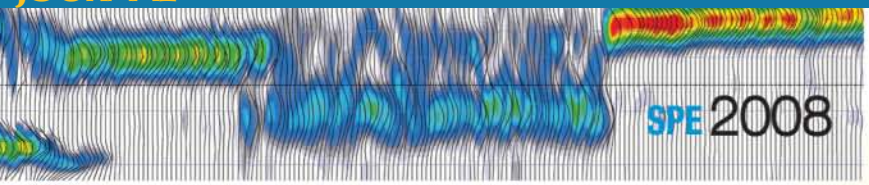

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At the 2008 SPE Annual Technical Conference and Exhibition, Baker Hughes experts will discuss technologies and services that help operators maximize productivity from their reservoirs at the presentation theater in the Baker Hughes exhibit booth 1019.

Baker Hughes is proud to sponsor the SPE "Run-for-the-Future" 5K Fun Run/Walk Wednesday — 7:00–8:00. Proceeds from this event benefit the Gus Archie Memorial Scholarship Fund. (Separate SPE ticket purchase required.)

Monday, 22 September

- 9:15 am — Mark Thomas — Imaging While Drilling for Enhanced Reservoir Navigation/Formation Evaluation
- 10:00 am — Michael Doiron — New Fluids Bring "Reservoir Focus" to Increase Well Productivity
- 10:45 am — David Chace — GasView Evaluates Gas in Your Reservoir behind Casing
- 11:30 am — Lester Clark — New Quantec Bits Drill Farther, Faster to Your Reservoir
- 1:00 pm — Sean Yakeley — New Horizontal Completion Systems Get More for Less from Your Reservoir
- 1:45 pm — Brian Haapanen — Monitoring and Automation Systems Improve ESP Performance
- 2:30 pm — Kevyn Smith — Downhole Remediation Strategies Help Restore Reservoir Productivity
- 3:15 pm — Tim Ong — Technology to Optimize Production from Your Reservoir
- 4:00 pm — Peter O'Shea — Geomechanics Analysis Drives Results from Fractured Reservoirs

WELLLINK

The first 50 SPE attendees to present this ad at the Baker Hughes booth each day will receive a portable USB drive, and learn more about the Baker Hughes WellLink™ service — providing real-time Web access to information.

Tuesday, 23 September

- 9:15 am — Peter O'Shea — Geomechanics Analysis Drives Results from Fractured Reservoirs
- 10:00 am — Tim Ong — Technology to Optimize Production from Your Reservoir
- 10:45 am — Kevyn Smith — Downhole Remediation Strategies Help Restore Reservoir Productivity
- 11:30 am — Brian Haapanen — Monitoring and Automation Systems Improve ESP Performance
- 1:00 pm — Sean Yakeley — New Completion Systems Get More for Less from Your Reservoir
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- 3:15 pm — Michael Doiron — New Fluids Bring "Reservoir Focus" to Increase Well Productivity
- 4:00 pm — Mark Thomas — Imaging While Drilling for Enhanced Reservoir Navigation/ Formation Evaluation

And don't forget to visit our new reservoir technology companies — GeoMechanics International (Booth 1429) and Gaffney, Cline & Associates (Booth 219) while you're at the show.

Wednesday, 24 September

- 9:15 am — Lester Clark — New Quantec Bits Drill Farther, Faster to Your Reservoir
- 10:00 am — Michael Doiron — New Fluids Bring "Reservoir Focus" to Increase Well Productivity
- 10:45 am — Sean Yakeley — New Completion Systems Get More for Less from Your Reservoir
- 11:30 am — Brian Haapanen — Monitoring and Automation Systems Improve ESP Performance
- 1:00 pm — Peter O'Shea — Geomechanics Analysis Drives Results from Fractured Reservoirs

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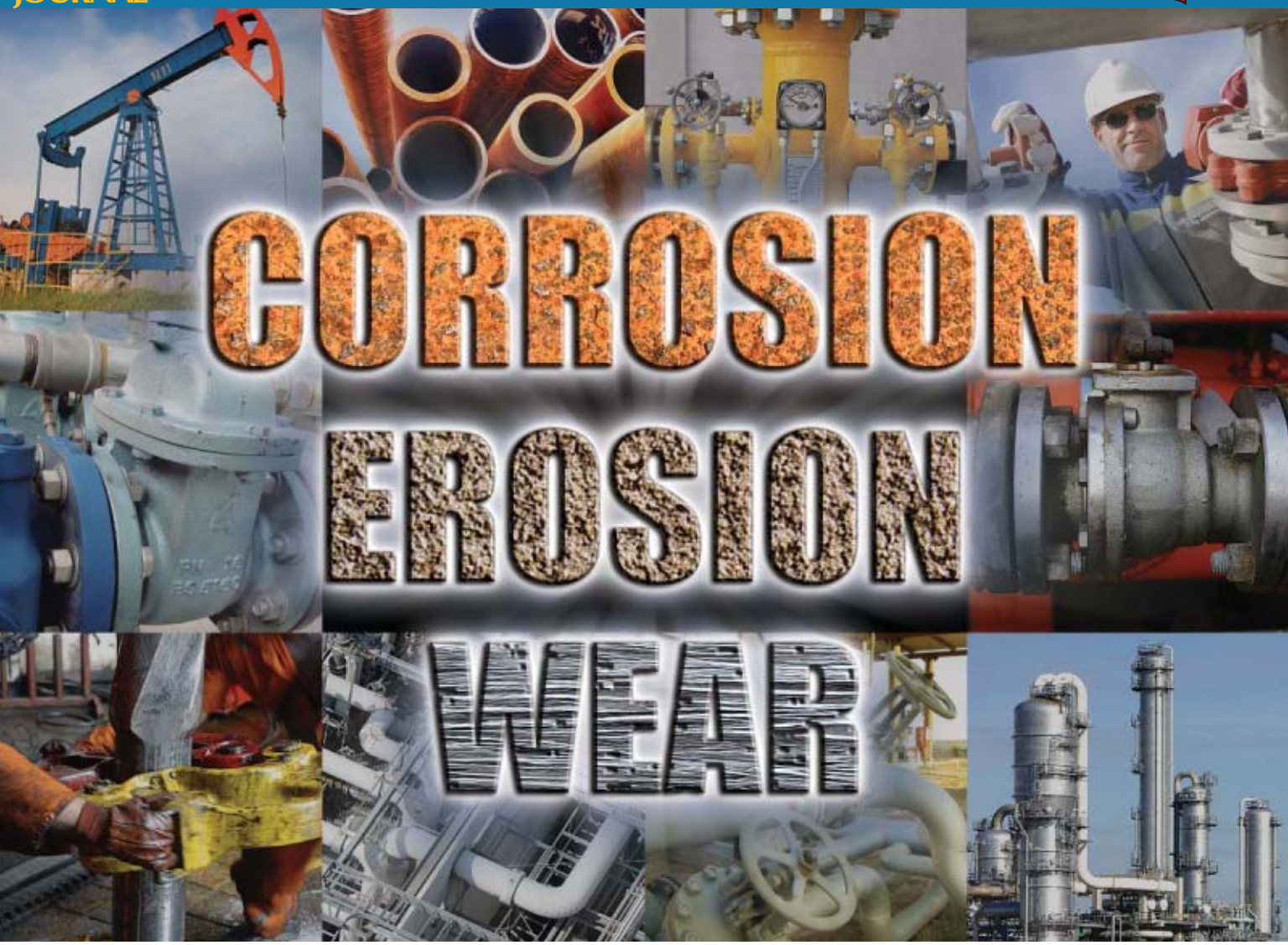
PRODUCTION TECHNOLOGY UPDATE

REGULAR FEATURES

COVER

Workers level the lower jacket section prior to setting it in 60 m of water in the Caspian Sea. Petronas Caragali (Turkmenistan) Sdn Bhd recently installed the production platform off Turkmenistan. The special section starting on p. 24 discusses the increased deployment of artificial lift surveillance and optimization technology in Middle East oil fields, the setting of the jacket off Turkmenistan, and the restoration of gas production from a nearly depleted well for use in fueling vehicles with small engines in the Philippines. Photo from Momentum Engineering.



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It's a technological breakthrough...
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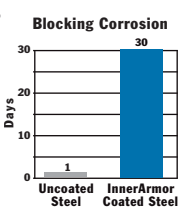
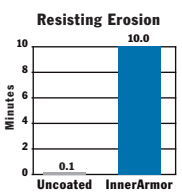
And InnerArmor has no porosity, no pinholes. So it creates a virtually impenetrable barrier against corrosion, erosion and wear.

Stopping corrosion
In NACE-standard TM185 sour autoclave testing, for example, InnerArmor withstood the maximum 30-day test—sustaining *no* attack or undercut.



While uncoated steel only lasted a single day!

Standing up to erosion
In the ASTM-standard G76 abrasive air-jet test, again, InnerArmor was easily able to go the full ten minutes—with *zero* surface damage.



By comparison, on uncoated steel the surface erosion began after only a few seconds.

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InnerArmor coatings can be created from a wide range of materials, and also in layers, for unprecedented sliding-wear properties and exceptional wear resistance.

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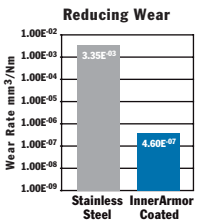

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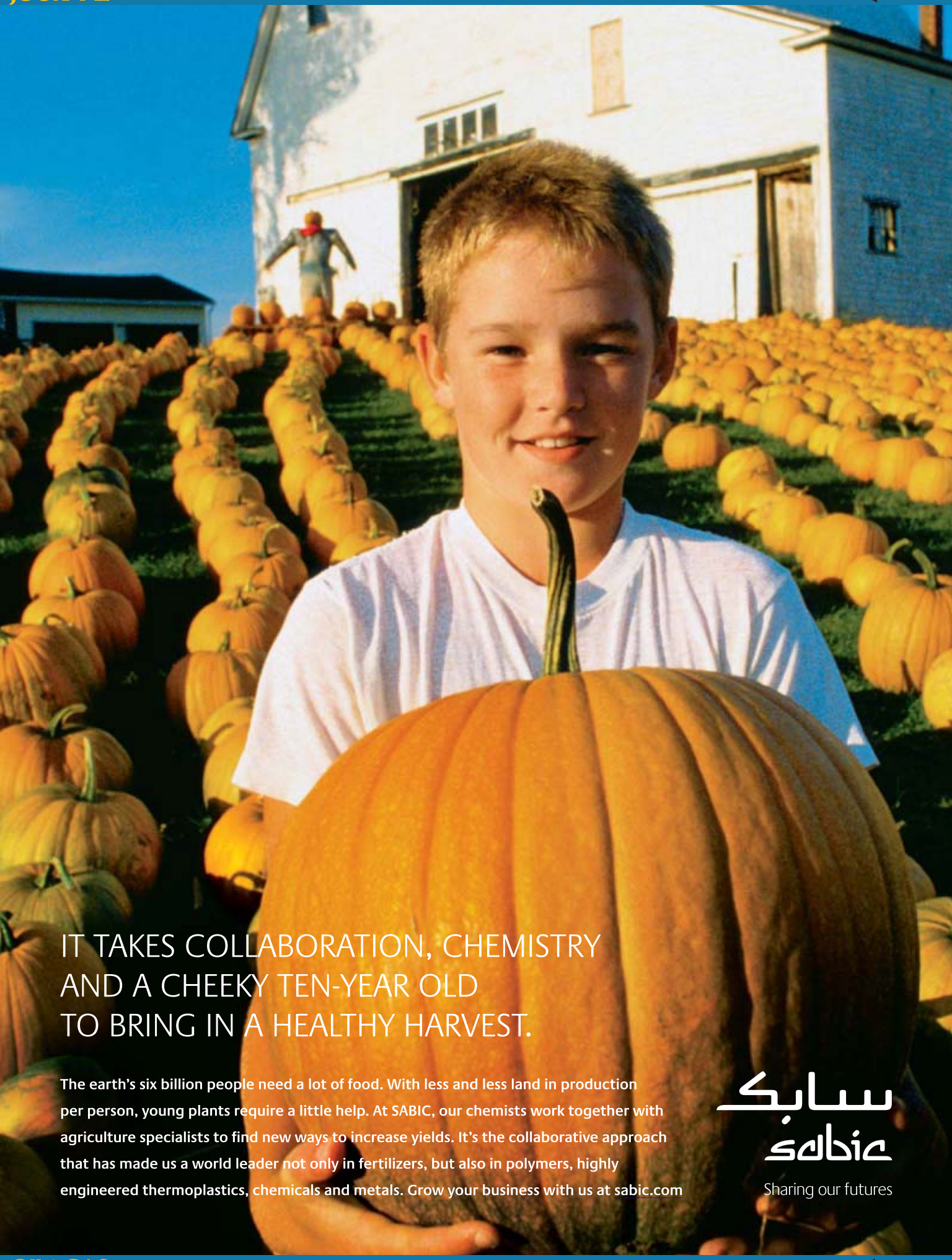
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General Interest — Quick Takes

Chavez shakes up PDVSA executive suite

In a move that could have implications for Venezuelan oil production, President Hugo Chavez, continues to tweak the leadership alignment within the country's oil and gas industry and in its national oil company, Petroleos de Venezuela SA (PDVSA). He has made several recent executive appointments and approved six new members to the PDVSA board of directors.

Chavez retained oil minister Rafael Ramirez as president of PDVSA. Other members of the board are Ivan Orellana, who recently became oil vice-minister; Asdrubal Chavez, refining, trade, and supply vice-president; and Eulogio del Pino, PDVSA's exploration and production vice-president.

Ramirez, in turn, removed from the board the former head of PDVSA's production and exploration unit Luis Vierma; along with Dester Rodriguez, Jesus Villanueva, Carlos Martinez, and Bernard Mommer.

He also swore in six new members: Hercilio Rivas, recent president of PDVSA's research unit Intevep; Carlos Vallejo, previous president of PDVSA's natural gas unit; Ricardo Coronado, second in command for exploration and production in western Venezuela; Luis Pulido, head of PDVSA's oil services unit; Faddi Kabboul, who has worked in the Venezuelan embassy in Washington, DC, on oil-related issues; and Aref Richany Jimenez, an army general who headed the state armament company.

While the changes are said to indicate Chavez's desire to keep his most trusted allies at the top of PDVSA, especially when production needs to be boosted, those removed from the board are not necessarily out of favor.

To the contrary, Chavez last month appointed former oil vice-minister Mommer as the country's new governor at the Organization of Petroleum Exporting Countries (OPEC). Mommer, a Marxist mathematician, is considered a key architect of Chavez's oil policy. He served as consultant to Ali Rodriguez during his tenure as OPEC secretary-general and initiated such policy changes as having the company take majority stakes in most oil projects and raising taxes and royalty payments.

Chavez's changes in the PDVSA board follow a restructuring of the state firm made in early August (OGJ Online, Aug. 7, 2008). At the time, reports said that the changes gave PDVSA the responsibility of "participating in ventures intended for the sustained, organic, and integral development of the country, including agricultural, industrial activities."

Militants attack Nigerian oil, gas installations

Royal Dutch Shell PLC has suffered an explosive attack on its Alakiri flow station, gas plant, and field logistics base southwest of Port Harcourt by a militant group that has warned it will burn them to the ground.

The Movement for the Emancipation of the Niger Delta (MEND) has pledged to continue the offensive until the Nigerian government enters into dialogue to deal with the volatile situation in the Niger Delta.

It has dubbed the campaign "Operation Hurricane Barbarossa" as the first stage of an "oil war" of sabotage on oil and gas installations. According to Nigerian reports, 115,000 b/d of oil production has been shut in over the past 4 days.

Shell said one security guard was killed and four people wounded during the attack. "A section of the Greater Port Harcourt Swamp Line at Bakana, Rivers State, was attacked," Shell said. The link is part of the Bonny Light crude system.

Chevron Corp. said there also was shooting around its Idama flow station.

Oil companies in the area have evacuated staff from the area, according to Nigerian reports, while security has tightened.

MEND claimed it is holding 27 oil workers who were kidnapped in the Delta after their oil supply vessel was hijacked last week.

Nigerian President Umaru Yar'Adua has created a new Ministry of Niger Delta, which will focus on development and peace in the area. It will have two ministers to create environmental and youth empowerment policy initiatives. The government has said there would not be any duplication between the new ministry and the Niger Delta Development Commission.

Nigeria has shut in about a quarter of its production following the sabotages, making Angola now the leading oil producer in Africa.

EPA waives Texas-specific diesel requirement

The US Environmental Protection Agency temporarily waived certain diesel fuel requirements that apply only in the state of Texas following fuel supply disruptions caused by Hurricanes Gustav and Ike.

Responding to a state request, EPA will allow the suspension of the Texas Low Emission Diesel (TxLED) requirements until Sept. 30, but federal regulations for ultralow-sulfur diesel fuel having maximum sulfur content of 15 ppm still must be met.

The Texas Commission on Environmental Quality said the goal of the TxLED rule is to lower emissions of NOx and other pollutants from diesel motor vehicles and nonroad equipment. TxLED is part of the Texas federally approved State Implementation Plan that was implemented in 2005.

The rule covers 110 counties in the eastern half of Texas, including the ozone nonattainment areas of Beaumont-Port Arthur, Dallas-Fort Worth, and Houston-Galveston-Brazoria.

EPA Administrator Stephen L. Johnson said extreme and unusual supply circumstances exist that are likely to result in a shortage of

Industry Scoreboard

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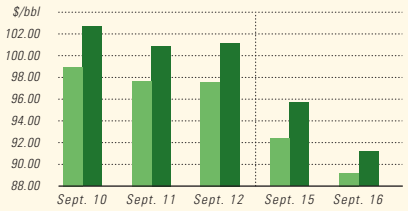
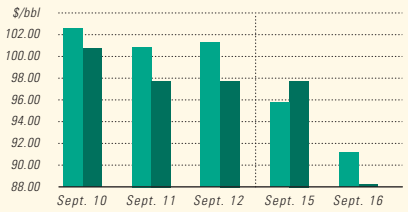
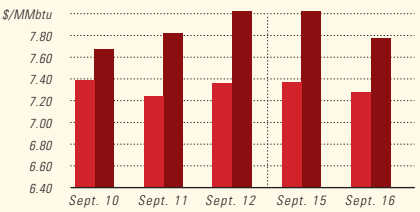


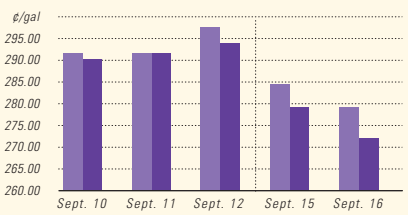
WTI CUSHING / BRENT SPOT



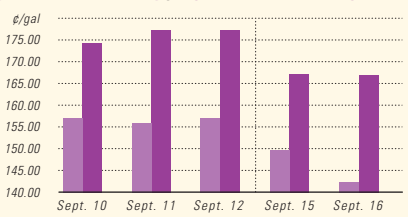
NYMEX NATURAL GAS / SPOT GAS - HENRY HUB



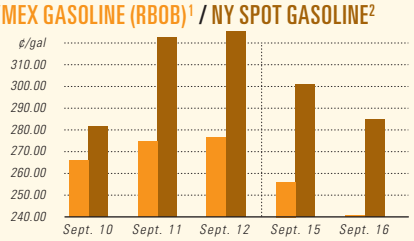
IPE GAS OIL / NYMEX HEATING OIL



PROPANE - MT. BELVIEU / BUTANE - MT. BELVIEU



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



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

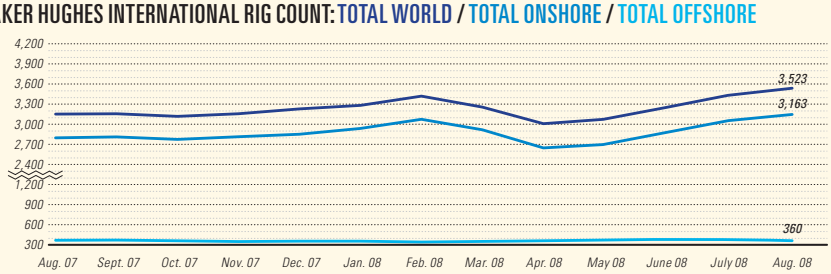
US INDUSTRY SCOREBOARD — 9/22

Latest week 9/5	4 wk. average	4 wk. avg. year ago[1]	Change, %	YTD average[1]	YTD avg. year ago[1]	Change, %
Demand, 1,000 b/d						
Motor gasoline	9,337	9,535	–2.1	9,118	9,306	–2.0
Distillate	4,130	4,148	–0.4	4,090	4,213	–2.9
Jet fuel	1,552	1,679	–7.6	1,562	1,635	–4.5
Residual	551	749	–26.4	622	742	–16.2
Other products	4,575	4,827	–5.2	4,733	4,818	–1.8
TOTAL DEMAND	20,145	20,938	–3.8	19,899	20,747	–4.1
Supply, 1,000 b/d						
Crude production	4,791	4,910	–2.4	5,094	5,093	0.0
NGL production[2]	2,371	2,394	–1.0	2,264	2,370	–4.5
Crude imports	9,845	10,315	–4.6	9,832	10,059	–2.3
Product imports	2,919	3,321	–12.1	3,160	3,559	–11.2
Other supply[3]	1,348	975	38.3	1,394	1,051	32.6
TOTAL SUPPLY	21,274	21,915	–2.9	21,744	22,132	–1.8
Refining, 1,000 b/d						
Crude runs to stills	14,879	15,596	–4.6	14,879	15,169	–1.9
Input to crude stills	15,107	15,785	–4.3	15,107	15,456	–2.3
% utilization	86.1	90.5	—	86.1	88.6	—

Latest week 9/5	Latest week	Previous week[1]	Change	Same week year ago[1]	Change	Change, %
Stocks, 1,000 bbl						
Crude oil	298,034	303,862	–5,828	322,649	–24,615	–7.6
Motor gasoline	187,942	194,404	–6,462	190,417	–2,475	–1.3
Distillate	130,460	131,712	–1,252	133,963	–3,503	–2.6
Jet fuel-kerosine	39,815	42,081	–2,266	41,533	–1,718	–4.1
Residual	36,695	37,424	–729	36,793	–98	–0.3
Stock cover (days)[4]			Change, %		Change, %	
Crude	20.3	20.3	0.0	20.6	–1.5	
Motor gasoline	20.1	20.6	–2.4	19.9	1.0	
Distillate	31.6	30.9	2.3	32.0	–1.3	
Propane	56.2	54.4	3.3	57.4	–2.1	
Futures prices[5] **9/12**			**Change**		**Change**	**%**
Light sweet crude ($/bbl)	102.85	108.30	–5.45	75.95	26.90	35.4
Natural gas, $/MMbtu	7.41	7.32	0.09	5.65	1.77	31.3

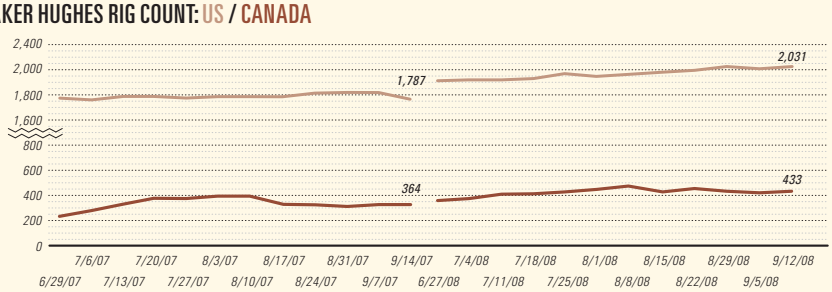
[1]Based on revised figures. [2]Includes adjustments for fuel ethanol and motor gasoline blending components. [3]Includes other hydrocarbons and alcohol, refinery processing gain, and unaccounted for crude oil. [4]Stocks divided by average daily product supplied for the prior 4 weeks. [5]Weekly average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

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



Note: Monthly average count

BAKER HUGHES RIG COUNT: US / CANADA



Note: End of week average count

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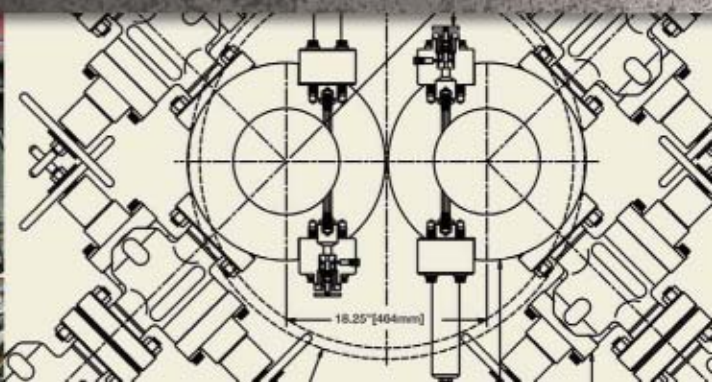

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diesel compliant with TxLED requirements.

In coordination with the US Department of Energy, EPA granted the waiver to allow greater flexibility for fuel distribution systems. ✦

Exploration & Development — *Quick Takes*

North Argentina discovery flows oil near Chivil

Gran Tierra Energy Inc., Calgary, reported a stabilized flow rate of 2,324 b/d of 43.8° gravity oil on a production test of Cretaceous Lower Palmar Largo volcanics and volcaniclastics at the Proa.x-1 exploration well on the Surubi block in northern Argentina's Noroeste basin.

The well, tested at 12,649-661 ft and 12,620-641 ft on a 35/64-in. choke, was drilled to total depth of 12,920 ft measured depth. Water cut was 0.5%. A drillstem test in the same formation at 12,694-713 ft yielded no flow.

The company, operator with 85% working interest in the 90,688-acre block, plans to begin a long-term test within a week through a 31/2-in., 15-mile, 4,000 b/d pipeline to Gran Tierra-operated Chivil field on the adjacent Chivil block. Recursos Energeticos Formosa SA (REFSA), the provincial government company, has 15% interest.

Gran Tierra, which carried REFSA's drilling costs, will be reimbursed for all costs incurred during drilling from 50% of the net production assigned to REFSA. Provincial royalties on production range from 12% for up to 4.7 million bbl of cumulative production to 14% on 4.7 million to 9.4 million bbl to 16% for further production.

Gran Tierra said the well's results improve the prospectivity of identified leads in the Surubi block and in the adjoining Chivil and Palmar Largo blocks, where the company has 100% and 14% working interest, respectively.

RWE finds gas in Disouq concession in Egypt

RWE Dea AG has discovered gas for the second time within the South Sidi-Ghazy 1x-well on the Disouq concession in the Egyptian Nile Delta.

South Sidi-Ghazy 1x was spudded on Jul. 20 and reached a TD of 3,188 m within the Late Miocene. The gas was found within the Messinian formation.

"The well encountered a gas bearing interval of 24 m column. Formation evaluation and the Modular Dynamics Tester Tool confirmed the presence of gas in the intervals of 2,747-2,771 m with porosities in the range of 27%," RWE said.

RWE Dea picked up the 5,375 sq km onshore block in July 2004. The prospect is based on a seismic anomaly within the Upper Messinian succession, which shows direct hydrocarbon indicators conformable with a four way dip closure at the top of the Messinian succession in analogue to the North Sidi-Ghazy discovery, drilled by RWE Dea in 2008.

The company will go on to drill nearby exploration well North West Khilala-1x to see if there is any more hydrocarbons in the Messinian structure.

South Sidi Ghazy-1x well is the fifth well drilled by RWE Dea in the Disouq Concession. It is 7.5-km south/south-west of the North Sidi Ghazy-1x discovery.

Petrobras makes offshore find with Iara

Petroleos Brasileiro SA (Petrobras) announced that an offshore field, in the same block as the Tupi field, is expected to yield some 3-4 billion bbl of recoverable light crude and natural gas.

The Petrobras-led consortium, which also includes BG Group and Galp Energia, completed the drilling of well 1-BRSA-618-RJS and proved "the relevant discovery" of light oil in the presalt reservoirs.

"The new discovery…was confirmed by a cable test and revealed the existence of light oil, with specific gravity between 26° and 30° API, in an area of some 300 sq km that has been very well defined seismically," Petrobras said.

The state-owned firm said that the discoverer well, called 1-BRSA-618-RJS (1-RJS-656) and known as Iara, lies in an area north of Tupi, some 230 km offshore Rio de Janeiro. It is located at a depth of 2,230 meter, and reached a final depth of 6,080 meters.

Petrobras said the consortium partners "will give continuity to the exploratory activities and to the investments in this area via a Discovery Assessment Plan to be submitted to the NPA, as provided for in the Concession Agreement, in order to characterize the field better."

Petrobras, operator, holds a 65% stake in the consortium, while BG Group holds 25% and Galp Energia holds 10%. ✦

Drilling & Production — *Quick Takes*

Total to operate Madagascar's heavy oil license

Total SA will operate the Bemolanga heavy oil license in Madagascar with a 60% interest after signing a farm-in agreement with Madagascar Oil SA.

The partners will use mining technology to develop the estimated 10 billion bbl of heavy oil in place. The onshore 6,500 sq m license in western Madagascar was granted to Madagascar Oil in 2004.

"During the initial appraisal phase, additional core drills will be drilled to determine the license's potential. A production pilot will be set up in a second phase to confirm the development parameters before considering a large scale development of the license," Total said.

It believes that heavy oil will be crucial to supply world markets within the next decade and will build upon its experience developing these projects in Venezuela and in Canada.

Total already has marketing, aviation fuel, and petroleum product logistics in Madagascar.

CNOOC brings Peng Lai oil field on stream

China National Offshore Oil Co. Ltd. said another platform at the Peng Lai (PL) 19-3 oil field has come on stream.

Platform B is the third of five platforms in phase II of PL 19-3. Platforms A and C already have started production, while D and E have yet to begin.

The development facilities in Phase II of PL 19-3 include the five wellhead platforms, a central processing facility and a 190,000 b/d world-class floating production, storage, and offloading facility. PL19-3 field, which lies on Block 11/05 in the Bohai Bay, was jointly developed by CNOOC and ConocoPhillips China Inc. CNOOC holds a 51% interest in the field and ConocoPhillips holds the remaining 49%.

Peru aims to meet half domestic oil needs by 2015

Peru's state-owned Petroleos del Peru (Petroperu) has taken the first steps toward becoming an oil producer again and aims to produce enough to meet at least half of domestic fuel demand by 2015, according to Petroperu Chief Executive Cesar Gutierrez.

"Diesel consumption will continue rising in Peru at an annual rate of 3.5%," Gutinerrez told Spanish news agency Efe, adding that demand will increase to 90,000 b/d over the next seven years from the current 60,000 b/d.

"If we want to maintain our share of the market, we must produce 45,000 b/d because today we have 50% of the market," Gutierrez said.

Currently, Petroperu must buy all the petroleum it refines from private firms. It currently buys about 30,000 b/d, with some 24,000 b/d produced domestically, while the remainder is imported.

Gutierrez said the remaining 30,000 b/d of fuel needed to meet domestic demand is supplied by Spain's Repsol-YPF SA, which imports a percentage of the crude it processes.

"We buy it all at the international price and so what we want to do is exploit our fields," Gutierrez said.

To double domestic production, Gutierrez said Petroperu will have to modernize the Talara refinery at a cost of $1 billion and start production from the 12 blocks where petroleum exploration is taking place.

