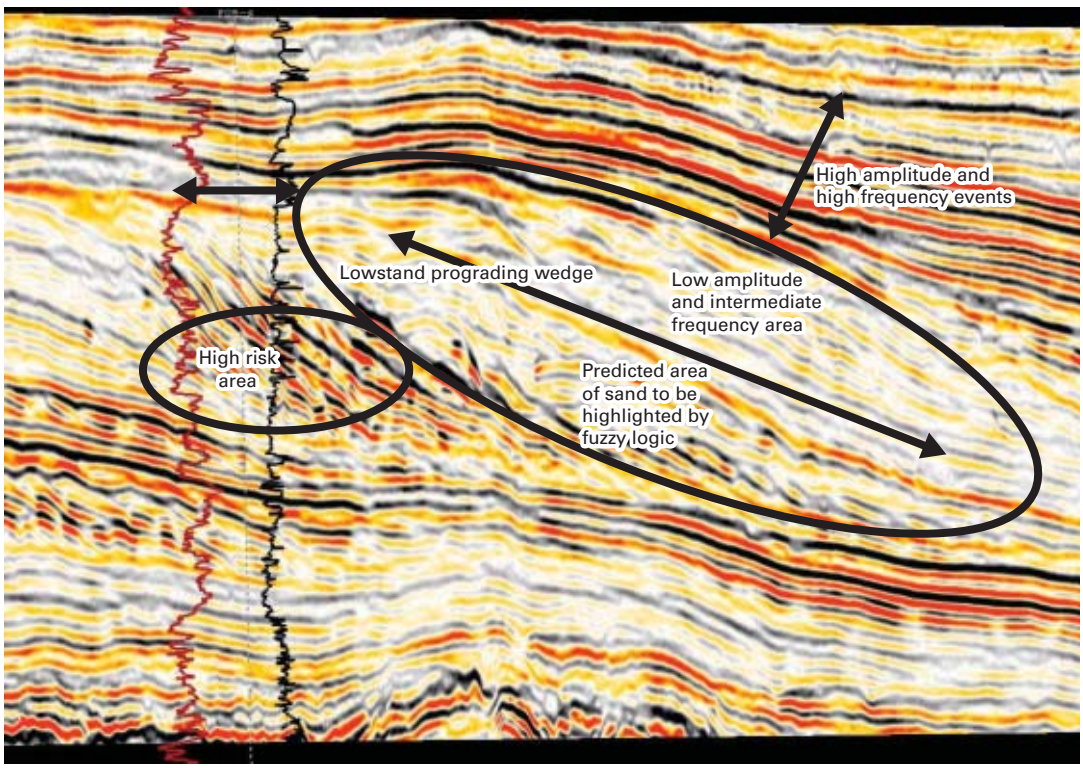
The logical expressions can help to resolve problems at any interpretation level. But their fuzzy role comes as a self-filtering method between input attributes and in prediction by using neural networks during key interpretational phases in reservoir characterization (Fig. 1).

In case of reservoir characterization from seismic data, the simple logical expressions can stand in between the application of neural networks and input attributes. The need of such expression increases when the number of input information increases, and such things happen when an interpreter integrates several techniques.

So prior to applying neural networks directly from such information a simple method of an IF-THEN clause sometimes reveals interpretable results. Even though neural networks and fuzzy logic are always fuzzy, the interpretation by using simple logics can

INLINE FROM NETHERLANDS F3 BLOCK*

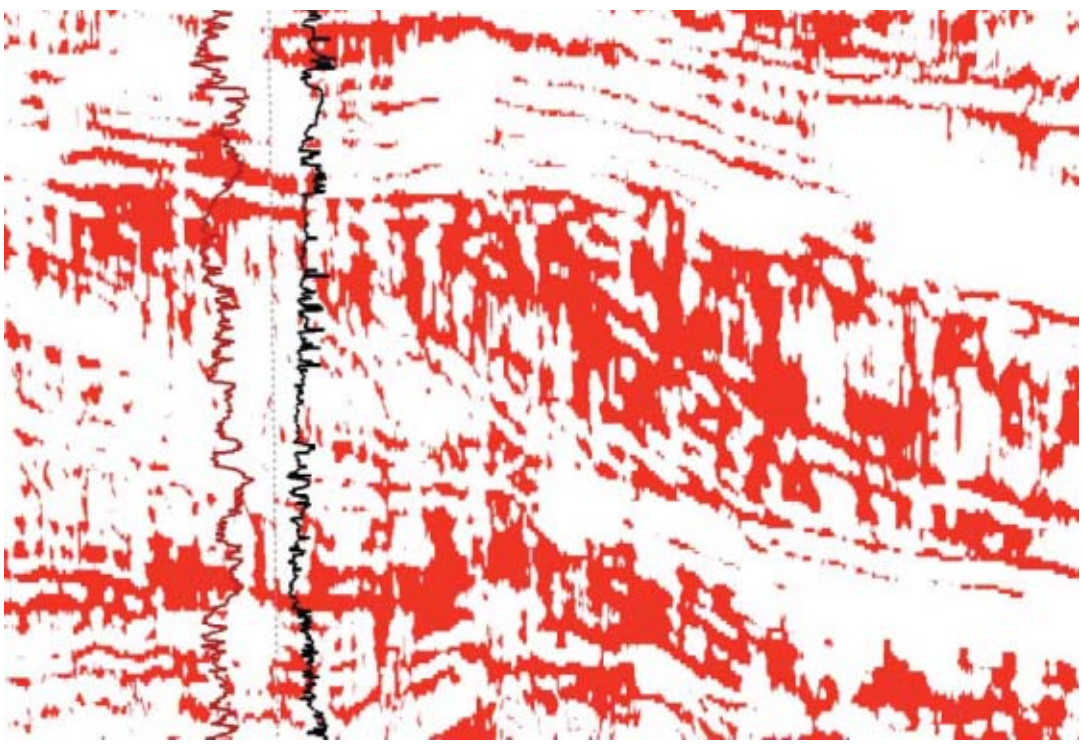
Fig. 3



*Inline is overlain by gamma ray log (maroon) and porosity log (black).

SIMPLE LOGIC APPLIED OVER F3 BLOCK INLINE

Fig. 4



Note: Simple logic is applied with limited instantaneous attribute (0-3,000) and average frequency below 50 Hz.
Red areas in the section mark the location where the condition satisfies, i.e. true with value (1).

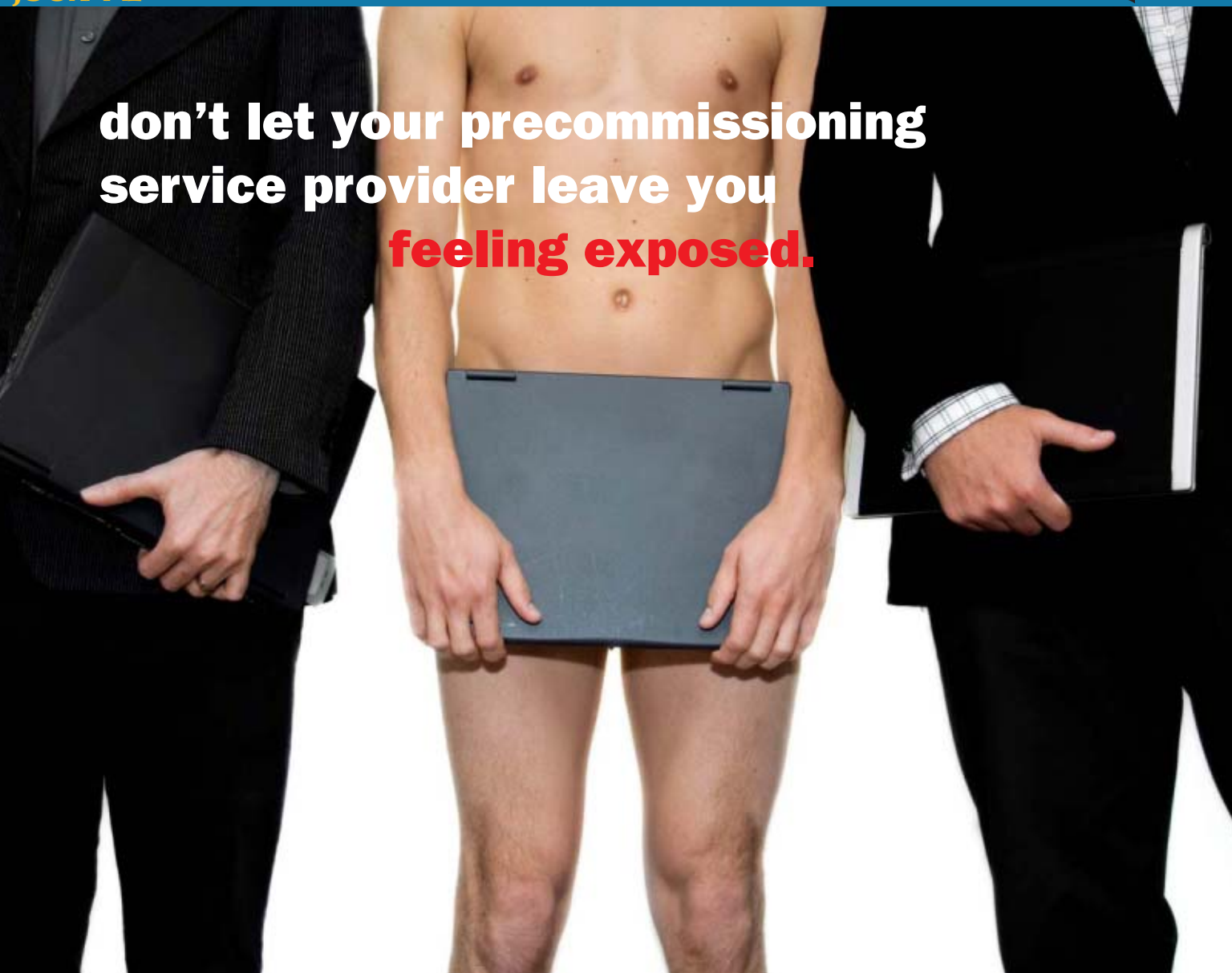
provide enough insights. A way is proposed to simplify the results by applying simple logics over overlapping information. And the end result in such case would be unique, i.e., "true" where condition satisfies and "false" where condition fails to satisfy the results.

Building logic

A most general case is exemplified in this section to highlight the need and importance of simple logical expressions.

Fig. 2 describes a simple case of logical expression to combine several inputs as one descriptive output. The first idea is to use one or two seismic attributes and elaborate the role of such expressions as self filters. Thus amplitude and frequency instantaneous attributes are used as a filtered out example.

We will create new filtered output (frequency and amplitude limitation) as the object of our focus (Figs. 3 and 4). Moreover, if an interpreter has a transformed acoustic impedance cube, he



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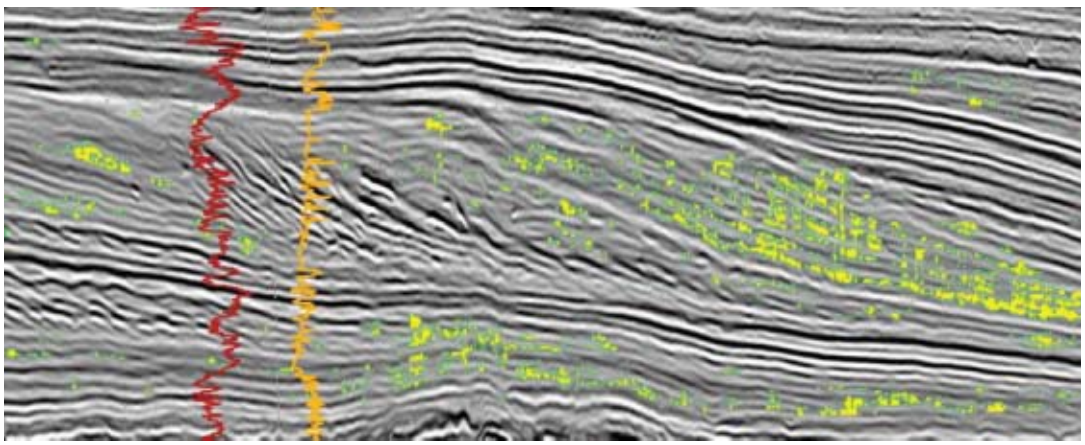
FUZZY LOGIC OVER PREDICTED SECTIONS

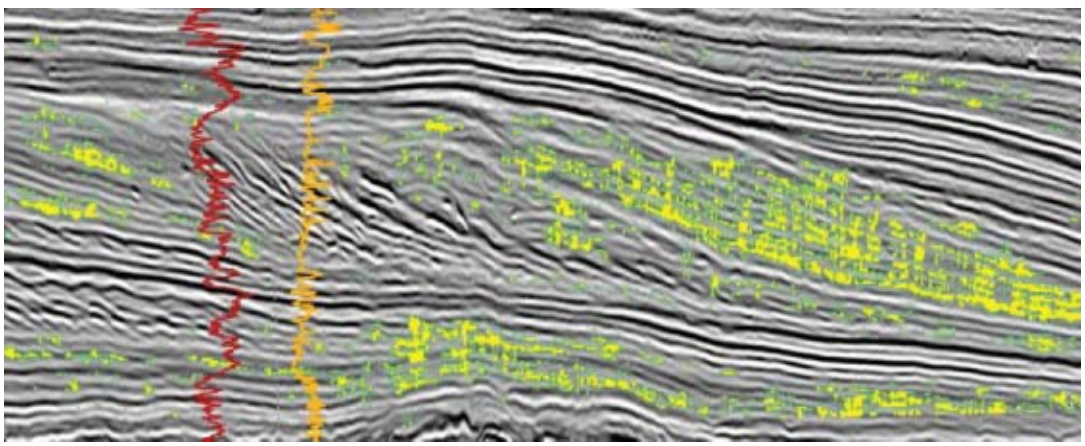
Fig. 5



Note: Fuzzy logic is applied over predicted gamma ray and porosity section that is overlying the original seismic section. Yellow areas highlight the intermediate predicted porosity (0.15-0.3) and low gamma ray (0-50 API).

FUZZY LOGIC WITH INCREASED RANGE OF EXPRESSION

Fig. 6



Note: Fuzzy logic is applied over predicted gamma ray and porosity section that is overlying the original seismic section. Yellow areas highlight the intermediate predicted porosity (0.15-0.3) and low gamma ray (0-60 API).

can use such information at this step (besides amplitude and frequency), i.e., output of limited acoustic impedance range.

The basic theme of the presented data set (Netherlands F3 Block) and associated geological ideas is based upon the work of Overeem.[9] The chronostratigraphic relationship of this block has already been discussed.[10 11 12]

Let us build a simple logic from Fig. 3.

The large ellipse marks the area to be highlighted by using logical expressions. This area is predicted as good quality sands preservation with low amplitudes and intermediate frequencies as input acoustic information. Geologically the large ellipsoid marks the area of a lowstand prograding wedge.

The small ellipse marks the area of high risk, i.e., poor quality sand accumulation as compared to the area marked by the large ellipse. Our goal is to create an output that reflects:

- An average frequency of 0-50 Hz.
- Minimum positive amplitude range of 0-3,000.
- Fair to good predicted pseudoporosities.
- Low predicted pseudogamma ray values (Fig. 2).

Based upon such problem we will resolve two things at this point: Firstly, to highlight a low risk area with good quality sand prediction, and secondly, maybe we can quickly visualize the dispositional patterns in 3D volume.

The limitation at this point is that results lack low frequency information (acoustic impedance) and conditions would be separated by AND operator over frequency and amplitude.

Thus in either case, there would be highlighted areas with no sand information because of condition over amplitude and frequency. Such areas would be treated as areas that lack sands information with low gamma ray and porosity information.

Then in this case we will use two property cubes, i.e., pseudogamma ray and pseudoporosity cubes derived from neural networks. These cubes lack low frequency information, and appropriate prediction of such cubes is not necessary and beyond the scope of this research.

By knowing such limitations, the GR and porosity cubes are just highlighted as an expression, not as a true case. Moreover, we want to create an output at seismic resolution. For superior results anyone can create appropriate property cubes by minimizing low

frequency limitations and then use simple logical expressions for self-filtered outputs.

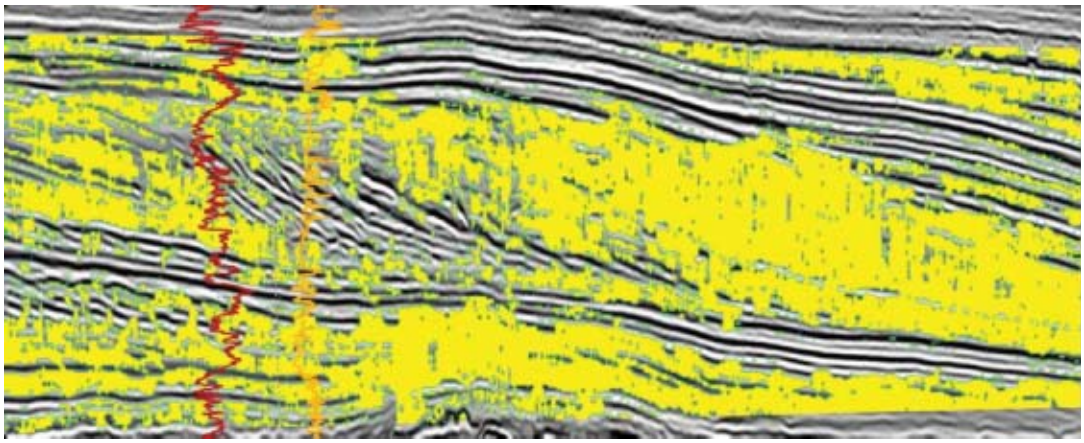
Example:

An in-line from North Sea (F3 Block) has been shown in Fig. 3 with posted gamma ray (maroon) and porosity logs (black), respectively. Over this in-line the logical expressions are to be applied to present and highlight the areas of sand accumulation with respective conditions.