"We are in six preexploratory lots with (Brazil's) Petrobras and (Colombia's) Ecopetrol, and now we have won four offshore lots and two other lots on land," Gutierrez said.

According to Efe, Petroperu officially ended its petroleum exploration and production activities in 1996, when former President Alberto Fujimori's administration privatized the remaining lots the company had stakes in.

In 2006, when President Alan Garcia took office, he agreed to a request from Gutierrez to allow Petroperu to find private partners to fund petroleum and gas exploration and production, with the state firm holding minority stakes in fields.

Under this arrangement, Petroperu formed partnerships with Petrobras and Ecopetrol in 2006 to explore six blocks, and earlier this month came to agreements with Norway's Discovery, India's Reliance, China's CNPC and Argentina's Pluspetrol.

In July, Petroperu announced plans to invest some $50 million for an extension to the 852-km Norperuano crude oil pipeline that runs to the Pacific coast from fields in the northeastern jungle region (OGJ Online, July 24, 2008). ✦

Processing — *Quick Takes*

Iran, Ecuador sign refining upgrade agreement

Iran and Ecuador, both members of the Organization of Petroleum Exporting Countries, signed a memorandum of understanding in the oil sector under which Iran will help refurbish and upgrade Ecuador's refineries.

The MOU, signed in Tehran by Iranian oil minister Gholam Hossein Nozari and Ecuadoran minister of mines and petroleum Galo Chiriboga Zambarno, calls for the construction of an oil refinery to be co-financed by Iran, Ecuador and fellow OPEC member Venezuela.

Nozari said the two oil ministers additionally agreed to construct a petrochemical production unit in Ecuador, while Zambarno said the two countries would establish an oil company to implement the joint energy projects.

Their agreement also covers training of Ecuador's oil industry employees by Iranian experts and cooperation in maintenance on Ecuadorean oil facilities.

Ecuador, the fifth largest oil producer in South America, currently has three refineries with a combined capacity of 176,000 b/d. The largest refinery in Ecuador is the 110,000 b/d Esmeraldas facility on the Pacific coast.

According to the US Energy Information Administration, Ecuador is a net importer of refined oil products: during the first half of 2007, Ecuador's Ministry of Energy and Mines said the country imported 86,000 b/d of refined products, while exporting 36,000 b/d.

Japanese refiners to cut products output

Three Japanese refiners, who control some 35% of the nation's refining capacity, plan to cut their output by the end of the year due to reduced demand for fuels.

Showa Shell Sekiyu KK will cut production by 4.4% for the remainder of 2008, while Cosmo Oil Co. will reduce output during the fourth quarter—possibly by 2%.

Idemitsu Kosan Co. said it also would reduce output in the face of declining demand in Far East markets, but has signed a contract to export gas oil to Mexico (OGJ, Sept. 15, 2008, p. 48).

Idemitsu also plans to export gasoline to Mexico and now is in talks with the Mexican government over specifications. "We are telling them that Japanese specifications are fine (for Mexico)," said Idemitsu sales director Seiji Fukunaga (OGJ Online, Sept. 10, 2008).

Kuwaiti minister confident about refinery support

Kuwaiti Oil Minister Mohammad al-Olaim, rejecting allegations that he had violated any laws in the award of contracts, expressed confidence he would win parliamentary support to construct the 615,000 b/d Al-Zour refinery.

"There was relief among the members of the committee over data presented by the ministry," said al-Olaim after briefing parliament's key financial committee for 5 hr. "All the steps taken…were

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legal and transparent," al-Olaim said.

Members of parliament had demanded an investigation after state-owned Kuwait National Petroleum Co. (KNPC) awarded contracts worth $8.4 billion to Japan's JGC Corp and South Korea's GS Engineering & Construction Corp., after a tender.

Al-Olaim also came under pressure from some parliamentarians who alleged other violations, particularly in connection with the award of a utility and offsite services package without a tender to US engineering firm Fluor.

The main objections came from Kuwait's Popular Action Bloc which insists that the bidding process and awarding of contracts must go through the Central Tenders Committee and that oil projects are no exception.

In August, al-Olaim refuted legislators' claims of any wrongdoing in the award process for the al-Zour refinery project, and said he would make some documents on the tenders available for inspection (OGJ Online, Aug. 17, 2008).

Kuwait has announced plans to increase refining capacity to 1.415 million b/d from the current 930,000 b/d with the new plant along with upgrades to two existing refineries. Al-Zour is scheduled to start operating in 2012, two years later than initially planned. ✦

Transportation — *Quick Takes*

Iraq resumes oil exports following storm

Iraq has resumed oil exports following a storm that shut in the southern port of Basra and the completion of repairs to the bomb-damaged northern pipeline that carries crude from the northern Kirkuk fields to the Turkish Mediterranean port of Ceyhan.

On Sept. 15, Iraqi oil exports stood at some 1.53 million b/d, up from 860,000 b/d the previous day, according to shipping agents. But the flow of exports from Basra was still lower than the normal average of 1.6 million b/d.

Oil flowed at 450,000 b/d via the country's northern pipeline system, while exports rose to 1.08 million b/d at Basra and the nearby Khor al-Amaya facility as operations at both facilities began to recover after a storm.

Oil exports at Basra slowed to 860,000 b/d on Sept. 14-15, down from 1.68 million b/d on Sept. 13, according to shipping agents. Officials stressed that the reduced throughput was due only to bad weather.

"There is a storm in the south that has contributed to the delay of exports," said one official. "It's just a storm, nothing else."

Meanwhile, until the completion of repairs in the north, Iraq had suspended shipments of crude oil along pipeline route since Sept. 10 following an explosion on the line, according to government officials.

"A bomb hit a pipeline transporting crude to Ceyhan in Turkey and halted exports on [Sept. 10]. The blast occurred in an area called Hadhar," said a spokesperson for the state-owned North Oil Co.

Virginia gas pipeline blast injures five

A natural gas pipeline exploded in Appomattox County, Virginia, the morning of Sept. 14, leveling one home and injuring five people, local and federal authorities said. Four of the injured were treated and released.

Two inspectors from the US Pipeline and Hazardous Materials Safety Administration were at the scene with state and local investigators and representatives of Williams Cos. Inc., the pipeline's owner and operator, a PHMSA spokeswoman told OGJ on Sept. 15.

The 30-in. line is part of Williams's Transco interstate system. Pressure-monitoring equipment registered a change, the line was shut down immediately, and the gas was rerouted to other lines, a Williams spokesman said. The incident did not affect service to any customers.

BP says WREP line remains shut in after conflict

BP PLC said its trans-Caucasus Baku-Supsa pipeline, also known as the Western Route Export Pipeline, remains shut a month after its closure due to the conflict between Russia and Georgia.

"It was shut as a security precaution," said BP spokesman David Nicholas. "The situation remains unchanged," he said of the line which had been carrying some 45,000-90,000 b/d of Azeri crude before the Aug. 12 shut down.

Last month, a BP spokesman said that efforts to restart the WREP had been "put on hold until we can assess the impact of this conflict on the integrity of this pipeline," (OGJ, Aug. 30, 2008).

The continued closure of the line adds to Azerbaijan's export problems as shipments of Azeri oil by rail across Georgia also remain halted after being stopped when railway bridge was damaged during the hostilities.

Despite the continued delays in reopening the oil export links, the region is still viewed as a viable energy corridor by neighboring governments and international oil companies.

Earlier this week, Tengizchevroil (TCO), the Chevron-led consortium developing the Tengiz oil field in western Kazakhstan, made an agreement with the State Oil Company of the Azerbaijan Republic to transport oil by rail across Georgia.

TCO will send up to 2 million tonnes/year of oil (40,000 b/d, on average) by barge across the Caspian Sea to Azerbaijan, according to a source at SOCAR, although volumes could eventually increase to 5 million tpy.

Analyst Global Insight interpreted the agreement as indicating that TCO is "more concerned with finding outlets for its growing oil production than it is about the inherent risks of relying on Georgia as a transit state in the wake of the Russia-Georgia war."

Total to participate in Futurol project

Total SA said it will participate in Futurol, an ethanol research and development project with a €74 million estimated budget.

The project seeks to develop a process for producing ethanol by fermenting nonfood lignocellulosic biomass. The project also will seek to determine the industrial viability of such a process.

Futurol is expected to involve French research organizations, manufacturers, and financial institutions, Total said. ✦

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Energy Institute Decommissioning Conference, Aberdeen, + 44 (0) 20 7467 7106, + 44 (0) 20 7580 2230 (fax), e-mail: hetheridge@energyinst.org.uk, website: www.energyinst.org.uk/events. 23.

ERTC Petrochemical Conference, Cannes, +44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. Sept. 29-Oct. 1.

DGMK Future Feedstocks for Fuels & Chemicals Conference, Berlin, 040 639004 0. 040 639004 50 (fax), website: www.dgmk.de. Sept. 29-Oct. 1.

International Pipeline Exposition, Calgary, Alta., 403) 209-3555, (403) 245-8649 (fax), website: www.petroleumshow.com. Sept. 30-Oct. 2.

Unconventional Gas International Conference & Exhibition, Ft.Worth, Tex., (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.unconventionalgas.net. Sept. 30-Oct. 2.

OCTOBER

GPA North Texas/NGS East Texas Red River Conference, Tyler, Tex., (713) 222-0852, (713) 222-0858 (fax), e-mail: tom.rommel@accessed.com, website: www.gasprocessors.com. 1-2.

NPRA Q&A Forum, Orlando, Fla., (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 5-8.

GPA Houston Annual Meeting, Kingwood, Tex., (918) 493-3872, (918) 493-3875 (fax), e-mail: pmirkin@gasprocessors.com, website: www.gasprocessor.com. 7.

KIOGE Kazakhstan International Oil & Gas Exhibition & Conference, Almaty, + (44) 020 7596 5000, + (44) 020 7596 5111 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.ite-exhibitions.com/og. 7-10.

IADC Drilling West Africa Conference & Exhibition, Lisbon, (713) 292-1945, (713) 292-1946 (fax); e-mail: conferences@iadc.org, website: www.iadc.org. 8-9.

International Gas Union Research Conference, Paris, +31 50 521 30 78, +31 50 521 19 46 (fax), e-mail: igrc2008@gasunie.nl, website: www.igrc2008.com. 8-10.

ERTC Lubes and Additives Conference, Berlin, +44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 13-15.

Middle East Plant Maintenance Conference, Abu Dhabi, +44 207 067 1800, +44 207 430 0552 (fax), e-mail: d.michalski@theenergyex

change.co.uk, website: www.theenergyexchange.co.uk. 13-15.

API Fall Petroleum Measurement Standards Meeting, Long Beach, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org/events. 13-17.

Oil Shale Symposium, Golden, Colo., (303) 384-2235, e-mail: jboak@mines.edu, website: www.mines.edu/outreach/cont_ed/oilshale. 13-17.

Central and Eastern European Refining & Petrochemicals Roundtable, Warsaw, +44 207 067 1800, +44 207 430 0552 (fax), e-mail: c.taylor@theenergyexchange.co.uk, website: www.theenergyexchange.co.uk. 14-16.

ISA EXPO, Houston, (919) 549-8411, (919) 549-8288 (fax) website: www.isa.org. 14-16.

Oil & Gas Transportation in the CIS & Caspian Region Conference, Moscow, +44 (0) 207 067 1800, +44 207 430 0552 (fax), e-mail: j.golodnikova@theenergyexchange.co.uk, website: www.theenergyexchange.co.uk/cispipes10register.html. 14-16.

PIRA New York Annual Conference, New York, (212) 686-6808, (212) 686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 16-17.

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

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

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

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

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

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

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

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

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

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

NOVEMBER

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

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

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.

Deepwater Operations Conference & Exhibition, Galveston, Tex., (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.deepwateroperations.com. 4-6.

North African Oil and Gas Summit, Vienna, +44 (0)

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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.

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.

AAPG Annual Convention & Exhibition, San Antonio, 1 (888) 945 2274, ext. 617, (918) 560-2684 (fax), e-mail: convene@aapg.org, website: www.aapg.org/sanantonio. 20-23.

SPE Improved Oil Recovery Symposium, Tulsa, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 20-23.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

FEBRUARY

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

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

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

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

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

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

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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.

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.

ASEG International Conference & Exhibition, Adelaide, +61 8 8352 7099, +61 8 8352 7088 (fax), e-mail: ASEG2009@sapro.com.au. 22-26.

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.

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.

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

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

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

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

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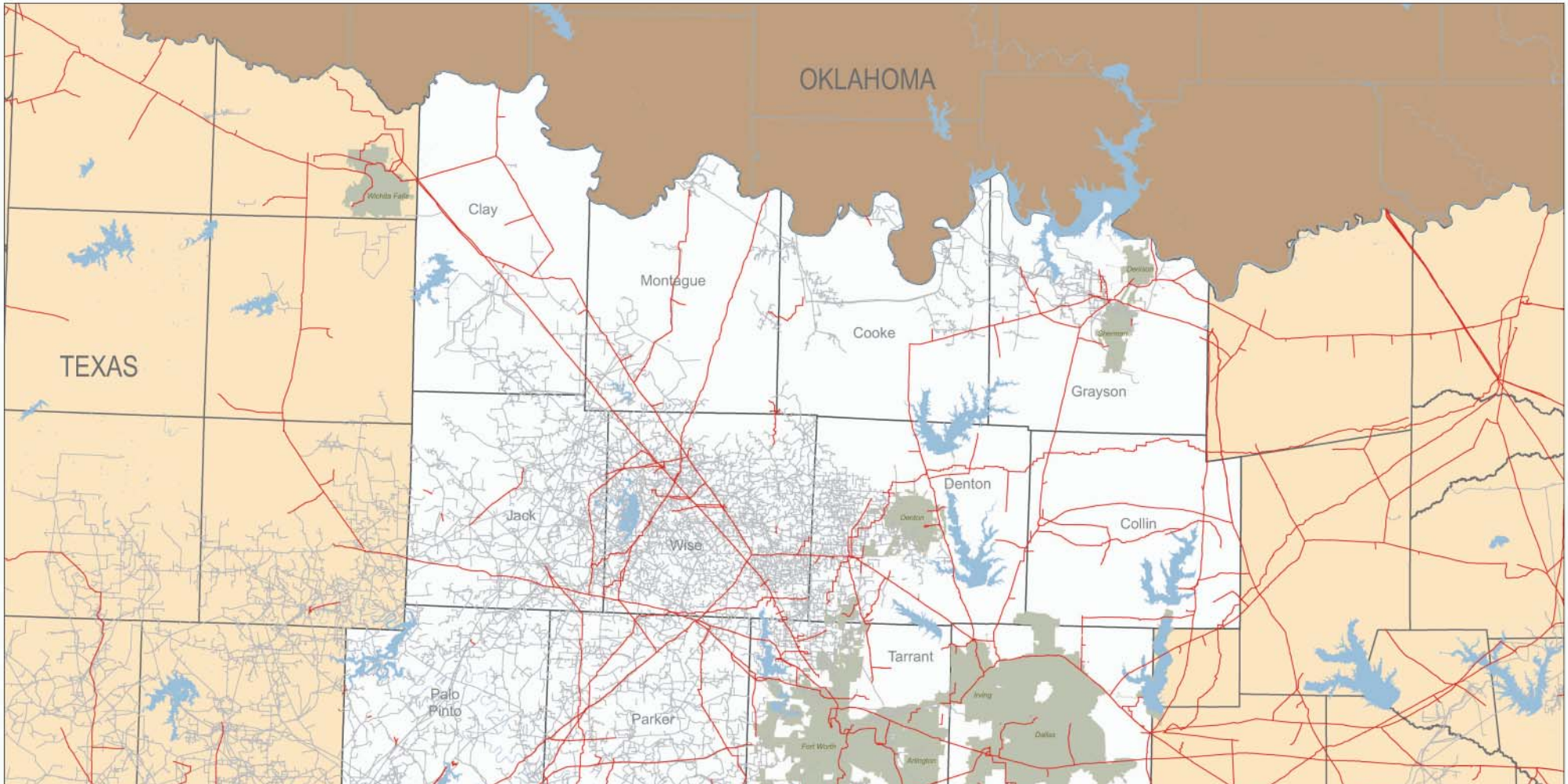

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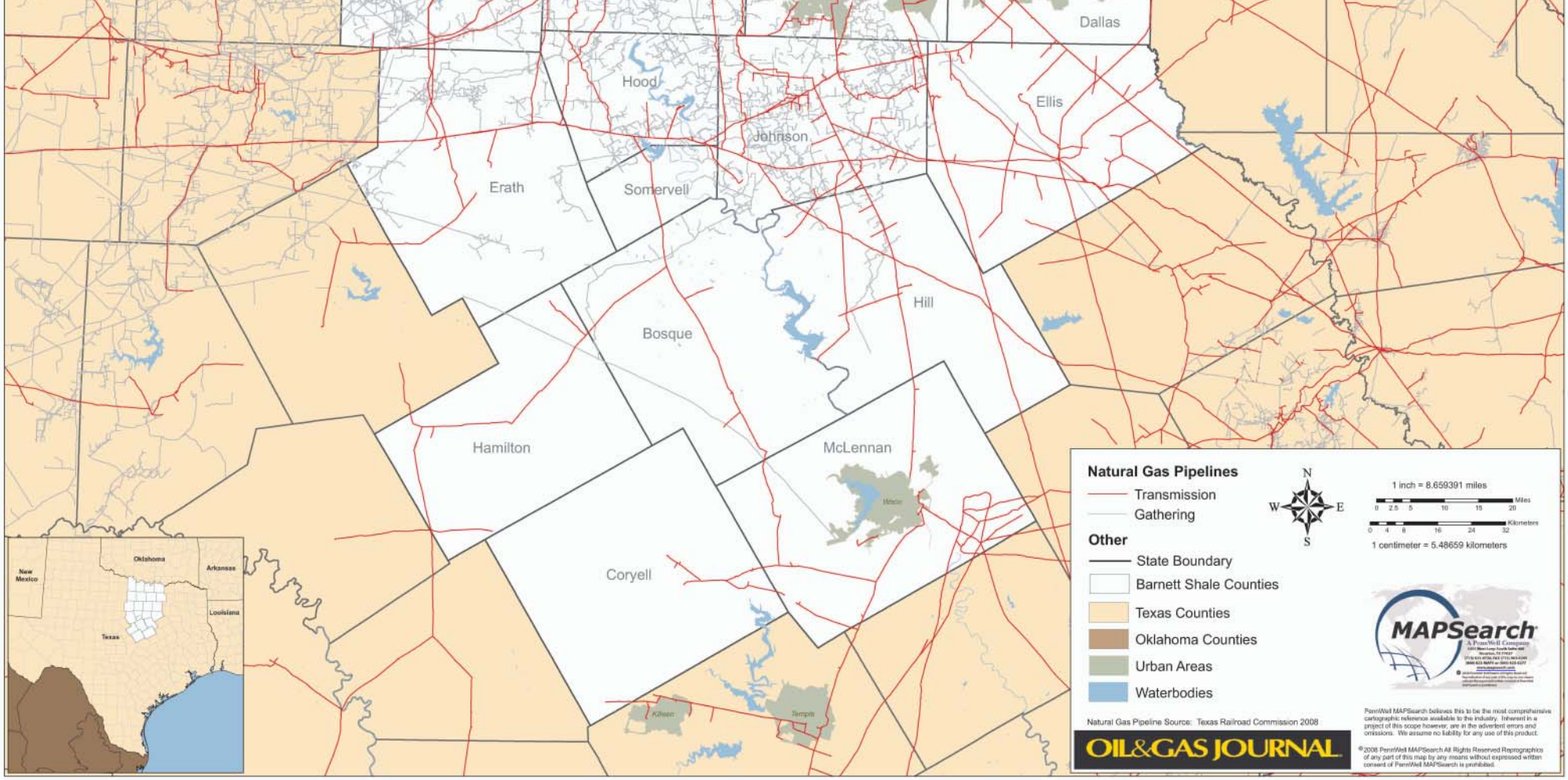

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Private Equity Capital for Energy Infrastructure & Mineral Businesses

November 16, 2007

Capital and Sponsorship for the Energy Industry Since 1988

Reversing roles

Uchenna Izundu
International Editor

Ipsos Mori, the global research company, loves asking questions, and with the economic downturn, job insecurity, rising inflation, and record-high energy prices, anyone who is anyone has an opinion on the matter because it affects his or her pocket.

So, when Mori asked this OGJ editor to conduct an interview along with Britain's other oil and gas journalists, I thought it was time to flirt with the unknown and challenge my comfort zone. The role reversal is particularly odd as a journalist. Whether we make the news or report the news is an interesting debate that will continue to rage within academic circles, particularly as the internet has fundamentally changed how we communicate.

Becoming an interviewee, sometimes, is like being caught under a very hot ray of sunshine; temporarily blinded as a continuous stream of questions are fired seeking opinions, facts, and information. Are people honest when they are interviewed? Are they influenced by their environment or indeed the person asking the questions?

Although six years on in my career, I am still amazed at the reaction it invokes: people clam up immediately. They are afraid of being misquoted or indeed quoted! Along with lawyers and real estate agents, this profession doesn't receive many kudos in British society.

What journalists think

According to the survey, 61% said high prices would be the most important issue for the oil and gas industry over the next 12 months followed by maintaining supplies (48%) and rising costs (39%). Interestingly enough, however, 39% of us said that the economic prospects for the oil and gas sector would stay the same over the next 12 months compared with 35% who said it would improve and 26% who thought it would get worse.

"We are not running out of oil. What we are running out of is oil that is relatively easy to recover," said one respondent. Stories about TNK-BP's recent operating difficulties in Russia illustrate the increasing importance of nationalism in the petroleum sector. According to the report, 16% of journalists recognized supplier nationalism as an important issue over the next 12 months. "There is a growing trend around the world towards the nation states wanting to hang on to their own indigenous oil and gas," said another journalist.

And when it comes to British journalists judging companies, the most important factor, for 84% of those surveyed, is financial performance. That is unsurprising considering that the majors are reporting billions of dollars of quarterly profits. This response was down 2% on the answer given in the 2007-08 survey. Quality of management is the second most crucial parameter, according to 65% of those questioned, and 61% of journalists voted for honesty and integrity. The change for 2007-08 respondents was –4% and –11% respectively.

We consider it very important to access top executives for background discussions and briefings, so please make more time for us in your schedules! About 45% of us also said this was very important for on-the-record interviews.

Advice for PR personnel

PR personnel should take note: email is the preferred way to communicate; no one faxes these days. And 48% of us (me included) still like a phone call. I was surprised that 3% of those surveyed said they liked hard-copy mail. In this fast-moving environment, surely that would be inefficient because any news release would be old by the time it was received.

Many small operators hire external agencies to help them raise their profile and reach out to journalists. The good ones will study the market and the media outlets to develop a strategy to manage their client's reputation.

Too many PR personnel continue to fire information willy-nilly hoping to get a mention for their client, sending unsuitable content, without bothering to do the basics about that media outlet. Research, research, research: OGJ does not publish information about boiler repairs! The large companies can sometimes have this and in-house staff, but 39% of us said it was less acceptable to deal with an external media relations agency than a company's in-house media relations personnel.

It will be interesting to see how many operators' press teams will use this information in the future to tweak their communication strategies and build their relationships with us.

That is a survey for another time of course, and I will keep you posted. ✦

Editorial

Two oil-dependent economies

As financial crises rock two globally important, oil-dependent economies, a question looms for anyone with capital to expose to risk: Which is likelier to emerge from this turmoil as a promising and safe place to invest money—the US or Russia?

Both countries depend on oil—the US on purchases and Russia on sales. The US worries too much about its oil dependency, Russia not enough. And both countries bleed from deep financial wounds.

Giants succumb

In rapid succession, three US financial giants have succumbed to a credit crunch. Lehman Bros. Holdings Inc. declared bankruptcy. Merrill Lynch & Co. agreed to be bought by Bank of America Inc. A beleaguered American International Group Inc. submitted to government control after receiving an emergency loan of $85 billion. This all came after the government rescued mortgage behemoths Fannie Mae and Freddie Mac on Sept. 6 and the investment bank Bear Sterns in March.

It has become painfully clear that a rebalancing of national accounts and purge of credit-market excesses were inevitable, even necessary. Equally clear is the need for better, though not necessarily more, regulation. Those processes will be difficult. But they will end.

The adjustment, moreover, will have help from oil prices falling not only from a weakening of market fundamentals but also from financial side effects. This year's surge of investment money into commodities, including oil, already was receding when the newly aggravated financial crisis slashed the ability of oil traders to buy on credit. Also, the Federal Reserve has resisted new pressure to cut interest rates and weaken the dollar. Leverage limits and dollar strength should add downward momentum to oil prices.

While falling oil prices are economic health food in the US, they're poison in Russia. There, an arrogant government has squandered its oil boom. Instead of promoting foreign investment and economic diversification, it has exploited nationalism and momentary public comfort to fatten its authority. It has raised taxes capriciously, expropriated the assets of large companies, thrown leaders of private corporations into jail or out of the country, and handed large segments of the Russian economy back to state-owned enterprises. Then it invaded Georgia.

Business seems to have lost confidence. Last week trading had to be halted on Russian stock markets, where plummeting share prices pushed aggregate losses since May to more than 40%. The rout followed publication in the Sept. 3 Moscow Times of an essay by Anders Aslund of the Peterson Institute for International Economics entitled, "Ten reasons why the Russian economy will falter."

Aslund's pessimism hinges on the Aug. 8 invasion of Georgia. "Russia's foreign aggression has strengthened the authoritarian regime, and this has ended all hopes for substantial reforms at a time when they are needed the most," he wrote. Russia, he said, has profited from a surge in private enterprise, an economic "catch-up" effect and credit boom during the transition away from communism, and high oil prices. But those sources of growth "will soon be exhausted."

Corruption and risk

As the global economy weakens, Russia remains plagued by "enormous corruption" and the inability to carry out major infrastructure projects, Aslund wrote. The government's bullying of private businesses has raised political risk. Investment as a share of economic growth is low by international standards. Russian efforts to join the World Trade Organization probably are doomed. Poor public services increasingly hamper economic growth. With oil prices falling and production stagnant, Russia's external accounts "are bound to deteriorate quickly." The banking system is poor. And the inflation rate is 15%/year. "In short," said Aslund, "Russia is set for a sudden and sharp fall in its economic growth."

Two economies, each dependent in its own way on oil, thus have turned stormy. One remains subject to the rule of law; the other subordinates law to raw power. One will respond to current troubles with systemic changes, good or bad; the other won't. One, if its systemic changes are constructive, will stabilize; the other will unravel, weakening the political regime, until oil prices rebound. One will attract investment; the other…. ✦


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Emulsion fuel options still viable for heavy oil

Saul Guerrero
Firewater Consulting
Caracas

Venezuela was until recently the only source of a unique fuel option that bypassed the traditional yet capital intensive two-step conversion of bitumen-extra heavy crudes(B-EHC) to synthetic crude oil (syncrude) and then to refinery products.

Petroleos de Venezuela (PDVSA) and its subsidiary Bitumenes Orinoco (Bitor) had shown that it was possible to tap Venezuela's enormous reserves of bitumen in the Orinoco Belt quickly via the production of its proprietary fuel Orimulsion—a 70% bitumen and 30% water emulsion with a surfactant exported as a boiler fuel for power generation.

In 2003 major supply contracts had been approved and signed for power plants in Asia and Central America where the pricing of Orimulsion was then indexed to gas or oil, rather than coal. Its positive use in Denmark and the US Environmental Protection Agency's report had established that under adequate safeguards Orimulsion could comply with all environmental legislation as well as any other hydrocarbon fuel source.

The technical success of Orimulsion as a fuel for Wartsila generators opened up new horizons, with a new plant in Guatemala designed specifically to be used with the fuel.

As PDVSA declared in its 2003 filing to the US Securities and Exchange Commission, the Orimulsion business plan called for expanding its production capacity through joint ventures to 19.5 million tonnes (300,000 b/d) by 2006 from 6.5 million tonnes/year (100,000 b/d) in 2003.

For PDVSA and the Ministry of the Power of the People for Energy and Petroleum (MPPEP) there was every reason to feel proud of the 100% Venezuelan breakthrough, a new fuel option that after more than 15 years had finally demonstrated its technical, environmental, and pricing advantages to a skeptical and demanding power generation market.

Yet, its success was not to be. From the apogee of PDVSA's published 2003 expansion plan to the shutting down of all production at yearend December 2006, Orimulsion was the target of an unprecedented domestic attack carried out through the public media by both the Minister of Energy and the PDVSA president. The final blow was for PDVSA to renege on its long-term supply commitments. The main strand of their argument ran as follows:

- "It is more profitable for the Venezuelan state to use its existing B-EHC reserves to produce traditional oil products such as blends or syncrude than to make Orimulsion because…."
- "The market pricing and fiscal returns of these are far superior to those of Orimulsion because…."
- "Orimulsion was indexed to coal so its price was kept to $7/bbl for its bitumen fraction, and the fiscal revenue was too low…."
- "Because there has never been bitumen in Venezuela, Orimulsion is no different from all other oil production, and this proves that…."
- "Orimulsion was invented by the previous energy authorities in Venezuela solely to discredit OPEC, devalue reserves in the Orinoco Oil Belt to the price of coal, and cheat the state of its proper due in fiscal payments."

Inherited options

Current PDVSA authorities inherited two options for developing the Orinoco Oil Belt: a $14 billion investment in four upgraders that could transform some 610,000 b/d of B-EHC into 500,000 b/d of 16-32° crude; and more than 10 years invested in research and development of Orimulsion, with a capital investment of about $500 million in a 6-million-tonne production unit, a pipeline, and port facilities at Jose, which could transform some 70,000 b/d of bitumen.[1]

Both options presented problems for the new oil industry ideology:

- No production from the Orinoco Oil Belt was counted in Venezuela's OPEC quota.

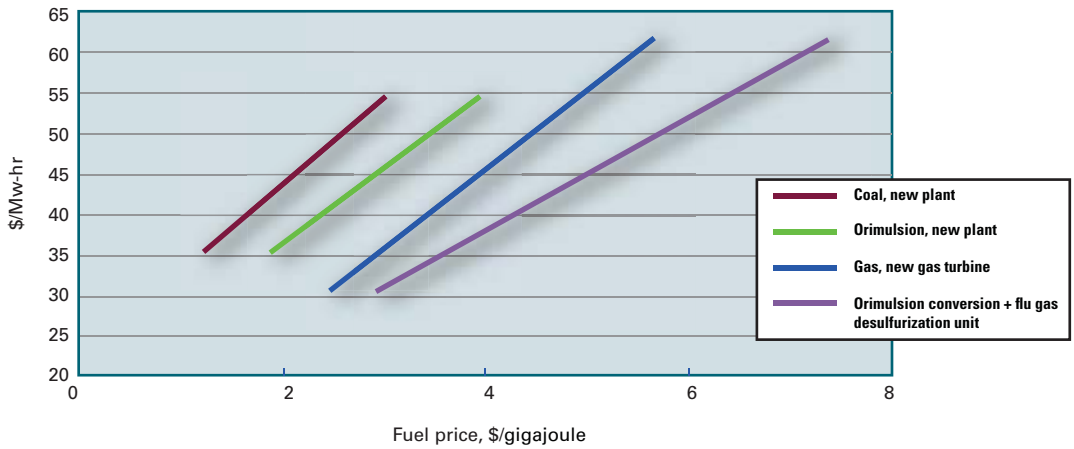
• A low royalty rate applied to the upgrading operations as an incentive for foreign investment and to Orimulsion because bitumen was used as feedstock.

• The majority of ownership in the four upgraders and in the new Chinese Orimulsion module was foreign.

• Lower tax rates applied to all of these companies.

COMPARATIVE FUEL GENERATION COSTS*

Fig. 1



*Based on a 750 Mw power plant.

• Fiscal returns were low until 1999 as a consequence of indexing the price of Orimulsion to coal.

By yearend 2006 none of the first four factors above applied. Maximizing fiscal returns to the sole owner of the oil reserves—the Venezuelan state—via royalties and income tax and the shoring up of OPEC to increase prices were fundamental to all decisions undertaken and changes made.

The change in the fifth condition, vital to the future of the Orimulsion business, also took place when contracts signed in 2003 indexed the price of Orimulsion to gas or oil with PDVSA approval. However the new contracts and their improved pricing formulas were to be totally ignored in the rush of official criticism that would ultimately lead to the closing of the business.

A school of red herrings

Against a conviction that the "old" PDVSA system had been designed expressly to circumvent and minimize fiscal obligations, it is necessary to answer the three main strands of criticism directed against Orimulsion:

1. *Making bitumen fluid would subject the Orinoco Belt to OPEC quotas.* Bernard Mommer, the ideologue behind the drive to close Orimulsion, charged: "PDVSA looked for other ways to manipulate the definition of crude oil subject to OPEC quotas: Increasing production of the extra heavy (heavier than water) crude of the Orinoco Belt—the largest reserves of its kind in the world—the company argued that Orinoco deposits, which are processed into a product called 'Orimulsion,' did not fall under the definition of crude oil." [This assertion is technically correct, as the deposits do not constitute a liquid at normal temperatures.] "Therefore, PDVSA argued, the Orinoco Belt should be classified as 'bitumen' and, hence, not be subjected to OPEC quotas," he wrote.[2]

By 2006, however, it was no longer politically correct to mention "the B word" in any document issued by PDVSA-MPPEP in reference to the Orinoco Oil Belt. Thus Mommer, now as Director of PDVSA, declared in a newspaper interview: "The reserves are classified according to their state within the reservoir and not their state on the surface… bitumen does not flow, it is a solid... there (in the reservoir) it flows, thus it is an extra heavy crude."[3]

Nevertheless, prior to 2002 in Venezuela it was accepted that some 30% of the reserves in the Orinoco Oil Belt had an API gravity of 8.5° or less, and this fraction was classified according to international criteria as bitumen.

The use of bitumen as feedstock allowed Orimulsion to be excluded from the OPEC quota. No power plant could accept a long-term dependence on a single source fuel subject to unilateral supply interruptions. In addition, it competed against OPEC members' natural gas, which was also outside of quota restrictions.

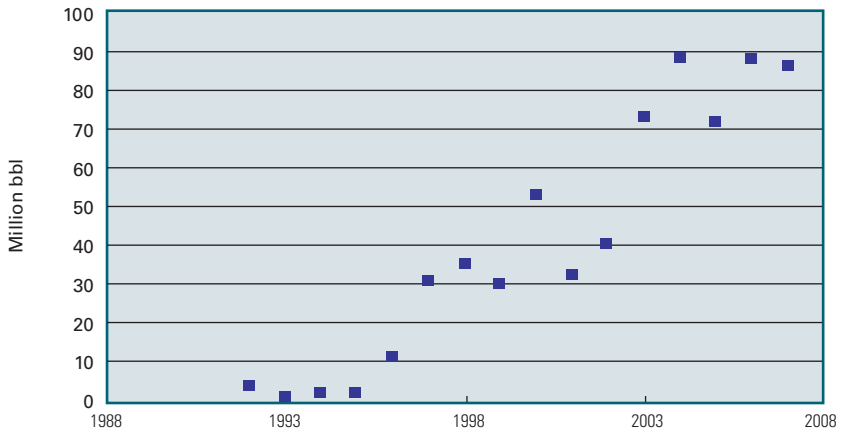
2. *Orimulsion is not cost efficient.* Actually it is a cheap fuel when indexed against gas or oil. During1992-2002 Orimulsion had to establish its technical, environmental, and even shipping credentials within a very competitive market. Pricing was established using coal as a reference, absorbing the cost of cleaning up emissions.

Fig. 1 shows how Orimulsion fares in theory vs. coal for newly built 750 Mw plants. All initial Orimulsion clients operated existing fuel oil-coal plants and profited from the market conditions to maintain Orimulsion pricing at or near the value for coal (cif Japan). This was the pricing scenario used to justify closing down the Orimulsion business.

However in 2003 the first major long-term contract was signed whereby Orimulsion pricing was established on the basis of the comparative economics of converting an existing fuel oil plant, including installation of a new flue gas desulfurization (FGD) unit vs. the cost of generation from a new gas turbine facility using imported gas.

US IMPORTS OF 15-17° OIL* FROM VENEZUELA

Fig. 2



*With 2.5-3% sulfur.

The major advantage for Orimulsion under this new market option is the much lower capital cost of conversion (including an FGD) compared with building a new gas turbine facility. Now new contracts could be negotiated on the basis of the higher value gas index curves of Fig. 1. These initial contracts reached levels in the region of at least 50% of fuel oil prices. Taking into account that due to its heat content Orimulsion pricing has a ceiling at 70% of fuel oil pricing, this represented a major change in the pricing structure of the business.

Also in 2003 Bitor encouraged a US company in Guatemala to adapt the fuel for use in Wartsila generators. The technical success opened a completely new market segment for generating plants below 200 Mw where Orimulsion could compete at prices directly referenced to oil, a market segment where coal was not an option.

3. *Merey 16 type blends are more profitable than Orimulsion.* PDVSA and MPPEP have insisted that the Orimulsion business was never going to be as profitable as the use of B-EHC reserves for the preparation of Merey 16 blends (16-17° with 2.8% sulfur), which are sold at a higher price than Orimulsion and thus produce a higher fiscal revenue for the state.

The argument however presents a major flaw: PDVSA has never had the potential to increase its production levels of Merey 16 type blends to compensate for the total loss of revenues as a result of closing down the Orimulsion business.

Diego Gonzalez published very convincing figures to demonstrate the lack of sufficient Mesa light crude oil to implement any significant increase in PDVSA's current production levels of Merey blends.[4] Indirectly the same conclusion can be deduced from the fact that PDVSA and partners invested over $2.4 billion to transform 140,000 b/d of B-EHC into 120,000 b/d of a 16° syncrude with 3.3% sulfur, a product equivalent to a very sour Merey 16 blend. This investment makes no sense if they could have simply prepared more quantities of a sweeter Merey 16 blend using existing volumes of Mesa crude with available bitumen reserves.

Finally, import data published by the US Department of Energy's Energy Information Administration (Form EIA 814) imparts significant evidence. Historically, nearly all of PDVSA's exports of Merey 16 type blends has been to the US.[5] Fig. 2 shows the historical data since 1992 when the Orimulsion business started. The closing of the Orimulsion business has not been compensated by a pro-rata increase in exports in the API gravity range of interest. In 2007 exports to the US in this range of crudes remained at basically the same level as in 2006.

The inability shown by PDVSA to increase its production of Merey 16 blends in the total absence of Orimulsion and in a raging bull market for oil prices, begs the question of whether the largest red herring of all has been the touting of higher priced blends as the excuse to close down the business.

In a September 2006 press release announcing the end of Orimulsion production, PDVSA stated: "...Once the nature of the feedstock was established as being the same as the reserves used as feedstock for the upgraders and for the preparation of blends, it was determined that either of these other options gave greater value to the extra heavy crude reserves than the Orimulsion option. Orimulsion production would now cede its place to the production of blends that would be improved in new upgrading facilities as they became available."

Nearly 2 years after the PDVSA statement, there is no evidence of an increase in the production or export of such blends or of the construction of new upgrading facilities to process them.

Mommer himself once said: "This is also the opportunity to make clear why a policy of simply blending the extra heavy crude is not possible. The reason is that the blend enters a very limited market of refineries with deep conversion capacity. If this capacity is exceeded, the price of extra heavy crude would collapse."

Therefore even Mommer's contention that the production of Orimulsion instead of Merey 16 blends has generated an onerous opportunity cost for Venezuela ($290 million in 2002) rings hollow due to the lack of Mesa diluent and the absence of end markets that could have absorbed both the early production observed in Fig. 2 plus any hypothetical additional production of blends instead of Orimulsion.[6]

All these facts lead to the conclusion that PDVSA never had any new market

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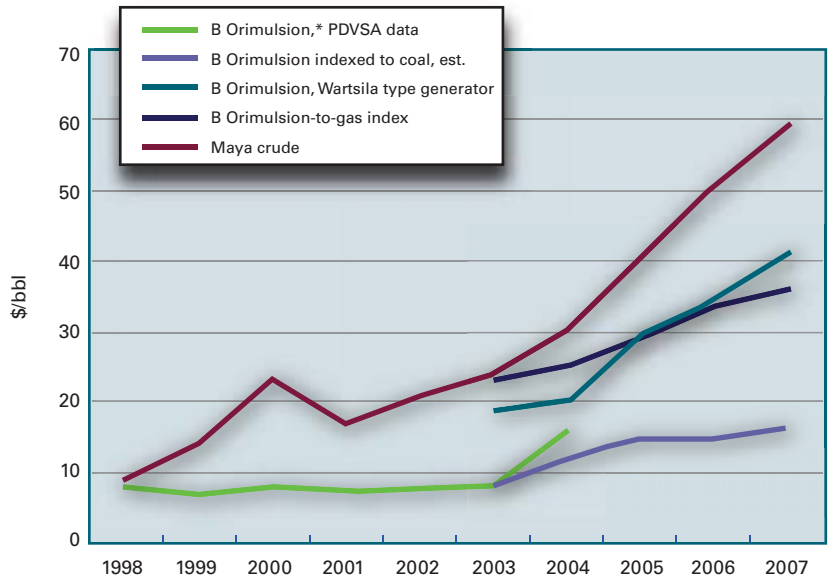
VALUE OF BITUMEN IN ORIMULSION VS. MAYA CRUDE

Fig. 3



*Bitumen in Orimulsion.

alternative in the foreseeable future to compensate for the closing down of the Orimulsion business and the loss of $500 million/year in sales (2007 energy prices) for every 100,000 b/d Orimulsion module that ceased to exist.

Brave new world

Is this tale about the last days of Orimulsion simply a footnote in the history of energy, where PDVSA will be seen to have eliminated an interesting and growing segment of its export market, for reasons as yet unknown but which are certainly not the ones given in public by its authorities?

Or do emulsion type fuels such as Orimulsion represent a viable option in today's energy-starved market that needs to be addressed seriously again as they can help alleviate the demand for energy and electric power in both the industrialized and developing world?

Bitumen and EHC reserves that are considered recoverable represent at this time around 1,000 billion bbl, with the two main deposits in Venezuela and Canada. A fuel along the lines of Orimulsion can bring part of these deposits into play in the power generation market within 3 years, at a fraction of the cost of installing new refineries, thus opening up sources of hydrocarbon energy supply at a most critical time.

The public track record of Orimulsion over some 15 years and the more than 60 million tonnes used around the world provide enough operating, transport, storage, and emission data to give a very solid starting point for a fresh look at this option. For major developing countries, which in the next decade will be the source both of an unstoppable energy demand and of increasing CO_2 emissions, Orimulsion type fuels could represent a welcome choice between costly LNG and fuel oil options or the more probable sharp increase in the use of coal with 20% more CO_2 emissions than Orimulsion.

Yet Orimulsion proved to be an inconvenient fuel, not only for PDVSA-MPPEP but also for energy suppliers, OPEC members, and environmental groups in the industrialized world. On the one hand it can make important inroads into traditional LNG markets and displace fuel oil in Wartsila type generators. On the other hand it forces a most necessary and critical environmental discussion to focus on technical and proven facts and not on perceptions, one that correctly places an Orimulsion type fuel in the context of tough energy choices that must be faced as developing countries inexorably inch forward toward a standard of living closer to that of the industrialized world.

Questions remain: Do the economics really make sense? Why should an effort be made to again develop the market for Orimulsion type fuels?

First, Orimulsion had proven by 2003 that a market demand existed for such fuels to generate power without having to lower its price to that of coal. Fig. 3 illustrates how the price of bitumen reserves marketed via an Orimulsion type fuel indexed to coal, to gas, or to oil compare with the price of Maya-Merey 16 crude. The lower solid black curve shows the pricing of the bitumen fraction in Orimulsion as reported by PDVSA.

For most of the period it followed the stable coal index, but in 2004, the last year PDVSA published Orimulsion pricing, the new pricing formulas kick in. Had the pricing followed strictly a coal index, it would have continued along the dotted line.

The marked deviation in 2004 is a direct result of higher prices linked to oil that were suddenly in effect. The next two curves reflect the pricing bitumen reserves can command for contracts where the fuel is used in Wartsila type generators or where it can compete against gas in converted fuel oil plants fitted with FGD.

The final curve, Maya-Merey 16, really belongs to another market, because at these prices neither crude can be used for power generation for most of the period covered.

Second, the market growth PDVSA initially projected for Orimulsion—to 300,000 b/d—was based on long-term fuel contracts. Orimulsion, like LNG, could only grow on the back of guaranteed customers as there was no spot market for this fuel. Thus by 2006 there was a certified market demand for enough Orimulsion to supply nearly 10 Gw in generation capacity.

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Compared with coal and gas generation, this figure is a modest but significant incursion. Compared with other new energy sources, its impact is better judged by stating that the final withdrawal of Orimulsion from the energy market had the same impact as if all of the world's geothermal or 13% of wind power generation had been eliminated, or in energy content as if 60% of ethanol for fuel production had suddenly disappeared from the market in 2006. The decision to foreclose such a relevant contributor to the world's energy needs had to be justified on much more solid grounds than those here reviewed.

It is possible to tap quickly into bitumen reserves with low capital requirements and to obtain long-term contracts for power generation that value the bitumen fraction at $30-40/bbl at 2007 energy prices.

Any new phase in the saga of this type of fuel will require two incentives: a push from B-EHC reserves owners seeking faster and less capital intensive outlets for their underground assets before they are devalued by competition from other sources of energy and a pull from plant owners, retail and industrial customers, and government agencies, which will in the future be under strong pressure to present a lower-cost alternative to their increasingly vocal and critical client base.

It would be inexcusable to ignore that the option not only exists but has been tested and found attractive by important sectors of the power generation market around the world. ✦

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The author

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Storm recovery begins; limited refinery damage seen

Nick Snow
Washington Editor

Sam Fletcher
Senior Writer

The US oil and gas industry reported early progress as it began to recover from damage caused by Hurricane Ike, which made landfall over Galveston, Tex., in the early hours of Sept. 13.

"Clearly, we have experienced damage to a number of our facilities," American Petroleum Institute Pres. Red Cavaney said. "However, it appears to be less than that associated with Hurricanes Katrina and Rita in 2005."

Based on aerial inspections by the US Minerals Management Service, industry, and the US Coast Guard through Sept. 15, MMS officials said 28 of the 3,800 offshore oil and gas production platforms in the Gulf of Mexico were destroyed by Hurricane Ike. "Several other platforms have been reported as significantly damaged; information on those facilities is being compiled and will be released in the near term," officials said Sept. 16. Initial estimates were that the destroyed production platforms produced a total of 11,000 b/d of oil and 82 MMcfd of gas.

"To date, most of the destroyed platforms include older facilities with small levels of production," said Lars Herbst, regional MMS director for the Gulf of Mexico. "We expect additional reports of damage as the weather allows more flights and operators are able to board the platforms and begin inspections."

E&P damage reports

Shortly after the storm cleared its path onshore, oil and gas producers in the gulf began to report their damage assessments.

Analysts in the Houston office of Raymond James & Associates Inc. said, "Hurricane Ike appears worse than initially expected, as several jack ups have been damaged, as well as a few semis whose moorings were broken." MMS officials reported three jack up drilling rigs destroyed and one jack up with

extensive damage. Two semisubmersible rigs that had been reported drifting Sept. 13 later were secured by tugs.

MMS said, as of midday Sept. 16, that 425 of the 717 manned production platforms and 50 of the 121 mobile offshore rigs in the gulf were still without crews. MMS reported 95.9% of the oil and 82.3% of the natural gas normally produced from federal leases in the gulf remained shut in. The US sector of Gulf of Mexico accounts for 25% of all the oil and 15% of all the natural gas produced in the US. As of June, daily production from the gulf amounted to 1.3 million bbl of oil and 7 bcf of gas. Since then, gas production from the deepwater Independence Hub facility increased, and in August gas production from the gulf was estimated at 7.4 bcfd.

Other reports of damage in the gulf included:

- ExxonMobil Corp. reported only limited minor damage to its offshore platforms.
- ATP Oil & Gas said its Gomez Hub sustained minimal damage. The company's production at Canyon Express is online, and officials plan to bring the remaining Gulf production back as receiving stations and pipelines permit.
- Ensco International said it located "all but one" of its jack up rigs that were in the hurricane's path. The missing rig is Ensco 74, a MLT Super 116-C that was in South Marsh Island Block 149 prior to the storm. The rig is insured for $100 million, and the company has a $50 million per occurrence retention for gulf windstorm damage losses, officials said. Ensco said it has crews aboard 8 of its 13 jack up rigs in the gulf. No damage to those rigs was reported.
- Noble Corp. reported mooring failures on two of its rigs, the Noble Paul Romano and Noble Amos Runner, that drifted from their original locations. Those rigs have been boarded, and power has been restored, officials said. The mooring system of the Noble Lorris Bouzigard was damaged, but it remained in the area of its primary location. It, too, has been boarded and power has been restored. Tugs were on station to assist with the start-up of each of the rigs.
- Pride International Inc. said its 250-foot mat slot jack up, The Wyoming, is apparently a total loss, although the rest of its fleet appears to have weathered the storm. Pride had insured the rig for $45 million.
- Rowan Drilling Co., Houston, reported its Rowan-Anchorage rig may have capsized and sunk during the hurricane. It was insured for $60 million, with a $17.5 million windstorm deductible. It had a carrying value of $4.5 million and had been operating under a well-to-well contract of $60,000/day, Rowan said. In addition, the company said its Sabine Pass facility in Texas would be out of commission for a time after withstanding a storm surge. Its new jack up rig, the Rowan Mississippi, was struck by a vessel while stationed there, but Rowan said the damage is limited. The company's other rigs in the Gulf Coast area appeared to have suffered minimal damage, pending closer inspection once their crews return.
- Hercules Offshore Inc. said its Hercules 78 rig, an 85-ft Donhaiser Marine submersible, was moved 600 ft from its pre-storm position. An assessment crew was onboard and a diving vessel will conduct an underwater survey of the rig. The company has start-up crews on most of its active rigs in the gulf.
- Helmerich & Payne Inc. reported no material damage to any of its drilling rigs or facilities. However, officials remained "uncertain" how the loss of power and "the impact on the labor force" in the Houston and southeast Texas area will affect the company's rig construction facilities, as well as those of its vendors. They said flooding also could affect Helmerich & Payne's new-build rig delivery schedule.

"Clearly, we have experienced damage to a number of our facilities. However, it appears to be less than that associated with Hurricanes Katrina and Rita in 2005."—**American Petroleum Institute Pres. Red Cavaney**

Pipeline damage

The US Pipeline and Hazardous Materials Safety Administration had not received reports of major pipeline problems as of Sept. 15, a spokeswoman for the US Department of Transportation agency told OGJ. She said the emphasis prior to the hurricanes was on working with operators to make sure backup power generation was available.

"For the most part, we've had a lot of encouraging news. The restoration efforts are moving ahead. Some pipelines have already resumed operations at reduced capacity," she said.

MMS was making helicopter flyovers to investigate reports of oil spills and sheens. While too soon for definitive reports, officials said there was one sheen, estimated to be 9 bbl, that was spotted Sept. 15. Subsequent investigations showed the sheen had dissipated.

Reports of pipeline damage included:

- The 2.4 million b/d Colonial products pipeline serving the East Coast resumed partial operations Sept. 14.
- Explorer Pipeline Co., the second largest refined products pipeline in the US, regained power at its Pasadena, Tex., point of origin but not at Port Arthur. The pipeline was making deliveries of petroleum products in the Houston area. Officials said they hoped to deliver refined product to points further along on its Lake Charles-to-Chicago pipeline.
- Shell Pipeline transported crude inland from some eastern Gulf of Mexico production facilities as workers continued assessment of its Central Gulf and western gulf systems. Damage was

reported at Shell Pipelines' Eugene Island 331 intermediate pumping station platform where an underwater survey team was inspecting. The Shell-operated Capline Crude Oil Pipeline System continued to deliver crude from St. James, La., and planned to ramp up rates as additional crude supply becomes available.

• Work was in progress to mitigate spot flooding and restore electricity at some facilities at the western end of the Houma-to-Houston crude system. The system was not able to move crude from Houma, La. Shell said its finished product storage and delivery systems in the Houston and Port Arthur areas were using portable generators to make limited deliveries from inventory to connecting truck terminals and pipelines.

• The Louisiana Offshore Oil Port resumed unloading crude oil from tankers Sept. 15 and was making deliveries to customers from its Clovelly storage facility.

• TEPPCO resumed service on its 30-in. crude oil pipeline to Cushing, Okla., and its 20-in. refined products pipeline. Power has been restored to the Seaway dock and Jones Creek terminal in Freeport, Tex., and those facilities are ready to receive crude shipments when the port reopens.

• Enterprise Products Partners restarted its NGL and propylene fractionators in Mont Belvieu, Tex., as well as major pipelines on the Texas-Louisiana Gulf Coast. In Louisiana, most processing plants are either operating or waiting to receive natural gas production, officials said.

• Targa Resources Partners reported only minor disruptions in its gulf operations as a result of market supply issues. Its onshore Louisiana facilities are fully operational, and volumes are expected to ramp up to normal levels in a matter of days.

• Plains All American said damage to its Gulf Coast facilities appeared minimal.

Refinery damage

On Sept. 16, the US Coast Guard reported 103 vessels waiting outside the Houston Ship Channel, which remained open only to outbound traffic with drafts of less than 12 ft. The ports of Beaumont and Port Arthur were open to vessels with drafts of less than 16 ft. The ports of Freeport, Texas City, and Lake Charles, La., remained closed pending clearance of navigation hazards. The Port of Morgan City, La., remained in operation in spite of extensive flooding from eastern Louisiana through Texas.

The Department of Energy reported 14 refineries with total capacity of 3.57 million b/d remained shut down Sept. 15, while 13 refineries (total capacity of 3 million b/d) were operating at reduced rates. In the Houston area, 5 pe-

troleum products pipelines with a total capacity of 1.18 million b/d were shut down. Another nine pipelines with total capacity of 6.69 million b/d were operating at reduced rates. Officials reported 24 natural gas processing plants (12.2 bcfd total capacity) in Texas, Louisiana, and Alabama remained shut down. As of Sept. 16, 42.1% of Texas and 2.8% of Louisiana remained without electrical power.

Having delivered 380,000 bbl to Marathon Petroleum and Placid Oil, DOE said it would deliver an additional 309,000 bbl of oil from the Strategic Petroleum Reserve to ConocoPhillips' Wood River refinery and Placid Oil's Port Allen refinery. DOE has released a total of 939,000 bbl from the SPR this month; Citgo requested 1 million bbl on Sept. 14.

Reports of refinery damage included:

• Valero Energy Corp. said power was restored to most production units at its 245,000 b/d Texas City refinery, and the company was working to restore power at its 295,000-b/d Port Arthur refinery. Its 130,000-b/d Houston refinery was in the preliminary stages of a multiday restart process. "The plant has power and steam, as well as a limited supply of industrial gases, said company officials. However, production at the main process units is not expected for several more days, and adequate supplies of external industrial gases remain an issue. Valero's other Gulf Coast refineries remain in operation at planned rates. Its refinery in Ardmore, Okla. remains at reduced rates due to supply issues.

• Total SA's 232,000 b/d refinery in Port Arthur remained without power. The company had no estimate on the extent of the damage or when the plant would be brought back up.

• Shell Oil Co.'s 332,000 b/d Deer Park, Tex., refinery and chemical plant was in the initial phase of restarting operations, with normal operating rates expected in 5-7 days. The Deer Park refinery is jointly owned by Shell and Mexican state oil firm Petroleos Mexicanos.

• Motiva Enterprises LLC (a Shell-Saudi Aramco joint venture) said minor repairs were underway at its Port Arthur refinery, which was without power Sept. 16. "A priority is establishing generator power to enable movements of gasoline and diesel in inventory to the pipeline distribution system. It is too early to predict when the refinery will resume normal operations," officials said.

• Motiva's Norco, La., refinery was operating at 80% of capacity, limited by dependent resources affected by Hurricanes Gustav and Ike. Its 235,000 b/d Convent, La., refinery was making some blending components but is not yet able to make finished gasoline and other products. Shell's chemical plant in Mobile was operating normally. Its chemical plant in Geismar, La., was still in start up sequence and supplying limited product from existing inventory.

• The 288,000 b/d Flint Hills refinery in Corpus Christi restarted but was operating at reduced throughput.

• ExxonMobil's 349,000 b/d Beaumont, Tex., refinery remained without electrical power; the company said some units of its Baytown refinery might be up later in the week.

• ConocoPhillips was restarting its 300,000 b/d Sweeny, Tex., refinery Sept. 15. Its 195,000 b/d Alliance refinery in Belle Chasse, La., shut down more than 2 weeks since Hurricane Gustav, also suffered some flooding from Ike.

• Marathon Oil said its 76,000 b/d Texas City refinery was without power. GreenHunter Energy Inc. said its biodiesel plant near Houston was expected to be out of service 6-8 weeks pending restoration of electricity and natural gas service. Meanwhile, it's getting temporary interruptible power from diesel and gasoline-powered generators.

> *"We have seen no evidence of leaks from platforms where the shutoff valves apparently worked, as they did with Katrina and Rita. The cooperation from the federal to the local level has been tremendous."*
> **—API Pres. Red Cavaney**

Safety emphasized

API's Cavaney said refiners will emphasize safety as well as speed in bringing their facilities back into operation. "Typically, a restart can take 3-5 days, depending on the shutdown," he told reporters.

Crude oil and product inventories along the Gulf Coast were below normal before Ike's arrival because the area was recovering from Hurricane Gustav, Cavaney said. "Already, there are supplies rerouted from other areas that are coming into the region," he said.

"We have seen no evidence of leaks from platforms where the shutoff valves apparently worked, as they did with Katrina and Rita," he said.

Cavaney said that government officials as well as the oil and gas industry apparently applied lessons from Katrina and Rita in responding to Gustav and Ike. "The cooperation from the federal to the local level has been tremendous," he maintained. ✦

US House approves Democratic leadership's energy bill

Nick Snow
Washington Editor

US House members passed an energy bill by 236 to 189 votes on Sept. 16 which Democrats called a true compromise and Republicans labeled a travesty.

HR 6899 came to a vote about 24 hours after it was introduced following some three hours of debate around 9:30 p.m. EDT. Republicans charged that it was designed primarily to give Democrats political cover in their reelection bids by letting them say they voted to open more of the US Outer Continental Shelf to oil and gas leasing.

That claim is false because the measure would permanently ban leasing up to 50 miles offshore where it does not exist already, and allow leasing from 50 to 100 miles offshore only when a coastal state requests it, GOP House members argued. They contended that Democrats omitted revenue shares for coastal states from the bill to reduce the incentive to make such requests.

"We're sitting here tonight in the midst of the biggest sham I've seen in my 18 years in Congress. It locks up 85% of the reserves on the OCS and removes incentives for states to allow drilling by denying them a share of the revenues. There's no compromise here. We're playing political games on the eve of an election," said Minority Leader John A. Boehner (R-Ohio).

The bill's sponsor, Natural Resources Committee Chairman Nick J. Rahall (D-W.Va.), argued that the bill was a compromise because it included provisions not only from a proposal by a bipartisan working group led by Reps. John E. Peterson (R-Pa.) and Neil Abercrombie (D-Ha.), but also the group of US senators calling themselves the Gang of 10. "We did not put revenue sharing into this bill because these are the people's resources. States will realize benefits from new jobs and economic growth without additional bribes," he explained.

A work in progress

Abercrombie said he would have preferred to see HR 6709, the bill that he and Peterson developed with a

bipartisan working group which grew to 137 cosponsors, as the legislative vehicle. But he urged support for HR 6899 as a work in progress which can be modified later. "The speaker doesn't want this bill. She doesn't approve of most of its provisions. But she realizes we need to move something along," he said.

At a news conference that afternoon, Speaker Nancy Pelosi (D-Calif.) said that the bill on the House floor would reduce US dependence on foreign oil, protect consumers by lowering prices and taxpayers by demanding full value for resources produced from public lands, and create new US jobs by stimulating alternative energy technology research and development.

"We're really excited about it. My colleagues have told me to tell you that it's time for an oil change in America and this bill represents that," she said.

Jim Matheson (D-Utah), who proposed giving states with oil shale deposits on federal acreage the option of approving or rejecting development, said that HR 6899 used ideas from Republicans as well as Democrats. "If we took a closer look, we could see many areas in it where Democrats and Republicans would agree. We should be having a reasoned debate. Instead, I'm hearing rhetoric from both sides of the aisle," he said.

Expressions of opposition

Trade associations in the oil and gas industry as well as other businesses opposed the bill. "Inclusion of more than $36 billion of new taxes on the oil and gas industry makes no economic sense.... It would tilt the playing field against the US-based oil and gas companies which must compete with large foreign government-owned companies for resources," American Petroleum Institute President Red Cavaney said in a Sept. 12 letter to Pelosi.

"For far too long, America's offshore development has been unnecessarily prohibited. Finally, Congress appears to be ready to address this key issue. While IPAA comments the Congress for recognizing the importance of developing America's offshore resources, HR 6899 falls short of an effective program and presents new, inappropriate burdens," Independent Petroleum Association of American President Barry Russell said on Sept. 16.

National Petrochemical and Refiners Association President Charles T. Drevna said that denying coastal states a share of new offshore revenues to fund an energy efficiency and renewables reserve robs Peter to pay Paul, while a provision allowing neighboring states to veto a state's decision to allow offshore exploration "is utterly nonsensical."

The National Association of Manufacturers said that it opposed provisions in the bill which would increase energy producers' taxes, including ending the federal tax code Section 199 exemption and restricting foreign tax credits; create a mandatory 15% federal renewable energy standard, and deny coastal states a share of revenues from new federal OCS leasing. ✦

Congress members pledge action after oil speculation study

Nick Snow
Washington Editor

An independent report showing that record amounts of speculative investment drove oil prices to record peaks in 2008 confirms that stronger market regulation is needed, federal lawmakers said.

Institutional investors pumped more than $60 billion into major commodity indexes, resulting in the purchase of approximately 187 million bbl of West Texas Intermediate crude oil futures and a nearly $33/bbl increase in their price, according to the study by Michael W. Masters, portfolio manager at Masters Capital Management, and Adam K. White, research director at White Knight Research & Trading.