The first example is shown in Fig. 4 in which specific amplitude and frequency information (equation 2) are filtered out by using "AND" operator (&&). Equation 4 represents a case of creating a new seismic output (between 0 and 1) where both conditions (overamplitude and frequency) satisfy.

Fuzzy logic with further increased range of expression

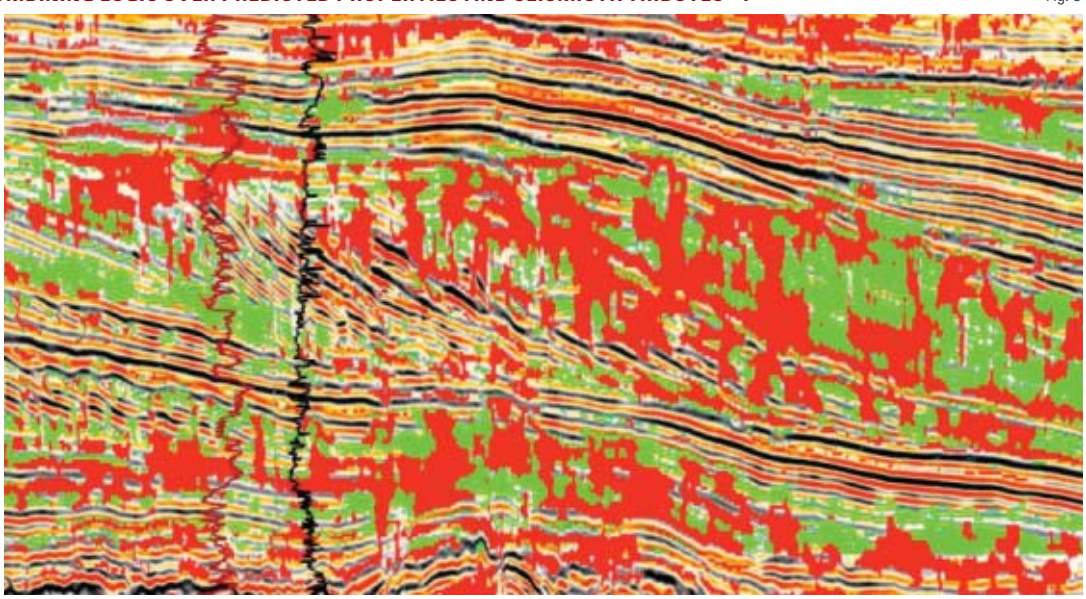
Fig. 7



Note: Fuzzy logic is applied over predicted gamma ray and porosity section that is overlying the original seismic section. Yellow areas highlight the intermediate predicted porosity (0.15-0.35) and low gamma ray (0-70 API).

Combining logic over predicted properties and seismic attributes—I

Fig. 8



Note: Three sections are superimposed (Figs. 1, 2, and 7). Red marks are filtered amplitude and frequency section (1) and green marks are filtered gamma ray and porosity (1).

The case is to highlight the areas of input section with intermediate amplitude information and frequency information by assuming that sand will represent a low positive amplitude range and intermediate to low frequency. The predicted area (Fig. 3) shows a red colored clastic deposition with limited amplitude and frequency information (Fig. 4).

Notice that the red color misses the areas of high frequency and high amplitude information in high risk area (Figs. 3 and 4).

$$((x0 > 0 \;\&\&\; x0 < 3{,}000) \;\&\&\; (x1 < 50)) \;?\; 1 : 0 \qquad \text{(eq-4)}$$

where x0 is instantaneous amplitude and x1 is average frequency.

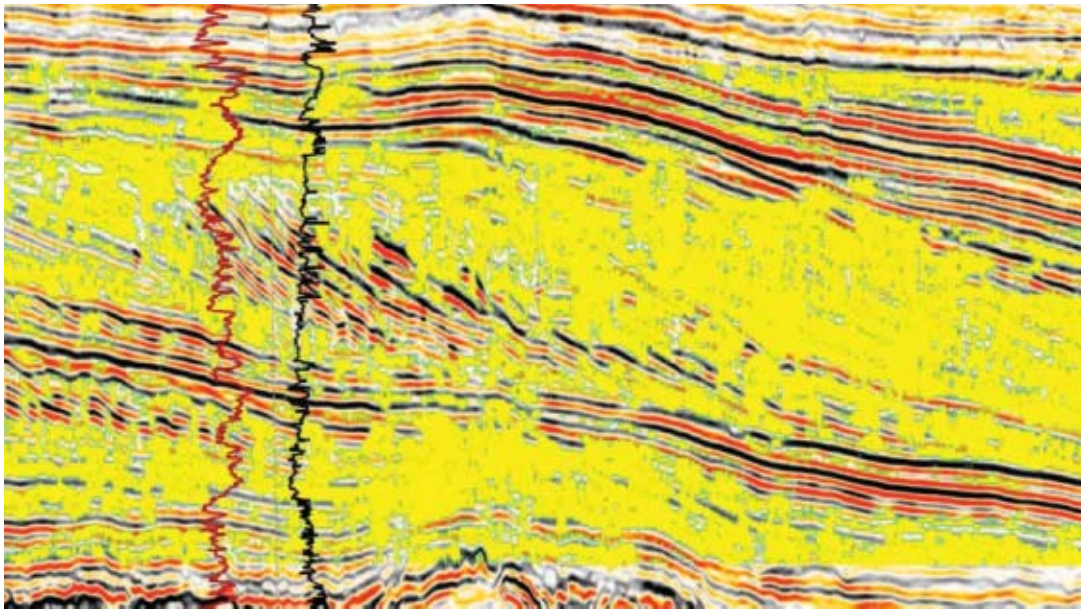
Another fuzzy logic (equation 5) has been applied over neural network predicted pseudoproperty cubes (gamma ray and porosity). This section has been shown in Fig. 5 as a yellow (true = 1) colored section overlying the actual in-line (gray scale). The areas are highlighted as predicted sands with limitation (equation 5).

The same yellow color has been improved (Figs. 5 and 6) by increasing the range of expression (equation 5). By increasing the range of the condition, the resultant section is more pronounced, but still the low risk area (Fig. 3) does not show any good quality sand prediction.

((x0 < 50 API) && (x1 > 0.15 &&

COMBINING LOGIC OVER PREDICTED PROPERTIES AND SEISMIC ATTRIBUTES—II

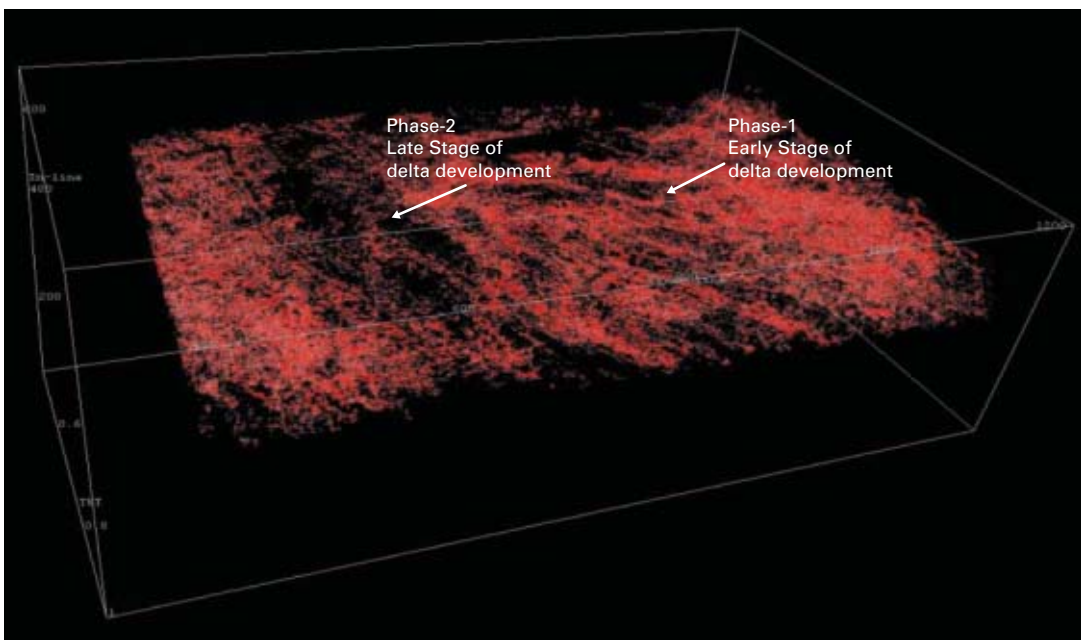
Fig. 9



Note: Enhanced version of Figs. 4 and 7 highlighting the areas where condition over amplitude, frequency, predicted pseudo gamma ray and porosity satisfies.

FUZZY LOGIC APPLIED TO VISUALIZE THE DEPOSITIONAL PATTERNS

Fig. 10



x1 < 0.3)) ? 1:0 (eq-5)

where x0 = pseudogamma ray predicted section and x1 is pseudoporosity predicted section.

A fuzzy output has been created using Figs. 4 and 7, first by overlapping and then by using logical expressions. Fig. 8 describes the overlapped sections (Figs. 3, 4, and 7). The red areas mark the condition (equation 4) whereas green areas mark logically filtered gamma ray and porosity (equation 5).

As discussed earlier, it was assumed that the characteristic sand in the low stand prograding wedge (Fig. 3) would describe low amplitudes and intermediate frequency ranges at seismic resolution.

Now in Fig. 8, there are a few areas of sand hits that satisfy equation 4. But there are other areas highlighted (green) with acoustic information other than equation 4. One can derive too many conclusions from this section. The sand deposited at slopes (arrow marks) is a characteristic of average frequency ranging from 0 to 50 Hz and low amplitudes of 0-3,000, fair to good porosities, and low gamma rays.

The same logical expressions are visualized as combine information in Fig. 9. The good sand hits (with limited amplitude and frequency) are clearly indicated by yellow color. If one wants to get this fuzzy output as in Fig. 6, they will have to change the parameters range of equations 4 and 5.

The same information can be visualized in 3D domain (Fig. 10). Notice how the stages of delta development are visualized that satisfy the logic applied of predicted pseudogamma ray and pseudoporosity cubes along with limited frequency and amplitudes. Such cube as in Fig. 10 is a descriptive of subsurface depositional patterns besides

as a lithological cube.

One can develop such cubes by proper prediction of porosities and gamma ray which contain the information of acoustic impedance. The basic idea in this discussion is to invoke the role of logical expression and the way of utilization during interpretation.

Discussion

Simple logical expression can be used as a tool to create fuzzy outputs (0,1) at seismic sample value.

Such logics create new seismic output which can be descriptive of number of input seismic attributes, i.e. a fuzzy output. Such method of simple logical (IF-THEN) statement is basically a self-filtering technique of interpretation.

The integration of a number of technologies generates a number of output cubes/sections. One can use simple logical expression to define an expression for particular situation e.g., DHI. One can play with the parameter range until satisfactory results are achieved.

Moreover, we can use acoustic impedance information to create property cubes, and then we can use such logical expressions to take benefits in interpretation. Logical expressions are a strong tool to predict seismic objects, subsurface stratigraphic situation, depositional patterns, etc. It is up to an interpreter how he creates the input recipe to create such outputs.

The goal of the next millennium would be to develop new approximated cubes, for instance a sand cube, carbonate cubes (e.g., reef), etc. Such cubes can be approximated by simple IF-THEN statements.

Acknowledgment

We thank dGB Earth Sciences BV, Netherlands, for honoring OpendTect as a tool to generate such fuzzy results. Also we thank Fred Aminzadeh and Paul de Groot for publishing an extensive guide on fuzzy logic and soft computing techniques along with the public domain (F3 Block, Netherlands) data set used in this article. ✦

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Chinese design drilling fluids for Tuha's Jurassic sandstone

Yong Shu
Jienian Yan
China University of Petroleum
Beijing

New drilling fluids prevent formation damage in a sandstone reservoir in northwest China's Turpan Hami (Tuha) basin. The Tuha oil field is the only integrated condensate-gas field development in the Turpan Hami Oil field Branch, Shanshan, Xinjiang Uygur autonomous region of China.

Low-permeability, dense reservoirs are commonly characterized by a high content of clays, high original water saturation, high sensitivity to invasive fluids, high capillary pressure, complicated structure and anisotropic, and high flow-resistance.

Generally, these reservoirs also contain numerous natural microfractures, probably leading to stress sensibility. This article reviews the geological characteristics and potential damage in the Tuha sandstone, a dense Jurassic reservoir, and introduces a new, multifunctional drilling fluid system.

The fluid includes preventive, water-blocking surfactants and consists mainly of amphion polymer, sulfonation polymer, ideal packing temporary bridging agents (TBA), and film-forming agents.

We include a systematic analysis of the main damage mechanisms and factors influencing water-blocking. Numerous studies have shown that the extent of water-blocking ranges from 70% to 90%.[1-5] Once damaged, reservoirs can rarely be recovered.

Researchers at China University of Petroleum in Beijing experimentally evaluated the rheological properties, inhibition, compatibility, and regained permeability of the new fluid. Both lab evaluations and field tests show that the new amphion, sulfonation polymer drilling fluid is suitable for low-permeability dense gas reservoirs in China's Tuha oil field.

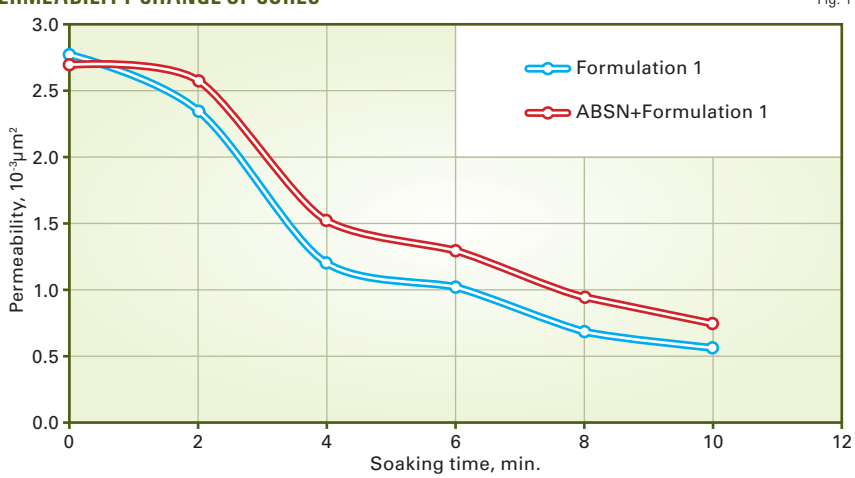
Geological characteristics

In the oil-producing, Jurassic, Qiudong formation, the main lithology is fine sand. Porosity ranges from 11.9% to 13.5%; permeability ranges from 0.08×10^{-3} μm² to 13.6×10^{-3} μm²; and radii of pore throats range from 0.1 to 1.0 μm (average 0.28 μm). Most of the rock has microfine pore throats along with many micro fractures; this plays a leading role in seepage flow and reduces or eliminates storage capacity.

In short, the target formation can be characterized as a typical low-permeability, dense formation with microporosity. Hydraulic fracturing is the main method for enhancing oil-gas recovery during production operations.

PERMEABILITY CHANGE OF CORES*

Fig. 1



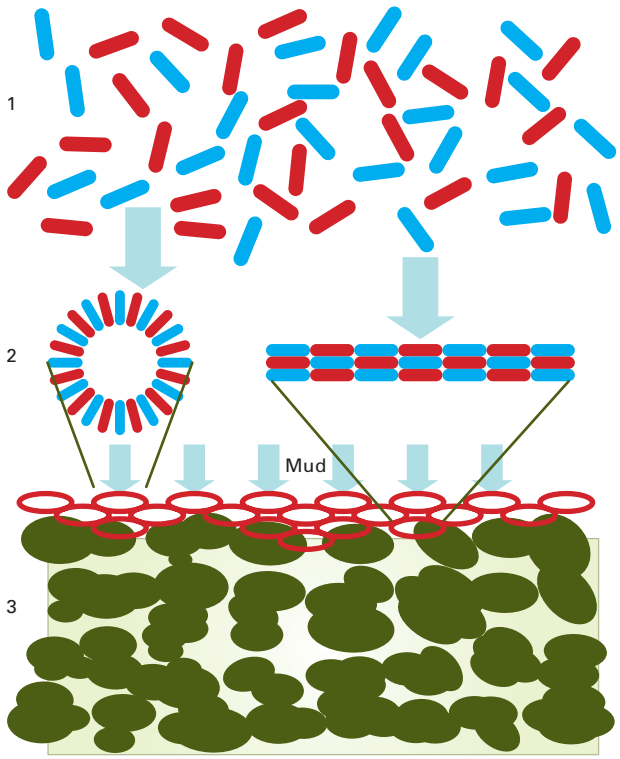
*Soaked in drilling fluids with and without added ABSN.