Starting July 15, however, index speculators made a 180-degree turn and pulled about $39 billion from those indexes which led to the sale of about 129 million bbl of West Texas Intermediate crude futures and a drop of some $29/bbl in their prices by Sept. 2, the study's authors said.

"We went into this with fairly open minds. We recognize that money moves markets, but in this case we saw an unusually significant amount of money come into the market and oil prices increase, followed by a significant withdrawal in July and a decrease in prices," Masters told reporters at a briefing.

US Rep. Bart Stupak (D-Mich.), at a US Capitol briefing on Sept. 10 with Michael W. Masters, coauthor of an independent oil market speculation study, and Sen. Maria Cantwell (D-Wash.), questioned Commodity Futures Trading Commission Acting Chairman Walter L. Lukken's statements that supply and demand primarily drive oil prices. Photo from US Senate.

The findings confirmed several federal lawmakers' suspicions and they announced that they will try to make stronger commodities regulation part of any comprehensive energy bill that is produced in the next few weeks. The study also came out the day before the US House Agriculture Committee plans to hold a hearing on speculation and oil commodities. The US Commodity Futures Trading Commission also expects to issue what is now being called a swaps report by Sept. 15.

'Unbelievable, unbridled speculation'

"We have known for some long while that speculators have played a role in where oil prices have gone. We made the case that unbelievable, unbridled speculation has driven and then broken the market. This report shows how oil speculators controlled the market while the federal agency which should be protecting American consumers has been dead from the neck up," Sen. Byron L. Dorgan (D-ND) said at the briefing.

Sen. Maria Cantwell (D-Wash.) said, "This analysis illustrates that when oil speculators poured large amounts of money into oil markets, prices skyrocketed just as they hoped. It also shows that when Congress began pressing the CFTC and developing legislation to end dark oil markets, speculators ran for the exits and pulled $40 billion out of the commodities market, dropping the price of oil by about $40/bbl. This is why I continue to hold up the CFTC nominations and called for the inspector general's investigation into the CFTC's bogus reports that seem to be pushing an agenda rather than the truth."

"Large numbers of dollars by a very few investors have driven the oil commodities market," she said, adding, "Many of us here have pushed the CFTC to do its job. It has barely been an inch in front of us."

Other federal lawmakers also expressed skepticism about declarations by the CFTC and its acting chairman, Walter L. Lukken, that supply and demand has been primarily responsible for oil price movements. "The only supply and demand this report shows is the supply and demand of money. As speculators pour more money into the energy market, prices go up. As they pull their money out, prices go down," said Rep. Bart Stupak (D-Mich.), chairman of the House Energy and Commerce Committee's Oversight and Investigations Subcommittee.

"The evidence is undeniable for consumers, policymakers, and everyone who has a stake in our economy. I personally wonder how we can explain the

WATCHING GOVERNMENT

Nick Snow, Washington Editor

Blog at www.ogjonline.com

Energy compromises

Within a few short weeks, the potential for congressional energy compromises, which looked so bright at the beginning of August, began to look increasingly tarnished.

Critics conceded there had been progress because Speaker Nancy Pelosi (D-Calif.) finally was letting the matter come to a vote as the US House prepared on Sept. 16 to debate a bill that included expanded Outer Continental Shelf leasing. The number of US senators supporting a compromise proposal had doubled to 20 from the original "Gang of 10."

But the proposals drew significant fire. Florida Senators Mel Martinez (R) and Bill Nelson (D) warned they would fight the Senate's current energy legislation because it would overturn safeguards that were part of the 2006 Energy Independence and Security Act.

Rep. John E. Peterson (R-Pa.), a primary force behind a compromise proposal with 137 cosponsors, said on Sept. 12 that the Democratic leadership's bill HR 6899 makes the first 50 miles offshore off limits, does not share federal offshore revenues with coastal states, and provides no funding for environmental restoration or alternative energy research and development.

Public understands need

"It's very clear from public opinion surveys that the American public understands the need for improved access, and Congress gives the impression that it plans to do something," American Petroleum Institute Pres. Red Cavaney said during a Sept. 15 briefing.

But were lawmakers ready to take the necessary steps? "Our focus right now is trying to make sure phony legislation isn't passed," he said.

In a Sept. 16 letter to Pelosi and House Minority Leader John Boehner (R-Ohio), National Petrochemical and Refiners Association Pres. Charles T. Drevna said HR 6899 "amounts to nothing more than a political shell game that threatens, not enhances, the nation's energy security."

"Moderate members of Congress should not be under any illusion that this...is a proproduction bill," he added.

Out to posture

Officials at the Interstate Natural Gas Association of America agreed Sept. 16 that congressional posturing over energy continued. "While there has been significant progress in terms of offshore drilling, it's still an election year, and both sides are trying to preserve the issue," Pres. Donald F. Santa said.

Martin E. Edwards, INGAA's vice-president for legislative affairs, said congressional leaders seemed to be ignoring harder energy questions. "I wonder when the two sides will start to try and do something substantive by dealing with energy comprehensively instead of trying to still please one or two constituencies," he said.

The main House and Senate bills also focused more on crude oil than natural gas, and hardly mentioned global climate change, the INGAA officials said.

"Conventional wisdom is that legislation on greenhouse gas emissions is 3-4 years away. That raises the question of how an energy bill now might begin to address some of these issues because they're not going to go away," Santa said. ✦

continued decline of crude oil prices when so much Gulf of Mexico production and refining capacity remains shut in following Hurricane Gustav," said Rep. Rosa L. DeLauro, who chairs the House Appropriations Committee's Agriculture Subcommittee.

Supply, demand in balance

Masters said he and White used information compiled by CFTC and the US Energy Information Administration as well as their own investment sources for their report. "It is important to note that during the first 6 months of 2008, actual worldwide inventories for crude oil were essentially flat: They did not change. Therefore, supply and demand were in balance during this time period. Clearly, supply and demand cannot fully explain crude oil's dramatic rise and fall during 2008," it said.

Neither can a weak US dollar, it continued. In 2008, the currency never weakened more than 7% but the price of WTI rose by as much as 50%. "Note that oil traders' fixation with the US dollar is prima facie evidence of the 'financialization' of commodities. Most likely, the US dollar's impact on commodity futures prices comes not through changes in real world supply and demand (which would be seen as actual supply and demand data), but instead through the inflow and outflow of investment funds from foreign speculators," the report said.

It suggested that the period from the end of May to mid-July was pivotal for commodity futures markets and institutional investors despite positions being reduced slightly and oil prices rising further.

"But a debate was raging in Washington DC over the role that speculators were playing in the rise of the price of oil. There were multiple hearings in both houses of Congress during this time, focused on the effect that speculators were having on food and energy prices. There were multiple pieces of legislation introduced that would have cracked down on speculation. Both the Senate and the House had substantial bills proposed by

the majority that made significant progress during July," it said.

The report noted that the CFTC also announced multiple initiatives and investigations which were aimed at determining what role speculators played in the rapid oil price increase. The commodities regulator made special calls on swaps dealers for information related to index speculation and other matters. It also obtained agreements from foreign regulators to increase reporting for markets the CFTC doesn't regulate such as the InterContinental Exchange, the study said.

Concern led to pullout

"Although institutional investors typically buy and hold investments for the long term, it is likely that a number of index speculators were concerned enough by what was occurring in Washington to pull their money out of commodity index investments," it said.

The report concluded that if Congress acts to restrict speculation, price volatility will be reduced and food and energy prices will cone down as excessively speculative money flows out of the markets. Cantwell agreed. "If we saw the fear of better regulation drop gasoline prices by 50 cents/gal, what would true regulation do? We could see prices drop to the $70-80/bbl level that many oil company executives have said is the real price," she said.

"The American economy is being killed by excessive prices these speculators create not only in oil, but in 22 of the 25 major indexes. The CFTC has its head in the sand. Congress must continue to propose regulations that set forth position limits," said Stupak.

"I think this confirms what many of us have been concerned about. The American consumer has been dangled on a string. We know now where that string leads. We also have a brain-dead regulator which has not been doing its job. Speculation repair clearly needs to be part of comprehensive energy legislation and I intend to make that point at the Senate's energy summit this Friday," Dorgan said. ✦

AFR: E. Java mud flow damage understated

Eric Watkins
Oil Diplomacy Editor

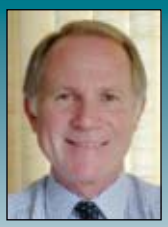
Santos Ltd. has rejected speculation suggested by a Sept. 15 report in the Australian Financial Review (AFR) that said: "Santos is facing a blowout in the clean-up bill from the world's largest mud volcano in East Java" because the "disaster cannot be contained." The article cited the United Nations Environment Program and AusAid, that it had understated the severity of the Sidoarjo mudflow incident in East Java.

"Santos is not in a position to comment specifically on the UNEP report,"

WATCHING THE WORLD

Eric Watkins, Oil Diplomacy Editor

Blog at www.ogjonline.com



The Russians are coming

Did anyone really think Moscow would just sit still as Washington, DC, and its allies attempted to extract oil and gas from Russia's backyard in the Caspian and Central Asia?

Leaving aside Georgia, which the Russians slapped down a few weeks ago, there are other targets now under Kremlin scrutiny. They include efforts to influence the Organization of Petroleum Exporting Countries, as well as inroads into Latin America.

Russian Energy Minister Sergey Shmatko, on a recent visit to Venezuela, said his country hopes to sign a memorandum of understanding with OPEC, as a first step in cementing a closer relationship with the group.

Shmatko said the proposed MOU is a very broad program of joint action in various areas of activity. For instance, he said, it would include a better interaction between Russian companies and OPEC members.

Short on details

The Russian minister, who declined to impart very much by way of details, said some aspects of the proposed agreements might include greater cooperation regarding overall oil market analysis and information.

Lest anyone were getting panicky over the proposed MOU, Shmatko was quick to caution that closer ties with OPEC would not affect markets right away.

Russia doesn't think that there will be immediate agreements to influence the price of oil, Shmatko said, adding that the proposed MOU is more related to an approach for a strategic partnership, for a strategic interaction.

Meanwhile, other Russian oil and gas officials on their visit to Caracas wasted no time regarding their country's intentions toward Latin America in general and Venezuela in particular.

"There are gas fields in the region and one of the subjects for today's discussion is the companies' plans with possible participation of Russia in the development of not only oil, but also gas fields," said Alexander Medvedev, Deputy Chairman of the Board of Directors of Gazprom and Director General of Gazprom export.

Long on plans

If there is a Monroe Doctrine regarding Latin American oil and gas, Medvedev made no mention of it. To the contrary, he made clear that Russia is ready to supplant the US in terms of exploiting the continent's oil and gas reserves.

"The regional oil and natural gas market in Latin America is developing very actively both in Argentina and Brazil, and with taking into account the implementation of a large LNG project in Venezuela, this means that there will be no need as before to link Caracas only with the American market, regarding both oil and natural gas," said Alexander Medvedev.

Indeed, noting that US companies have vacated the region, Lukoil Vice President Andrei Kuzyayev said the two sides "are considering issues linked with the establishment of a joint venture with the state-run oil and natural gas company Petroleos de Venezuela on the recovery of heavy and extra-heavy crude in the Orinoco River belt."

Yes, friends, look over the backyard fence. The Russians are coming. ✦

the Australian firm said in a statement. "However, given the conditions at site and current activities being conducted, Santos believes that the provision remains an appropriate estimate of its potential liability associated with the incident."

At the same time, Santos acknowledged that matters could change because "the situation remains dynamic, complex, and uncertain." As a result, Santos said it "will continue to review the adequacy of the provision in light of developments and available information."

The AFR referred to updated costs of $830 million (Aus.), which it said "are nearly 10 times higher than Santos has disclosed to the stock market, leading to accusations that the oil and gas major is deliberately playing down the disaster."

The paper said Santos has an 18% interest in PT Lapindo Brantas, which experienced drilling problems near the site the day before the mud volcano erupted.

"Presuming it paid 18% of mitigation costs," Santos is facing a cleanup bill of $355-829 million over the next 25 years, the paper said, citing the UNEP report.

In its report, the AFR said that impacts of the mudflow are increasing and that the authors of the report envisage three courses of action to mitigate them:

- Pipe the mud to the sea at a cost of $1.9 billion over 25 years. But there are concerns that the material is too viscous and the pumps would not be able to move the required volume.
- Pump the mud to a nearby river at a cost of $1.9 billion over 25 years. But there is strong local opposition to this method and concern about the increased flood risk.
- Build an open canal that would slowly transport the mud to the sea at a cost of $4.6 billion.

The study, commissioned by the Indonesian government and carried out by UNEP and AusAid, says transporting the mud 14 km to the sea and creating a new wetland is the only mitigation option available. ✦

FACTS: Iran to complete many delayed petchem projects

David N. Nakamura
Refining/Petrochemical Editor

By yearend 2009, Iran plans to complete many delayed petrochemical projects currently under construction, according to FACTS Global Energy in a report entitled, "An Update on Iran's Petrochemical Projects."

This year, several mega petrochemical projects have started commercial production in Iran, which will significantly increase exports of petrochemical products from the Middle East. And even though some of the planned projects may not materialize, Iran's petrochemical sector has a "huge exports potential."

Iran, by 2015, will nearly double its petrochemical production, according to the report. Current key petchem projects will bring more than 29 million tonnes/year (tpy) of new capacity online for the production of ethylene, propylene, methanol, benzene, ammonia, urea, and other petrochemical products by 2015.

Production, exports

In 2007, Iran's petrochemical production increased to nearly 24 million tpy, and it experienced an average growth rate of at least 8%/year during 1997-2007, according to the report. Exports of petrochemical products rose to almost 9.5 million tpy in 2007, a growth of about 12%/year for 1997-2007.

The figure shows this growth in production and exports from Iran.

Iran's petrochemical exports are mainly destined for Asian markets. After the completion of new petrochemical plants in fourth-quarter 2008 and early 2009, Iran's petrochemical exports will increase to 12-13 million tpy, according to the report.

New petrochemical projects

Currently, Iran is constructing several petrochemical plants, especially in the Pars and Bandar Iman Petrochemical Zones. Iran is also building an ethylene pipeline, currently under construction from Assaluyeh in the south of Iran to Mahabad in the northwest of the country.

Of the more than 29 million tpy of new capacity Iran plans to build, some of these projects are faced with various issues such as long delays in their completion dates due to lack of financial resources or feedstocks, according to the report.

The attached table lists Iran's petchem projects that have more definite start-up dates.

Main roadblocks

One of the main roadblocks for petrochemical projects in western and northwestern Iran is the availability of enough feedstock.

Sufficient feedstock for these petrochemical projects may become a reality after the completion of a 2,163-km ethylene pipeline (the West Ethylene Pipeline) from the south to the west and northwest of the country.

This project, which is now 50% complete, was scheduled for completion in 2007. The project's initial costs, an estimated $2 billion, have increased to nearly $7.2 billion, according to the report.

Iran initially planned to construct five petrochemical complexes along the pipeline; currently, however, the number of petrochemical complexes has been increased to 11 projects. There may not be sufficient feedstock from the West Ethylene Pipeline for some of the new petrochemical projects.

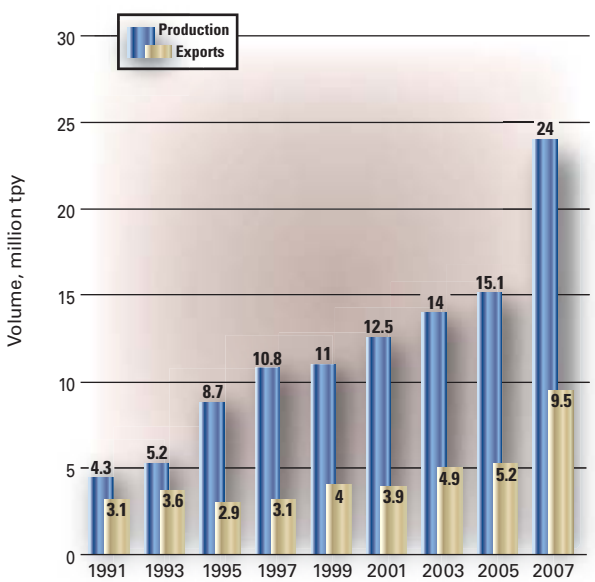
There also may be some unsolved technical problems in delivering ethylene by pipeline over a long distance for a country that has a large temperature difference in its south as compared with its northwest, especially in the wintertime, according to the report.

Currently, there are five projects under construction across the West Ethylene Pipeline and six projects are planned to be completed by 2012. Of these projects, the 300,000-tpy polyethylene plant at Kermanshah is further along and should be completed in 2009-10.

Some projects such as those in Mahabad, Miyandoab, Mammasani, Andimeshk and Chahar Mahal, and Bakhtiary have no construction progress and are unlikely to be completed before 2014-15, the report said.

National Iranian Petrochemical Co. is planning to

IRAN PETROCHEMICALS



IRAN PETROCHEMICAL PROJECTS

Project	Capacity, 1,000 tpy	Status
9th Olefin (Arya Petrochemical)	1,000	Commissioning
10th Olefin (Jam Petrochemical)	2,100	Commissioning
Ethylbenzene (Pars Petrochemical)	631	97% complete, start-up in 2008-09
6th Urea & ammonia (Ghadir Petrochemical)	1,150	97% complete, start-up in 2008-09
6th Methanol (Zagross 2nd Methanol)	1,650	95% complete, start-up in 2008-09
HDPE (Mehr Petrochemical)	300	88% complete, start-up in 2009-10
PVC (Arvand Petrochemical)	1,507	Completed in 2009-10
5th Olefin (Morvarid Petrochemical)	540	86% complete, start-up in 2009-10
LDPE (Amir Kabir Petrochemical)	300	Start-up in 2009-10
HDPE (Kermanshah Petrochemical)	300	Start-up in 2009-10
13th Olefin (Ilam Petrochemical)	738	Start-up in 2010-11
11th Olefin (Kavian Petrochemical)	2,180	Under construction, start-up in 2011-12
Gachsaran (Olefin)	1,090	Under construction, start-up in 2012-13
Shiraz Urea & ammonia	1,050	Under construction, start-up in 2012-13
LLDPE (Mahabad Petrochemical)	307	Under construction, start-up in 2012-13
LLDPE (Lorestan Petrochemical)	300	Under construction, start-up in 2012-13
LLDPE (Kordestan Petrochemical)	300	Under construction, start-up in 2012-13
12th Olefin (Persian Gulf Petrochemical)	5,214	Completed in 2013-14

construct a 3,500-km ethylene pipeline to the east and northeast (East Ethylene Pipeline) and a 600-km pipeline to central Iran.

Iran is planning to build 14 petrochemical units along the East Ethylene Pipeline.

Capital expenditures for the East Ethylene Pipeline are more than $13 billion. FACTS believes that the East Ethylene Pipeline is unlikely to materialize due to many technical and commercial issues. The main commercial issues are a lack of financial resources and low profitability of the pipeline. These construction plans for petrochemical plants in eastern and northeastern Iran are therefore less likely to materialize compared with those in western and southern Iran, according to the report.

Domestic gas demand, especially for new petrochemical projects, will continue to escalate because most of Iran's petrochemical industry is gas based. The availability of enough feedgas for the industry could become a problem if the country continues to delay its gas production projects, especially those in South Pars. ✦

Biofuels gain within fuels mix could be slow, study says

Paula Dittrick
Senior Staff Writer

Biofuels could make up 10-15% of the global fuels mix in 20 years, although getting to the level will be more difficult than some might expect, consultant Accenture said in a recent report.

"The pain of going from start up to global market will be greater than expected," for biofuels producers, said the report, which forecasts an increasingly diverse fuels market.

Melissa Stark, a senior executive in Accenture's Energy industry group, said the ultimate scale of the biofuels industry remains unknown.

"Our research shows that government policy and technology developments are the biggest uncertainties," Stark said. "Technology will continue to improve the economics of biofuels development, but the industry will also have to deal with competing technologies such as plug-in hybrids."

Competing technologies

Competition for biofuels is expected to come from various sources, not just gasoline and diesel. Government regulations are expected to accelerate the competition as markets adjust to mandates for a cleaner fuel mix in a low-carbon economy, Accenture said.

Growing diversity in transport fuels will be provided by a diverse group of players, including agribusiness and chemical companies. There are many different producers and types of biofuels.

Most integrated oil companies have no agriculture or biofuels production so they obtain biofuels through long-term contracts. Some majors have set up academic collaborations and established joint ventures with smaller companies developing future biofuels.

"International oil companies have the potential and ambition to be involved in all transport fuel technologies," the report said. "Other nontraditional sectors, such as chemicals, will have a narrower interest in the kind of projects they will pursue over the next 10 years."

Plug-in hybrid electric vehicles (PHEV) are under development and could be available by 2010. Electric technologies will involve utilities. Automotive manufacturer GM is collaborating with nonprofit Electric Power Research Institute to focus on infrastructure requirements for PHEVs.

Electricite de France (EDF) is installing recharging points for PHEVs on roads, streets, and parking lots in France, Accenture said. EDF also has a partnership with Elektromotive Ltd. to install charging points in the UK.

PHEVs could be powered by blended biofuels, but ultimately PHEVs are expected to primarily compete with biofuels in a fuel-on-fuel competition, Accenture said. PHEV give drivers the choice of electricity, biofuel, or either gasoline or diesel.

Meanwhile, automotive manufacturers are introducing flexible-fuel vehicles. Most gasoline cars on the road can take up to 10% ethanol while diesel vehicles can take 5-10% biodiesel. Warranties continue to vary by vehicle manufacturer and country. ✦

Reoriented Talisman evaluating unproven Utica, Lorraine shales

A self-redirected Talisman Energy Inc. expressed encouragement earlier this month at results from its first well in Ordovician Utica shale in Quebec's St. Lawrence Lowlands.

While it describes the overlying Lorraine shale, as yet untested by Talisman, as having the potential to be just as prospective as the Utica, the company describes the play as "unproven."

Talisman's acreage position is large. The Calgary firm holds 760,000 net acres spread across 940,000 gross acres (Fig. 1). And it points out that it has to drill wells to earn 600,000 acres from independent company farmors.

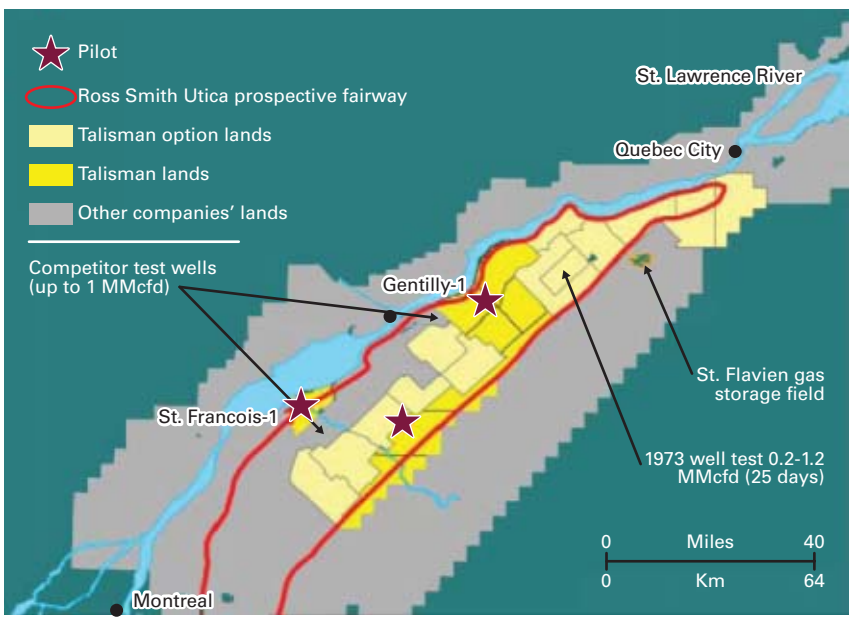
Talisman plans to drill three more wells by the end of 2008.

The company reported a sustained, 18-day test rate of 800 Mcfd from a single completed Utica interval at Gentilly-1, a well previously drilled to test the deeper Ordovician Trenton-Black River formation (OGJ, Sept. 8, Newsletter).

The company plans to move up the hole to test the Basal Lorraine and Lor-

GAS SHALES IN QUEBEC'S ST. LAWRENCE LOWLANDS

Fig. 1



Source: After Talisman Energy Inc.

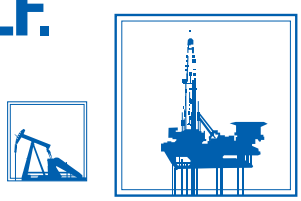
GEOLOGY OF UNCONVENTIONAL PLAYS

Table 1

	Outer Foothills	Montney	Bakken	Marcellus	Quebec
Reservoir lithology	Sandstone	Sandstone/siltstone/shale	Sandstone/siltstone	Shale	Siltstone/shale
Drill depth, ft	11,500-13,000	3,000-13,000	5,000-7,000	2,500-6,000	4,900-8,800
Thickness, ft	100-2,000	160-1,000	32-40	50-250	300-6,500
TOC weight, %	n/a	1.5-6.0	7.0-12.0	1.0-12.0	0.1-2.5
Ro, %	n/a	0.8-2.5	Immature	1.1-3.0	1.1-4.0
Silica weight, %	n/a	20-60	90-95	20-50	*30-35
Clay weight, %	n/a	<30	<5	20-45	*30-38
Gas filled porosity, %	2.0-12.0	1.0-6.0	10.0-14.0 (oil)	1.6-7.0	1.2-3.5
Pressure gradient, psi/ft	0.42-0.78	0.44-0.70	0.43	0.45-0.60	0.60-0.76
OGIP, bcf/section	55-180	70-300	3.4-4.5 MMboe	20-100	75-350
Relative to NYMEX $	–1.10	–1.30	+5.00/bbl	+0.40	+0.60

*Refers to Lorraine only.
Source: Talisman Energy Inc.

LOOKING INTO THE FUTURE HAS ALWAYS MEANT LOOKING BEYOND YOURSELF.



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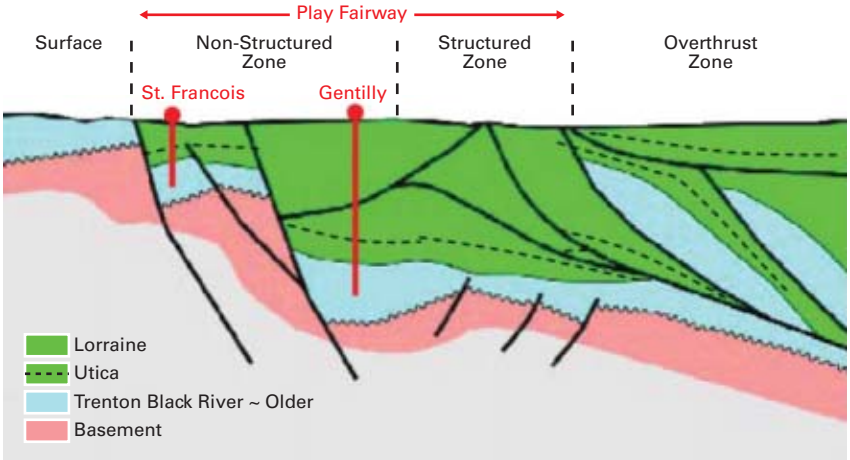
UTICA, LORRAINE SHALE CHARACTERISTICS Table 2

Parameter	Lorraine	Utica
Prospective depth, ft	1,500-10,000	1,500-11,000
Thickness, ft	1,500-6,500	300-1,000
TOC weight, %	01.-1.5	0.3-2.5
Ro, %	1.1-4.0	1.1-4.0
Silica weight, %	30-35	12-51
Clay weight, %	30-38	8-66
Gas-filled porosity, %	1.2-3.2	2.2-3.5
Pressure gradient, psi/ft	0.6	0.6
OGIP, bcf/section	50-190	25-160

Source: Talisman Energy Inc.

LORRAINE-UTICA SHALES IN THE LOWLANDS Fig. 2



Source: After Talisman Energy Inc.

raine shale intervals (Fig. 2).

Even though Talisman holds industry's largest land position in the play for gas in the two Quebec shales, the company's projected timeline doesn't call for it to enter the development phase there until late 2010.

Talisman and shales

The Quebec shales are the least evaluated of several North American onshore gas and oil shale plays that Talisman chose to pursue as it refocused in May 2008.

The potential in Quebec, however, is quite large. Talisman estimated 48 tcf of original gas in place in the formations, and the gas content per square mile compares favorably to gas content in the other shale plays in which the company is involved (Tables 1 and 2).

Eastern Canada consumers, most of their gas shipped 2,200 miles from western Canada, would certainly welcome the development of a substantial local supply.

Talisman said in May that it would spend $1.1-1.3 billion through the end of 2009 evaluating a material part of the gas potential in its 2.5 million net acres of unconventional land in North America. Of the total, it budgeted $900 million for development programs in areas where the company experienced early success, including 200 wells in the Western Canada Outer Foothills and Devonian Montney shale gas plays and the US Williston basin Bakken shale oil play.

Another $420 million is earmarked to drill pilot areas in other parts of the Outer Foothills and Montney, Quebec, and Appalachia.

"By the end of 2009, we will be able to make informed choices about ongoing levels of investment into our unconventional resource plays," Talisman Energy said. ✦

Shell completes Bonga deepwater 4D survey

Royal Dutch Shell PLC's Nigerian subsidiary completed 4D seismic acquisition over deepwater Bonga oil and gas field off Nigeria in an effort to maximize ultimate recovery from the field.

The effort, which the company described as the first 4D survey in Nigeria's deepwater region, started with a baseline 3D seismic survey in 2000. That information guided the siting and drilling of early wells and other relevant activities.

Shell started production from the field in more than 1,000 m of water in late 2005 and was to quickly ramp up output to 225,000 b/d of 30° gravity oil and 150 MMcfd of gas (OGJ, Dec. 12, 2005, Newsletter). The field, now with 16 subsea oil producing and water injection wells, covers 60 sq km about 120 km offshore.

The most recent work, carried out by a Lagos contractor, took 76 days and involved one marine seismic vessel and three support vessels. The data, collected after 2 years of production, are expected after further processing and interpretation to reveal how reservoir conditions and fluid content have changed and result in better placement of subsequent wells, Shell said.

Marine 4D seismic data acquisition operations, especially those involving close passes of fixed installations, are technologically complex and involve several high-risk activities including operating air guns and towing long streamers with close passes to fixed installations, Shell said.

The four vessels with 100 people recorded 133,000 man-hr without a lost time injury, and 40% of the onboard personnel were Nigerians. Shell staff used the opportunity to gain valuable deepwater 4D experience.

Other firsts for Bonga field include one of the world's largest floating production, storage, and offloading vessels at 2 million bbl capacity, the first iconel clad steel catenary risers on an FPSO, and the world largest and most sophisticated FPSO mooring buoy 23 m in diameter, 12 m high, and weighing 870 tonnes. ✦

US, Canada to map unexplored Arctic seafloor

The US and Canada will jointly map the unexplored Arctic seafloor where the two countries may have sovereign rights over oil, gas, and other resources, the US Geological Survey announced.