Potential damage

Based on geological characteristics and lab evaluation, the main damaging factors and existing problems can be summarized as follows:

- Sensibility evaluation of cores taken from well QD3 (depth 3,105.0-3,141.5 m) show that main damaging factors are moderately high flow rate, light salt, acid, and alkali sensibility.
- Permeability and skin factor are high before and after wells are put into production, indicating that the formation was contaminated early. In well QD3, for instance, the early permeability was 1.45 × 10^{-3}μm^2 and the skin factor was 25.4. After 20 days, the permeability increased to 2.93 × 10^{-3}μm^2 and the skin factor decreased to 19.6. This type of damage will not be eliminated during production.
- For permeability recovery of well-site drilling fluids, early experimental result was 56.6%; after 20 days, it was 51.4%. Generally speaking, however, permeability recovery of fluids is less than 70%.
- Total clay content of target formation is 12.74 %. The relative content of different minerals is illite-smectite (12.6%); chlorite (31.9%); kaolinite (36.1%); illite (19.4%); and carbonate (3.5%). Water sensibility and water blocking can easily be induced by invasive fluids at micropore throats and seepage space. This can block the limited seepage flow channels and restrict oil and gas production.

ACTION PRINCIPLE OF FILM-FORMING AGENTS Fig. 2



1–Polymer macromolecule; 2–Forming micelle; 3–Forming ultralow permeability film

Multifunctional drilling fluids

The first step in systemic formation protection is to prevent formation damage during drilling operations.

At first, formations are exposed to drilling fluids, sometimes over a prolonged period because of well depth, circulation loss, drill pipe sticking, and well collapse. Consequently, invasive fluids induce water sensibility and water blocking, resulting in extensive damage.

Therefore, drilling fluids should have good properties including strong inhibition, low filtration, water-blocking prevention, and suitable density for near-balance to underbalanced drilling operations.

Based on current drilling technology and known damage factors in low-permeability Jurassic formations, guidelines to develop new drilling fluids include:

- Selecting effective surfactants to minimize water-blocking caused by filtration.
- Adopting three kinds of amphion polymer with different molecular weights to substitute for macromolecule polymer KPAM.
- Selecting compound TBAs by adopting ideal packing theory (IPT) to form a thinner, tighter mud cake and achieve a good temporary plugging effect.[6,7]
- Selecting film-forming agents to further improve inhibition of drilling fluids.[8]

The final formulation of drilling fluids formed by these guidelines should have good rheological properties and be compatible with the characteristics of the target formation, as well remain in a safe density window during drilling operations.

Optimizing basic formulation

We used amphion polymer, FA-367, JT-888 and XY-27 as the main additives to the drilling fluid and determined their concentration by using an orthogonal experimental method ($L_9 3^4$).

We optimized the basic drilling fluid formulation (Formulation 1) as follows: 3% bentonite + 0.3% FA-367 + 0.6%

RHEOLOGICAL PROPERTIES, BASIC FORMULATION 1* Table 1

Rheological parameters	AV/PV, mPa·sec	Yield point, Pa	Φ6/Φ3	Gel, Pa/Pa	API V_f, ml
Room temp.	33/24	9	4/3	2/6	7.3
120° C. for16 hr	31/22	8	4/2	1.5/5	8.5

*Density = 1.21 g·cc; pH = 9.

SURFACE TENSION, COMMONLY USED SURFACTANTS Table 2

Serial no.	Concentration/0.4%, surfactant types	Surface tension, mN.m^{-1}
1	ABS	34.75
2	OP-10	35.45
3	Sodium oleate	40.33
4	Peregal	48.97
5	1231(cation)	39.41
6	Tween	55.15
7	Turkey red oil	43.82
8	ABSN	34.00

JT-888 + 0.1% XY-27 + 1.5% SMP-1 + 1.5% SPNH.

Table 1 shows the rheological parameters. Experimental results show that we achieved relatively reasonable rheological properties.

The next step was to minimize API and HTHP filtration through technology of film-forming and ideal packing TBA.

Selecting surfactants

Young-Laplace's equation[8] and D.B. Bennion's prediction formula have shown that water-blocking damage is mainly related to core permeability, porosity, initial water saturation, and oil-gas interface tension. It is also related to the lithological characteristics of the formation, types of cementation, porosity structure, and properties of invasive fluids.

Effective surfactants can markedly minimize surface tension and oil-gas interfacial tension of filtration. We tested the surface tension of eight commonly used surfactants (Table 2; OGJ, May 19, 2008, p. 45).

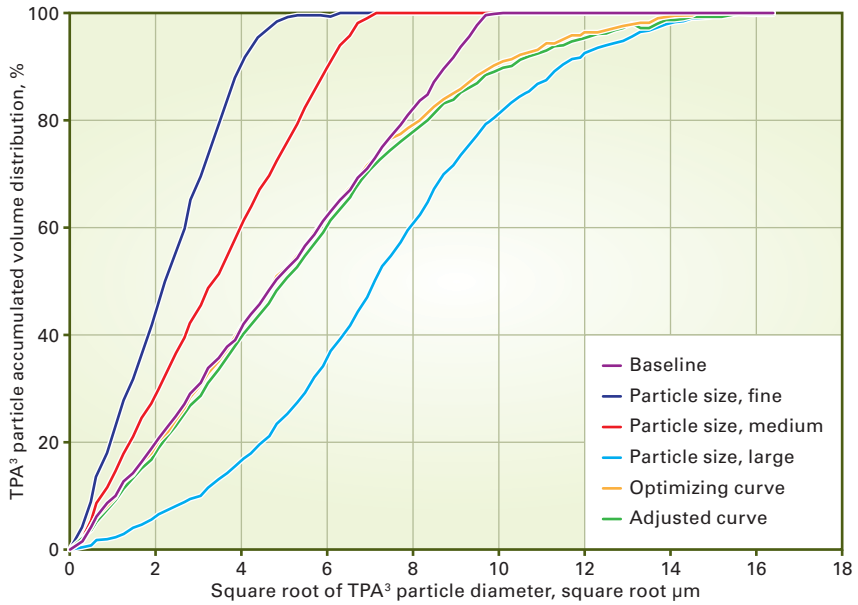
Experimental results show that ABSN and OP-10 can effectively reduce surface tension and these were recommended as preventive water-blocking agents in drilling fluids. ABSN may form precipitates when the concentration of Ca^{2+} is high in formation brine. In this case, OP-10 can be substituted. The concentration of both surfactants should not exceed 0.4%.

We used cores taken from well QD3 (depth 3,105.0-3,141.5 m) and soaked them in drilling fluids (Formulation 1), with and without added 0.4% ABSN, for different lengths of time. We then measured the core permeability at displacement differential pressure of 0.4 MPa. Fig. 1 shows experimental results.

The results show that the permeability of cores soaked in drilling fluids with added 0.4% ABSN was relatively higher and the reduction in permeability was postponed, suggesting that adding ABSN to drilling fluids can effectively minimize the extent of water-blocking.

Optimizing curve of ideal packing TBA[1] PSD[2]

Fig. 3



[1]Temporary bridging agents. [2]Particle size diameter. [3]Temporary plugging agent.

Impact of film-forming agents on drilling fluids

Table 3

Test no.	Chemical types	AV/PV, mPa.sec	Gel, Pa/Pa	API,-Vf ml	HTHP-Vf, 140° C./ml
1	Formulation 1	30/22	1/5	7.2	28
2	1 + 2% CMJ-2	38/24	2/8	5.2	10
3	2/120° C., 16 hr	36/23	2/7	6.2	11
4	1 + 2% FLC2000	34/22	2/6	4.8	8
5	4/120° C., 16 hr	33/23	1/6	3.6	7.8

Selecting film-forming agents

Ultralow permeability drilling fluids composed of special polymers can form supermolecules and deposit a plugging film on the wellbore rock surface. This will pack pore throats and effectively prevent filtrates from entering the formation.[9] Fig. 2 illustrates the action principle of film-forming agents.

Film-forming technology depends predominantly on ultralow permeability film-forming agents. We selected FLC2000 and CMJ-2, for lab optimizing experiments. These two agents consist primarily of plant derivatives and water-soluble organic polymer and metal oxide compounds. They have relatively high temperature stability, are simple to maintain, and produce little environmental contamination.

Impact on drilling fluids

We added the two different film-forming agents to drilling fluids (Formulation 1) for 24 hr, let sit at 120° C. for 16 hr, then measured rheological properties (Table 3). The results indicate that relatively lower filtration can be achieved after adding the film-forming agents, with little impact on rheological parameters of drilling fluids.

Filtration of simulated rustless steel slot plats cores

Table 4

Test no.	Drilling fluid types	Initial/total loss, ml	Invasive depth, cm
1	Formulation 1	4/12	2.6
2	1 + 1% CMJ-2	0.8/3	1.6
3	1+ 1% FLC2000	0.5/2	1.0
4	1 + 2% CMJ-2	0.3/0.8	0.5
5	1 + 2% FLC 2000	0/0.3	0.2

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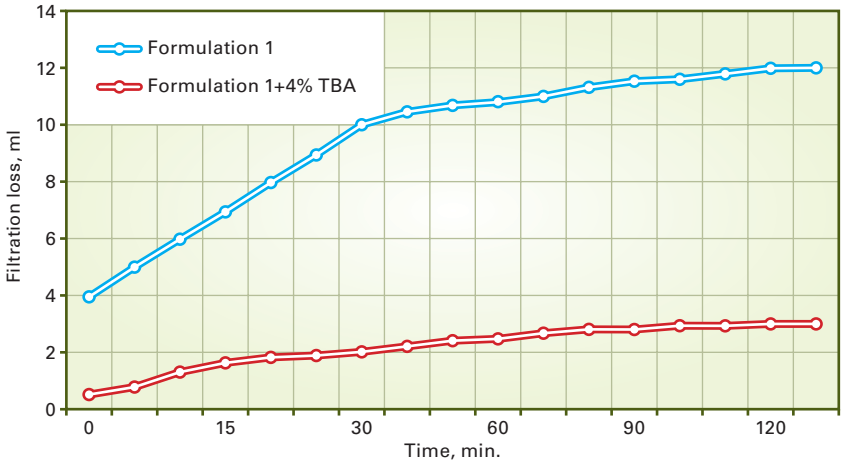
DYNAMIC LOSS, WITH AND WITHOUT TBA*

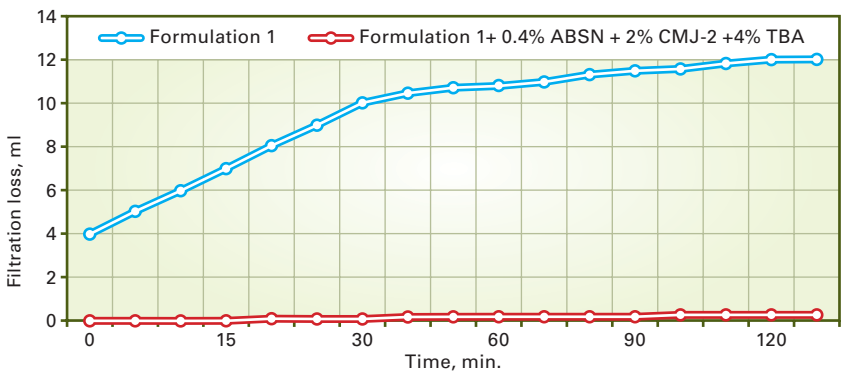
Fig. 4



*Temporary bridging agent.

DYNAMIC DAMAGE CURVE, LOW-DAMAGE DRILLING FLUIDS

Fig. 5



IDEAL PACKING TBA; IMPACT ON DRILLING FLUIDS*

Table 5

Rheological parameters		AV/PV, mPa·sec	YP, Pa	Gel, Pa/Pa	API-Vf, ml
Formulation 1	Room temp.	30.0/19	11.0	1.5/5	7.6
	120° C./16 hr	28.5/18	7.5	0.5/4	8.4
1 + 3% TBA	Room temp	33.5/22	11.5	2/6	6.4
	120° C./16 hr	31.0/21	10.0	1.5/5	7.2
1 + 4% TBA	Room temp.	37.5/24	13.5	2/8	5.4
	120° C./16 hr	35.0/22	13.0	2/7	5.8
1 + 5% TBA	Room temp.	47.0/28	19.0	3/11	4.6
	120° C./16 hr	43.0/25	18.0	3/12	5.6

*Density of formulation 1 is 1.20 gm/cc; the others are all 1.21 gm/cc; pH = 9 for all.

Filtration tests

In dynamic filtration tests, we simulated cores with rust-free steel slot plates (50 µm wide). The plates were set up in clamps of high-pressure, high temperature (HPHT) filtration apparatus and measured filtration change of drilling fluids over time at 90° C. (Table 4). Experimental data show that initial loss and total loss are nearly zero filtration.

Considering cost and transportation factors, we recommend a 2% concentration of CMJ-2 as the preferred film-forming agent in drilling fluids.

Selecting TBAs

Based on the relationship between the particle-size distribution of temporary bridging agents and size distribution of pore throats, we determined the D90 (largest pore throat) of TBA using the ideal packing theory (IPT) and the D90 rule.[7] We used corresponding matching software, considered shearing and abrasion of TBA in the annulus between drillstring and wellbore. Finally, we determined the ideal packing composition for a calcium carbonate-based TBA: 600 mesh (10%); 800 mesh (40%); 1,000 mesh (50%), as shown in Fig. 3.

We measured rheological parameters and dynamic loss of drilling fluids after adding the optimized TBA (Fig. 4, Table 5). The rheological parameters are reasonable and filtration is further reduced. The total loss falls to 4 ml from 12 ml. The initial instantaneous loss fell dramatically, illustrating that the introduction of the optimized TBA helped to protect the formation. We recommend a 4% concentration of this TBA in drilling fluids.

Formulation 2

Based on the optimized results, the new low-damage drilling fluids system (Formulation 2) is: 3% bentonite + 0.3% FA-367 + 0.6% JT-888 + 0.1% XY-27 + 1.5% SMP-1 + 1.5% SPNH + 0.4% ABSN + 2% CMJ-2 + 4% ideal packing TBA. Adding 0.5-1% oil-soluble resin can further improve temporary bridging effect.

Rheology

We evaluated the rheological properties of drilling fluids with and without weighting with $BaSO_4$ (Table 6). The experimental results indicate that the new drilling fluids system has good high-temperature stability. The API and HPHT loss is less than 5 ml (without $BaSO_4$) and 10 ml (with $BaSO_4$) and the frictional coefficient is less than 0.141. The lubrication and inhibition properties meet the requirements of drill-in fluids for low-permeability formations.

Compatibility with formation

To determine the compatibility of the new drilling fluids with forma-

Rheological properties of improved[1] drilling fluid

Table 6

Formulation	ρ, g/cc	AV	PV	YP, Pa	Gel, Pa/Pa	API-Vf, ml	HTHP-Vf, 140° C./ml	K_f[2]	Testing condition
		mPa.sec							
1		35	25	10	1/5	3.6	10		Room temperature
	1.07	32	14	8	2/6	4.0	8	0.125	120° C./16 hr
		28	19	9	1/4	4.8	12	0.131	140° C./16 hr
2		48	30	18	2/9	3.2	8		Room temperature
	1.23	46	28	18	3/8	3.5	7	0.137	120° C./16 hr
		42	22	20	2/7	4.2	10	0.141	140° C./16 hr

[1]Low-permeability amphoteric polymer. [2]K_f is the friction coefficient of mud cake.

tion rocks and fluids, we mixed 6-10 mesh rock cuttings with new drilling fluids, aged at 120° C. for 16 hr, then measured rock cuttings recovery. More than 99% was recovered after screening through 40 mesh, illustrating that the new drilling fluids have good compatibility with formation rock. Shape and size of rock cuttings exhibited no obvious change during above experiments.

We also mixed the drilling fluids with simulated formation brine in different proportions. There was no flocculation, chemical reaction, or precipitate formed, indicating good compatibility with formation brine.

Evaluating formation damage

We used a JHMF-2 dynamic damage experimental apparatus to examine cores taken from low-permeability target formation in well QD-3 (depth interval 3,105.0-3,141.5 m).

The experiment took place at simulated wellsite formation conditions, at a temperature of 90° C., contaminated differential pressure of 3.5 MPa, and shearing rate of 150 s^{-1}. Table 7 shows the experimental results.

Experimental results illustrated in Fig. 5 show that dynamic permeability recovery clearly improved and can reach 82.8% and 81.0%, respectively (wellsite drilling fluids formulation are 56.6% and 51.4%, respectively). After adding optimizing film-forming and ideal packing TBA to drilling fluids, the dynamic loss is low, initial fluid loss is nearly zero, and we achieved a good film-forming effect.

Results

Water blocking is the main damaging factor for low-permeability reservoirs, reducing permeability by 70% to 90%. Once damaged, formation permeability can rarely be recovered. Low-permeability formations with low pressure can be even more severely affected.

Main factors that cause water blocking include: core permeability, porosity, original water saturation, and oil-water interfacial tension, as well as lithology characteristics, types and content of cementing substances, pore structure, and properties of invasion fluids.