The US Department of the Interior agency said both countries will use resulting data to establish the continental shelf's outer limits under criteria in the Law of the Sea Convention. The extended continental shelf, the seafloor, and subsoil beyond 200 nautical miles from shore that meet those criteria are of great scientific interest and could represent potential economic development, it noted.

The collaboration will use two ships, USGS said. It said that it will lead data collection from Sept. 6 through Oct. 1 on the US Coast Guard cutter Healy to map the seafloor. The Geological Survey of Canada in that country's natural resources department will follow on the Canadian Coast Guard ship Louis S. St. Laurent and study the subseafloor's geology.

"The two-ship experiment allows both the US and Canada to collect and share complementary data in areas where data acquisition is costly, logistically difficult, and sometimes dangerous. Both countries benefit through sharing of resources and data as well as increasing likelihood of success by utilizing two icebreaker ships in these remote areas of the Arctic Ocean," noted USGS scientist Deborah Hutchinson, who will sail aboard the Louis.

Jonathan Childs, another USGS scientist who will be chief aboard the Healy, said that effort will use an echo sound, which emits sound signals in the water, to map the seafloor using a multibeam bathymetry system.

"Unlike conventional echo sounders, which measure the water depth at a point directly beneath the ship, the multibeam system collects a 'swath' of depth information about 3 km wide along the ship's patch, creating a three-dimensional view of the seafloor," he explained.

The National Oceanic and Atmospheric Administration funded US participation in the US-Canadian mission and collaborated with the University of New Hampshire to collect bathymetric data in the Arctic Ocean from onboard the Healy from Aug. 14 through Sept. 5, USGS said. ✦

Australia

Beach Petroleum Ltd., Perth, commissioned the 47 km, 5,000 b/d Callawonga-Tantanna oil pipeline to serve its western Cooper basin fields in Australia.

The pipeline connects with Moomba via Santos Ltd.'s Tantanna facility and forwards oil to Port Bonython. It carried its first oil in August, and shipments

reached 3,000 b/d by Sept. 10.

One discovery served by the new line is Parsons-1, which began producing in June at 1,600 b/d. Beach is exploring the Jurassic Namur and Hutton sandstones in the western part of the basin.

Guyana

YPF Guyana Ltd., a subsidiary of Repsol YPF SA, let a contract to Fugro-GeoTeam for a 1,650 sq km marine 3D seismic survey on the Georgetown petroleum prospecting license in the Atlantic off Guyana, said 25% interest holder CGX Energy Inc., Toronto.

Work is to start in late September using the R/V Geo Pacific. The 3D work is to be conducted jointly with CGX's previously announced 536 sq km 3D program on the adjacent Corentyne PPL, in which CGX's interest is 100%.

CGX said it will realize savings from economies of shared mobilization and longer sailing lines on the Corentyne program. The company placed on hold the Corentyne farmout process until the 3D seismic data are received and preliminary interpretation completed.

Namibia

Petroholland Ltd., a Dubai holding company, signed a farmout agreement with Circle Oil PLC to earn a 70% interest in 70,000 sq km in the Ovambo basin in Namibia just south of the border with Angola.

Petroholland, to earn the 70% interest, is to pay Circle $15 million in cash and cover all costs attributable to Circle's 20% share of exploration and development expenditure through to production. Namibia's Minister for Energy and Mines has approved assignment of the 70% interest.

North Dakota

Northern Oil & Gas Inc., Wayzata, Minn., said it participated in eight North Dakota Bakken shale oil wells operated by others at which initial production averaged 768 b/d.

The wells are in Mountrail and Dunn counties and are operated by Hess Corp., Slawson Exploration, ConocoPhillips, and Marathon Oil Corp. Northern holds working interests in 21 producing wells and 65,000 net acres.

Northern is participating in five other wells that target the Bakken and five wells that target the Three Forks-Sanish formation. Those wells are in Divide, Mountrail, and Dunn counties.

Utah

Marion Energy Ltd., Melbourne, has spud the first of three infill wells in an area of Clear Creek gas field in Utah, drilled in the 1950s-60s on 1,000-acre spacing.

The Oman 10-19 directional well is projected to Cretaceous Ferron sandstone at 5,700 ft in the central part of the unit. The field is in Carbon and Emery counties. Marion Energy has 236 bcf of proved and probable reserves in the field.

Mideast operators using more artificial lift surveillance, optimization technology

Hatem Nasr
vMonitor Inc.
Houston

As the number of electrical submersible pump installations has increased in the Middle East, operating companies have started deploying more surveillance and optimization technology.

Deployment of artificial-lift systems throughout the Middle East continues to grow rapidly, especially ESPs. In many other parts of the world, operators install ESPs in wells producing from nearly depleted reservoirs. In the Middle East, however, ESPs are in wells that produce from reservoirs that are far from depleted.

These installations provide a means to increase production rates and improve recovery. For instance in Saudi Arabia, Saudi Arabian Oil Co.'s (Aramco) aggressive goal is to recover in excess of 50% of the original oil in place, a recovery factor much higher than the industry average.

In fewer than 3 years ago, fewer than 150 ESPs were in Kuwait. Since then, the number has more than doubled. During the next few years, expectations are that the number of artificially lifted wells in Kuwait with ESPs will increase by more than 50% annually.

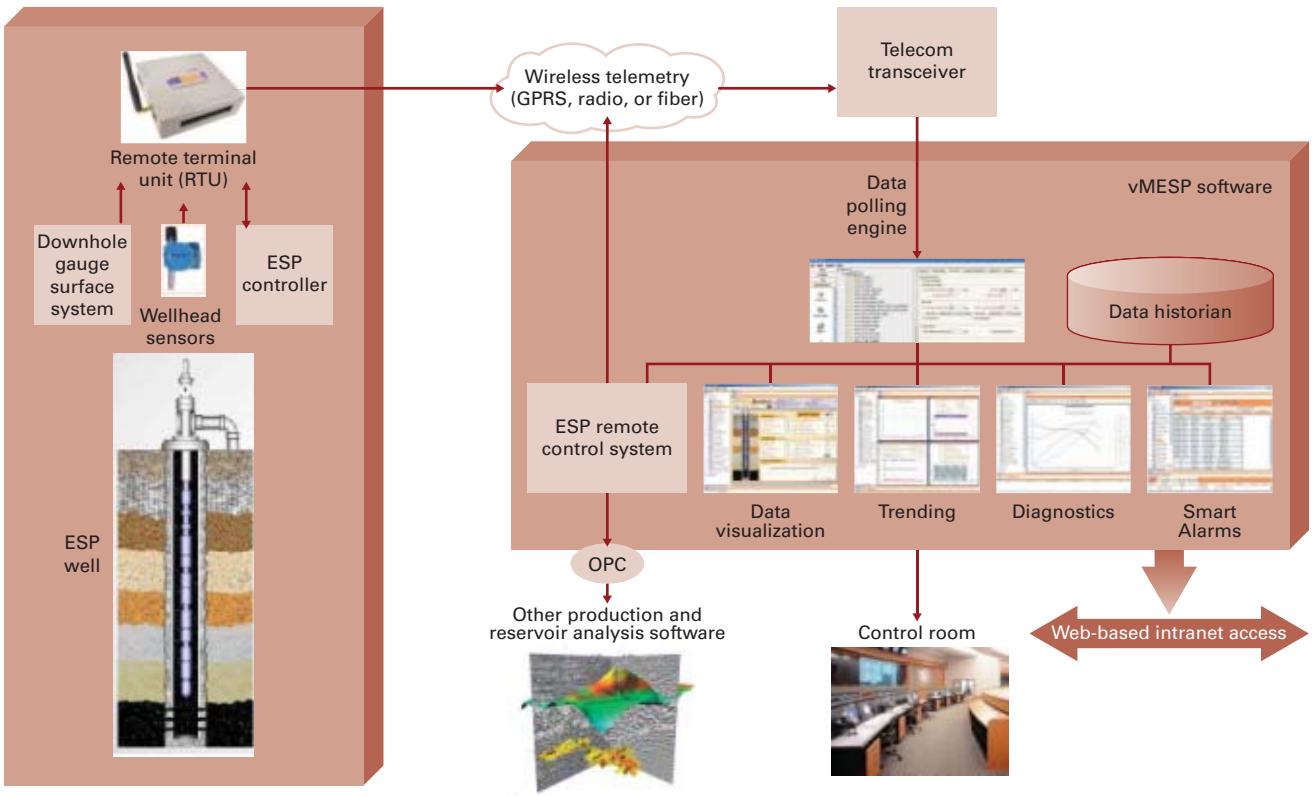
While ESPs can increase substantial well production, they are inherently the most complex and expensive artificial-lift systems. Many operational and environmental parameters can influence ESP performance and well productivity. To improve pump performance, several oil companies in the Middle East have comprehensive strategies for deploying smart digital oil field technology. A key component of these digital technologies is real-time remote surveillance for ensuring optimal artificial-lift performance and predicting well failures before they occur.

Digital oil field

vMonitor is conducting several digital oil field projects across the Middle East with Petroleum Development Oman (PDO), Saudi Aramco, Kuwait Oil Co. Ltd. (KOC), Qatar Petroleum Corp., and several companies in Abu Dhabi, such as Abu Dhabi Oil Co. for Onshore Oil Operations (ADCO), Zakum Development Co. (ZADCO), and Abu Dhabi

COMMON ESP REMOTE SURVEILLANCE ARCHITECTURE

Fig. 1



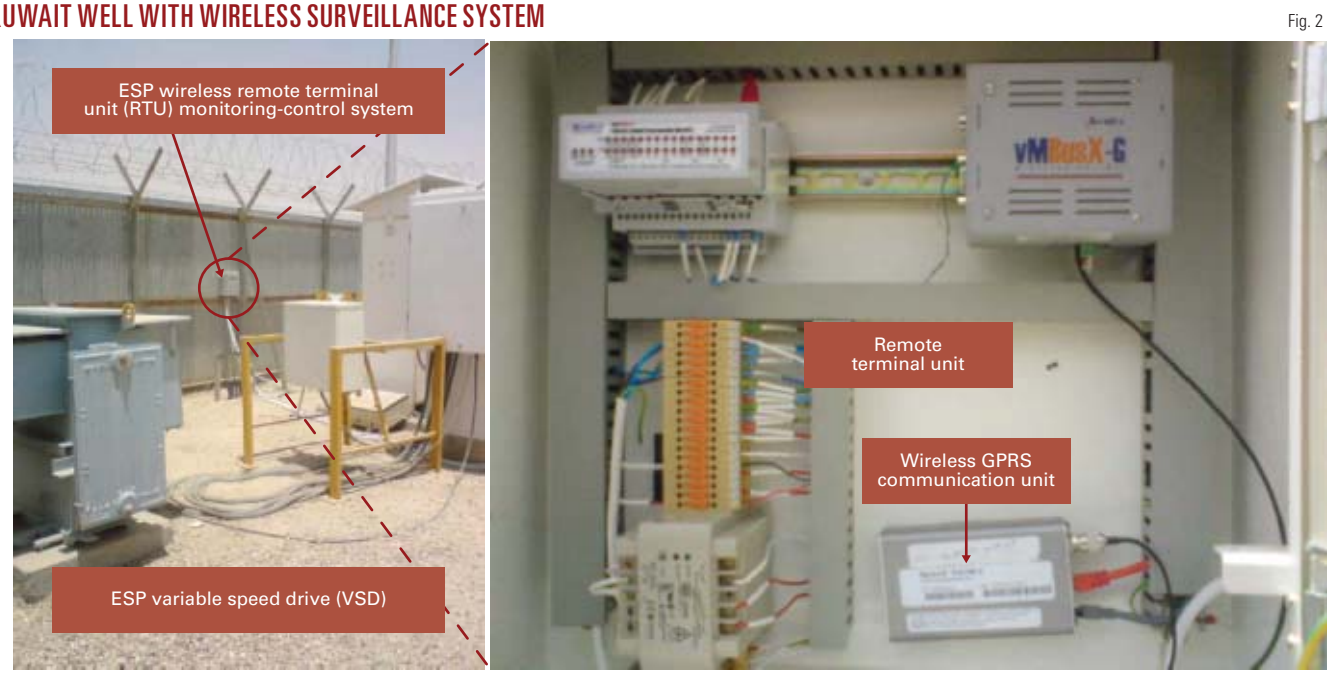
Marine Operating Co. (ADMA-OPCO).

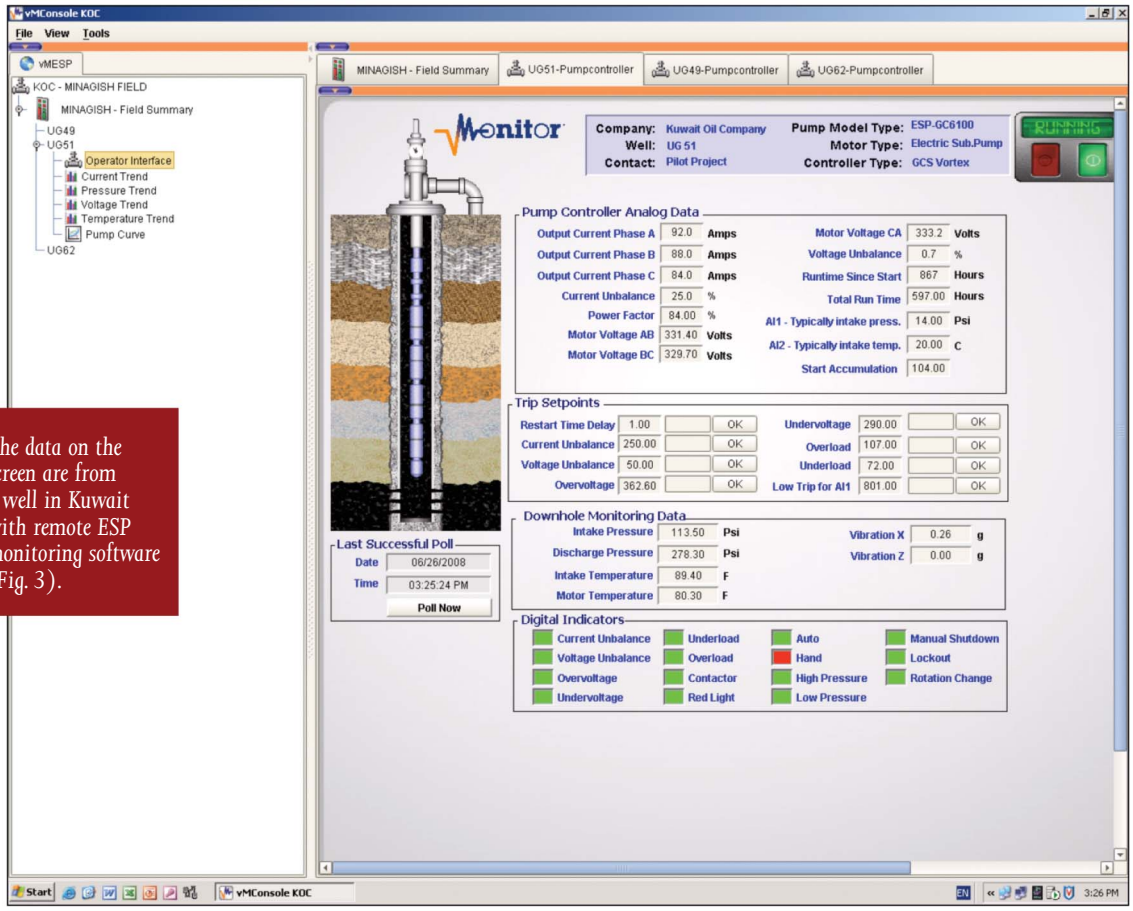
In these smart digital oil field initiatives, the common technology denominator is real-time data capture and remote surveillance.

The focus of most of these companies for now is on real-time data capture, analysis, alarms, and tools for supporting the decisions made by pro-

KUWAIT WELL WITH WIRELESS SURVEILLANCE SYSTEM

Fig. 2





The data on the screen are from a well in Kuwait with remote ESP monitoring software (Fig. 3).

duction and reservoir experts.

To date, these systems have limited remote-control functions. In the case of ESP systems, the remote control for now is limited to on-off and changing frequency. As the technology matures further, it is likely that these systems will incorporate more autonomous control functions.

ESPs

One goal of companies is to extend the run life of an ESP. Severe operational and environmental conditions, however, often cause an ESP to fail, which in turn interrupts production and leads to expensive workovers.

An ESP system may encounter many problematic elements, such as:

- Proper pump design and redesign.
- Corrosive environments caused by sour gases and microbiological elements.
- High associated gas production.
- Solids produced during pumping.
- Maintaining proper electric power supply.

The industry has made many advances in ESP systems in the past decade, including new materials, downhole multisensor systems to measure pressure and temperature, advanced variable-speed drives (VSDs), improved methods for design, and lately real-time surveillance and optimization technology.

Real-time surveillance, optimization

Remote ESP monitoring and optimization systems are key for ensuring long pump life and optimal production. Traditional installations require personnel to visit wellsites constantly and collect data manually, thereby making it impossible to detect and predict failures in a timely manner.

Real-time surveillance systems make pump data available instantaneously. Operators can see real-time reports, trends, and diagnostic measures. Important ESP performance measures and well lift performance become available immediately to the ESP and production experts in the office and field. They can view downhole sensor data in real time and quickly determine how pressure, temperature, and electrical current are affecting pump performance.

These systems allow historical data from several critical parameters such as intake and discharge pressure, motor, and intake temperature to be displayed quickly to determine the health of the system. ESP experts can analyze pump curve data that show actual pump data vs. theoretical pump model data and determine the most efficient manner for operating the pump.

Another feature of these systems is that they allow programming of intelligent alarms based on the collected historical and real-time data so that operators are warned of impending problems or failures.

This new remote surveillance and control technology has allowed easy control of the pump from operator offices hundreds, even thousands of miles away from the wellsite.

Technology rollout

Fig. 1 shows common system architecture of several real-time surveillance and optimization systems that vMonitor has deployed in Saudi Arabia, Abu Dhabi, and Kuwait. The surveillance system collects data from the ESP pump controller, the downhole gauge sensors, and the wellhead surface pressure and

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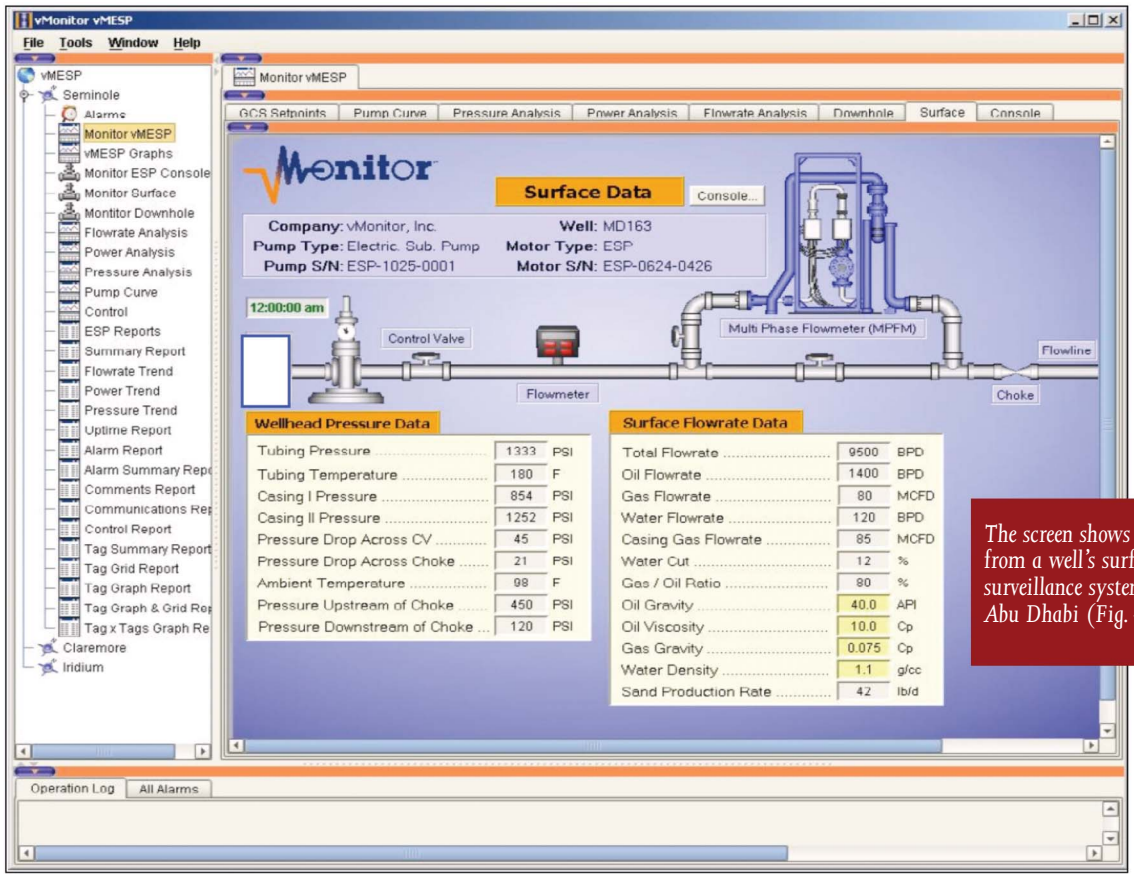


The screen shows data from a well's surface surveillance system in Abu Dhabi (Fig. 4).

temperature instruments.

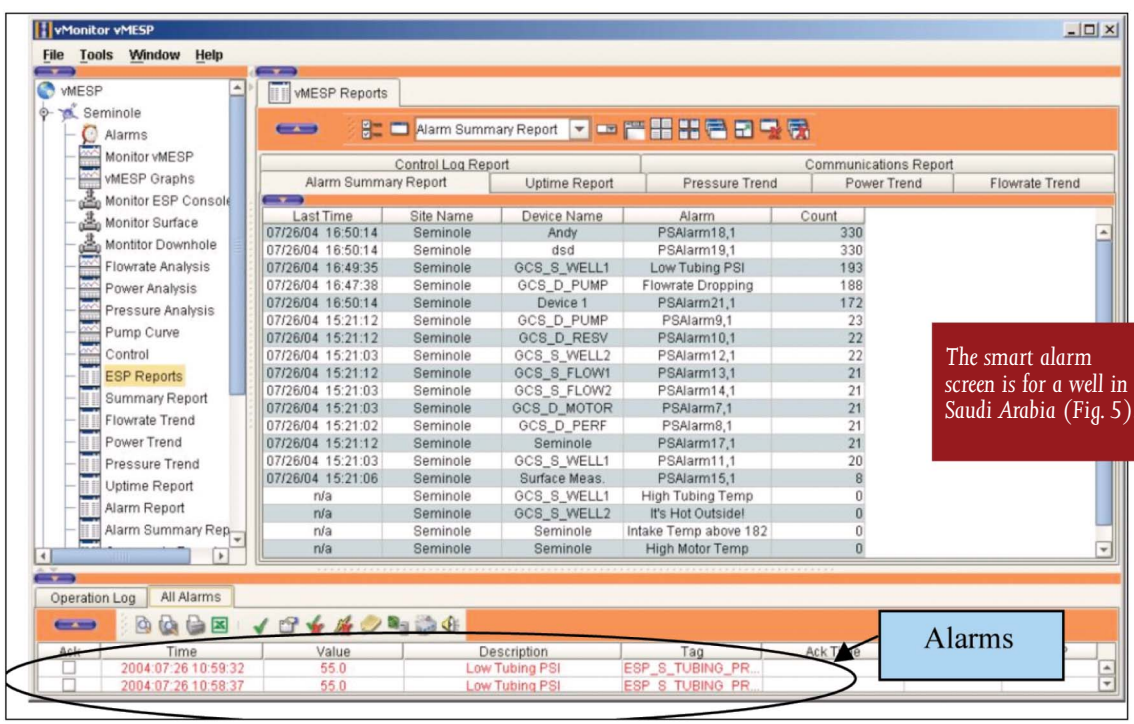
A remote terminal unit (RTU) connected to a communications system gathers the data (Fig. 2). The telecommunication system is wireless in most cases.

Available are various wireless communication options such as GPRS/3G (GSM phone network), broadband radio systems, and soon Wimax. In some cases, the wells are in a fiber optics network.

These systems transmit the data in real-time from the well RTUs to the control room. In some applications, the surveillance system transmits up to 80 ESP parameters.

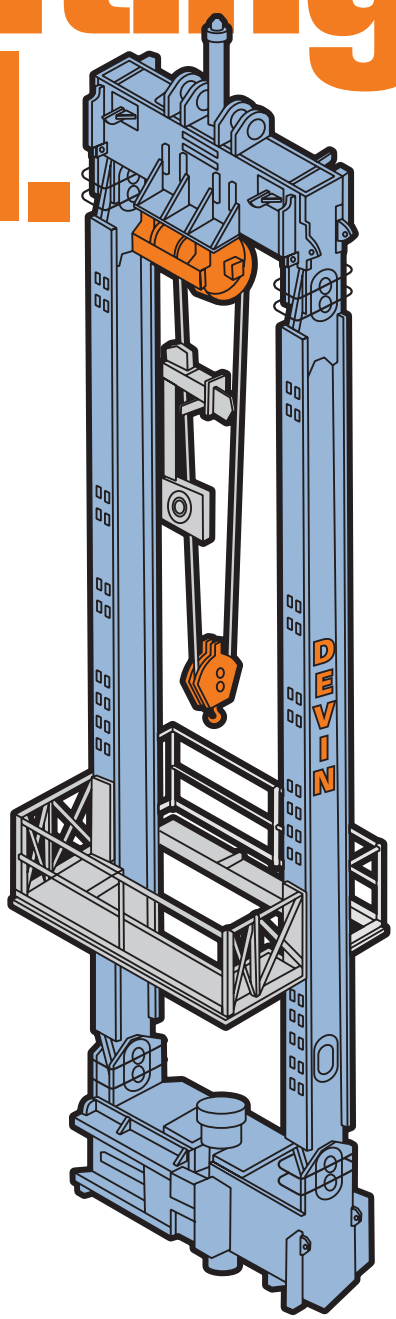
Some of the various parameters collected by vMonitor's vMESP software in the main control room include:

- VSD cabinet temperature.
- Frequency signal control.
- Current unbalance (%).
- Voltage unbalance (%).
- Current unbalance set point.
- Voltage unbalance set point.
- Underload shutdown threshold.
- Overload shutdown threshold.
- Efficiency of the power.
- Total run time.
- Lockout status.
- Red light status on controller.
- Current limit status.
- ESP central



The smart alarm screen is for a well in Saudi Arabia (Fig. 5).

Just short of reinventing the wheel.



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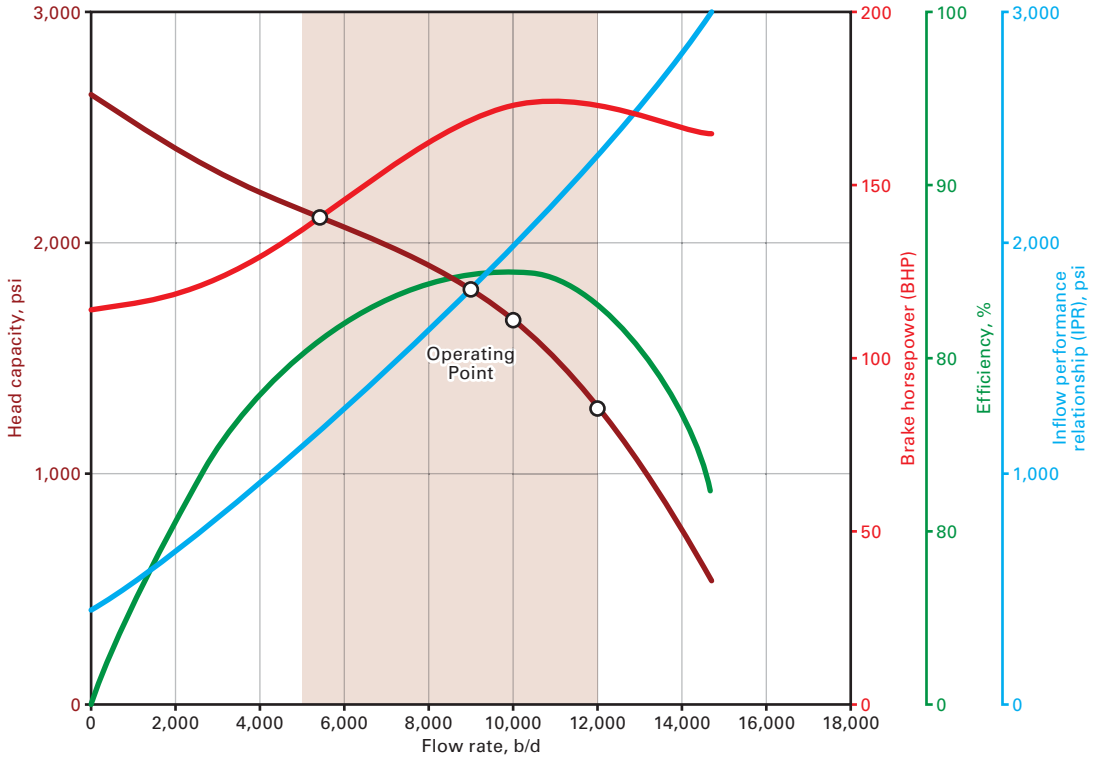
PUMP CURVE FOR SAUDI ARAMCO WELL

Fig. 6



Note: For 39 stage P100 at 3,500 rpm, SG=0.86, head deviation: 0.0%, BHP deviation: 0.0%.

shutdown.

The vMESP software has several modules. The first module is a data-polling engine that collects data from the ESP controller, downhole gauges, and the surface instrumentation. Some oil companies have deployed systems that collect data from nearly 250 wells simultaneously.

The other software modules include the database or data historian. Once the software captures the well data, several software modules provide a variety of diagnostics charts, trends, and smart alarms (Figs. 3-6).

One important diagnostic tool is the pump-curve analysis module (Fig. 6) that provides the essential steps for pump optimization.

Wireless technology

Companies have applied various wireless technologies for remote surveillance systems. One such technology is broadband (Ethernet-based) radio. Most countries in Middle East allow the use of broadband radios using 2.4 Ghz frequency. In North America, the use of 900 Mhz radio is common, while in the Middle East, countries do not allow 900 Mhz radio communication because the frequency is too close to their cellular phone GSM frequency.

In the Middle East, GSM (GPRS, EDGE, and 3G) networks have extensive coverage even in very remote oil field desert areas.

In a GSM cellular network, GPRS/EGDE/3G carries data instead of voice. GPRS is the older technology and has a lower bandwidth (54 kilobits/sec).

Most Middle East countries have rolled out 3G networks that provide a data communication bandwidth up to 2 megabits/sec.

Broadband radios can have a bandwidth of up 2 megabits/sec. Broadband radios require installation of private network and infrastructure. Once companies have set up communication structure (towers and antennas), data transmitting is free, while transferring data using the GPRS/3G network incurs monthly charges from the telecom company providing the service.

Many oil companies in the Middle East are moving towards setting up their own private ultrahigh-speed communication network using the emerging Wimax technology.

Wimax is a high speed, long-range Wi-Fi system. Wimax frequencies in the Middle East range between 3 and 5.8 Ghz. Wimax has a theoretical bandwidth of up to 100 megabits/sec that will enable high-speed data, internet, voice, and video access, even in the most remote oil fields. ✦

The author

Hatem Nasr (hatem.nasr@vmonitor.com) is a cofounder of vMonitor. Before founding vMonitor, he was a director of technology at Baker Hughes Inc. He also worked for 11 years at Honeywell Technology Center where he held several positions include senior principal scientist and several research and management positions. Nasr completed his PhD studies at the University of Minnesota in computer engineering and holds BS and MS degrees in systems engineering from the University of Houston.

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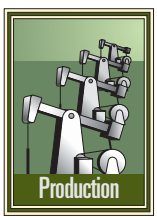
Champion Technologies

Nearly depleted Philippine gas well to provide small vehicle fuel



A company plans to extract the remaining gas from the nearly depleted San Antonio well in the Philippines for use in fueling small vehicles. Energtek Inc. recently signed a purchase contract with the Philippine National Oil Co. (PNOC) for the gas from the well, which is in the Philippine province of Isabela (Fig. 1).

The company will use its adsorbed natural gas (ANG) technology for filling the fuel cylinders for the vehicles.

Its initial plan calls for the gas to fuel 3,000 vehicles for 7 years, with the 3,000 vehicles converted by yearend 2009.

The company also plans to fulfill the government's request to convert more than 500,000 three-wheel vehicles in the next 3-4 years.

Energtek says the Philippines has about 1.5 million three-wheel vehicles and the government has an initiative to ban these vehicles because of the pollution generated by their two-stroke engines.

It has operated sample converted vehicles, using gas from the San Antonio well, since July 2008.

Power plant supply

The San Antonio well has supplied gas to an electric power plant since 1994. Energtek says that the current low pressure in the well has led to the shut down of the power plant.

The company says that PNOC estimates that the well still can recovery about 1 bcf of gas. Energtek plans to use this remaining gas to initiate its plan for fueling two and three-wheel vehicles in the Philippines.

After completing a study of the reservoir, Energtec plans to install gas dehydration equipment and additional compression at the well site.

It also says that it is evaluating other Philippine stranded gas sources similar to the San Antonio well and the possibility of obtaining gas from the Malampaya gas pipeline, although stranded gas costs less than pipeline gas.

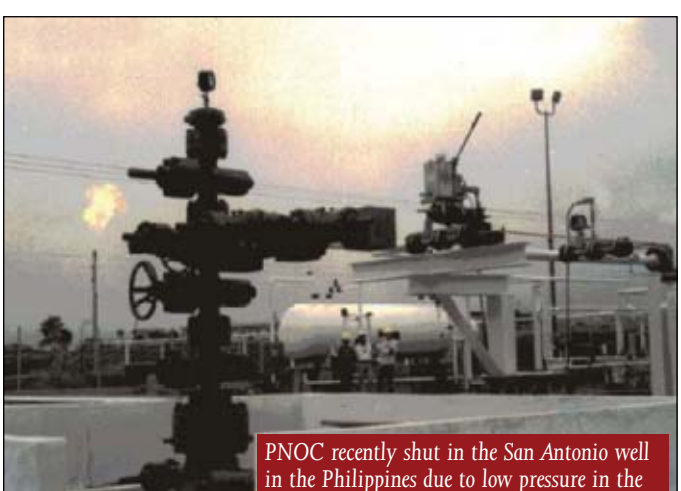
ANG technology

Energtek explains that its ANG technology increases storage capacity in cylinders. With the technology, a cylinder can hold a similar amount of compressed natural gas at 60 bar (870 psi) as a cylinder of the same size without the technology pressured to 200 bar (2,900 psi).

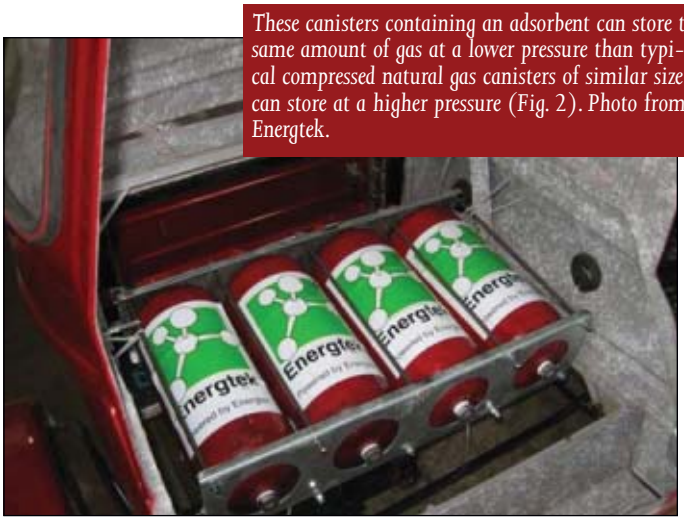
The ANG technology involves placing an adsorbent (activated carbon) in the cylinders.

Energtek explains that the surface area of the microporous adsorbent attracts methane molecules so that the molecules stick closer together, allowing the cylinder to hold more gas.

The lower pressure also allows for use of simpler compressors and welded, less costly cylinders, Energtek says. The company adds that refilling stations for these cylinders also require less capital investment because of the lower pressures involved. ✦



PNOC recently shut in the San Antonio well in the Philippines due to low pressure in the well (Fig. 1). Photo from Energtek.



These canisters containing an adsorbent can store the same amount of gas at a lower pressure than typical compressed natural gas canisters of similar size can store at a higher pressure (Fig. 2). Photo from Energtek.

Platform with a two-section jacket installed off Turkmenistan

Petronas Caragali (Turkmenistan) Sdn. Bhd. recently had a platform installed for producing the oil and gas discovery it made in 2002 off Turkmenistan in the Caspian Sea.

The platform is in Block 1 in which Petronas Caragali holds a 100% interest.

The company says its fourth well, East Livanov 2A, tested flow rates of 14,176 bo/d and 19 MMcfd of gas.

Momentum Engineering out of Dubai built and installed the platform. Momentum Engineering is a unit of the Irish registered Momentum Group,

The 1,000-ton platform is in a 60-m water depth. The accompanying photos show the installation of the two jacket sections and the deck.

The installation procedure involved Momentum's managed crane barge, General Shikhlinsky, first setting the lower 400-ton jacket into place. In the next step, Momentum used its S280 hammer to drive four piles through the jacket skirt to a depth of 68 m.

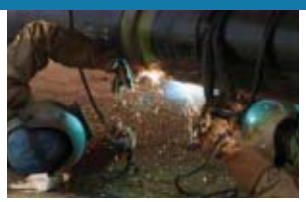
After the job of grouting the piles, the crane barge lowered the upper portion of the jacket. Grouting secured the upper section to the lower section.

The last part of the installation involved placing and welding the deck section on to the jacket. ✦

The first part of the platform installation involved the Titan 4, 600-ton General Shikhlinsky crane barge setting the lower portion of the platform jacket (photo at left) in 60 m of water.

In the row of photos below, the one on the left shows the crane barge picking up the upper section of jacket from the transportation barge. In the middle photo, after installation of the jacket, the crane barge placed the deck on the jacket. The photo on the right shows welders connecting the deck to the jacket.

Photos from Momentum Engineering.

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GUIDE TO WORLD CRUDES

Saxi-Batuque crude assayed

StatoilHydro has conducted an assay of the Saxi-Batuque blended crude, which is part of the Kizomba C development project on Block 15 off Angola. ExxonMobil Corp. began production from Saxi and Batuque fields in mid-August 2008 (OGJ, Aug. 18, 2008, p. 8).

Production from the two fields, along with Mondo (assay in OGJ, Mar. 24, 2008, p. 54), which started production in January, is expected to reach 200,000 b/d later this year. Output from Block 15 will be 700,000 b/d when Saxi and Batuque fields reach peak production, ExxonMobil said.

Kizomba C, which is designed to develop 600 million bbl of oil from the Mondo, Saxi, and Batuque fields, lies in 2,400 ft of water (OGJ, Jan. 21, 2008, p. 8).

StatoilHydro, a partner in the development, described Angola as a key building block for its international production growth. So far its nine producing fields contribute more than 200,000 b/d of equity production. It holds a 13.33% stake in Block 15.

Block 15 is operated by ExxonMobil, holding a 40% stake. Its other block partners are BP 26.67%, and Eni Angola Exploration BV 20%.

Fig. 1 shows a true boiling point (TBP) curve for the whole crude. These data are from StatoilHydro.

Whole crudes

Gravity, °API: 32.83
Specific gravity: 0.8611
Pour point, °F.: 29
Neutralization number (total acid number), mg/gm: 0.64
Sulfur, wt %:0.3231
Viscosity at 20° C., cst: 12.96
Viscosity at 40° C., cst: 7.29
Viscosity at 50° C., cst: 5.75
Viscosity at 100° C., cst: 2.44
Viscosity at 150° C., cst:1.44
Mercaptan sulfur, ppm: 9.4
Nitrogen, ppm: 1,485.5
Conradson carbon residue, wt %: 2.93
Nickel, ppm: 7
Vanadium, ppm: 1.6
rvp, psi: 3.4
Heat of combustion (gross), btu/lb: 19,448
Heat of combustion (net), btu/lb: 18,459
Hydrogen sulfide (dissolved), ppm: 0
Salt content, 1,000 lb/bbl: 35
Cetane index (ASTM D4737): 33

Butane, lighter

TBP cut point, °F.: –200-60
Yield, vol %: 1.66
Gravity, °API: 119.64
Specific gravity: 0.5634
Carbon, wt %: 82.49
Hydrogen, wt %: 17.51
Viscosity at 20° C., cst: 0.36
Viscosity at 40° C., cst: 0.31
Viscosity at 50° C., cst: 0.29
Viscosity at 100° C., cst: 0.21
Viscosity at 150° C., cst: 0.17
Nitrogen, ppm: 0.1
Vanadium, ppm: 0
Heat of combustion (net), btu/lb: 19,265
Paraffins, vol %: 100
Naphthenes, vol %: 0
Distillation type: D-86
Initial boiling point, °F.: –130.5
5 vol %, °F.: –87.2
10 vol %, °F.: –24.1
20 vol %, °F.: 31.5
30 vol %, °F.: 34.5
40 vol %, °F.: 34.7
50 vol %, °F.: 33.6
60 vol %, °F.: 37.1
70 vol %, °F.: 41.5
80 vol %, °F.: 45.2
90 vol %, °F.: 44.6
95 vol %, °F.: 45.1
End point, °F.: 46.6
Cetane index (ASTM D4737): 139

Light naphtha

TBP cut point, °F.: C_5-165
Yield, vol %: 4.98
Gravity, °API: 82.24
Specific gravity: 0.662
Carbon, wt %: 83.87
Hydrogen, wt %: 16.13
Viscosity at 20° C., cst: 0.41

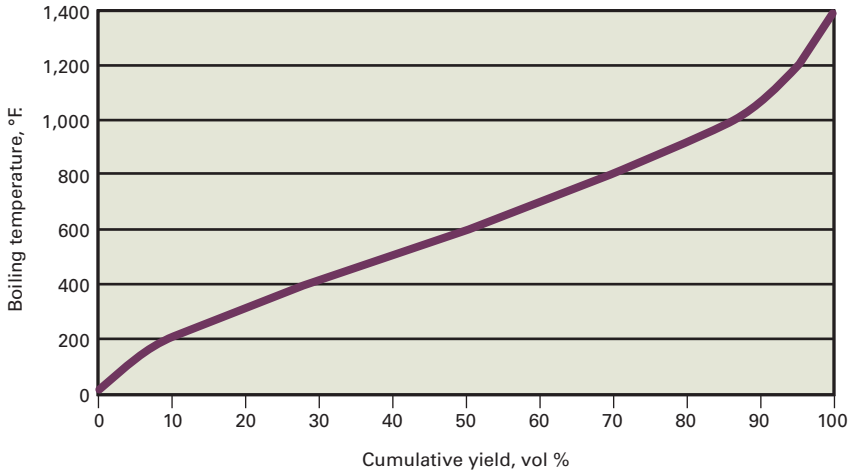
Viscosity at 40° C., cst: 0.35
Viscosity at 50° C., cst: 0.32
Viscosity at 100° C., cst: 0.24
Viscosity at 150° C., cst: 0.19
Nitrogen, ppm: 0.1
Vanadium, ppm: 0
Heat of combustion (net), btu/lb: 18,865
Paraffins, vol %: 83.19
Naphthenes, vol %: 16.36
Distillation type: D-86
Initial boiling point, °F.: 96.9
5 vol %, °F.: 101.4
10 vol %, °F.: 104.3
20 vol %, °F.: 106.6
30 vol %, °F.: 111.4
40 vol %, °F.: 116.7
50 vol %, °F.: 121.8
60 vol %, °F.: 128.5
70 vol %, °F.: 134.1
80 vol %, °F.: 139.5
90 vol %, °F.: 142.1
95 vol %, °F.: 144.5
End point, °F.: 147.0
Cetane index (ASTM D4737): 47

Heavy naphtha

TBP cut point, °F.: 165-330
Yield, vol %: 14.12
Gravity, °API: 55.35
Specific gravity: 0.7573
Carbon, wt %: 85.56
Hydrogen, wt %: 14.44
Sulfur, wt %: 0.0077
Viscosity at 20° C., cst: 0.76
Viscosity at 40° C., cst: 0.62
Viscosity at 50° C., cst: 0.57
Viscosity at 100° C., cst: 0.39
Viscosity at 150° C., cst: 0.29
Mercaptan sulfur, ppm: 3.3
Nitrogen, ppm: 0.3
Vanadium, ppm: 0
Heat of combustion (net), btu/lb: 18,622
Paraffins, vol %: 45.02
Naphthenes, vol %: 45.33
Aromatics (FIA), vol %: 9.65
Distillation type: D-86
Initial boiling point, °F.: 207.9
5 vol %, °F.: 213.3
10 vol %, °F.: 216.1
20 vol %, °F.: 222.6
30 vol %, °F.: 230.2
40 vol %, °F.: 239.1

Simulated distillation

Fig. 1



50 vol %, °F.: 247.6
60 vol %, °F.: 257.6
70 vol %, °F.: 268.0
80 vol %, °F.: 279.2
90 vol %, °F.: 290.8
95 vol %, °F.: 297.2
End point, °F.: 308.0
Cetane index (ASTM D4737): 30

Kerosine

TBP cut point, °F.: 330-480
Yield, vol %: 14.36
Gravity, °API: 42.24
Specific gravity: 0.8144
Carbon, wt %: 86.11
Hydrogen, wt %: 13.84
Pour point, °F.: –80
Sulfur, wt %: 0.0437
Viscosity at 20° C., cst: 1.99
Viscosity at 40° C., cst: 1.44
Viscosity at 50° C., cst: 1.25
Viscosity at 100° C., cst:0.74
Viscosity at 150° C., cst: 0.5
Mercaptan sulfur, ppm: 3.6
Nitrogen, ppm: 5.3
Vanadium, ppm: 0
Heat of combustion (net), btu/lb: 18,550
Paraffins, vol %: 35.5
Naphthenes, vol %: 51.41
Aromatics (FIA), vol %: 13.08
Distillation type: D-86
Initial boiling point, °F.: 364.3
5 vol %, °F.: 368.9
10 vol %, °F.: 371.2
20 vol %, °F.: 376.7
30 vol %, °F.: 383.4
40 vol %, °F.: 391.0
50 vol %, °F.: 398.3
60 vol %, °F.: 407.0
70 vol %, °F.: 415.7
80 vol %, °F.: 425.3
90 vol %, °F.: 434.9
95 vol %, °F.: 440.3
End point, °F.: 444.7
Freeze point, °F.: –58.5
Smoke point, mm: 21.8
Naphthalenes (ASTM D1840), vol %: 3.6
Cetane index (ASTM D4737): 42
Cloud point, °F.: –62
Aniline point, °F.: 138.1

Diesel

TBP cut point, °F.: 480-650
Yield, vol %: 18.88
Gravity, °API: 33.98
Specific gravity: 0.8551
Carbon, wt %: 86.41
Hydrogen, wt %: 13.42
Pour point, °F.: 0
Neutralization number (total acid number), mg/gm: 0.941
Sulfur, wt %: 0.1642
Viscosity at 20° C., cst: 7.76
Viscosity at 40° C., cst: 4.33
Viscosity at 50° C., cst: 3.42
Viscosity at 100° C., cst: 1.51
Viscosity at 150° C., cst: 0.9
Nitrogen, ppm: 94.4

Conradson carbon residue, wt %: 0
Nickel, ppm: 0
Vanadium, ppm: 0
Paraffins, vol %: 39.58
Naphthenes, vol %: 34.77
Distillation type: D-86
Initial boiling point, °F.: 506.3
5 vol %, °F.: 511.3
10 vol %, °F.: 513.8
20 vol %, °F.: 520.2
30 vol %, °F.: 527.8
40 vol %, °F.: 536.5
50 vol %, °F.: 544.7
60 vol %, °F.: 554.3
70 vol %, °F.: 564.6
80 vol %, °F.: 575.8
90 vol %, °F.: 587.6
95 vol %, °F.: 594.3
End point, °F.: 605.0
Freeze point, °F.: 19.4
Cetane index (ASTM D4737): 54
Cloud point, °F.: 14
Aniline point, °F.: 162.8

Vacuum gas oil

TBP cut point, °F.: 650-1,000
Yield, vol %: 29.88
Gravity, °API: 24.47
Specific gravity: 0.9072
Carbon, wt %: 86.69
Hydrogen, wt %: 12.84
Pour point, °F.: 90
Neutralization number (total acid number), mg/gm: 0.47
Sulfur, wt %: 0.3773
Viscosity at 20° C., cst: 182.49
Viscosity at 40° C., cst: 54.58
Viscosity at 50° C., cst: 33.89
Viscosity at 100° C., cst: 6.8
Viscosity at 150° C., cst: 2.77
Nitrogen, ppm: 1,022.3
Conradson carbon residue, wt %: 0.23
Nickel, ppm: 0.1
Vanadium, ppm: 0
Paraffins, vol %: 22.18
Naphthenes, vol %: 53.75
Distillation type: D-1160
Initial boiling point, °F.: 689.8
5 vol %, °F.: 694.3
10 vol %, °F.: 705.1
20 vol %, °F.: 727.3
30 vol %, °F.: 752.9
40 vol %, °F.: 780.6
50 vol %, °F.: 810.5
60 vol %, °F.: 840.7
70 vol %, °F.: 870.2
80 vol %, °F.: 900.5
90 vol %, °F.: 930.0
95 vol %, °F.: 948.2
End point, °F.: 969.8
Cetane index (ASTM D4737): 56
Aniline point, °F.: 190.2

Vacuum residue

TBP cut point, °F.: 1,000+
Yield, vol %: 16.12
Gravity, °API: 11.46
Specific gravity: 0.9898
Pour point, °F.: 99
Neutralization number (total acid number), mg/gm: 1.153
Sulfur, wt %: 0.7543
Viscosity at 20° C., cst: 5,196,579.3
Viscosity at 40° C., cst: 212,838.98
Viscosity at 50° C., cst: 59,137.4
Viscosity at 100° C., cst: 759.77
Viscosity at 150° C., cst: 70.77
Nitrogen, ppm: 5,974.7
Conradson carbon residue, wt %: 15.24
n-Heptane insolubles (C_7 asphaltenes), wt %: 1.5
Nickel, ppm: 38.8
Vanadium, ppm: 8.5
Distillation type: D-1160
Initial boiling point, °F.: 1,038.5
5 vol %, °F.: 1,042.9
10 vol %, °F.: 1,053.3
20 vol %, °F.: 1,076.2
30 vol %, °F.: 1,103.6
40 vol %, °F.: 1,135.0
50 vol %, °F.: 1,170.8
60 vol %, °F.: 1,213.3
70 vol %, °F.: 1,258.8
80 vol %, °F.: 1,309.5
90 vol %, °F.: 1,362.9
95 vol %, °F.: 1,397.6
End point, °F.: 1,457.0
Cetane index (ASTM D4737): 42 ✦

CP changes address hydrogen diffusion

Ramesh Singh
Gulf Interstate Engineering Co.
Houston

Adjustments to a pipeline's cathodic-protection program can help address possible hydrogen diffusion brought about by nonconformance with welding procedure specifications (WPS) during construction.

Low-hydrogen welding processes like gas metal arc welding (GMAW), flux-cored arc welding (FCAW), or where necessary selection of low-hydrogen shielded metal arc welding (SMAW) consumables are required for joining high-strength steel pipeline material, particularly if the structure is also protected by cathodic protection.

Deep-digging arc characteristics of cellulose-coated electrodes allow better weld metal penetration and arc control in varying welding positions as compared with other available pipeline welding processes. The use of cellulose-coated electrodes, however, increases hydrogen content in the weld metal, conflicting with requirements for low-hydrogen weld metal during welding of high-strength steels. Increased demand for higher-strength steels has heightened the importance for controlling diffusible hydrogen levels in weld metals.

This article examines resolution of this problem in one pipeline project.

Background

Construction of a 1,000-mile large diameter gas pipeline involved major river crossings, steep rises in elevation, and passage through environmentally sensitive areas.

Measures taken to reduce construction's effect on the environment included applying 3 LPE coating to the pipe and providing both completed sections and the finished pipeline with cathodic protection.

The pipeline used API 5L X-70 PSL2 line pipe, with an average yield strength greater than 79,000 psi.

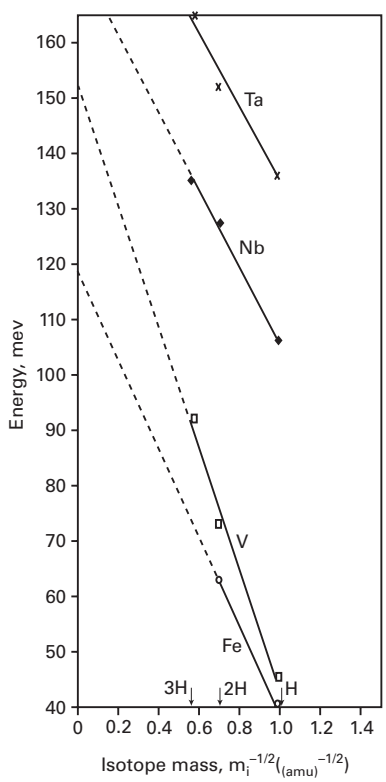
The pipeline's operator asked its contractors to use a low-hydrogen welding process. These contractors qualified the welding procedures with a GMAW semiautomatic welding processes for construction, and a combination of FCAW and low-hydrogen SMAW for repairs, tie-in, and welds that could not be completed semiautomatically.

Except for the FCAW process, all weld processes had a certified diffusible hydrogen content of 4 ml/100 g of weld metal. The FCAW process accepted a maximum diffusible content of 8 ml/100 g of weld metal, in line with American Welding Society AWS A5.29 and AWS A5.20 requirements.

Construction lasting several months required cathodic protection of any pipe lying in soil for long periods between installation and start of operations. Cathodic-protection installation occurred in two phases:

- A temporary CP system with sacrificial anodes to provide external corrosion protection during construction.
- A permanent system with an impressed current to protect the pipeline for its design life (acceptance criteria for CP polarization of –0.95 v to –1.5 v).

Hydrogen-diffusion activation



DIFFUSIBLE HYDROGEN TEST REPORT, PER AWS A4.3-93 (REV. 2006)

Description of sample: 4 × 350 mm AWS SFA – 5.5 Grade E-8010G electrode
Drying time, temperature before welding: No drying
Welding date: May 15, 2008
Welding process: SMAW
Welding polarity: DCEP
Welding current: 170 ±5 amp
Welding voltage: 20 ±2 v
Specimen storage temperature: –196° C.
Specimen storage time prior to loading in analytical apparatus: 1 hr 10 min
Specimen loaded from bath or warmed to 0° C.: Warmed to 0° C.
Mercury temperature during loading: 45° ±1° C.
Hydrogen evolution time: 72 hr
Analysis method: Standard mercury displacement
Mercury temperature during testing: 45° ±1° C.

Sample	1	2	3	4
Barometric pressure, mm Hg	761	761	761	761
Ambient temperature (T_a), °C.	35	35	35	35
Middle sample weight + weld metal (M_2), g	179.5183	180.4443	180.0822	181.1649
Middle sample weight before welding (M_1), g	172.9622	173.8284	172.9563	173.1536
Hydrogen collected (V_g), ml	4	4	4	4
Mercury head in tube (H), mm	144	142	145	148
Hydrogen, corrected to STP (V_{gSTP}), ml	2.8783	2.8876	2.8737	2.8597
Hydrogen/100 g weld deposit (V_{DH}), ml	43.88	43.65	40.33	35.70
Average diffusible hydrogen/100 g	40.89			

Calculation: $V_{gSTP} = \frac{V_g(B - H)}{760} \times \frac{273}{273 - T_a}$

$$V_{DH} = \frac{V_{gSTP} \times 100}{M_2 - M_1}$$

Spur construction took place in parallel with construction of the main pipeline. Local contractors under a different construction and quality management team built these spur lines. The spur line used the same grade pipe as the mainline but measured 36-in. OD and 0.75-in WT.

An internal audit discovered the local contractor for this spur line had used a previously approved WPS from an unrelated job not suitable for this section of the pipeline. A roughly 390-ft section of pipeline consisting of 32 welds used this non-conforming WPS. The WPS allowed the contractor to use an SMAW process with E-6010 cellulose-coated electrodes for root pass and hot pass and E-8010 G electrodes for the rest of the weld.

On detecting these deviations, field inspectors issued a nonconformance order and quarantined this section of pipe pending resolution by engineering.

The problem

Construction management and engineering had to decide whether to:

- Accept the weld as is.
- Reject the welds and ask the contractor to reweld the section.
- Find an engineering solution to compensate as much as possible for the extra hydrogen these welds could contain.

Construction management placed a premium on a rapid solution.

The contractor accepted that the use of the chosen WPS was wrong but disputed both that the weld would have any adverse effect and that it would contain sufficient diffusible hydrogen to warrant cutting away and rewelding the section.

Engineering began to review material test reports from pipe mills. Five different heats of pipe were discovered, with yield strengths of 77,010, 77,889, and 81,790 psi: an average of 78,896.33 psi, close to the average yield strength of the mainline pipes.

Engineering next analyzed a weld sample for the presence of diffusible hydrogen. If the amount of hydrogen found was less than 16 ml/100 g of weld metal, the welds would be retained.

The contractor agreed to participate in this test and abide by the results. Under supervision of engineering, the contractor's welders assembled three weld sections of the project pipe with cellulose-covered welding electrode A5.5, E 8010 G, batch number SI 7684934, the same type used for the welding of the quarantined section of pipeline.

Testing

MET-HEAT Engineers Pvt. Ltd. cut four specimens from the three welds and analyzed them according to AWS A4.3 (Rev. 2006), determining the amount of diffusible hydrogen contained by standard mercury displacement method. They maintained a bath temperature of 45° C. ±1° C., allowing a 72-hr hydrogen evolution time. All three welds contained more than 16 ml diffusible hydrogen/100 g weld metal, averaging 40.89 ml/100 g (see box).

This diffusible hydrogen exists in atomic form (also called nascent hydrogen), as opposed to the molecular hydrogen associated with such weld imperfections as gas pockets and porosities. Molecular hydrogen cannot diffuse in the steel substrate and is hence relatively less harmful.

Hydrogen diffusion in metals occurs when a hydrogen molecule dissolves on a metal's surface. The hydrogen molecule dissociates into two atoms (Sieverts' Law), incorporated by the bulk solid via diffusion through interstitial sites in the metal crystal lattice.

A dissolved hydrogen atom creates a lattice defect capable of inelastically scattering phonons, the thermal oscillation of an atom. In a scattering event, energy in the phonon transfers to the hydrogen atom, forcing it over a

potential energy barrier and propagating it through the lattice as a free wave. This released potential energy, if not absorbed by the ductility of the material, exceeds the yield strength of the material and causes it to crack.

The accompanying figure plots the activation energies for hydrogen isotope diffusion in metals, Fe, V, Nb, and Ta as functions of isotope mass. The data form the straight lines predicted by the theory, proving the isotope effect in the activation energy is due to hydrogen-atom zero point vibration at an interstitial site.

MET-HEAT also considered the additional hydrogen evolved through cathodic protection, in excess of the hydrogen present in the weld metal. Atomic hydrogen evolves as the natural reaction product of both corrosion and cathodic protection. The partial cathodic reaction $2H^+ + 2e \rightarrow H_2$ shows the evolution of hydrogen gas.

Review of the specifications led to limits on adding additional hydrogen beyond what was present in the weld metal. Redesigning the polarization current for cathodic protection limited the evolution of excess hydrogen, consistent with NACE RP 0169 Sec. 6, Para. 6.2.2.3.4.[1]

Initial project design defined cathodic-protection requirements in the range of −0.95 v to −1.5 v. for the entire pipeline. Engineers suggested the close interval potential (CIP) survey data for the quarantined section of pipeline be reviewed for any possible changes in an effort to reduce the hydrogen evaluation for this section of the pipeline.

CIP survey data supported making special conditions for this section of the pipeline, adjusting the impressed polarization current to a range of −0.85 v to −1.1 v.[2]

The pipeline operator asked the CP contractor to adjust the transformer control to achieve the suggested polarization range. Follow-up CIP surveys established achievement of required protection to the pipe section. The operator plans additional monitoring of this section of pipeline by its integrity-management group and periodic review by engineering as a precaution. ✦

References

1. NACE RP0169, "Standard Recommended Practice: Control of External Corrosion on Underground or Submerged Metallic Piping Systems," Sec. 6, Para. 6.2.2.3.4, National Association of Corrosion Engineers, 2002.

2. NACE RP0169, "Standard Recommended Practice: Control of External Corrosion on Underground or Submerged Metallic Piping Systems," Sec. 6, Para. 6.2.21.2, 6.2.2.1.3, and 6.2.2.3.4, National Association of Corrosion Engineers, 2002.

The author

Ramesh Singh (rsingh@gie.com) is a senior principal engineer, specializing in materials and corrosion, at Gulf Interstate Engineering Co. He graduated from California Coast University with an MS (2003) in engineering management and gained his basic metallurgical education (1984) from Air Force Technical College, India. He is an Incorporated Engineer, registered with the Engineering Council in the UK, and Member of The Welding Institute, Cambridge, UK.

Sulphco Inc.,

Houston, has appointed Fred S. Zeidman to its board. Zeidman has held leadership positions in a number of energy-related companies. He is the former chairman of the board of Houston-based Seitel Inc., a leading provider of seismic data and related geophysical expertise to the petroleum industry. He also served as chairman of the board of Unibar Corp., the largest US independent drilling fluids company until its sale in 1991 to Anchor Drilling Fluids. He currently serves as interim president for Nova Biosource Fuels Inc., a refiner and marketer of renewable biodiesel fuel products. Zeidman is also a senior director for governmental affairs at Greenberg, Traurig's Washington, DC, law office. He is a graduate of Washington University and received an MBA from New York University.


Zeidman

Sulphco has developed a patented process employing ultrasound technology to desulfurize and hydrogenate crude oil and other oil-related products. The company's technology is designed to upgrade sour heavy crude oils into sweeter, lighter crude oils, producing usable oil per barrel.