Dynamic damage of new log-damage drilling fluids

Table 7

Core no.	Ka, 10^{-3}μm²	K_{o1}, 10^{-3}μm²	K_{o2}, 10^{-3}μm²	K_{o2}/K_{o1}, %
3-1	11.27	6.60	4.54	82.8
3-2	8.03	4.26	3.45	81.0

New drilling fluids devised to cause minimal damage consist of ideal packing temporary bridging agents, film-forming agents, and water-blocking prevention surfactants. These fluids have many advantages over fluids used previously, including good compatibility with target formations, high permeability recovery, low filtration (nearly zero loss), small friction coefficient, and reasonable rheological parameters.

The new fluids prevent water-blocking, provide a good temporary plugging effect, and have ultralow permeability (API filtration ≤5 ml, HTHP filtration ≤10 ml, mud cake frictional coefficient ≤0.14, permeability recovery >81%). These fluids efficiently prevent or minimize damage, preserve natural formation characteristics, and enhance comprehensive development-investment effect in Tuha sandstone, a dense, Jurassic reservoir with low permeability. ✦

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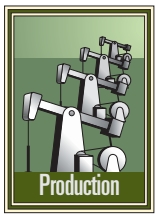
Rental units supplied power during Sakhalin-2 construction



During construction of Sakhalin-2 Phase 2 production facilities, rental units provided a wide range of flexible power systems, according to Aggreko PLC, provider of the units.

Aggreko says the units supplied power during construction, commissioning, tow, and offshore hookup of the LUN-A and the PA-B production platforms off the eastern coast of Russia.

The platforms are four-legged concrete gravity-base substructures (CGBS) with fully integrated decks and living quarters for more than 100 people.

Sakhalin Energy Investment Co. Ltd. (SEIC) is the operator for developing the Sakhalin-2 integrated oil and gas project. Partners in SEIC are Shell Sakhalin Holdings BV, 55%; Mitsui Sakhalin Holdings BV, 25%; and Diamond Gas Sakhalin BV, 20%.

Production from Phase 1 started in July 1999 from the PA-A gravity based Molikpaq platform (OGJ, Oct. 1, 2001, p. 58). Phase 1 produces oil from the Vityaz complex that consists of the Molikpaq production platform, a single anchor-leg mooring buoy, and the Okha floating storage and offloading unit.

Construction and commissioning of the Sakhalin-2 LUN-A platform required temporary power and safety packages (Fig. 1). Photo from Aggreko.

LUN-A temporary power

During construction of the 22,000-ton Lunskoye (LUN-A) topsides in South Korea, Samsung Heavy Industries (SHI) contracted the temporary power rental project to Aggreko. The project called for supplying a 7 Mw, 6.6-kv turnkey power generation system including a fire and gas detection and suppression system, winterization packages, and operation and maintenance of the packages.

Aggreko says it delivered temporary power and safety packages for the final phases of the platform's topsides construction and subsequent commissioning (Fig. 1). The company retained the power plant and fire and gas detection and suppression equipment for supplying security during the tow period and for the offshore power cable hookup that required reliable power supply.

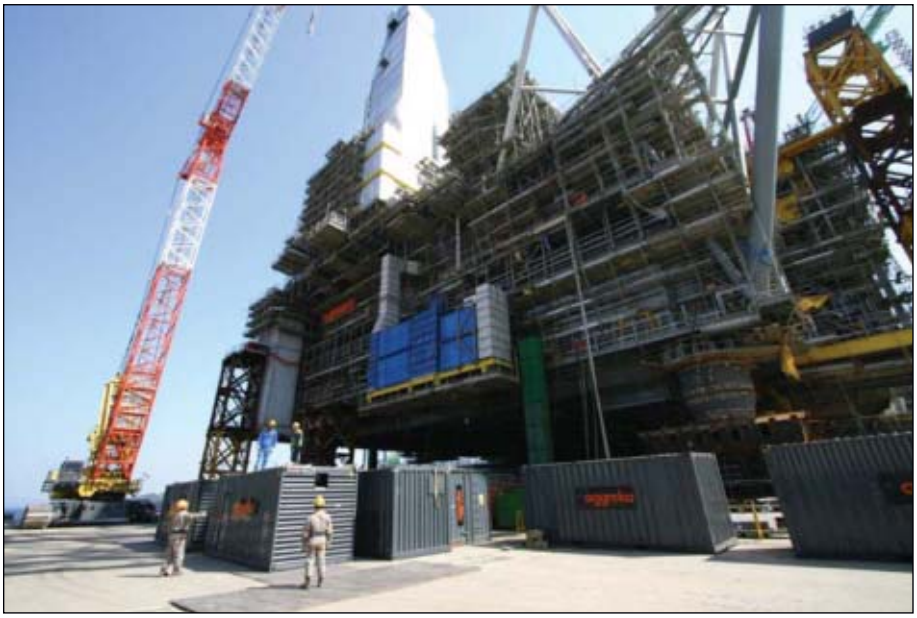
The LUN-A platform is in the Lunskoye gas and condensate field 15 km off the northeastern coast of Sakhalin Island, in 48 m of water. The platform is a drilling and production facility with minimum processing facilities. All oil-condensate and gas separation including gas treatment will be at an onshore processing facility on Sakhalin Island. After the facility separates the gas and condensate, pipelines will transport the fluids more than 800 km to an oil export terminal and Russia's first LNG plant at Prigorodnoye on the southern end of Sakhalin Island.

LUN-A has a designed capacity for producing 1.8 MMcfd of gas, 34,000 b/d of liquids and condensate, and 16,000 bo/d. The platform has 27 well slots.

SEIC installed the gravity base in 2005 and the topsides in June 2006. It expects production to start in November 2008.

PA-B temporary power

Aggreko says as with the LUN-A platform, the 28,000 ton PA-B drilling, processing, and production topsides for the Pilton-Astokhskoye field required a temporary 7 Mw, 6.6-kv turnkey power rental system for the latter stages of the platform's topsides construction and commissioning in the SHI yard (Fig. 2)



The PA-B topsides needed a turnkey power rental system for the latter stages of the platform's topsides construction and commissioning (Fig. 2). Photo from Aggreko.

as well as for the tow, power hookup, and commissioning phases offshore.

SEIC installed the 103,000-ton concrete base in July 4, 2005, with topsides installed in July 2007. It completed the hookup and commissioning in November 2007. SEIC expects production to start by yearend 2008.

Pilton-Astokhskoye field will produce from an oil reservoir with associated gas.

The PA-B platform is in 32 m of water, 13 km from the northeastern coast of Sakhalin Island. PA-B has a capacity to produce 70,000 bo/d and 92 MMcfd of gas.

Testing, commissioning

As well as Aggreko supplying the highly flexible temporary power packages, SHI awarded a contract to Aggreko for the testing and commissioning of the PA-B platform's own turbine generators.

Aggreko says this task required it to deliver a rental 30 Mw, 6.6-kv resistive reactive load-bank testing package to the SHI shipyard in Korea 3 months prior to the sail-away of the PA-B topsides.

It notes that the testing of the platform's turbine generators proved that the power equipment was in good condition and fully operable and ensured that the onboard power plant would deliver the power as needed.

The company adds that LUN-A topsides did not need the testing package because the platform will rely on a submarine cable for power.

Emergency power

Due to an emergency at the onshore processing facility's (OPF) power plant on Sakhalin Island, SEIC also contracted Aggreko to supply two 22.5 Mv-amp high-voltage transformers on a rental basis because during the commissioning of the OPF's permanent power plant's transformer system, a serious fault developed on both main turbine transformers.

The two transformers came from Aggreko's facility in Dubai and SEIC shipped the two 40-ton transformers from Dubai to Sakhalin Island onboard an Elusion 76 air cargo plane in two trips.

Aggreko says the emergency power project took a few days with the transformers delivered on a rental basis within 10 days of the emergency call. ✦

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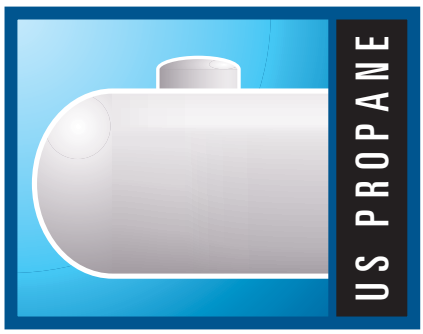
SECOND-THIRD QUARTERS 2008

Midyear inventory woes aggravated by hurricanes

Dan Lippe
Petral Worldwide Inc.
Houston



A strong sense of déjà vu pervaded Gulf Coast propane markets during third-quarter 2008, as comparisons of September 2008 with the hurricane season of 2005 abounded. But US propane markets also suffered from inventory accumulation rates during second quarter that fell below normal, as occurred in 2007.

The volume of propane in primary storage is an important element of supply for the winter heating season. This article discusses how markets will cope with lackluster propane inventory accumulation during second and third quarters.

Although landfall dates for Hurricanes Gustav and Ike were eerily similar to Katrina and Rita in 2005, August and September are the months of peak storm activity during the hurricane season. While Gustav and Ike traversed the Gulf of Mexico, they were substantially weaker than Katrina and Rita, both Category 5 storms at some point before making landfall.

Although all four storms came ashore in Louisiana or the Upper Texas Coast, the exact points of landfall in 2008 were significantly different from those in 2005. Katrina in 2005 moved ashore to the east of New Orleans, while Gustav in 2008 came ashore to the city's west. Hurricane Rita in 2005 made landfall at Port Arthur, Tex., just inside the Texas-Louisiana border; Ike in September 2008 came ashore over Galveston, Tex.

Katrina affected only those plants in southeast Louisiana (20% of US capacity), while Rita affected only those plants bounded by Beaumont, Port Arthur, and Orange in the west and by Lake Charles, La., in the east. These plants comprise 17% of US capacity.

Differences in landfall points for the storms of 2008 resulted in substantial differences in their impacts on the petrochemical industry. Gustav directly affected 20% of US capacity, while Ike directly affected 67% of total US ethylene capacity or more than three times the capacity at risk due to Gustav.

Feedstock demand

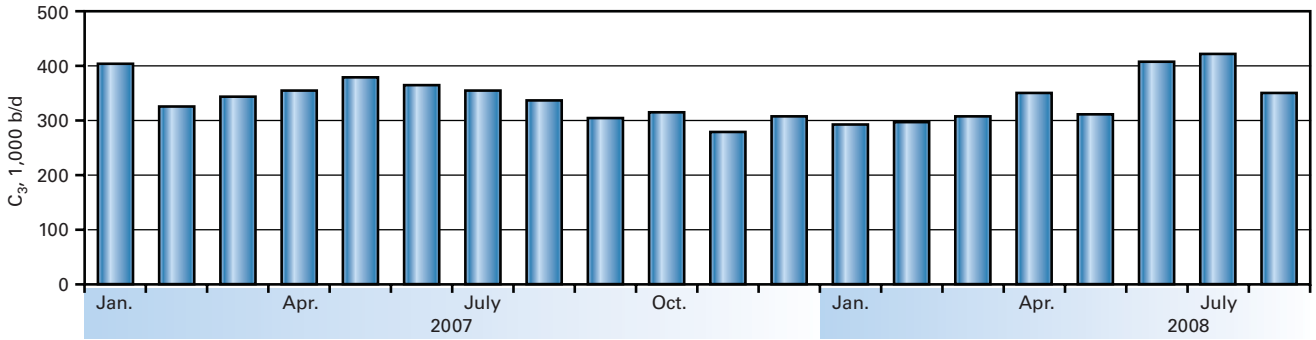
Typically, feedstock demand for propane rebounds during first quarter, when the winter heating season begins winding down. During winter 2007-08, however, inventories were 9 million bbl below the 3-year average at the beginning of the heating season. Furthermore, nearly all the inventory shortfall was concentrated in Mont Belvieu and was therefore a significant constraint on availability for the ethylene feedstock market.

As a result, feedstock demand for propane averaged 299,000 b/d during first-quarter 2008 and was unchanged from fourth-quarter 2007.

Propane feedstock demand is one of the most important balancing elements of the overall propane market in North America. When colder weather pushes sales and consumption in the retail markets steadily higher during November through February, ethylene producers in the Gulf Coast use their substantial feedstock flexibility to reduce their consumption of propane. This predictable shift in feedstock demand for propane offsets the impact of colder-than-normal winters, loss of production, or low inventories. Historically, most of the seasonal decline in ethylene feedstock demand has occurred during the fourth quarter.

ETHYLENE FEEDSTOCK DEMAND FOR PROPANE

Fig. 1



Source: Petral Worldwide Inc.

With warmer spring weather, retail propane demand fell sharply during second-quarter 2008 and availability for the feedstock market improved. Feedstock demand for propane averaged 357,000 b/d during second-quarter 2008. Demand in second-quarter 2008 was almost 60,000 b/d more than in the first quarter but 10,000 b/d less than in 2007.

Inventories (net of nonfuel propylene) were consistently less than the 3-year average during second-quarter 2008, but they were also consistently higher than in 2007. The year-to-year inventory surplus, however, narrowed to 700,000 bbl at the end of July from 4.2 million bbl at the end of May. The steady increase in ethylene feedstock demand for propane during March through July was one of the key reasons for the narrowing inventory surplus. Specifically, feedstock demand for propane averaged 408,000 b/d in June (1.3 million bbl more than in 2007) and 423,000 b/d in July (2.2 million bbl more than in 2007).

Feedstock demand for propane was higher than in 2007 because variable production costs for propane were 10-15¢/lb less expensive than for natural gasoline and light naphthas of similar quality.

Ethylene plants operated at 86% of nameplate capacity during second-quarter 2008 and 90% of capacity during July and August. Hurricanes Gustav and Ike caused extensive downtime for most ethylene plants on the Upper Texas and Louisiana Gulf Coast during September; some plants did not return to full operations until November.

As a result, feedstock demand curtailments in October and November offset supply losses due to downtime in gas plants and refineries. This factor was an important consideration for continued accumulation of propane inventories in Gulf Coast storage.

Ethylene plants will operate at 88-92% of nameplate capacity during fourth-quarter 2008 and first-quarter 2009. Total feedstock demand will average 1.60-1.65 million b/d during fourth-quarter 2008 and 1.65-1.70 million b/d during first-quarter 2008.

Consistent with typical seasonal patterns, however, propane consumption in the ethylene feedstock market will remain weak during fourth-quarter 2008 and average 275,000-290,000 b/d or about 15,000 b/d less than in 2007.

In first-quarter 2009, feedstock demand will average 240,000-260,000 b/d, or 55,000-65,000 b/d less than year-earlier volumes. The year-to-year decline in feedstock demand during fourth-quarter 2008 and first-quarter 2009 will offset the expected inventory deficit of 2-3 million bbl on Nov. 1. Fig. 1 illustrates historic trends in ethylene feedstock demand.

Retail demand

Consistent with the seasonal in heating degree-days, retail demand fell to its seasonal low during second and third quarters 2008. We estimate that total retail propane sales averaged 420,000 b/d in second-quarter 2008. In third-quarter 2008, we estimate that retail propane sales averaged 220,000-230,000 b/d vs. 205,000-215,000 b/d in third quarter 2007.

During a cold winter, retail propane sales will be 10-20% higher than during recent winters. The record high for retail propane sales occurred during winter 2000-01 and totaled an estimated 210 million bbl.

Propane supply-demand forecasts for winter 2008-09, however, are based on total retail sales of 170-185 million bbl. In comparison, retail sales totaled 174 million bbl during winter 2006-07 and 186 million bbl during winter 2007-08.

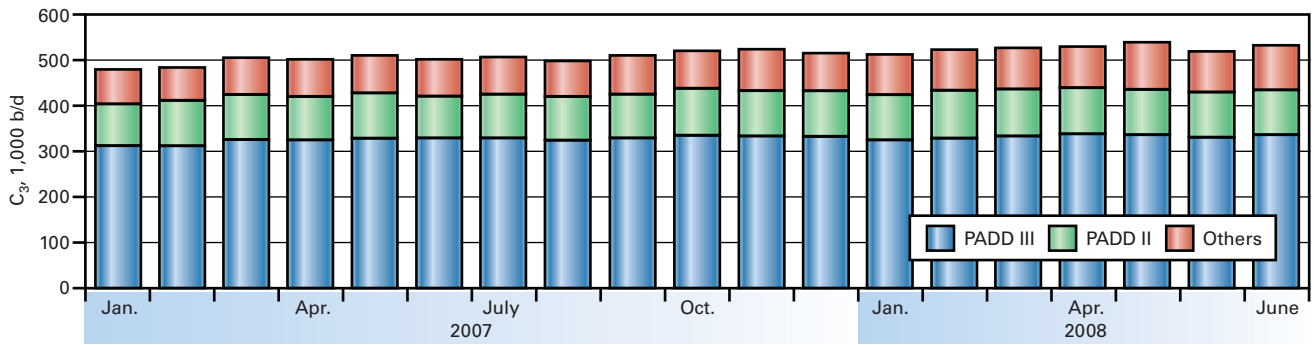
Propane supply

Gas processors continued to experience strong profit margins in all producing regions during second and third quarters 2008. Furthermore, propane prices were consistently 40-60¢/gal higher than their btu equivalent based on spot natural gas prices in the Houston Ship Channel market—indicating

Propane's use as a space-heating fuel in the residential-commercial market reaches its seasonal peak each year during December and January but begins to decline in February and falls to its seasonal minimum during the summer.

US GAS PLANT PROPANE PRODUCTION

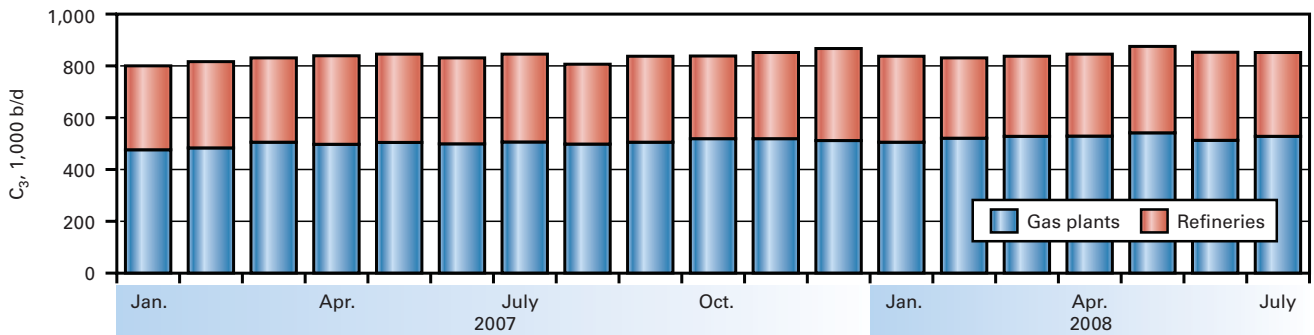
Fig. 2



Source: US Energy Information Administration

TOTAL US PROPANE PRODUCTION

Fig. 3



Source: US Energy Information Administration

that refineries had no economic incentive to use propane instead of natural gas in their fuel systems.

Strong profitability for all gas processing plants and economic incentives for refineries lead to the conclusion that US propane production was at full recovery for both gas plants and refineries.

Based on data published by the US Energy Information Administration, total production from gas plants and net propane production from refineries averaged 835,000 b/d during first-quarter 2008 (19,000 b/d higher than year-earlier volumes) and 857,000 b/d during second-quarter 2008 (16,000 b/d higher than year-earlier volumes).

Gas plants

EIA statistics show gas plant propane production averaged 530,000 b/d for second-quarter 2008 and was an estimated 525,000-535,000 b/d during July and August. Disruptions to gas processing operations in Louisiana in September and estimated production losses show that gas plant production declined to 485,000-495,000 b/d in September and averaged 510,000-520,000 b/d for third-quarter 2008.

Gas plant production in Louisiana will gradually improve during fourth quarter but remain below full recovery until February or March 2009. As a result, production in fourth-quarter 2008 will average 510,000-520,000 b/d or 5,000-10,000 b/d lower than year-earlier volumes. Fig. 2 illustrates trends in propane production from gas plants.

Refineries

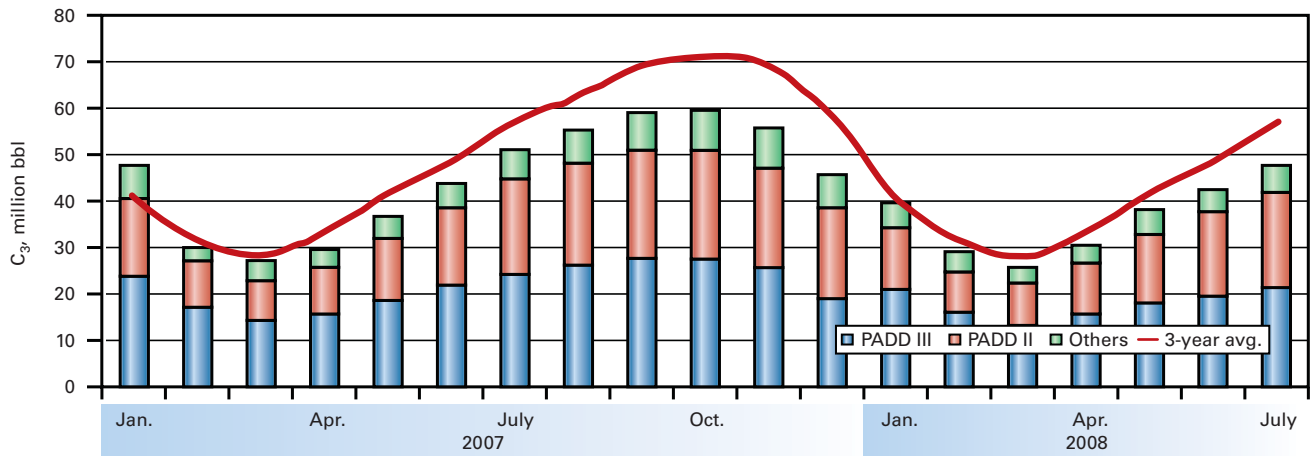
In second-quarter 2008, propane production from refineries (net of propylene for propylene chemicals markets) averaged 327,000 b/d. Net refinery production was 10,000 b/d greater than in first-quarter 2008 but declined by 10,000 b/d from year-earlier volumes, according to EIA statistics.

As with gas plant production, net supply from refineries was 320,000-330,000 b/d in July (EIA actual statistics) and August (estimated) but dropped sharply in September and was an estimated 240,000-250,000 b/d. For third-quarter 2008, propane supply from refineries averaged 290,000-310,000 b/d in third-quarter 2008 and will average 310,000-330,000 b/d in fourth-quarter 2008.

The projected decline in production in fourth quarter is consistent with general seasonal trends and also accounts for lingering hurricane-related problems at a few refineries in the Upper Texas Coast. Fig. 3 shows trends in total propane production (gas plants and refineries).

US PROPANE INVENTORY

Fig. 4



Source: US Energy Information Administration

Imports

Based on data from the US Census Bureau's Foreign Trade Division, propane imports from Canada declined in second-quarter 2008, consistent with normal seasonal patterns, and averaged 78,000 b/d. Imports were 3,000 b/d higher than in second-quarter 2007 but were 22,000 b/d lower than the average for 2000-05.

Propane imports from Canada increased to an estimated 95,000-105,000 b/d in third-quarter 2008. The increase in receipts from Canada during third quarter was consistent with historic seasonal patterns.

Contrary to seasonal supply trends, waterborne imports declined in second-quarter 2008 and averaged only 32,000 b/d, as reported by the Foreign Trade Division. Waterborne imports were 46,000 b/d less than year-earlier volumes. International propane imports averaged an estimated 70,000-80,000 b/d during third-quarter 2008 and were equal to receipts during third-quarter 2007 but were 45,000 b/d lower than the average for 2002-06. The year-to-year decline in waterborne imports during second and third quarters totaled 4.2 million bbl.

Overall inventory trends

Mar. 31 normally marks the end of the inventory liquidation season for the US. Occasionally, propane inventories continue to decline during April if temperatures are below average.

According to EIA weekly statistics, propane inventories fell to a seasonal low at the end of March 2008 and began to increase during the first week of April. EIA monthly statistics show that total inventories (including propylene for nonfuel uses) totaled 25.6 million bbl on Apr. 1. Inventories were equal to the 3-year average but were 1.4 million bbl lower than year-earlier volumes.

During 2003-06, the seasonal accumulation of propane in primary storage ranged consistently 40-45 million bbl. The seasonal inventory build, however, totaled only 31.7 million bbl in 2002 and 34.0 million bbl in 2007.

For 2008, based on EIA's monthly statistics through July and weekly statistics for August and September, the seasonal inventory build (net of nonfuel propylene) totaled 32.2 million bbl and inventories totaled 55-57 million bbl on Oct. 1, 2008, and reached 57-58 million bbl on Nov. 1, 2008.

Including Canadian inventories in underground storage, propane markets will have access to 71-72 million bbl of supply in primary storage during the winter heating season. These volumes were equal to inventories in 2007 but 15 million bbl less than in 2006.

At the end of the 2006-07 winter heating season, purity propane inventories in underground storage in Canada fell to a low of 1.9 million bbl on Mar. 1, 2007. At this level, purity propane inventories were 1.5 million bbl below the 5-year average and 2.5 million bbl lower than in 2006.

Based on statistics from Canada's National Energy Board, Canadian companies added 7.5 million bbl of propane during Mar. 1 through Sept. 1, 2007. The seasonal build in Canadian storage erased nearly all the inventory deficit on Mar. 1, 2007. Fig. 4 shows trends in US propane inventories.

During 2002-06, total withdrawals of propane from primary storage were 39-49 million bbl. For the 2007-08 winter heating season, however, withdrawals totaled only 35.9 million bbl and inventories fell 23.6 million bbl. If the 2008-09 winter heating season is similar to winter of the past 5 years, inventories will be adequate to meet retail demand but only if ethylene feedstock demand is weak in fourth-quarter 2008 and declines further during first-quarter 2009. Inventories will fall to a low of 23-24 million bbl on Mar. 31, 2009, but could easily fall as low as 20-21 million bbl.

Regional inventory trends

On Mar. 1, 2008, propane inventory in primary storage in US Petroleum

Administration for Defense District (PADD) II fell to a low of 8.65 million bbl, or 1.4 million bbl below year-earlier levels but equal to the seasonal minimum of 2007 (Apr. 1, 2007).[1] During second-quarter 2008, inventory in primary storage in PADD II increased by 8.8 million bbl and totaled 17.8 million bbl on July 1.

At this level, inventories were 1.2 million bbl higher than in 2007 but were 1.4 million bbl below the 2002-06 average. During third-quarter 2008, inventories increased by an additional 6-7 million bbl and totaled 24-25 million bbl on Oct. 1. The cumulative inventory build during second and third quarters 2008 was 1.6 million bbl higher than average.

According to EIA monthly statistics, propane inventory in primary storage in PADD III (net of nonfuel propylene) totaled 11.4 million bbl on Apr. 1, 2008, and was equal to year-earlier levels but was 0.65 million bbl less than the average for 2005-07. During second-quarter 2008, propane inventory in primary storage in PADD III increased by 7.7 million bbl vs. 6.5 million bbl in 2007.

In 2005, however, PADD III inventories increased by 14.0 million bbl during second quarter. The volume of waterborne imports during second-quarter 2008 was similar to receipts in 2006 but was far less than receipts during second-quarter 2005.

In most markets, trends in crude oil prices determine propane's competitive ethylene feedstock parity value as an alternative for light naphthas. Propane prices typically move in tandem with feedstock parity values vs. light naphthas.

On Oct. 1, inventories in PADD III (net of nonfuel propylene) totaled 24.5-25.5 million bbl and were 0.6 million bbl below the year earlier level. Inventories declined to 23-24 million bbl on Nov. 1 and were 4.5 million bbl lower than in 2007.

Pricing, economics

During second-quarter 2008, propane prices in Mont Belvieu increased to an average of 181.9¢/gal in June from 159.0¢/gal in April. Despite the increase in spot prices of 23¢/gal, propane's ratio vs. West Texas Intermediate declined to 57.0% in June 2008 vs. 59.3% in April 2008. These comparisons indicate that spot prices in Mont Belvieu did not keep pace with the $21.30/bbl increase in monthly average prices for WTI crude oil during second-quarter 2008.

Although hurricane season began on June 1 with forecasts for an active season, WTI prices fell sharply beginning in mid July and averaged $116.58/bbl in August and $104.47/bbl in September. Propane prices fell more slowly than WTI prices during third-quarter 2008 and the ratio averaged 61.0% in September vs. 58.0% in July.

Prices averaged 152.5¢/gal in September or nearly 30¢/gal less than in June but were 23¢/gal higher than year-earlier levels. Propane retailers were probably much less impressed with the declining trend in the propane/WTI ratio than they were dismayed by the year-to-year increase in spot prices.

Parity values

During second-quarter 2008, spot prices in Mont Belvieu aver-

In view of the ethylene industry's capability to adjust its consumption of propane within 1-2 months, propane prices vs. alternative ethylene feedstock values are better measures of the relative strength or weakness in spot prices in Mont Belvieu.

aged 170.2¢/gal, while the range of propane's feedstock parity values was 166¢/gal vs. ethane and 198¢/gal vs. natural gasoline. By these measures, propane prices were strong relative to ethane (166¢/gal) but weak relative to natural gasoline (198¢/gal) during second-quarter 2008.

During third-quarter 2008, however, spot prices in Mont Belvieu averaged 167.8¢/gal but feedstock parity values averaged 167.2¢/gal vs. ethane and 182.1¢/gal vs. natural gasoline. Based on these comparisons, propane prices were neutral vs. ethane but remained weak relative to natural gasoline during third-quarter 2008.

2008-09 winter prices

The sharp decline in WTI prices during third-quarter 2008 may well signal the end of the 4-year bullish trend for crude oil prices. Traders now seem more concerned about the fallout of the financial crisis and the continuing decline in gasoline demand and have little concern about the threat of supply disruptions.

Crude oil inventories, however, remain at the lower end of the historic range and gasoline inventories fell to record low levels at the end of September. If the financial crisis has caused traders to have an overly bearish view of the true trends in the US economy, prices may well rebound sharply in first or second quarter 2009. For fourth-quarter 2008 and first-quarter 2009, however, price forecasts for propane are based on WTI prices of $95-105/bbl.

Based on price forecasts for competing feedstocks and coproducts, propane's feedstock parity values will be in the range of 135-160¢/gal in fourth-quarter 2008 and 130-150¢/gal in first-quarter 2009. Propane prices will average 145-155¢/gal during the winter heating season 2008-09.

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1. http://www.eia.doe.gov/pub/oil_gas/petroleum/analysis_publications/oil_market_basics/paddmap.htm.

The author

Daniel L. Lippe (danlippe@petral.com) is president of Petral-Worldwide Inc., Houston. He founded Petral Consulting Co. in 1988 and cofounded Petral Worldwide in 1993. He has expertise in economic analysis of a broad spectrum of petroleum products including crude oil and refined products, natural gas, natural gas liquids, other ethylene feedstocks, and primary petrochemicals. Lippe began his professional career in 1974 with Diamond Shamrock Chemical Co., moved into professional consulting in 1979, and has served petroleum, midstream, and petrochemical industry clients since that time. He holds a BS (1974) in chemical engineering from Texas A&M University and an MBA (1981) from Houston Baptist University. He is an active member of the Gas Processors Association, serving on the NGL Market Information Committee and currently serving as vice-chairman of the committee.

NELSON-FARRAR COST INDEXES

Refinery construction (1946 Basis)
(Explained on p.145 of the Dec. 30, 1985, issue)

	1962	1980	2005	2006	2007	July 2007	June 2008	July 2008
Pumps, compressors, etc.	222.5	777.3	1,685.5	1,758.2	1,844.4	1,846.5	1,938.2	1,959.0
Electrical machinery	189.5	394.7	513.6	520.2	517.3	517.3	515.9	517.3
Internal-comb. engines	183.4	512.6	931.1	959.7	974.6	974.5	984.6	990.9
Instruments	214.8	587.3	1,108.0	1,166.0	1,267.9	1,272.4	1,341.5	1,342.4
Heat exchangers	183.6	618.7	1,072.3	1,162.7	1,342.2	1,374.7	1,374.7	1,374.7
Misc. equip. average	198.8	578.1	1,062.1	1,113.3	1,189.3	1,197.1	1,231.0	1,236.9
Materials component	205.9	629.2	1,179.8	1,273.5	1,364.8	1,368.2	1,727.6	1,768.3
Labor component	258.8	951.9	2,411.6	2,497.8	2,601.4	2,596.4	2,674.3	2,681.2
Refinery (Inflation) Index	237.6	822.8	1,918.8	2,008.1	2,106.7	2,105.1	2,295.6	2,316.0

Refinery operating (1956 Basis)
(Explained on p.145 of the Dec. 30, 1985, issue)

	1962	1980	2005	2006	2007	July 2007	June 2008	July 2008
Fuel cost	100.9	810.5	1,360.2	1,569.0	1,530.7	1,537.9	2,587.4	2,800.5
Labor cost	93.9	200.5	201.9	204.2	215.8	207.1	228.6	238.0
Wages	123.9	439.9	1,007.4	1,015.4	1,042.8	1,025.8	1,104.2	1,130.3
Productivity	131.8	226.3	501.1	497.5	483.4	495.2	483.0	475.0
Invest., maint., etc.	121.7	324.8	716.0	743.7	777.4	776.8	847.1	854.6
Chemical costs	96.7	229.2	310.5	365.4	385.9	396.2	489.3	531.8
Operating indexes								
Refinery	103.7	312.7	542.1	579.0	596.5	594.6	736.5	766.4
Process units*	103.6	457.5	787.2	870.7	872.6	872.3	1,270.6	1,350.7

**Add separate index(es) for chemicals, if any are used. See current Quarterly Costimating, first issue, months of January, April, July, and October.*

These indexes are published in the first issue of each month. They are compiled by Gary Farrar, Journal Contributing Editor.

Indexes of selected individual items of equipment and materials are also published on the Costimating page in the first issue of the months of January, April, July, and October.

Altex CEO guides newbuild sands crude transport project

Christopher E. Smith
Pipeline Editor

Altex CEO and Pres. Jack Crawford, as one of the principals in the Alliance Pipeline project, is familiar with the problems accompanying large new infrastructure projects such as the Altex Pipeline.