Anton Oilfield Services Group,

Hong Kong, has agreed to acquire the oil field services business of Qingdao Precede Technology Co. Ltd. The deal includes Qingdao's associated company Shengli Oilfield Liwei Petroleum Technology Co. Ltd. The business and related assets of Qingdao will be injected into a new company, and Anton will acquire 75% of the new company for 160 million renminbi in stock and 50 million renminbi in cash. Anton has an option to purchase the remaining 25% within 1 year from Jan. 1, 2011.

Qingdao Precede provides sand control and production enhancement services in Shengli, Jidong, and Nanyang oil fields in China.

Anton provides drilling, completion, and production-related services.

Det Norsk Veritas,

Oslo, through its commercial software unit DNV Software has acquired Jardine Technology Ltd., Glasgow. This acquisition follows DNV's acquisition and integration of the Jardine & Associates Ltd. consultancy in 2005, completing DNV's offering of software and services in the market for reliability, availability, and maintainability simulations. The acquired software products include MAROS for the upstream oil and gas industry; TARO for the refining, petrochemical, and chemicals industries; and TRAIL for the rail industry. These new products complement DNV's Safeti software for quantitative risk assessment, consequence modeling, and management systems assessment.

DNV is an independent risk management consultancy with the objective of safeguarding life, property, and the environment. DNV Software serves the maritime, offshore, and process industries.

Jardine was established in March 1998 to focus on developing software solutions to asset performance and risk problems in the oil and gas, chemical, power, and railway industries.

J-W Wireline Co.,

Dallas, acquired the business, assets, and personnel of Meeks Wireline Services Inc., Dunbar, WV, for an undisclosed cash sum. Meeks Wireline Services is an independent cased-hole wireline company serving the Appalachian basin from bases in Weston, WV, and Jager Hill, Ky. Plans call for providing wireline services covering all of the Appalachian basin, including from a new base of operations.

J-W Wireline is a wholly owned subsidiary of J-W Operating Co. that specializes in providing cased-hole logging services in Texas, Oklahoma, Louisiana, Arkansas, Colorado, Wyoming, New Mexico, Utah, Kentucky, and West Virginia.

Remora ASA,

Stavanger, and Stena Drilling Ltd., Aberdeen, have signed an engineering, procurement, and construction contract for phased development of an innovative mooring system to be used on the first drillship to be designed for operation in polar seas. The Drillmax Ice drillship will be built at the Samsung shipyard in South Korea. The mooring system is based on Remora's patented HiLoad technology and will allow the advanced dynamically positioned (DP) drillship to operate with the highest possible regularity in shallow (60–300 m) and icy waters. The system will be based on a DP-assisted mooring configuration.

Remora provides the international market with innovative solutions for offshore loading of oil.

Stena Drilling, a wholly owned subsidiary of Stena AB, Gothenburg, Sweden, is one of the world's foremost independent drilling contractors.

Wellbore Energy Solutions,

Lafayette, La., has appointed Jason Foreman quality, health, safety, and environment (QHSE) manager. As QHSE manager, he will support existing QHSE policies and procedures and implement initiatives to continue to foster a company-wide commitment to safety and quality assurance. Prior to joining WES, Foreman spent 12 years with Baker Oil Tools, serving in various capacities, including applications advisor in the Fluid Pumping District and quality analyst within the Baker Oil Tools Super Center. He has a bachelor's degree in industrial technology from the University of Louisiana at Lafayette's College of Engineering.


Foreman

WES is an oil field service company specializing in the rental of wellbore clean-up equipment throughout the Gulf Coast region and international markets.

Bentley Systems Inc.,

Exton, Pa., has acquired Struc-Soft Inc., Montreal. Terms were not disclosed. Struc-Soft is a reseller and developer of 2-D and 3-D engineering, construction, and fabrication products for analysis, design, and drawing of production plant facilities in the oil and gas, chemical, mining and metals, and other industries in eastern Canada.

Struc-Soft has been the exclusive North American reseller of Bentley's ProSteel 3-D structural steel detailing and fabrication software since 2000 and also offers custom-developed ProSteel add-ons for specialized applications such as offshore platforms and jackets, pressure vessels, and towers. Bentley named Struc-Soft cofounder and former Pres. George Ajami director, global structure professional services. Struc-Soft co-founder and former Vice-Pres. Diane Hansen also is joining Bentley.

Bentley provides comprehensive software solutions for sustaining infrastructure.

Expro,

Reading, UK, will soon start work on a new 60 million kroner (Nor.) base in Norway supporting its Matre sensor products The company will spend an additional 10 million kroner in tooling and outfitting the base. Expro's Matre sensors are deployed in its high-integrity subsea power and data connection systems. Zurhaar & Rubb AS will build the base in the Ternetangen industrial area in the Bomlo area of Hordaland. Planning permission has been approved, and building contracts are expected to be signed within the next month with an expected 12-month construction program. The Norwegian Technology Institute has been contracted during the design phase to consult on lean manufacturing and layout.

Expro is a market leader in providing services and products that measure, improve, control, and process flow from high-value oil and gas wells. It markets in the areas of well testing and commissioning, production systems, wireline intervention, connectors and measurements, and drilling choke systems.

Petrofac,

Aberdeen and Sharjah, has opened a new state-of-the-art training center in Dubai. The Dubai Petroleum Training Center is the result of a joint agreement between Dubai state company Dubai Petroleum Establishment and Petrofac Training to invest in and develop a safety and technical training center in the UAE. The facility is equipped to meet the safety and technical training needs of the energy industries throughout the Middle East. With a practical training area of about 1,500 sq m, the center boasts cutting-edge training equipment, including a mobile helicopter underwater escape training unit, a mobile confined space training unit, a rigging and lifting frame, and a scaffolding area. The center also has four fully equipped classrooms, and as a result can deliver a mix of practical and theoretical learning onsite to both external clients and DPE.

Petrofac Training, a division of Petrofac, is a leading provider of training and consultancy solutions to the global oil and gas industry. Petrofac is a leading international provider of facilities solutions to the oil and gas production and processing industry

DPE assumed full control of Dubai's offshore petroleum assets in April 2007.

Equipment/Software/Literature

Respirator offers custom fit, user comfort

PeakFit, a US National Institute for Occupational Safety and Health-approved N95 air-purifying respirator, is specifically engineered for personal comfort as well as safety.

Its contoured design and ample size help make breathing easier, reducing worker fatigue and promoting compliance, the company says. The molded nose bridge fits most faces, with no need to pinch a metal nosepiece to achieve a "peak fit." An internal nose cushion is made with soft, closed-cell foam and helps ensure a safe, snug fit. The integrated, one-piece cloth head strap with buckle is fully adjustable to fit any head size.

Respirators provide protection against a variety of contaminants and are available in three versions: PeakFit (filtration against aerosols free of oils below permissible exposure limit), PeakFit OV (additional filtration against aerosols free of organic vapors below PEL), and PeakFit AG (additional filtration against aerosols free of organic vapors and acid gases below PEL).

Source: **Gateway Safety Inc.,** 11111 Memphis Ave., Cleveland, OH 44144.

Monitoring system supports frac, well test services

A new real-time monitoring service—Intellisite RTViewer—supports this company's frac and well test services.

Frac monitoring service. One user is using the service to deliver second-by-second frac and well test data directly to customers anywhere in the world using the internet. The service provides as many as 40 channels of real-time frac data that can be accessed anywhere via web browser. The graphical interface allows each user to customize the frac data and select the preferred view: real-time graphs, digital readouts, or a raw data display.

Well testing monitoring service. Another user is using the system to receive near real-time data used to measure pressure, temperature, gas, and liquid flow in a potentially explosive environment. The system is designed to provide a small footprint and stand alone power requirements. The service allows the user to select the preferred interval range in readings: 1 sec to 60 sec intervals.

Source: **Implicit Monitoring Solutions LP,** 2002 Academy Lane, Suite 130, Farmers Branch, TX 75234.

Imports of crude and products

	Districts 1-4		District 5		Total US		
	9-5 2008	8-29 2008	9-5 2008	8-29 2008	9-5 2008	8-29 2008	*9-7 2007
	1,000 b/d						
Total motor gasoline	1,109	883	12	0	1,121	883	1,314
Mo. gas. blending comp.	837	640	12	0	849	640	879
Distillate	117	93	0	0	117	93	389
Residual	156	199	169	157	325	356	162
Jet fuel-kerosine	22	46	4	4	26	50	224
Propane-propylene	157	251	6	7	163	258	122
Other	67	464	140	60	207	524	(23)
Total products	**2,465**	**2,576**	**343**	**228**	**2,808**	**2,804**	**3,067**
Total crude	**7,981**	**8,630**	**600**	**1,200**	**8,581**	**9,830**	**10,237**
Total imports	**10,446**	**11,206**	**943**	**1,428**	**11,389**	**12,634**	**13,304**

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

Purvin & Gertz LNG netbacks—Sept. 12, 2008

Receiving terminal	Liquefaction plant					
	Algeria	Malaysia	Nigeria	Austr. NW Shelf	Qatar	Trinidad
	$/MMbtu					
Barcelona	9.75	7.69	9.14	7.56	8.40	9.05
Everett	6.43	4.05	6.01	4.11	4.71	6.77
Isle of Grain	12.02	9.38	11.21	9.41	10.11	11.24
Lake Charles	4.64	2.67	4.37	2.83	3.08	5.35
Sodegaura	9.48	12.15	9.73	11.78	10.92	8.61
Zeebrugge	11.37	8.77	10.58	8.65	9.48	10.59

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

Crude and product stocks

District	Crude oil	Motor gasoline		Jet fuel, kerosine	Fuel oils		Propane-propylene
		Total	Blending comp.[1]		Distillate	Residual	
	1,000 bbl						
PADD 1	14,214	49,608	29,403	9,961	49,724	13,457	4,599
PADD 2	60,669	49,155	17,881	7,016	30,418	1,775	22,957
PADD 3	159,608	57,740	27,681	12,639	34,558	15,811	24,466
PADD 4	14,569	6,046	1,872	519	2,946	288	[1]2,506
PADD 5	48,974	25,393	19,217	9,680	12,814	5,364	—
Sept. 5, 2008	**298,034**	**187,942**	**96,054**	**39,815**	**130,460**	**36,695**	**54,528**
Aug. 29, 2008	**303,862**	**194,404**	**98,636**	**42,081**	**131,712**	**37,424**	**52,908**
Sept. 7, 2007[2]	**329,660**	**191,083**	**85,143**	**41,186**	**132,170**	**36,375**	**55,162**

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

Refinery report—Sept. 5, 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	1,523	1,516	2,126	109	492	89	61
PADD 2	3,401	3,357	2,414	192	1,051	63	216
PADD 3	5,580	5,373	2,193	578	1,606	207	552
PADD 4	542	538	253	26	163	10	[1]106
PADD 5	2,737	2,699	1,412	505	609	151	—
Sept. 5, 2008	**13,783**	**13,483**	**8,398**	**1,410**	**3,921**	**520**	**935**
Aug. 29, 2008	**15,617**	**15,258**	**9,446**	**1,505**	**4,518**	**502**	**1,014**
Sept. 7, 2007[2]	**16,067**	**15,901**	**9,157**	**1,473**	**4,317**	**658**	**1,017**
	17,610 Operable capacity		**78.3 utilization rate**				

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

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

OGJ crack spread

	*9-12-08	*9-14-07	Change	Change, %
	$/bbl			
SPOT PRICES				
Product value	124.61	88.78	35.84	40.4
Brent crude	100.48	76.56	23.92	31.2
Crack spread	24.14	12.21	11.92	97.6
FUTURES MARKET PRICES				
One month				
Product value	117.83	87.66	30.18	34.4
Light sweet crude	102.85	78.96	23.89	30.3
Crack spread	14.99	8.69	6.29	72.4
Six month				
Product value	116.43	87.55	28.88	33.0
Light sweet crude	104.46	74.63	29.83	40.0
Crack spread	11.97	12.92	–0.95	–7.3

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

OGJ GASOLINE PRICES

	Price ex tax 9-10-08	Pump price* 9-10-08	Pump price 9-12-07
	¢/gal		
(Approx. prices for self-service unleaded gasoline)			
Atlanta	320.3	364.7	278.1
Baltimore	326.5	368.4	268.6
Boston	323.7	365.6	265.6
Buffalo	300.4	360.0	281.6
Miami	309.7	361.3	293.3
Newark	321.4	354.3	263.8
New York	305.0	364.6	281.2
Norfolk	321.6	359.6	262.7
Philadelphia	316.9	367.6	279.3
Pittsburgh	312.6	363.3	277.6
Wash., DC	323.9	362.3	280.6
PAD I avg	316.5	362.9	275.7
Chicago	336.4	394.3	322.1
Cleveland	311.4	357.8	286.0
Des Moines	311.7	351.8	276.5
Detroit	314.3	368.7	307.7
Indianapolis	307.7	357.8	295.3
Kansas City	315.8	351.8	284.5
Louisville	324.9	361.8	297.9
Memphis	311.0	350.8	266.4
Milwaukee	315.5	366.8	302.6
Minn.-St. Paul	318.4	358.8	293.6
Oklahoma City	314.7	350.1	285.7
Omaha	319.5	361.8	285.5
St. Louis	316.8	352.8	268.3
Tulsa	310.3	345.7	284.6
Wichita	304.4	347.8	279.9
PAD II avg	315.5	358.6	289.1
Albuquerque	322.5	358.9	277.4
Birmingham	320.4	359.0	268.4
Dallas-Fort Worth	307.8	346.2	267.3
Houston	304.8	343.2	274.2
Little Rock	317.8	358.0	270.2
New Orleans	322.6	361.0	274.1
San Antonio	318.6	357.0	267.3
PAD III avg	316.4	354.8	271.3
Cheyenne	324.1	356.5	280.2
Denver	348.0	388.4	289.3
Salt Lake City	337.6	380.5	291.3
PAD IV avg	336.6	375.2	286.9
Los Angeles	327.6	391.5	277.9
Phoenix	328.7	366.1	285.3
Portland	325.8	369.2	284.1
San Diego	329.6	393.5	288.2
San Francisco	337.2	401.1	284.5
Seattle	323.7	378.1	280.2
PAD V avg	328.8	383.3	283.4
Week's avg.	**319.3**	**363.8**	**281.6**
Aug. avg.	**330.8**	**375.3**	**280.8**
July avg.	**361.3**	**405.7**	**295.2**
2008 to date	**309.7**	**353.6**	—
2007 to date	**229.1**	**272.7**	—

*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

	9-5-08 ¢/gal		9-5-08 ¢/gal
Spot market product prices			
Motor gasoline (Conventional-regular)		Heating oil No. 2	
New York Harbor	285.00	New York Harbor	295.41
Gulf Coast	294.50	Gulf Coast	294.53
Los Angeles	287.50	Gas oil	
Amsterdam-Rotterdam-Antwerp (ARA)	268.41	ARA	306.90
Singapore	256.29	Singapore	284.29
Motor gasoline (Reformulated-regular)		Residual fuel oil	
New York Harbor	290.00	New York Harbor	210.43
Gulf Coast	301.50	Gulf Coast	214.60
Los Angeles	287.50	Los Angeles	284.57
		ARA	215.60
		Singapore	230.91

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

BAKER HUGHES RIG COUNT

	9-12-08	9-14-07
Alabama	6	5
Alaska	11	5
Arkansas	58	48
California	47	37
Land	46	35
Offshore	1	2
Colorado	116	120
Florida	3	1
Illinois	0	1
Indiana	2	1
Kansas	11	13
Kentucky	12	11
Louisiana	190	178
N. Land	85	60
S. Inland waters	21	28
S. Land	28	25
Offshore	56	65
Maryland	0	1
Michigan	2	1
Mississippi	17	12
Montana	12	13
Nebraska	0	0
New Mexico	90	75
New York	7	6
North Dakota	74	40
Ohio	10	15
Oklahoma	216	197
Pennsylvania	28	16
South Dakota	1	2
Texas	949	829
Offshore	11	6
Inland waters	1	1
Dist. 1	28	25
Dist. 2	34	34
Dist. 3	61	55
Dist. 4	92	84
Dist. 5	184	187
Dist. 6	130	125
Dist. 7B	34	35
Dist. 7C	72	60
Dist. 8	133	105
Dist. 8A	26	18
Dist. 9	43	36
Dist. 10	100	58
Utah	47	40
West Virginia	28	33
Wyoming	81	75
Others—NV-3; OR-1; TN-2; VA-6; WA-1	13	12
Total US	**2,031**	**1,787**
Total Canada	**433**	**364**
Grand total	**2,464**	**2,151**
Oil rigs	413	298
Gas rigs	1,606	1,483
Total offshore	74	75
Total cum. avg. YTD	**1,864**	**1,760**

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

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

SMITH RIG COUNT

Proposed depth, ft	Rig count	9-12-08 Percent footage*	Rig count	9-14-07 Percent footage*
0-2,500	81	3.7	65	7.6
2,501-5,000	132	51.5	112	58.0
5,001-7,500	261	16.8	223	21.9
7,501-10,000	466	2.3	430	3.4
10,001-12,500	452	1.7	437	1.8
12,501-15,000	359	—	275	0.7
15,001-17,500	135	—	116	—
17,501-20,000	80	—	67	—
20,001-over	14	—	33	—
Total	**1,980**	**6.7**	**1,758**	**8.1**
INLAND	15		39	
LAND	1,959		1,659	
OFFSHORE	6		60	

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

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

OGJ PRODUCTION REPORT

	[1]9-12-08	[2]9-14-07
	1,000 b/d	
(Crude oil and lease condensate)		
Alabama	19	21
Alaska	673	626
California	645	666
Colorado	63	65
Florida	5	5
Illinois	26	27
Kansas	104	105
Louisiana	300	1,175
Michigan	14	14
Mississippi	55	57
Montana	95	94
New Mexico	161	159
North Dakota	125	126
Oklahoma	171	171
Texas	1,080	1,323
Utah	52	55
Wyoming	148	149
All others	62	73
Total	**3,798**	**4,911**

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

US CRUDE PRICES

	9-12-08 $/bbl*
Alaska-North Slope 27°	129.55
South Louisiana Sweet	103.75
California-Kern River 13°	88.30
Lost Hills 30°	96.60
Wyoming Sweet	87.18
East Texas Sweet	97.25
West Texas Sour 34°	90.25
West Texas Intermediate	97.75
Oklahoma Sweet	97.75
Texas Upper Gulf Coast	94.25
Michigan Sour	90.75
Kansas Common	96.75
North Dakota Sweet	88.25

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

WORLD CRUDE PRICES

$/bbl[1]	9-5-08
United Kingdom-Brent 38°	108.46
Russia-Urals 32°	104.62
Saudi Light 34°	105.03
Dubai Fateh 32°	106.19
Algeria Saharan 44°	109.39
Nigeria-Bonny Light 37°	111.39
Indonesia-Minas 34°	112.66
Venezuela-Tia Juana Light 31°	106.74
Mexico-Isthmus 33°	106.63
OPEC basket	108.29
Total OPEC[2]	106.39
Total non-OPEC[2]	106.43
Total world[2]	106.41
US imports[3]	105.26

[1]Estimated contract prices. [2]Average price (FOB) weighted by estimated export volume. [3]Average price (FOB) weighted by estimated import volume.

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

US NATURAL GAS STORAGE[1]

	9-5-08	8-29-08	9-5-07	Change, %
	bcf			
Producing region	795	793	912	–12.8
Consuming region east	1,723	1,676	1,732	–0.5
Consuming region west	387	378	407	–4.9
Total US	**2,905**	**2,847**	**3,051**	**–4.8**
	June 08	**June 07**	**Change, %**	
Total US[2]	**2,171**	**2,580**	**–15.9**	

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

Statistics

World oil balance

	2008 1st qtr.	2007 4th qtr.	2007 3rd qtr.	2007 2nd qtr.	2007 1st qtr.	2006 4th qtr.
	Million b/d					
DEMAND						
OECD						
US & Territories	20.15	20.90	21.06	20.95	21.09	21.09
Canada	2.37	2.39	2.43	2.31	2.38	2.29
Mexico	2.10	2.16	2.06	2.14	2.12	2.00
Japan	5.44	5.25	4.70	4.64	5.43	5.29
South Korea	2.33	2.31	2.06	2.12	2.35	2.32
France	1.98	2.02	1.94	1.86	1.98	1.95
Italy	1.62	1.75	1.65	1.69	1.72	1.71
United Kingdom	1.72	1.73	1.75	1.78	1.80	1.81
Germany	2.47	2.54	2.55	2.37	2.37	2.71
Other OECD Europe	7.38	7.60	7.52	7.25	7.35	7.55
Australia & New Zealand	1.13	1.15	1.12	1.11	1.12	1.10
Total OECD	**48.69**	**49.80**	**48.84**	**48.22**	**49.71**	**49.82**
NON–OECD						
China	7.72	7.87	7.59	7.52	7.33	7.45
FSU	4.34	4.32	4.22	4.32	4.25	4.36
Non-OECD Europe	0.86	0.79	0.73	0.78	0.85	0.78
Other Asia	8.81	8.93	8.64	8.83	8.74	8.80
Other non-OECD	15.46	15.18	15.47	15.16	14.87	15.47
Total non-OECD	**37.19**	**37.09**	**36.65**	**36.61**	**36.04**	**36.86**
TOTAL DEMAND	**85.88**	**86.89**	**85.49**	**84.83**	**85.75**	**86.68**
SUPPLY						
OECD						
US	8.64	8.58	8.36	8.50	8.38	8.40
Canada	3.35	3.40	3.48	3.37	3.45	3.39
Mexico	3.30	3.35	3.46	3.61	3.59	3.52
North Sea	4.46	4.57	4.28	4.49	4.80	4.76
Other OECD	1.54	1.57	1.56	1.54	1.50	1.55
Total OECD	**21.29**	**21.47**	**21.14**	**21.51**	**21.72**	**21.62**
NON–OECD						
FSU	12.60	12.66	12.55	12.60	12.61	12.48
China	3.93	3.86	3.87	3.96	3.92	3.81
Other non-OECD	10.89	11.17	11.25	11.06	10.73	11.22
Total non-OECD, non-OPEC	**27.42**	**27.69**	**27.67**	**27.62**	**27.26**	**27.51**
OPEC*	**36.69**	**36.18**	**35.44**	**35.07**	**34.98**	**36.49**
TOTAL SUPPLY	**85.40**	**85.34**	**84.25**	**84.20**	**83.96**	**85.62**
Stock change	**–0.48**	**–1.55**	**–1.24**	**–0.63**	**–1.79**	**–1.06**

*Includes Angola.
Source: DOE International Petroleum Monthly
Data available in OGJ Online Research Center.

US petroleum imports from source country

	May 2008	Apr. 2008	Average YTD 2008	Average YTD 2007	Chg. vs. previous year Volume	Chg. vs. previous year %
	1,000 b/d					
Algeria	620	632	544	720	–176	–24.4
Angola	476	591	478	593	–115	–19.4
Kuwait	263	181	230	187	43	23.0
Nigeria	918	1,221	1,106	1,102	4	0.4
Saudi Arabia	1,604	1,462	1,547	1,414	133	9.4
Venezuela	1,171	1,189	1,163	1,355	–192	–14.2
Other OPEC	874	986	1,011	599	412	68.8
Total OPEC	**5,926**	**6,262**	**6,079**	**5,970**	**109**	**1.8**
Canada	2,346	2,534	2,494	2,482	12	0.5
Mexico	1,218	1,364	1,314	1,602	–288	–18.0
Norway	183	137	117	169	–52	–30.8
United Kingdom	237	229	211	303	–92	–30.4
Virgin Islands	340	340	340	340	0	0.0
Other non-OPEC	2,612	2,386	2,400	2,736	–336	–12.3
Total non-OPEC	**6,936**	**6,990**	**6,876**	**7,632**	**–756**	**–9.9**
TOTAL IMPORTS	**12,862**	**13,252**	**12,955**	**13,602**	**–647**	**–4.8**

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

OECD total net oil imports

	May 2008	Apr. 2008	Mar. 2008	May 2007	Chg. vs. previous year Volume	Chg. vs. previous year %
	Million b/d					
Canada	–1,322	–1,327	–1,440	–1,234	–88	7.1
US	11,056	11,498	10,728	12,784	–1,728	–13.5
Mexico	–1,120	–1,335	–1,390	–1,560	440	–28.2
France	1,720	1,716	1,862	1,657	63	3.8
Germany	2,043	2,210	2,358	2,009	34	1.7
Italy	1,441	1,528	1,496	1,362	79	5.8
Netherlands	1,005	818	1,225	1,157	–152	–13.1
Spain	1,496	1,627	1,521	1,566	–70	–4.5
Other importers	3,750	3,960	3,946	3,888	–138	–3.5
Norway	–1,960	–2,069	–1,842	–2,440	480	–19.7
United Kingdom	–112	115	139	155	–267	–172.3
Total OECD Europe	**9,383**	**9,905**	**10,705**	**9,354**	**29**	**0.3**
Japan	4,681	5,077	5,359	4,331	350	8.1
South Korea	2,251	2,055	2,084	2,444	–193	–7.9
Other OECD	988	1,059	1,051	993	–5	–0.5
Total OECD	**25,917**	**26,932**	**27,097**	**27,112**	**–1,195**	**–4.4**

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

OECD* total gross imports from OPEC

	May 2008	Apr. 2008	Mar. 2008	May 2007	Chg. vs. previous year Volume	Chg. vs. previous year %
	Million b/d					
Canada	375	453	396	401	–26	–6.5
US	5,926	6,262	5,934	6,402	–476	–7.4
Mexico	20	10	10	27	–7	–25.9
France	837	650	800	779	58	7.4
Germany	471	495	475	397	74	18.6
Italy	1,212	1,176	1,206	1,114	98	8.8
Netherlands	640	554	668	513	127	24.8
Spain	789	559	703	721	68	9.4
Other importers	1,209	1,154	1,169	1,309	–100	–7.6
United Kingdom	304	267	283	221	83	37.6
Total OECD Europe	**5,462**	**4,855**	**5,304**	**5,054**	**408**	**8.1**
Japan	4,275	4,634	4,497	3,774	501	13.3
South Korea	2,354	2,263	2,292	2,441	–87	–3.6
Other OECD	693	699	739	672	21	3.1
Total OECD	**19,105**	**19,176**	**19,172**	**18,771**	**334**	**1.8**

*Organization for Economic Cooperation and Development.
Source: DOE International Petroleum Monthly
Data available in OGJ Online Research Center.

Oil stocks in OECD countries*

	May 2008	Apr. 2008	Mar. 2008	May 2007	Chg. vs. previous year Volume	Chg. vs. previous year %
	Million bbl					
France	176	173	177	178	–2	–1.1
Germany	277	280	282	287	–10	–3.5
Italy	136	134	131	132	4	3.0
United Kingdom	99	98	100	106	–7	–6.6
Other OECD Europe	680	676	694	672	8	1.2
Total OECD Europe	**1,368**	**1,361**	**1,384**	**1,375**	**–7**	**–0.5**
Canada	210	206	203	183	27	14.8
US	1,673	1,665	1,653	1,724	–51	–3.0
Japan	617	610	610	616	1	0.2
South Korea	146	141	143	159	–13	–8.2
Other OECD	102	102	108	109	–7	–6.4
Total OECD	**4,116**	**4,085**	**4,101**	**4,166**	**–50**	**–1.2**

*End of period.
Source: DOE International Petroleum Monthly Report
Data available in OGJ Online Research Center.

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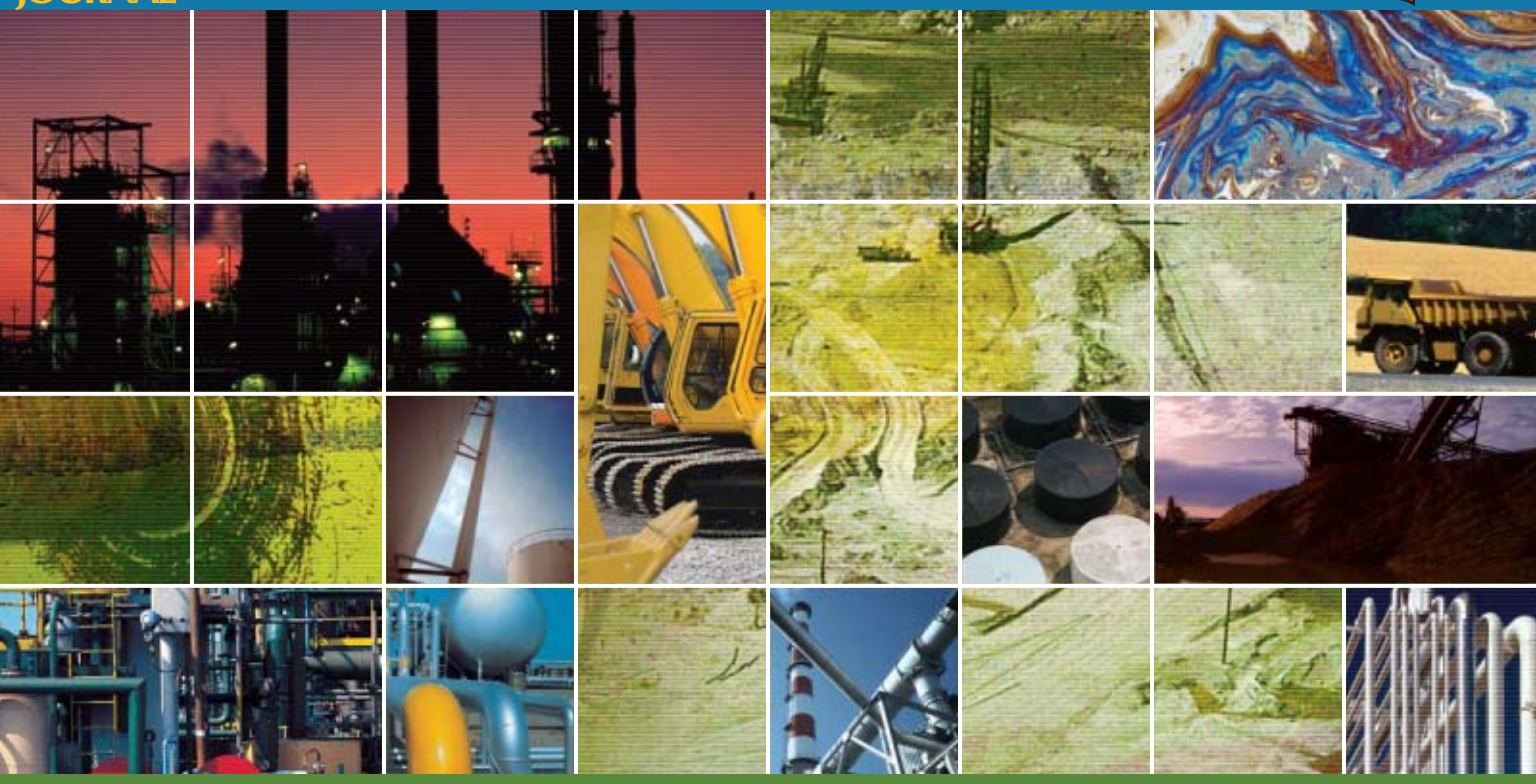

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Warming political menu gets new item: eggplant, well done

The sacrifices people have been called to make in response to global warming have become tangible in a new way.