Most of the transportation projects focused on moving sands production south include conversion or repurposing of existing infrastructure to bridge at least a large portion of the gap between Alberta and the US Gulf Coast. TransCanada's Keystone and Enbridge's various proposals—Texas Access, Trailbreaker, and it's most recent partnership with BP—all fall into this category.

Altex Pipeline

Altex Energy, however, is pursuing a completely newbuild 36-in. pipeline running directly from northern Alberta to the US Gulf Coast (see figure). The line's initial capacity will be 425,000 b/d, but the company says expansion to 1 million b/d is possible as demand warrants.

The Alliance Pipeline project was a newbuild line that brought then-isolated natural gas from northeastern British Columbia and northwestern Alberta to the also newbuild Aux Sable gas processing plant near Chicago.

The partnership behind the Alliance Pipeline was officially formed in May 1996 and the line entered service Dec. 1, 2000. Altex has a similar 4-5 year development time line planned. Despite having been announced in October 2005, however, it has yet to begin formal permitting and other processes associated with eventual construction.

"The difficulty is, we're not going to kick off major project work until we have a firm customer base with signed contracts," explains Crawford. "And the difficulty with that of course is, we're asking customers to sign long-term ship-or-pay types of contracts, which end up being a drag on their balance sheets. So they're not going to do that until they're ready."

The pipeline's roughly 4-year development time cycle runs beyond the 3-year window of typical oil sands production projects from the time of sanctioning to the beginning of production. This time line essentially requires prospective customers to sign up for transportation a year before those customers have sanctioned their own projects.

Even so, oil sands producers are typically more willing to enter into long-term shipping agreements than producers in other areas, according to Crawford, because they believe their projects will be producing for 30, 35, or more years and the customary exploration and development risk isn't really there.

Huge capital commitments, however, are present and have proven problematic to a number of oil sands' production projects. The scope of activity going on around Fort McMurray, Alta., has created a shortage of labor, driven costs up, and slowed projects, says Crawford.

Crawford recognizes that the current economy and crisis in the financial sector has the potential to create at least a pause in demand growth, if not an actual reduction in demand. He believes, however, that its ultimate effect will be limited on both the Altex Pipeline and sands projects in general

"It won't surprise me if there's a 1 or 2% drop in demand" at some time, says Crawford. He believes potential problems associated with the two primary heavy crude suppliers to the US Gulf Coast—Mexico and Venezuela—will outweigh any small overall demand dip for projects such as his.

POINT OF VIEW

"Mayan production in Mexico has declined precipitously, and there's no readily available means to bring it back up," Crawford says. "Venezuela's production capacity could probably do the trick, but you've got two other things going on there, both politically driven. [Venezuelan President Hugo] Chavez basically kicked out the foreign oil companies and confiscated their property. So even if this were to change, they're not likely to go charging back. And [Venezuela] has announced a bunch of deals with China, which if I remember correctly would raise their current claimed heavy crude exports to China of 300,000 b/d to 1 million b/d in 3-4 years. Given the lack of investment to bring production up, it's basically got to come out of their current supply."

Crawford also acknowledges the slowdown in sands development has already affected the Altex Pipeline, moving what was initially a 2010-11 start-up target to 2014.

Shortly after its announcement, Altex considered the viability of stopping in other markets between Alberta and the US Gulf Coast, looking particularly at Billings, Wyoming, and Denver. These three were eventually decided against as uneconomical, but the line's route will carry it close enough to Cushing to make a potential stop there at least still possible.

Preliminary routing decisions on river crossings and other difficult stretches of line have already been done, with fine-grain planning next.

Transport costs

Altex claims its finished system will offer total transport costs (TTC) 50-65% lower than those of competing systems, either existing or planned. The pipeline will use conventional line technology, keeping capital costs similar to other projects and allowing for competitive tolling costs. What brings real savings to the system, according to Altex, is its patent-pending Thermo-LEVR diluent, the relatively small commodity value loss of which allows for the dramatic TTC savings.

Crawford acknowledges the line will run at a somewhat elevated temperature, but not to a degree that it would bring costs out of the conventional realm.

The Thermo-LEVR itself will be either removed at the Altex terminus and replaced by conventional diluent for shipment to facilities, or left in the stream and removed by the consumer. Crawford says Altex expects at least some of the refiners will pursue the latter course, custom-blending their batches to match their plants.

The Altex terminus will include new facilities built near Port Arthur, Tex., but will also take advantage of existing terminals in the area for ease of transport to final customers.

Thermo-LEVR will not be recycled or returned upstream once removed but will instead be marketed locally, according to Crawford. Crawford declined to comment on what sort of product it would be sold as. He did, however, voice the expectation of "a large and liquid market" for the material. More details regarding its nature will emerge "as appropriate, likely during open season, public consultation, and regulatory phases," said Crawford.

Altex has also received inquiries from abroad regarding purchasing batches of Thermo-LEVR for use as a diluent, according to Crawford, which the company will likely pursue once patents have been granted.

Chicken, egg

In the meantime, however, development of the Altex Pipeline remains in slow motion, hampered by the previously mentioned need to secure shippers at the same time regulatory approvals are also needed if further headway is to be made. Crawford says work is currently under way to resolve these issues contractually with the prospective shippers.

Altex is in active discussions with five prospective shippers. Crawford adds, "there are four or five more players rethinking their whole plans," and discussions will begin with at least some of them shortly. "But the existing group is certainly capable of making the line go, even without additional interest," at the initial planned capacity of 425,000 b/d.

In comparing the Alliance and Altex projects, Crawford sees the largest difference in the commercial pressures of the two projects. Alliance required nearly full participation from the natural gas shippers in the region because

PROPOSED ALTEX PIPELINE

Fig. 1

Career highlights

Jack Crawford is president and chief executive officer of Altex Energy Ltd., an energy infrastructure company formed in 2005.

Employment

Prior to forming Altex, Crawford spent 10 years developing, building, and operating the Alliance Pipeline System. From 1996 to 2000, he served as vice-president, public, government, and regulatory affairs, for Alliance Pipeline and Aux Sable Liquid Products.

In 2001, he assumed the position of executive vice-president and chief operating officer for the two Alliance Pipeline partnerships, a position he held until the end of 2004. Crawford's career spans more than 30 years and includes stints in pipeline engineering, project engineering, regulatory work, project development, and marketing.

Education

Crawford holds a BS in mechanical engineering and an MBA, both from the University of Calgary. He is a professional engineer registered in the province of Alberta. He sits on the board of the Calgary Philharmonic Orchestra and is a member of the Engineering Associates program at the Schulich School of Engineering, University of Calgary.

"if you ended up with surplus capacity, that capacity was going to be marketed at less than full cost, and anybody holding that capacity was effectively holding a devalued asset. We ended up with something like 37 shippers when Alliance entered service."

Alliance reached an understanding with its shippers that by signing up for something that might be "slightly out of the market cost-wise for a small portion of their production, the rest of their production would benefit from a lift in prices in the basin" by virtue of being able to get the gas to market.

With Altex by contrast, "because we think we can soundly beat the competition from the price perspective, we don't need every producer in the basin," says Crawford.

Looking beyond his current project at the health of the industry in general, Crawford is fairly bullish on oil prices and cautiously optimistic regarding the steel and labor markets.

"I don't think we'll see a sustained drop below $100/bbl crude and I do think we'll see a fair bit of volatility. But I don't think there's enough $80 oil in the ground to sustain this market. The marginal cost will have to be above that and I think it will remain closer to $100/bbl."

The big question regarding steel and labor costs is what happens with the economy, says Crawford. "We have seen some softening in steel prices lately, as well as increased steel-making and pipe-making capacity. I think it remains an open question as to whether this will moderate prices of the materials and labor required to build a pipeline.

"It also depends on what else is going on. If you get the Alaska pipeline, and the Mackenzie Valley pipeline, and all of the connections occurring to bring the shale plays to market, you'll have a pretty intensive market in which you probably won't see much softening. But if these projects slow down and things back up a little bit, prices could come off." ✦

Cameron,

Houston, has acquired Guiberson Well Service System from Weatherford International Ltd. Terms aren't disclosed. Guiberson is a market leader in well service equipment, such as casing and tubing swabs and replacement swab cups, casing and tubing overload relief valves, wireline oil savers and tubing strippers, tubing spiders, rod BOPs, and wing nut unions. Cameron will sell Guiberson products through its Drilling & Production Systems Group, which manufactures a range of oil field elastomer products for drilling and production applications, as well as a line of products and services for artificial lift. Guiberson was previously an operating unit under Weatherford's Artificial Lift Systems Group.

Cameron is a leading provider of flow equipment products, systems, and services to worldwide oil, gas, and process industries.

ABS,

Houston, has appointed Rear Admiral Craig E. Bone to the newly created position of vice-president, corporate programs. Upon his retirement from the US Coast Guard after more than 30 years of service, Bone will be based in ABS's executive office in Paramus, NJ. He will assume responsibility for coordinating the wide range of environmental initiatives currently being undertaken by ABS to assist clients in dealing with significant new regulatory challenges and their need to identify operating efficiencies that also contribute to a reduced environmental footprint. He will assume overall responsibility for extending the growing portfolio of ABS training services and will work on specific operating initiatives and the development of client relations. Previously, Bone was commander of the 11th CG District on the Pacific Coast. He is the former assistant commandant for prevention, directing the agency's policy and programs for port, vessel, and facility maritime safety and security management. He has led the US delegation to the IMO and spearheaded the development of the US Department of Homeland Security's first all-hazards, risk-based decision-making model. Bone has masters' degrees in information systems technology and in national resource strategy, in addition to a marine science and oceanography degree.


Bone

ABS is a leading international classification society devoted to promoting the security of life, property, and the marine environment through the development and verification of standards for the design, construction, and operational maintenance of marine-related facilities.

PAS Technologies Inc.,

Kansas City, Mo., has announced that its joint venture company Asian Surface Technologies Ltd. (AST) entered into a new, multiyear agreement with Valve Components Ltd. (VCL) to provide a turnkey onsite facility for industrial coating and finishing of oil field components. The agreement includes plans for AST to establish a facility within the VCL Malaysia facility located at Kuala Lumpur. The entity will be known as AST Malaysia Sdn. Bhd. The new plant will supply industrial coatings, maintenance, and fabrication services work and finishing for gate valve components manufactured, processed, or repaired in the VCL Malaysia operations. It further strengthens AST's capability to provide highly reliable service in the Far East. AST will facilitate and operate the state-of-the-art coatings facility for start-up in 2009. AST is a Singapore-based JV of PAS, SIA Engineering Co., and Pratt & Whitney. The company provides high-performance surface coatings and finishing for oil field and aviation OEM components.

In addition, PAS Technologies and Lambda Technologies have signed a memorandum of understanding (MOU) focused on the marketing, R&D, and production of Lambda's Low Plasticity Burnishing (LPB) proprietary process as an integral element of the maintenance, repair ,and overhaul operations within the PAS Technologies' capabilities arena. The MOU includes Lambda's agreement to license PAS Technologies for the proprietary technology to perform the LPB process for the component repair applications implemented into production by PAS Technologies and includes product and market development of the oil field, military, and industrial power generation markets.

Lambda Technologies incorporates a premier materials research laboratory with a world-class engineering and production enterprise dedicated to the development and optimization of surface treatments to improve component performance.

PAS provides repair and overhaul solutions for the oil field, aerospace, and industrial markets. It services a broad range of components, including gas turbine engines, critical airframe parts, and gates and seats used in oil fields.

PBV Valve,

Houston, a subsidiary of Stafford-based Global Flow Technologies (GFT), has received the University of Houston's College of Technology Texas Manufacturing Assistance Center Gulf Coast (TMACGC) Excellence in Manufacturing Award. The award recognizes the company's dedication to providing improved products and services to its clients in the petrochemical industry, power generation, refining, transportation, chemical distribution, and oil and gas production industries. Recent consultation by TMACGC about lean manufacturing and the 5S Kaizen method helped PBV Valve reduce its lead times and work-in-progress inventory. PBV estimated that TMACGC consultation services helped increase its sales by $3 million.

GFT provides valve, actuators, and related services to the global oil and gas, petrochemical, power, biofuels, and other industries.

TMACGC is one of the partner institutions in the Texas Manufacturing Assistance Center, an affiliate of the Manufacturing Extension Partnership program of the National Institute of Standards and Technology.

Louis Capital Markets,

New York City, has appointed Edward L. Morse managing director and head of economic research. He joins the firm from Lehman Bros., where he was managing director and head of commodities research since 2006. Also at Lehman, he built a world-class research team as part of the No. 1-ranked fixed income research group and participated in the buildout of Lehman's global commodities trading platform. Morse received widespread publicity this year for forecasting the rapid demand destruction caused by high com-

Services / Suppliers

modities prices as well as for analyzing the bubble-like characteristics of the rise in oil prices toward $150/bbl. A leading analyst of the international oil and gas sector, Morse's career in energy spans 3 decades and includes senior positions in business, government, academia, and publishing. Before joining Lehman, Morse spent 7 years at Hess Energy Trading Co. LLC, providing strategic advice to the firm and clients on oil and natural gas market trends. For a decade before then he served as publisher of Petroleum Intelligence Weekly and other industry newsletters published by the Energy Intelligence Group, where he had been CEO. Morse received his Ph.D. from Princeton University, where he taught for 6 years before joining the senior research staff at the Council on Foreign Relations. During the Carter and Reagan administrations, Morse held various positions in the Department of State, including deputy assistant secretary for international energy policy. He also held a management position with the former Phillips Petroleum and was cofounder of PFC Energy, a Washington, DC, energy consultancy.

LCM Group is a global independent broker-dealer providing execution, sales, trading, and research services in cash equities, equity derivatives, commodities, foreign exchange, and fixed income. The firm has offices in New York, London, Paris, and Hong Kong and will soon open in Houston. LCM focuses exclusively on commodity and commodity-related markets, with a special emphasis on swaps, options, and exotics in crude oil, petroleum products, and natural gas.

Petris Technology Inc.,

Houston, has formed a strategic partnership with Warrior Technology Services Inc. Petris will be an OEM reseller of Warrior's risk management software solution, UnRiskIT. The reselling agreement allows for the embedding of UnRiskIT into Petris's own solutions, as well as for Petris to sell UnRiskIT on a standalone basis. Integrating the software solutions is intended to help customers limit nonproductive time and its associated costs during drilling. It allows operators to update scenarios while drilling to evaluate changes to the risk profile and forecasted time/cost estimates. Petris offers software coupled with focused professional services to oil and gas and pipeline companies.

Duoline Technologies,

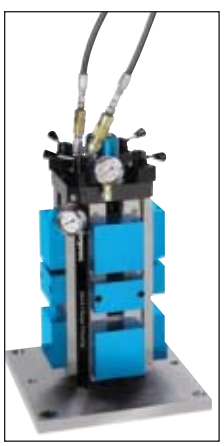
Odessa, Tex., has appointed Smittee Root marketing manager. Root will oversee marketing activities for Duoline products. She has a BBA from the University of Texas at Tyler and more than 7 years' experience in manufacturing and more than 10 years in marketing.


Root

Duoline is an industry leader in solving oil field corrosion problems through innovative products that entail inserting a liner through a process that secures a corrosion-resistant material such as glass-reinforced epoxy or PVC inside steel pipe, thereby protecting steel tubulars by isolating corrosive oil field fluids and gases.

Equipment / Software / Literature

New hydraulic vise column features patented coupling



This new hydraulic vise column features a patented swivel coupling that promises to save operator time by eliminating the need to disconnect and reconnect the two hydraulic hoses as the column rotates. Each vise can be independently operated to unload and load parts quickly. The compact rotary coupling does not interfere with tooling.

The company says that hydraulic power provides a fast, repeatable action that helps ensure consistent clamping force, up to 4,700 lb of clamping capacity, without the variability due to operator fatigue. The hydraulics help ensure consistent, repeatable clamping force. The operator opens the hydraulic valve to open the jaws to unload and load parts quickly.

The unit comes with 4 in. and 6 in. jaw sizes and in three-sided or four-sided configurations. The stand-alone design can be retrofitted in the field.

All vises include machinable, reversible jaws; hardened and ground steel rails; flow-through base; and fully sealed lead screw assembly.

Source: **Jergens Inc.,** Jergens Way, 15700 S. Waterloo Rd., Cleveland, OH 44110-3898.

New two-wire Coriolis meter

A new two-wire Micro Motion Coriolis meter expands the value of Coriolis to the range of refinery, chemical, and petrochemical processing applications that require loop-powered flow devices. The new units are especially suited for upgrading older loop-powered technologies to ELITE Coriolis meters without adding more power or installing new cabling.

The new meter delivers +0.10% liquid flow and +0.0005 g/cc liquid density accuracy in continuous process and mass balance applications. It has no moving parts and requires no maintenance.

The two-wire Micro Motion 2200S transmitter can be used with a range of Micro Motion ELITE Coriolis sensor sizes and materials of construction to deliver what the company says is excellent measurement performance for continuous process applications. Suited for integral or extended mount, the loop powered design makes for seamless integration into existing control systems and is helpful for long wiring runs and applications in hazardous areas.

Equipped with MVD digital processing technology, the 2200S transmitter delivers multivariable and diagnostic information via HART communications for reduced costs through improved process consistency and maximized uptime.

Source: **Emerson Process Management,** 12301 Research Bldg. III, Austin, TX 78759.

Imports of crude and products

	Districts 1-4		District 5		Total US		
	10-17 2008	10-10 2008	10-17 2008	10-10 2008	10-17 2008	10-10 2008	*10-19 2007
	1,000 b/d						
Total motor gasoline	1,062	1,452	0	0	1,062	1,452	838
Mo. gas. blending comp.	744	991	0	0	744	991	435
Distillate	181	91	0	0	181	91	235
Residual	108	166	78	92	186	258	298
Jet fuel-kerosine	79	67	6	6	85	73	235
Propane-propylene	243	102	5	14	248	116	167
Other	737	397	145	132	882	529	987
Total products	**3,154**	**3,266**	**234**	**244**	**3,388**	**3,510**	**3,195**
Total crude	**9,354**	**8,988**	**1,046**	**1,173**	**10,400**	**10,161**	**9,103**
Total imports	**12,508**	**12,254**	**1,280**	**1,417**	**13,788**	**13,671**	**12,298**

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

Purvin & Gertz LNG netbacks—Oct. 24, 2008

Receiving terminal	Liquefaction plant					
	Algeria	Malaysia	Nigeria	Austr. NW Shelf	Qatar	Trinidad
	$/MMbtu					
Barcelona	10.90	8.65	10.01	8.53	9.28	9.92
Everett	5.74	3.85	5.37	3.93	4.33	6.03
Isle of Grain	10.18	8.79	9.49	8.69	8.91	9.51
Lake Charles	4.06	2.31	3.87	2.48	2.72	4.62
Sodegaura	8.70	12.48	8.96	12.15	11.35	7.97
Zeebrugge	11.57	9.40	10.87	9.28	9.93	10.87

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

Crude and product stocks

District	Crude oil	Motor gasoline		Jet fuel, kerosine	Fuel oils		Propane-propylene
		Total	Blending comp.[1]		Distillate	Residual	
	1,000 bbl						
PADD 1	13,960	49,805	28,010	8,534	48,488	13,317	4,290
PADD 2	61,401	48,131	18,267	7,306	27,077	1,445	24,888
PADD 3	169,258	65,439	31,397	10,543	33,915	17,071	29,013
PADD 4	14,145	6,598	2,248	562	2,885	346	[1]2,711
PADD 5	52,616	26,524	21,094	9,634	11,939	5,180	—
Oct. 17, 2008	**311,380**	**196,497**	**101,016**	**36,579**	**124,304**	**37,359**	**60,902**
Oct. 10, 2008	**308,198**	**193,788**	**98,815**	**36,258**	**122,148**	**38,706**	**61,153**
Oct. 19, 2007[2]	**316,577**	**193,837**	**89,119**	**41,928**	**134,471**	**36,739**	**60,991**

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

Refinery report—Oct. 17, 2008

District	REFINERY OPERATIONS		REFINERY OUTPUT				
	Gross inputs	Crude oil inputs	Total motor gasoline	Jet fuel, kerosine	Fuel oils		Propane-propylene
					Distillate	Residual	
	1,000 b/d						
PADD 1	1,477	1,472	2,192	112	474	103	74
PADD 2	3,299	3,270	2,130	212	1,010	45	208
PADD 3	6,821	6,623	2,710	620	2,128	248	573
PADD 4	555	550	306	19	169	13	[1]166
PADD 5	2,773	2,647	1,623	425	658	79	—
Oct. 17, 2008	**14,925**	**14,562**	**8,961**	**1,388**	**4,439**	**488**	**1,021**
Oct. 10, 2008	**14,483**	**14,115**	**9,164**	**1,410**	**4,184**	**560**	**1,012**
Oct. 19, 2007[2]	**15,202**	**14,940**	**8,998**	**1,409**	**3,946**	**709**	**1,024**
	17,610 Operable capacity		**84.8 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

	*10-24-08	*10-26-07	Change	Change, %
	$/bbl			
SPOT PRICES				
Product value	80.05	95.28	–15.23	–16.0
Brent crude	64.78	84.70	–19.92	–23.5
Crack spread	15.27	10.58	4.69	44.4
FUTURES MARKET PRICES				
One month				
Product value	75.46	94.56	–19.10	–20.2
Light sweet crude	68.78	88.45	–19.67	–22.2
Crack spread	6.68	6.11	0.57	9.4
Six month				
Product value	82.30	98.72	–16.42	–16.6
Light sweet crude	71.19	84.25	–13.06	–15.5
Crack spread	11.11	14.46	–3.35	–23.2

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

Statistics

OGJ GASOLINE PRICES

	Price ex tax 10-22-08	Pump price* 10-22-08	Pump price 10-24-07
	¢/gal		
(Approx. prices for self-service unleaded gasoline)			
Atlanta	253.2	299.7	285.3
Baltimore	256.1	298.0	274.9
Boston	255.4	297.3	270.1
Buffalo	222.5	283.4	285.2
Miami	243.3	294.9	304.3
Newark	254.6	287.2	274.2
New York	239.7	300.6	285.1
Norfolk	245.1	283.5	269.9
Philadelphia	248.6	299.3	280.3
Pittsburgh	247.0	297.7	282.1
Wash., DC	259.8	298.2	288.7
PAD I avg	247.7	294.5	281.8
Chicago	235.6	300.0	294.7
Cleveland	235.1	281.5	280.4
Des Moines	239.8	280.2	274.4
Detroit	234.7	294.1	290.6
Indianapolis	229.7	289.1	290.4
Kansas City	234.4	270.4	274.0
Louisville	249.3	290.2	290.4
Memphis	234.4	274.2	260.4
Milwaukee	242.8	294.1	297.2
Minn.-St. Paul	240.0	284.0	291.2
Oklahoma City	215.2	250.6	267.7
Omaha	223.4	268.7	272.1
St. Louis	246.8	282.8	264.0
Tulsa	226.4	261.8	262.9
Wichita	233.1	276.5	266.2
PAD II avg	234.7	279.9	278.4
Albuquerque	244.5	280.9	282.7
Birmingham	230.9	270.2	274.4
Dallas-Fort Worth	230.0	268.4	265.4
Houston	221.2	259.6	270.4
Little Rock	233.7	273.9	270.0
New Orleans	251.6	290.0	272.4
San Antonio	238.1	276.5	269.3
PAD III avg	235.7	274.2	272.1
Cheyenne	259.4	291.8	279.8
Denver	277.3	317.7	294.8
Salt Lake City	258.9	301.8	290.2
PAD IV avg	265.2	303.8	288.3
Los Angeles	263.2	330.3	310.8
Phoenix	279.9	317.3	273.6
Portland	278.9	322.3	302.0
San Diego	270.2	337.3	321.0
San Francisco	275.3	342.4	332.1
Seattle	271.4	327.3	310.4
PAD V avg	273.1	329.5	308.3
Week's avg.	**246.0**	**291.6**	**283.2**
Sept. avg.	**322.7**	**367.2**	**280.4**
Aug. avg.	**330.8**	**375.3**	**280.8**
2008 to date	**308.2**	**352.2**	--
2007 to date	**230.1**	**273.7**	--

*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

	10-17-08 ¢/gal		10-17-08 ¢/gal
Spot market product prices			
Motor gasoline (Conventional-regular)		Heating oil No. 2	
New York Harbor	188.50	New York Harbor	212.00
Gulf Coast	164.25	Gulf Coast	209.00
Los Angeles	199.50	Gas oil	
Amsterdam-Rotterdam-Antwerp (ARA)	165.72	ARA	220.81
Singapore	187.86	Singapore	183.10
Motor gasoline (Reformulated-regular)		Residual fuel oil	
New York Harbor	181.50	New York Harbor	129.10
Gulf Coast	166.25	Gulf Coast	130.29
Los Angeles	205.50	Los Angeles	186.57
		ARA	146.61
		Singapore	131.55

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

BAKER HUGHES RIG COUNT

	10-24-08	10-26-07
Alabama	5	7
Alaska	7	8
Arkansas	57	49
California	48	42
Land	48	41
Offshore	0	1
Colorado	124	110
Florida	2	0
Illinois	1	0
Indiana	2	2
Kansas	11	14
Kentucky	12	9
Louisiana	189	158
N. Land	78	59
S. Inland waters	24	26
S. Land	26	31
Offshore	61	42
Maryland	0	1
Michigan	2	1
Mississippi	16	12
Montana	8	11
Nebraska	0	0
New Mexico	93	74
New York	4	8
North Dakota	83	49
Ohio	10	14
Oklahoma	187	188
Pennsylvania	29	18
South Dakota	2	0
Texas	920	828
Offshore	7	8
Inland waters	0	2
Dist. 1	28	23
Dist. 2	38	23
Dist. 3	65	63
Dist. 4	83	89
Dist. 5	187	181
Dist. 6	131	113
Dist. 7B	28	34
Dist. 7C	64	53
Dist. 8	125	117
Dist. 8A	27	20
Dist. 9	42	42
Dist. 10	95	60
Utah	32	44
West Virginia	29	31
Wyoming	77	72
Others—NV-4; OR-1; TN-3; VA-5; WA-1	14	10
Total US	**1,964**	**1,760**
Total Canada	**447**	**345**
Grand total	**2,411**	**2,105**
Oil rigs	423	326
Gas rigs	1,529	1,428
Total offshore	73	52
Total cum. avg. YTD	**1,881**	**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	10-24-08 Rig count	10-24-08 Percent footage*	10-26-07 Rig count	10-26-07 Percent footage*
0-2,500	87	3.4	56	5.3
2,501-5,000	148	47.9	97	59.7
5,001-7,500	264	15.9	229	24.8
7,501-10,000	456	2.6	437	1.8
10,001-12,500	457	0.6	453	2.8
12,501-15,000	373	0.2	274	0.7
15,001-17,500	166	—	114	—
17,501-20,000	78	—	69	—
20,001-over	29	—	33	—
Total	**2,058**	**6.3**	**1,762**	**8.0**
INLAND	31		40	
LAND	1,973		1,674	
OFFSHORE	54		48	

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

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

OGJ PRODUCTION REPORT

	[1]10-24-08	[2]10-26-07
	1,000 b/d	
(Crude oil and lease condensate)		
Alabama	19	19
Alaska	680	701
California	654	657
Colorado	62	66
Florida	5	6
Illinois	27	27
Kansas	104	108
Louisiana	984	1,213
Michigan	14	15
Mississippi	59	59
Montana	95	95
New Mexico	162	162
North Dakota	125	129
Oklahoma	172	172
Texas	1,254	1,337
Utah	52	53
Wyoming	148	148
All others	65	76
Total	**4,681**	**5,043**

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

US CRUDE PRICES

	10-24-08 $/bbl*
Alaska-North Slope 27°	110.67
South Louisiana Sweet	67.25
California-Kern River 13°	50.75
Lost Hills 30°	59.24
Wyoming Sweet	49.15
East Texas Sweet	60.25
West Texas Sour 34°	56.25
West Texas Intermediate	60.75
Oklahoma Sweet	60.75
Texas Upper Gulf Coast	57.25
Michigan Sour	53.75
Kansas Common	59.50
North Dakota Sweet	50.50

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

WORLD CRUDE PRICES

$/bbl[1]	10-17-08
United Kingdom-Brent 38°	71.95
Russia-Urals 32°	70.12
Saudi Light 34°	69.71
Dubai Fateh 32°	69.19
Algeria Saharan 44°	73.13
Nigeria-Bonny Light 37°	76.24
Indonesia-Minas 34°	78.39
Venezuela-Tia Juana Light 31°	71.78
Mexico-Isthmus 33°	71.67
OPEC basket	72.87
Total OPEC[2]	70.46
Total non-OPEC[2]	70.77
Total world[2]	70.60
US imports[3]	69.28

[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]

	10-17-08	10-10-08	10-17-07	Change, %
	bcf			
Producing region	918	892	1,013	–9.4
Consuming region east	1,985	1,945	1,959	1.3
Consuming region west	444	440	451	–1.6
Total US	**3,347**	**3,277**	**3,423**	**–2.2**
	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.

PACE REFINING MARGINS

	Aug. 2008	Sept. 2008	Oct. 2008	Oct. 2007	2008 vs. 2007 Change	2008 vs. 2007 Change, %
			$/bbl			
US Gulf Coast						
West Texas Sour	10.67	23.44	8.84	11.35	–2.51	–22.1
Composite US Gulf Refinery	9.95	24.05	10.93	10.41	0.52	5.0
Arabian Light	8.59	22.41	8.28	7.72	0.56	7.2
Bonny Light	5.13	19.34	4.36	5.05	–0.69	–13.6
US PADD II						
Chicago (WTI)	14.82	25.51	17.55	8.73	8.82	101.0
US East Coast						
NY Harbor (Arab Med)	11.96	15.36	9.32	6.91	2.41	34.9
East Coast Comp–RFG	10.84	19.19	11.03	8.62	2.40	27.9
US West Coast						
Los Angeles (ANS)	9.20	15.14	16.04	12.40	3.63	29.3
NW Europe						
Rotterdam (Brent)	4.76	8.10	6.61	3.14	3.47	110.5
Mediterranean						
Italy (Urals)	4.10	7.26	8.57	3.94	4.63	117.5
Far East						
Singapore (Dubai)	–1.19	3.68	4.80	4.38	0.42	9.7

Source: Jacobs Consultancy Inc.
Data available in OGJ Online Research Center.

US NATURAL GAS BALANCE DEMAND/SUPPLY SCOREBOARD

	July 2008	June 2008	July 2007	July 2008-2007 change	Total YTD 2008	Total YTD 2007	YTD 2008-2007 change
				bcf			
DEMAND							
Consumption	1,773	1,593	1,662	111	14,225	13,681	544
Addition to storage	430	420	397	33	1,858	1,934	–76
Exports	64	65	71	–7	602	443	159
Canada	29	30	38	–9	348	261	87
Mexico	30	30	29	1	227	153	74
LNG	5	5	4	1	27	29	–2
Total demand	**2,267**	**2,078**	**2,130**	**137**	**16,685**	**16,058**	**627**
SUPPLY							
Production (dry gas)	1,785	1,715	1,643	142	11,994	11,033	961
Supplemental gas	4	5	5	–1	29	37	–8
Storage withdrawal	88	80	84	4	2,221	2,116	105
Imports	313	283	418	–105	2,285	2,734	–449
Canada	282	247	315	–33	2,081	2,133	–52
Mexico	NA	3	5	–5	NA	39	–39
LNG	31	33	98	–67	204	562	–358
Total supply	**2,190**	**2,083**	**2,150**	**40**	**16,529**	**15,920**	**609**

NATURAL GAS IN UNDERGROUND STORAGE

	July 2008	June 2008	May 2008	July 2007	Change
			bcf		
Base gas	4,228	4,230	4,226	4,229	–1
Working gas	2,516	2,171	1,836	2,894	–378
Total gas	**6,744**	**6,401**	**6,062**	**7,123**	**–379**

Source: DOE Monthly Energy Review.
Data available in OGJ Online Research Center.

NOTE: No new data at presstime.

WORLDWIDE NGL PRODUCTION

	July 2008	June 2008	7 month average Production 2008	7 month average Production 2007	Change vs. previous year Volume	Change vs. previous year %
			1,000 b/d			
Brazil	87	87	87	83	4	4.3
Canada	627	585	657	697	–41	–5.8
Mexico	374	372	370	412	–42	–10.2
United States	1,856	1,810	1,845	1,747	97	5.6
Venezuela	200	200	200	200	—	—
Other Western Hemisphere	191	181	195	205	–10	–5.1
Western Hemisphere	**3,335**	**3,235**	**3,353**	**3,345**	**8**	**0.2**
Norway	301	270	293	289	4	1.5
United Kingdom	154	171	174	150	24	16.1
Other Western Europe	10	10	10	10	—	1.1
Western Europe	**465**	**451**	**477**	**449**	**29**	**6.4**
Russia	423	423	421	426	–5	–1.2
Other FSU	150	150	150	160	–10	–6.3
Other Eastern Europe	15	15	16	15	1	3.4
Eastern Europe	**588**	**588**	**586**	**601**	**–14**	**–2.4**
Algeria	359	358	355	340	15	4.3
Egypt	70	70	70	70	—	—
Libya	80	80	80	80	—	—
Other Africa	127	127	130	126	4	3.2
Africa	**636**	**635**	**635**	**616**	**19**	**3.0**
Saudi Arabia	1,440	1,440	1,440	1,440	—	—
United Arab Emirates	250	250	250	250	—	—
Other Middle East	885	880	878	870	8	0.9
Middle East	**2,575**	**2,570**	**2,568**	**2,560**	**8**	**0.3**
Australia	77	71	65	75	–9	–12.4
China	650	620	624	612	12	2.0
India	—	—	—	5	–5	–100.0
Other Asia-Pacific	178	175	179	178	1	0.3
Asia-Pacific	**904**	**866**	**868**	**870**	**–2**	**–0.2**
TOTAL WORLD	**8,503**	**8,345**	**8,487**	**8,441**	**46**	**0.5**

Totals may not add due to rounding.
Source: Oil & Gas Journal.
Data available in OGJ Online Research Center.

OXYGENATES

	July 2008	June 2008	Change	YTD 2008	YTD 2007	Change
			1,000 bbl			
Fuel ethanol						
Production	19,042	17,544	1498	120,227	84,201	36,026
Stocks	13,186	12,304	882	13,186	9,696	3,490
MTBE						
Production	1,671	1,501	170	11,169	13,639	–2,470
Stocks	1,252	1,456	–204	1,252	1,480	–228

Source: DOE Petroleum Supply Monthly.
Data available in OGJ Online Research Center.

NOTE: No new data at presstime.

US COOLING DEGREE-DAYS

	Sept. 2008	Sept. 2007	Normal	2008 % change from normal	Total degree-days Jan. 1 through Sept. 30 2008	2007	Normal	% change from normal
New England	50	71	22	127.3	490	544	417	17.5
Middle Atlantic	81	104	59	37.3	731	799	651	12.3
East North Central	64	121	60	6.7	643	864	701	–8.3
West North Central	71	132	87	–18.4	792	1,086	915	–13.4
South Atlantic	290	318	259	12.0	1,886	1,974	1,757	7.3
East South Central	252	304	209	20.6	1,577	1,856	1,486	6.1
West South Central	292	394	345	–15.4	2,327	2,296	2,275	2.3
Mountain	180	196	167	7.8	1,263	1,449	1,184	6.7
Pacific	177	117	125	41.6	893	770	663	34.7
US average*	**170**	**199**	**155**	**9.7**	**1,213**	**1,304**	**1,142**	**6.2**

*Excludes Alaska and Hawaii.
Source: DOE Monthly Energy Review.
Data available in OGJ Online Research Center.

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The Department of Interior, Bureau of Indian Affairs, Anadarko Agency will be holding an Oil and gas Lease Sale at 9:00 a.m. on December 2, 3 & 4, 2008 at the Cox Convention Center in Okla. City, Oklahoma. The Sale will include Indian lands in Caddo, Canadian, Comanche, Cotton, Grady, Jefferson, Kiowa, Stephens, Tillman, and Washita Counties in Oklahoma. To obtain the complete text of the sale notice or for further information, please contact the Oil & Gas section at 405/247-6677, extension 533.

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AUCTION

UNITED STATES BANKRUPTCY COURT
WESTERN DISTRICT OF MICHIGAN

In re: Jordan River Resources, Inc. Debtor. _____/	Case No. DL07-01747 Chapter 11
In re: Redstone Energy Corporation Debtor. _____/	Case No. DL07-01750 Chapter 11
In re: Superior Petroleum Corporations Debtor. _____/	Case No. DL07-01786 Chapter 11
In re: Apple Tree Resources, Inc. Debtor. _____/	Case No. DL07-02139 Chapter 11

NOTICE OF AUCTION SALE OF CERTAIN ASSETS OF THE CAPTIONED DEBTORS FREE AND CLEAR OF LIENS, ENCUMBRANCES AND INTEREST

The Chapter 11 Trustee of the captioned estate, James W. Boyd, has entered into a certain Third Amendment of Purchase Agreement with Shale Royalties 5, Inc. for the remaining oil and gas assets of the captioned Debtors and certain Related Entities (these assets include interests in oil and gas leases and membership interests in entities that hold oil and gas interests). There will be an auction sale of such oil and gas interests conducted at the offices of the "Liquidating Agent" of the captioned Debtors and certain Related Entities, Stephen A. Metzler, 1800 W. Big Beaver Rd., Troy, MI 48084, at 10:00 a.m. Eastern Standard Time on December 11, 2008. The bidding procedures are set forth in a certain order of the Bankruptcy Court granting the Trustee's Motion to establish Uniform Bidding Procedures that can be obtained from the United States Bankruptcy Court for the Western District of Michigan (Docket No. 436) or can be obtained from counsel for the Chapter 11 Trustee, Ronald A. Schuknecht, 402 Union Street, P.O. Box 784, Traverse City, MI 49685, Telephone: 231-947-2310, Fax: 231-947-2138, E-mail: ron@lsklegal.com).

All bids must be tendered to Stephen Metzler, the Liquidating Agent, at the address provided above no later than 5:00 p.m. on December 5, 2008 together with the cash deposits provided for in the bidding procedures order. Please refer to the bidding procedures order for the other requirements for the bid itself.

Due Diligence

Upon request by a prospective competitive bidder to the Trustee and the Liquidating Agent, the Trustee and Liquidating Agent shall, upon a determination by the Trustee and the Liquidating Agent, that such competitive bidder's interest in the Remaining Assets is bona fide and not for any improper purpose, and subject to such appropriate provisions for confidentiality as the Trustee and Liquidating Agent deem appropriate, provide such competitive bidder with access to relevant business and financial information reasonably necessary to enable such person to evaluate the remaining Assets for the purpose of submitting a bid and that is in the possession and control of Trustee and Liquidating Agent.

The assets to be sold consist of the interests of the four captioned Debtors and certain Related Entities that consist primarily of working interests in oil and gas leases located in the states of Oklahoma and Texas and Membership Interests in various limited liability companies that in turn hold interests in oil and gas leases commonly known as the "Spindletop" field.

A hearing to confirm the sale, either to Shale 5, Inc. or the successful bidder, will be held before the United States Bankruptcy Court for the Western District of Michigan at its Courtroom located in Grand Rapids, Michigan, at approximately 10:00 a.m. on Friday, December 12, 2008. The sale shall be free and clear of any liens, encumbrances or other interests.

Any inquiries with regard to this process may be directed to either Ronald Schuknecht, whose contact information is set forth above, or the attorney for the Related Entities and the Debtors, Jerome D. Frank, 30833 Northwestern Hwy., Suite 205, Farmington Hills, MI 48334, Phone: 248-932-1440, Fax: 248-932-1443, E-mail: jfrank@frankfirm.com.

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Officials prepare to rescue ethanol from new crisis

As fuel ethanol approaches a new crisis, the federal government busily fashions another rescue.

Ethanol had its heyday in 2006 after the Energy Policy Act of 2005 imposed rising annual mandates for the gasoline additive and exposed makers of a competitive oxygenate, methyl tertiary butyl ether, to unbearable legal risk.

Ethanol plant construction boomed.

The Editor's Perspective

by Bob Tippee, Editor

While new ethanol supply gushed into the market, however, corn prices zoomed. By 2007, distillation economics had turned sour. Congress responded by expanding the mandate to shore up demand.

That rescue didn't help. Corn prices have eased, but so have ethanol prices. Plant operators are going bankrupt.

Now gasoline consumption and prices, which the ethanol price tends to follow, have slumped.

The next crisis relates to the annual renewable fuel standard by which the Environmental Protection Agency enforces the ethanol mandate. It's the share of sales by each gasoline supplier that must come from renewable sources.

EPA calculates the standard from the statutory mandate level and expected gasoline consumption, with adjustments for unaffected states and an exemption for small refiners. For the next year's gasoline consumption, EPA uses the Energy Information Administration's October Short Term Energy Outlook.

With an ethanol mandate of 10.5 billion gal and gasoline use forecast at only 9.05 million b/d, the renewable fuel standard next year looks to be about 9.6%.

That means virtually all gasoline sold in the US must contain ethanol near the 10% maximum concentration now applicable to all but flexible-fuel vehicles.

Distributing ethanol to the whole US gasoline market will be difficult. Then there's 2010, when the grain-ethanol mandate rises to 12 billion gal and gasoline demand might come up short again.

Flex-fuel vehicles, which can burn 85% ethanol blends, might absorb some of the problem—but only if E85 is cheap enough to coax motorists who can use it to endure the mileage penalty.

Meanwhile, officials at the agriculture and energy departments are working on the ethanol industry's next rescue: studies showing that 15% or 20% ethanol concentrations in gasoline might not, after all, be as troublesome for engines as everyone once thought.

(Online Oct. 24, 2008; author's e-mail: bobt@ogjonline.com)

Market Journal

by Sam Fletcher, Senior Writer

OPEC cut yields no immediate effect

The decision by ministers of the Organization of Petroleum Exporting Countries to cut production by 1.5 million b/d effective Nov. 1 from the official quota of 28.8 million b/d had no immediate effect on plummeting crude prices.

After OPEC's short meeting Oct. 24, front-month crude contracts fell to $62.65/bbl in intraday trading in New York and $61/bbl in London—the lowest levels in either market since May 2007. The December contract for benchmark US light, sweet crudes closed at $64.15/bbl, down $3.69 for the day on the New York Mercantile Exchange. In London, the IPE contract for North Sea Brent was down $3.87 to $62.05/bbl.

Although traders were expecting OPEC to reduce output by 1-2 million b/d, crude prices were in steep decline for 2 days prior to the meeting. Over the last 3 months, crude has fallen 57% from record highs above $147/bbl.

It has been "a dramatic collapse unprecedented in speed and magnitude" to levels that "may put at jeopardy many existing oil projects and lead to the cancellation or delay of others, possibly resulting in a medium-term supply shortage," said OPEC ministers.

Olivier Jakob at Petromatrix, Zug, Switzerland said, "The current situation of economic slowdown and credit freeze is quite unique as together with low oil prices it will translate in an additional supply challenge in a year or two from now as some supply projects will be pushed further back."

Recession outweighs OPEC

General expectations of falling demand for energy through 2009 as a result of a deepening international financial crisis are influencing oil markets far more than OPEC's willingness to reduce supplies.

Fear of recession resulted in a steep liquidation of equity holdings in global markets Oct. 24, with the Dow Jones Industrial Average dropping 3.6% that day to end the week 5.3% lower than it started.

Recent strengthening of the US dollar against the euro and pound also has undercut energy prices. Oliver said, "Six months ago OPEC was complaining about the weak dollar, but it will start soon to regret these times."

He said, "OPEC is looking to shut down production because prices are too low for their economics. This makes an environment of spare production capacity where a return to previous record high prices will not be reached in the immediate future but where the supply side will get reduced at $50/bbl in a mirror image of the demand side getting reduced at $150/bbl." He said, "We remain of the opinion that $50/bbl would be on a medium term horizon as unsustainable as $150/bbl."

The lower the price of oil, the more likely are some OPEC members to over-produce their quotas to maximize revenues. In its latest monthly report, OPEC said its member countries produced 32 million b/d in September.

"OPEC Pres. Chakib Khelil stated the cartel wants to stabilize prices between $70-90/bbl, but it remains an open question whether this cut will be sufficient to offset demand weakness and, secondly, what the degree of enforcement will be," said Raymond James analysts. "Skepticism remains about OPEC's ability to offset deteriorating demand with oil trading down over $4.50/bbl despite the announcement."

Saudi projects pending

Analysts at Friedman, Billings, Ramsey & Co. Inc. (FBR) in Arlington, Va., said, "While it is possible that Saudi Arabia and the other producers can meet this [reduction] target, we would expect some of the cartel members to defect and exceed prescribed volumes if prices continue their slide, particularly given the size of quota cuts borne by Venezuela and Iran."

Despite the proposed cutback, FBR analysts said, "Saudi Aramco will proceed with plans for 100,000 b/d of new production from Dammam field, under the eastern Saudi city of Dhahran, in 2012." They said, "OPEC production cuts (and subsequent discipline in holding to quotas) are unlikely to halt Saudi Arabia's expansion projects already under way, including the 1.2 million b/d al-Khoreis project, as state-owned and private producers are likely to need revenue in the coming years, but delays are certainly likely."

Meanwhile, Jakob noted, "Medium to small E&P companies have started to be hurt by the credit crunch and are now starting to be hurt by limited cash flows linked to the lower oil prices." The reality, he said, "is that below $60/bbl there will be a flattening of the non-OPEC production curve, but that will be seen through the course of 2009 rather than in the remainder of 2008."

As has happened repeatedly during the oil industry's boom-and-bust history, lower prices eventually will reduce supplies and increase demand.

(Online Oct. 27, 2008; author's e-mail: samf@ogjonline.com)

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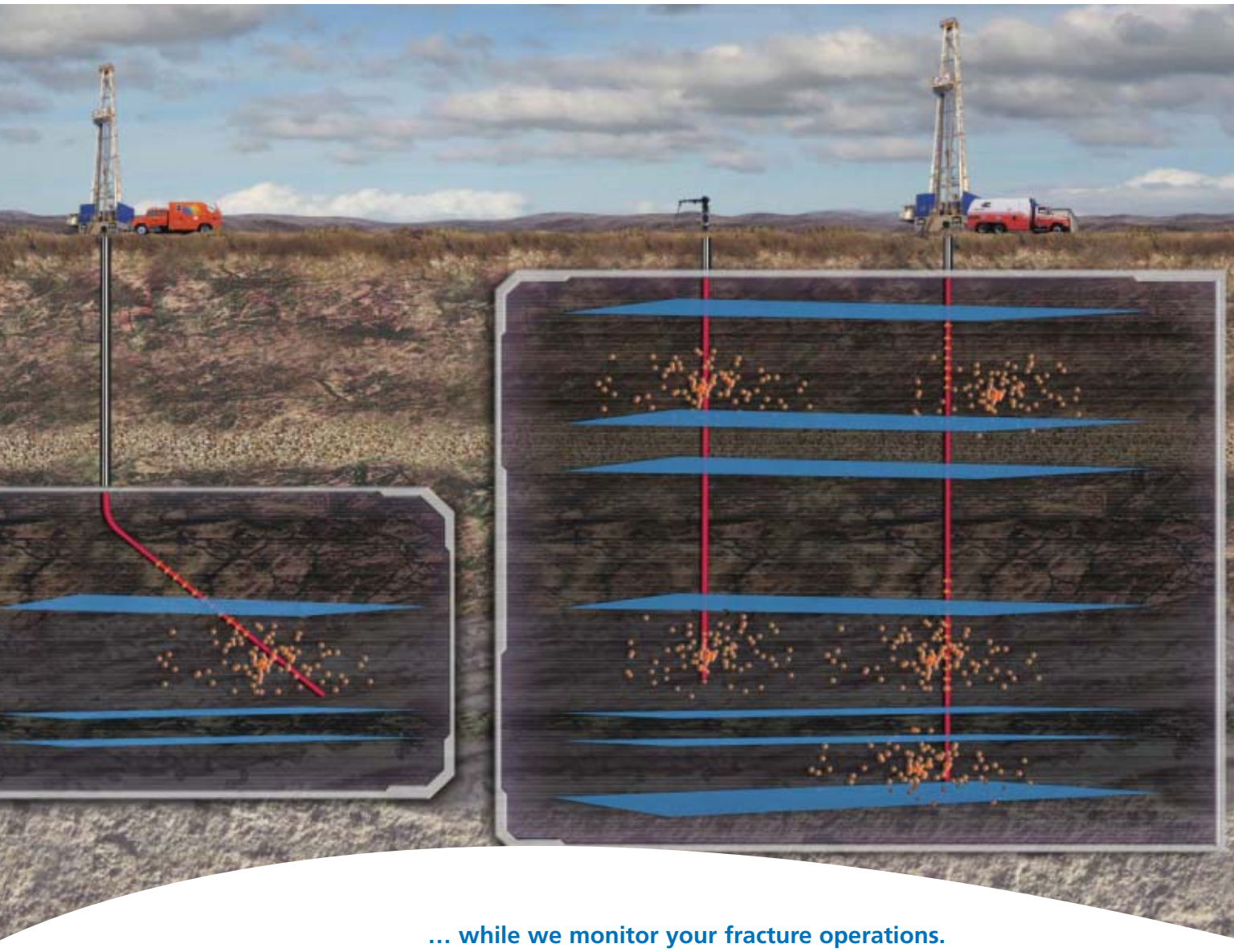

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You can submit your abstracts online today for presentation at the Rocky Mountain Unconventional Resources Conference & Exhibition. **Abstracts are due by November 24, 2008.**

Abstract Submittal

Abstracts must have a title and list all authors. Please provide full contact information for the primary contact author (company affiliation, telephone, and email address). Please designate who will be the speaker. Presentations must be of interest and of practical value to executives, managers, engineers, and operations personnel engaged in the unconventional oil and gas industry. Presentations will be selected based on a review of abstracts by the Advisory Board. Abstracts must not be commercial in nature.

Technical Sessions

To take part in event technical sessions, please submit a 150 - 200 word abstract on one or more of the technical focus areas by November 24, 2008.

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The deadline for receiving abstracts is November 24, 2008.

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1. Final selection of abstracts will be determined by the Rocky Mountain Unconventional Resources Conference Advisory Board. Presentations will be selected on the basis of abstract submitted. The abstracts should be in English, completely original, and address issues as outlined in the conference focus areas (above). Abstracts and presentations should avoid any commercialism.
2. Presenters are allowed 20-minutes to present (in English). A 10-minute discussion will follow each presentation.
3. Authors of abstracts selected for the Rocky Mountain Unconventional Resources Conference & Exhibition program will be notified by mid **December 2008**.
4. A technical presentation will be required for each abstract selected. Presentations shall be provided on a CD-ROM or memory stick in PowerPoint format.
5. Full instructions on preparation of presentations will be sent to authors of selected abstracts.
6. Complimentary conference registration will be provided for only one presenter per abstract. Rocky Mountain Unconventional Resources Conference & Exhibition assumes no obligation for expenses incurred by presenters for travel, lodging, food, or other expenses.

ABSTRACT DEADLINE: NOVEMBER 24, 2008

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