The leader of the United Nations Intergovernmental Panel on Climate Change suggests omnivores give up meat.

In a Sept. 8 speech in London, Rajendra Pachauri said greenhouse gas emissions (GHGs) associated with livestock production represent 80% of all agricultural

The Editor's Perspective

by Bob Tippee, Editor

emissions and 18% of the emissions from human activities.

"The average household would reduce carbon dioxide emissions by more if they halved their meat consumption than if they halved their car usage," said Pachauri. "If everyone in the UK abstained from eating meat for 1 day a week, this would…result in greater carbon savings than taking 5 million cars off the road in the UK."

The IPCC, from research based on climate modeling, champions aggressive precaution against catastrophic warming. It shared a Nobel Prize with former US Vice-President Al Gore for calling attention to the threat.

IPCC's work often is cited as evidence of a scientific consensus that warming results chiefly from human activity and that aggressive response is necessary.

The standard proposal is a drastic cut in use of fossil energy. Now Pachauri, because of his stature as a Nobel Laureate, has placed reduced meat consumption prominently on the menu of possible warming remedies.

He told his London audience that GHGs from livestock production come from land deforestation and desertification (35.4%), manure (30.5%), animal flatulence (25%), agricultural fertilizers (3.4%), on-farm fossil energy use (1.2%), and other factors (3.6%).

"One kilogram of beef is responsible for the equivalent of the amount of CO_2 emitted by the average European car every 250 km and burns enough energy to light a 100-w bulb for 20 days," he said.

Producing 6 oz of beef steak requires six times the energy and emits 25 times the CO_2-equivalent GHGs as producing 1 cup of broccoli, 1 cup of eggplant, 4 oz of cauliflower, and 8 oz of rice.

As a vegetarian, Pachauri might not appreciate the political implications of his comparison's implied summons to sacrifice.

The steak tastes immeasurably better than anything else on his list.

(Online Sept. 12, 2008; author's e-mail: bobt@ogjonline.com)

Market Journal

by Sam Fletcher, Senior Writer

OPEC promises 'strict' compliance

The Organization of Petroleum Exporting Countries agreed Sept. 10 to strictly comply with their September 2007 production quota of 28.8 million b/d, implying a possible compromise for de facto reduction of some 530,000 b/d of overproduction.

OPEC's decision requires some adjustment of individual members' quotas to include new members Angola and Ecuador and the withdrawal of Indonesia, a member since 1962. Iraq, of course, remains exempt from the OPEC quota as it tries to rebuild its oil industry. Indonesia's exit and addition of Angola and Ecuador make "for a statement as clear as mud and for wide interpretations as to the desired level of OPEC production," said Olivier Jakob at Petromatrix, Zug, Switzerland. He noted "mainly two countries" producing above quotas, Iran by 280,000 b/d and Saudi Arabia by 510,000 b/d, while Nigeria and Venezuela are below quota. "The most likely scenario we see is for Saudi Arabia to make a slight cut (about 300,000 b/d) and to readjust depending on the output from Nigeria," he said.

A preliminary estimate by KBC Market Services, a division of KBC Process Technology Ltd. in the UK, puts OPEC's July production nearly 900,000 b/d above its official quota, "of which by far the largest portion (757,000 b/d) comes from Saudi Arabia." KBC analysts said, "The excess output from Saudi Arabia consists of the two production increases they announced in the middle of this year, amounting to 550,000 b/d, plus some extra production." They said Venezuela's actual production is 80,000 b/d below quota—"a symptom of Venezuela's production crisis."

'Soft' $100/bbl floor

KBC analysts said OPEC ministers were "concerned that a move below $100/bbl could turn into a serious price retreat reminiscent of the 2006-07 fall in crude prices, which saw a high of $78/bbl in August 2006 slide down to $52/bbl in January 2007. OPEC's response then was 1.7 million b/d of production cuts, and prices rebounded. Today, the fragility of the global economy means that drastic production cuts are not possible without risking further demand destruction and economic pain."

Saudi Arabia "would be perfectly happy" with prices of $90-100/bbl but "other OPEC members wished to give a stronger signal," said Paul Horsnell, Barclays Capital Inc., London. "For those members, it appears that the $100 level is shaping up as a sort of 'soft floor' or 'alarm bell' which, while triggering price-defensive actions, might not be perceived as the level where all available policy tools should be drawn upon. In that sense, OPEC's entering a price defense mode is the key signal."

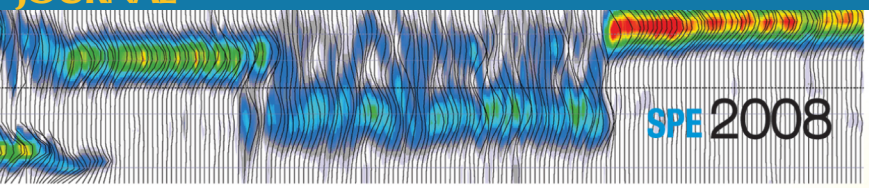
He said, "On one hand, Saudi Arabia would seem to have more ability to defend prices now than ever before. The Kingdom is producing at a high level, and at the least the first 500,000 b/d that could come off the market would be purely at Saudi discretion. In other words, there would be expected to be considerable credibility in the ability to defend prices." However, Horsnell said, "The current oil market has very pessimistic sentiment, is almost totally focused on the demand side and is strongly affected by momentum investors. It might (indeed surely will), ultimately prove to be as much of a [pointless] 'Charge of the Light Brigade' experience as taking on Saudi Arabia to the upside proved, but we feel that the market might well try to push below Saudi Arabia's comfort levels," Horsnell said.

Demand declines

Meanwhile, the International Energy Agency in Paris lowered its global oil demand forecasts by 100,000 b/d to 86.8 million b/d for 2008 and by 140,000 b/d to 87.6 million b/d for 2009. "The data suggest that the demand impact of weaker economic conditions and high prices during the summer—when oil prices reached an all-time peak—was more marked than expected, notably in the US. Furthermore, the effects of the ongoing hurricane season on US demand are subject to considerable uncertainty," the IEA said.

However, Jakob charged that the IEA "has been a main component in the making of the oil price bubble" by "grossly overestimating demand growth." He said, "Over the last 3 months, the IEA had to revise down Organization for Economic Cooperation and Development demand in the second quarter by 800,000 b/d but has not made any correction to demand for the fourth quarter." Moreover, he said, "Most forecast agencies have not fully realized that the US turned during 2008 from a net importer to a net exporter of middle distillates, the consequence being that they are double counting demand and will necessarily have to make further downward correction to OECD demand in months to come."

(Online Sept. 16, 2008; author's e-mail: samf@ogjonline.com)



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- **10:00 am** Michael Doiron — New Fluids Bring "Reservoir Focus" to Increase Well Productivity
- **11:30 am** Lester Clark — New Quantec Bits Drill Farther, Faster to Your Reservoir
- **1:45 pm** Brian Haapanen — Monitoring and Automation Systems Improve ESP Performance
- **3:15 pm** Tim Ong — Technology to Optimize Production from Your Reservoir
- **9:15 am** Mark Thomas — Imaging While Drilling for Enhanced Reservoir Navigation/Formation Evaluation
- **10:45 am** David Chace — GasView Evaluates Gas in Your Reservoir behind Casing
- **1:00 pm** Sean Yakeley — New Horizontal Completion Systems Get More for Less from Your Reservoir
- **2:30 pm** Kevyn Smith — Downhole Remediation Strategies Help Restore Reservoir Productivity
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Technology Forum

Production Stimulation

Supplement to *Oil & Gas Journal* • September 22, 2008

Production stimulation activity, such as this frac job, is picking up in North America with heightened interest in exploiting gas shales, as well as high oil prices spurring well intervention activity in oil fields. Photo courtesy of Halliburton.

Oil & Gas Journal's Technology Forum series, produced by the OGJ Group Publisher, supplements the magazine with topical features on cutting-edge technology, services, and equipment, all expertly written from the technology provider's perspective. Inquiries should be directed to Bill Wageneck, Group Publisher, at billw@pennwell.com.

Frac advances key to unconventional gas supply growth

Advances in production stimulation technologies have been critical to the meteoric growth in unconventional gas supply.

The unconventional gas share of US natural gas supply has surged to more than 40% today from less than 7% in the late 1970s, when government-sponsored research into unconventional gas technologies got underway. Some have predicted that the unconventional gas market share could top 50% in 2025–30.

Today, improvements in well fracturing technology have been instrumental in gas shales emerging as the hottest hydrocarbon play in North America. Advanced fracturing techniques are also playing a key role in recovery of natural gas from tight sands and coalbed methane (CBM) as well.

Gas shales

It is well known that hydraulic fracturing is the major enabler to convert nano-darcy reservoirs into profitable plays, notes Don Conkle, Schlumberger vice-president, stimulation services.

"As more shale reservoirs are exploited and discovered, proper reservoir characterization (geological and petrophysical models) will dictate the ways to optimally complete and stimulate wells," he points out. "Along those lines, technologies that will decipher stress anisotropy (e.g., the Sonic Scanner) and its effects on fracturing placement will be key for better reservoir management.

"Also, technologies that will allow operators to control fracturing geometry will be on top of the game-changer technologies; in today's environment, hydraulic fracturing monitoring by microseismic is a quite powerful tool to determine where the fracture goes. However, having the opportunity to control fracturing placement by using diverters poses a great challenge for operators and service companies and could be definitively a game-changer in the way that well cost can be reduced by completing horizontal wells in an open hole environment with the capability to control treatment diversion in real time."

In environmentally sensitive areas, such as those where the Barnett shale is being exploited, another concept that could be a game changer would be to find the ways to create the same fracture geometries by using less materials (water and sand), Conkle says.

"Water supply these days might not be an issue for some operators, but certainly in years with severe drought, water may become a scarce resource, so techniques that will improve the fracturing placement in the areas where reservoir engineers want it will have the potential to reduce treatment sizes significantly."

The biggest production driver for shale formations is the completion, according to Bill Grieser, Halliburton's Oklahoma City-based technical analyst.

"This requires a reverse engineering approach," he notes. "The final well operation — the completion — must be the initial consideration in order to design all of the other components involved in producing the resource."

Grieser notes that it is difficult to achieve commercial production from nano-Darcy rock without the substantial increase in surface area that can be generated by complex hydraulic fractures.

This is why industry seeks brittle shale rather than ductile shale as potential producers, he adds: "Calculations indicate it takes 1 to 2 million sq ft of surface area to generate the >1 MMcfd gas rates."

The biggest production driver for shale formations is the completion: "This requires a reverse engineering approach. The final well operation — the completion — must be the initial consideration in order to design all of the other components involved in producing the resource."

— *Bill Grieser, Halliburton*

Multistage mechanical bottomhole assemblies are being used to reduce cycle time and complete wells faster, Grieser points out: "Laterals are getting longer. Frac stages are increasing in number. Stimulation span is getting shorter, and more perforation clusters are being used. Proppant amounts continue to increase. More hybrid-style fracs are being used to reduce damage and place more proppant. Production and proppant trends seem to indicate conductivity is important."

Conductivity enhancement is critical for high-rate waterfrac treatments, concurs Barry B. Ekstrand, vice-president, reservoir stimulation, Weatherford International.

"Sand sizes have gotten progressively smaller in high rate waterfracs, as water in absence of a viscosifying agent is a poor and inefficient sand transport medium," he says. "Smaller sand is more readily accepted into the created fracture, but it still settles quickly to form a bed at the bottom of the fracture. This leaves a potentially significant amount of created fracture without any sand in suspension across it to prop it open at the

end of the treatment—and thus unconnected to the conduit from the reservoir into the wellbore."

Conductivity enhancement is achieved with specialized chemistry that coats the sand grains and causes rearrangement such that bed porosity and permeability increases, according to Ekstrand.

"The distribution of sand is increased in height, and the proportion of the created fracture area that is propped open at the end of the treatment is increased," he notes. "The result is a more efficient production conduit into the reservoir and increased longevity of fracture conductivity for a given job size."

Another advance in fracturing technology involves simultaneous fracturing, or simulfracing, multiple wells.

"The benefits [of simulfracing] to the reservoir are the higher hydraulic horsepower delivered per volume of rock, resulting in a larger, more complex fracture network," Grieser says. "The benefit to the operator is completion of two wells in a shorter period of time.

"The drawback is the extra effort required from both the operator and service company to mobilize two to three times the equipment, manpower, and materials and orchestrate a continuous operation without delays or breakdowns."

Early production analysis of more than 100 simulfraced wells has shown, on average, a production increase vs. conventional, single-well treatments, he cites. Late-time production is not yet available to determine the effects of linked fracture networks.

Among the new techniques and new technologies being brought to bear on the challenges posed by gas shales is that of fiber optic cable being used to provide a real-time temperature profile during the fracturing treatment to determine frac position and placement efficiency along the horizontal wellbore, says Grieser: "Fiber optic cable can also be used during production to determine areas of high productivity and areas that need restimulation."

The Halliburton analyst also foresees increased use of salt-tolerant fracturing chemicals that allow the reuse of returned frac water and the implementation of mechanical, chemical, and operational diversion techniques to refrac horizontal wellbores that drive creation of new fracture paths.

In addition, operators are looking at the "shale oil window" as potential shale targets that previously have been avoided in favor of dry gas, Grieser notes.

Just as important are industry's improvements in the environmental footprint of fracturing operations.

Drilling pads containing multiple extended-reach wellbores drilled and completed from the same location help reduce that footprint, according to Grieser.

"Smaller location size may drive the industry to compact completion/drilling equipment, including coiled tubing and skid-based fracturing equipment," he says. "This will force the hydraulic horsepower, water, and proppant to be delivered to the formation in a focused manner, normally called pinpoint stimulation."

Water management is also a crucial environmental issue, as this natural resource becomes increasingly scarce and and more costly each year.

"Water storage and disposal cost has gone from $1.00/bbl to $6.00/bbl in the past 8 years," Grieser points out. "It now competes with drilling and completion costs as one of the major cost items. The industry is under pressure to recycle, reclaim, and reuse this valuable resource."

Tight sands gas

Although exploitation of tight sands gas has taken a back seat to the hot shale gas plays, tight sands gas nevertheless accounts for one-third of US gas production and reserves.

Ekstrand contends that the game-changing production stimulation technique for tight sands gas "will center on eliminating damage of the fracture wall with viscosifier technologies that dramatically increase viscosity yield of materials, so significantly smaller amounts of foreign material are injected into the reservoir."

Such systems will have a much higher viscosity-to-polymer weight ratio and flatter viscosity profile, meaning longer life of the viscosity, he adds.

"Similarly, improvements in filter cake degradation/removal technologies will improve productivity by minimizing skin effects of the filter cake on the fracture wall for increased productivity and longevity."

Coalbed methane

Two Denver-based Halliburton experts—Mike Mullen, principal technical professional, and Kumar Ramurthy, technical professional-team lead—advocate a "holistic" approach to understanding and effectively stimulating CBM reservoirs.

Such an approach has five main components, they say:

"The first step begins with understanding the rock stresses in and around the coalbeds. This is a critical step in understanding how the hydraulic frac treatment will interact with the reservoir.

"The second step is to understand the gas stored in the system, in the coals, shales, and the sands that may be interbedded with the coals and shale. This petrophysical analysis can be accomplished using Halliburton's StimLOG software to provide a total system resource assessment that captures the gas in place of the sand, coal, and shale in one evaluation.

"The third step is to understand system permeability. This is essential for the proper design and placement of the frac treatment, as well as for reservoir modeling to understand reservoir performance.

"The fourth step is to take all this information into the fracture design process. There is no 'one frac design made to fit all coals': While there will be some trial and improvement to the frac design, frac modeling has proved to be a very useful tool not only for the design of a CBM frac but also in the post-job analysis to help diagnose and understand the stimulation issues specific to that particular coal.

"The fifth step is to review the post-stimulation well performance. Is it producing as expected? Are coal fines or frac sand being produced? If so, a number of remedial treatments could

be applied during the stimulation treatment to address these issues before they happen."

Ekstrand also thinks it's important to address the issue of coal fines being released during fracturing, which results in plugging and a loss of fracture conductivity.

"Coal fines agglomeration technologies that chemically bind together the coal fines provide stabilization of the coal fines and inhibit or stop migration of any that are released as they bind to become larger particles that no longer can enter the fracture," he says. "The result is higher fracture conductivity and longevity."

Horizontal wells completed with discrete fracturing ports that can be ball- or dart-activated for precise fracturing initiation are bringing a different life to CBM plays, according to Conkle: "With more horizontal wells completed in CBM, some of the technologies currently used and that will be used in shale plays will definitively impact the development of CBM plays—for instance, hydraulic fracturing monitoring, nondamaging fluids, and low-temperature diverters, among others."

Controlling diagenesis

Fracture diagenesis may be the most important and exciting area of research aimed at maintaining fracture conductivity, contends Matt Oehler, Halliburton fracturing product manager in Houston.

"Successful prevention could lead to substantial production uplifts without the need to refracture wells experiencing production decline," he says. The discovery and definition of rapid-onset diagenesis and the development of a service that helps prevent it is expected to have a profound effect on well completions throughout the industry, Oehler adds.

The diagenesis process is assumed to normally require millions of years, but in the case of hydraulic fracturing, it can occur within a few months. Prevention of the early onset of proppant diagenesis contributes significantly to the productive life of hydrocarbon wells.

Diagenesis-type reactions can occur between proppant and freshly fractured rock surfaces via generation of crystalline and amorphous, porosity-filling minerals within the proppant pack. Although rapid loss of fracture conductivity after hydraulic fracture stimulation is often assumed to be the result of migration of formation fines or the generation of fines derived from proppant crushing, Oehler cites recent laboratory work that points to diagenic reactions because of chemical compositional differences between the proppant and the formation, and compaction of the proppant bed due to proppant pressure solution reactions.

"This damage mechanism applies to propped, fracture-stimulated wells; however, it is more significant in high-temperature and high-stress wells," he says. "Diagenesis might explain the difference often observed between reservoir simulation of production after fracturing and actual production, including the decline rate.

"The rate of production loss is directly related to the diminishing rate of fracture conductivity that results from narrowing of propped fracture width and infill of proppant pack porosity. As pressure dissolution takes place, propped fracture width reduces under stress; but as precipitation (or recrystallization) occurs, precipitant fills in the pore spaces between proppant grains. As little as 25% of the initial proppant-pack porosity may remain after only 40 days at 300° and 6,000 psi closure stress."

To control proppant diagenesis, Halliburton applies a hydrophobic, dielectric material to fracture proppant before the proppant is pumped downhole as part of a hydraulic fracture stimulation treatment. The service helps prevent the early onset of diagenesis.

"The rate of porosity loss can be reduced by treating the proppant with a dielectric coating that makes the proppant surface hydrophobic (water-hating) and insulated (inhibiting water-based chemical reaction)," Oehler says.

"A survey of wells fractured or refractured using proppants coated with a dielectric, hydrophobic material showed very stable production over time. Wells in the same area that were completed using uncoated proppants generally demonstrated steeper declines and less-sustained production."

Hydraulic fracturing, produced water

One of the dilemmas for production stimulation experts is how to deal with the huge volumes of produced water and consequently the use of that produced water in hydraulic fracturing efforts.

Water costs, which can account for 30–50% of total well completion costs, is a necessity for all phases of drilling, completion, and stimulation activity. Being able to cost-effectively source, handle, treat, and dispose of water is a critical concern in production stimulation efforts. And it is becoming increasingly important, especially in the US Lower 48 Western states, to better utilize produced water and minimize use of fresh water supplies.

Leonard Case, stimulation product manager-equipment systems for Halliburton in Duncan, Okla., contends that the handling of produced water is transitioning from a liability to an asset, becoming a significant part of the value chain in the monetization of oil and gas assets.

Produced water has been used in production stimulation to varying degrees over the years, he notes: "The most common approach is to either use the produced water as is, modifying the final stimulation fluid system to give acceptable performance, or diluting the produced water with fresh water to bring the mixture to some minimum acceptable state and then modifying the frac fluid system.

"These are very unique solutions and only good for similar produced waters. With these solutions, there is always a tradeoff between fluid performance and economics."

To overcome the variability of the source water, some producers have incorporated a treating processes such as evaporator distillers or reverse osmosis, Case points out.

"Both of these processes produce water that is either drinking quality or very near drinking quality. which removes

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all variability from the produced water. The limitations of both of these processes is that they are very capital-intensive, have relatively low throughput volumes, and will not handle all produced and flowback water without some type of pretreatment being performed."

What the industry needs is a process tailored to typical oil field conditions, adds Case, "where job rates can vary from 10 bpm (barrels per minute) to >160 bpm, with total job volumes ranging from 60,000 gal to more than 3,000,000 gal and where the produced water quality can vary from 1,000 ppm to 300,000 ppm total dissolved solids.

"Now in field testing, Halliburton has addressed this challenge by developing the technology to selectively remove the ions that hamper our ability to use the produced water as a base fluid from which to create a fracturing fluid. Most produced waters contain different levels of sodium, potassium, magnesium, calcium, strontium, barium, iron, boron, chlorides, residual oil, and a host of production chemicals.

"With our 'selective ion removal' process, we can selectively remove the harmful ions such as calcium, magnesium, barium, iron, and boron, as well as the residual oil and various production chemicals.

"What we are left with is what we refer to as a 'treating brine' containing sodium, potassium, and chlorides. Not only can we effectively remove the targeted ions, we can vary the amount removed; therefore, we create a 'standard' treating brine that will give the same performance from a wide variety of produced water. This newly created treating brine is ideal for use in lower-rate water frac applications as well as linear fluids or borate cross-linked treating systems."

To that end, Halliburton has developed a new biopolymer-based, linear—no crosslink required—frac fluid system that can use produced water and eliminates the need for hydrocarbon-based concentrates.

"Because the system does not require potable mixing water or crosslinkers, the fluid is both practical and economical for use in a variety of produced waters," claims Oehler. "Eliminating the need for purchase and transportation of potable water for fracture stimulation reduces cost, reduces demand on potable water supplies, and contributes to the sustainability of favorable health, safety, and environment conditions."

The new fracturing fluid is mixed from a dry polymer, reducing its potential environmental impact in that no hydrocarbons are needed. The fluid can be mixed into tanks or on-the-fly with a new dry polymer blender. In typical water temperatures, 80% hydration can be achieved in under 5 min. Because there is no crosslinker, there are no additional liquid additive pumps, nor are crosslink quality-control tests needed.

"The new fluid outperforms traditional crosslinked gels and offers an economical, superior alternative to surfactant-gel technology for fracturing low-permeability, medium-temperature (150–250 °F) formations with permeability below 10 md," Oehler says. "In the resulting fracture, the retained conductivity of the proppant pack is often greater than 80%, and the system breaks and cleans up effectively.

"The low pipe friction generated by linear fluid makes it ideal for pumping down tubing and coiled tubing for multistage, pinpoint stimulation, and applications in unconventional reservoirs where high pressures are required at the fracture face."

Oehler thinks that the new fracturing fluid will have a "profound" influence on the way the industry does business: "It has the capability to perform without crosslinking and without liquid concentrates that require BTEX [benzene, toluene, ethylbenzene, and xylenes] to function. Further, it does not require transporting and consuming ever more scarce potable water."

Equipment innovations

Key areas of fracturing equipment innovation have focused on improving efficiency, reducing emissions, and increasing reliability, according to Chad Joost, sales manager, well stimulation products, Stewart & Stevenson.

"The improvements in efficiency have been achieved through the development of our distributed control and data acquisition system (AccuFrac and the Intelligent Pump Control), providing unit control and visibility to all recorded parameters from inside the Data Acquisition and Control Unit (commonly referred to as the Data Van)," he says. "This system allows the key wellsite personnel to control all aspects of the job and reduces the personnel demands on the wellsite—also providing some relief to the service companies' hiring requirements in a very tight labor market and allowing equipment operators to rest between unit mobilization."

With the US Environmental Protection Agency's off-highway emissions requirements now at Tier 2 levels for engines at or above 750 bhp, Stewart & Stevenson has developed fracturing equipment meeting those requirements with emissions-compliant engines and cooling systems.

"These emissions-compliant units have been well received in the US market as a result of our industry's drive toward reducing our environmental impact," Joost notes."We expect to see even greater emphasis on reducing emissions in markets outside of the US."

In addition, fracturing equipment reliability has improved significantly by integrating real-time diagnostics with the pump control system (Intelligent Pump Control), says Joost.

"This functionality informs the equipment operator of any faults during the job and takes the appropriate action (alarm only, unit rampdown, or unit shutdown)," he says. "In cases of unit alarms, the fault is logged and addressed after the job or during the next maintenance event. In the case of faults of greater importance, the control system takes the appropriate action to avoid further damaging the equipment.

"Other advances that have improved equipment reliability include preventative maintenance programs that are controlled through databases with operating fluid analysis, improvement in equipment design with high-strength materials and advanced designs, and operator training through the OEM."]

Non-frac stimulation technologies mark progress too

Although the oil and gas industry's buzz over the hot gas shale plays in North America has pushed fracturing technology advances to the forefront, other production stimulation technologies continue to make progress as well.

The rest of the well stimulation industry would do well to heed the example of innovations occurring in fracturing, according to Barry B. Ekstrand, Weatherford vice-president, reservoir stimulation.

"We should never forget that the proverbial lemmings do a great job of following an established path as they fall off the cliff," he says. "The analogy is relevant for us in our industry, as we must recognize when innovation creates a new path, an opportunity to build on success.

"We rightly seek efficiencies and often adapt our past successes to new situations, but we must not miss out on balancing efficiency with innovation opportunities. Effectively striking that balance ensures that we will not miss out on opportunities to take successes and improve upon them."

Fracture-related technologies

There are several fracture-related technologies marking progress in the realm of production stimulation.

Ekstrand points to improvements in and integration of borehole microseismic monitoring, along with frac treatment monitoring and controls and analytical technologies that "will enable increasingly accurate real-time optimization of frac treatments."

Also on Ekstrand's technology advance wish list are completion tool technologies that dramatically decrease the time to complete fracture stimulation activities in multizone wells.

"By reducing or eliminating the time for preparatory activities between frac stages, huge efficiency gains are achieved; the impact is magnified when on a horizontal well," he says. "Metallurgical technology and tool configuration are critical to the success of these systems that are subjected to high-pressure, highly erosive conditions."

Stimulation monitoring

A virtual, real-time integrated collaborative environment can maximize returns by applying a "model, measure, and optimize" strategy for well stimulation, according to Halliburton's Dan Gualtieri, global product champion, Houston, and Christi Gell, VeriStim program manager, also of Houston. Gualtieri and Gell provided written responses to Oil & Gas Journal Technology Forum's queries.

Such an environment is created with The Digital Asset's VeriStim stimulation monitoring and optimization service. This workflow combines a stimulation job with microseismic monitoring, distributed temperature sensing (DTS), and optimization of the stimulation model post-job to enable the most effective drainage of an asset.

"The key factor in this workflow that adds the value is integration," Gualteri and Gell wrote. "The process moves beyond simply measuring data to understanding how these data relate to the geology, to the production, and to what is done next. This workflow is reservoir-focused rather than well-focused.

VeriStim service consists of several components that when combined can result in optimized stimulation results:

- An experienced, multidiscipline team working collaboratively with the operator.
- Fracture stimulation.
- Monitoring the created fracture using microseismic analysis.
- Monitoring fluid movement in the near-wellbore area using DTS.
- Post-treatment analysis and reporting.
- Optimization of the stimulation model to enable the most effective drainage of an asset.

According to Gualteri and Gell, operators working with the VeriStim service teams gain enhanced capabilities in two important areas:

- Optimized reservoir stimulation and hydrocarbon production.
- Monitoring and control of the stimulation treatment in real time for maximum treatment efficiency in both vertical and horizontal wellbores.

Acidizing

As oil and gas production comes increasingly from challenging reservoirs, the industry will need to push the performance envelope for acidizing chemicals, contends Mary Van Domelen, product manager, near-wellbore stimulation, in Halliburton's Cairo office.

"This will take acidizing from what has traditionally been considered a commodity service into the high-tech arena, requiring not only advances in acidizing chemicals, but also in the area of engineering design, execution, and treatment monitoring," she says.

"One example is our integration of our state-of-the-art acidizing simulator, STIM2001, with fiber optic [DTS] treatment monitoring service, StimWatch."

She also cites advances in the area of environmentally improved acidizing chemicals:

"It is undoubtedly difficult to develop an acid corrosion inhibitor that will stand up to the corrosive environment of hydrochloric acid at high temperatures and then biodegrade in North Sea water at 20° C.

"Halliburton researchers screen ingredients for environmental

acceptability at the very first stage of product development, enabling provision of all services required of our customers, whether working in the Norwegian sector of the North Sea, in the Gulf of Mexico, or any land base operation around the world."

One of the current trends to exploit both carbonates and sandstones reservoirs is to drill deeper, looking for horizons in high-pressure, high-temperature (HPHT) environments, says Don Conkle, Schlumberger vice-president, stimulation services.

"Such harsh conditions are making some of the conventional acid-based materials unable to perform," he notes. "New ways to create conductivity channels in carbonate formations by etching rock with solid acid materials are definitively a cutting-edge technology that will decrease the inherent and serious corrosion problems associated with such environments.

"From a well completion point of view, the ability to complete such HPHT wells with more regular casing materials will signify a reduction in completion cost, as the fluid that will be pumped is noncorrosive."

In terms of sandstone acidizing, still one of the major obstacles to overcome are the secondary and tertiary reactions of conventional hydrofluoric (HF)-based acids, so new chemistry that will not rely on HF will definitively be a breakthrough, Conkle adds.

For both carbonates and sandstones, an area where more technologies will impact the success of the stimulation treatment are diverters. Conkle cites as examples of new concepts or chemistry diverters that are nondamaging, self-activated, and degradable under reservoir conditions.

Scale management

Van Domelen also points to advances in diversion technologies that will have "profound" effects on the success of scale management efforts.

"Having the right scale inhibitor, brine, and overflush is only part of the scale management process," she notes. "The success of a scale inhibitor treatment also depends on the placement efficiency. The scale inhibitor should be placed so that all water producing intervals accept a sufficient quantity of the total treatment volume.

"If significant permeability or pressure variations are present in the interval to be treated, treatment fluid will enter the zones with the higher permeability and lower pressure, leaving little fluid to treat the other zones, which potentially can be the water producing zones."

The challenge is even greater in long horizontal wells with significant permeability and pressure contrast, Van Domelen adds: "To achieve a more uniform fluid coverage, the original flow distribution across intervals often needs to be altered. The methods used to alter this are called 'diversion' methods. The purpose is to divert the flow from one portion of the interval to another.

"In response to this challenge, a viscosified scale inhibitor system was developed. The system comprises a linear (noncrosslinked) water-based fluid system, a standard scale inhibitor for downhole scale squeezing, and a breaker to achieve controlled gel breaking downhole."

Other diversion methods that are commonly used in the industry include a newly developed particulate that degrades over time at temperature and, with the presence of aqueous fluid, completely disappears for a nondamaging diverting and fluid loss control material, according to Van Domelen. Foams or ball sealers can also be used for altering the flow during a scale inhibitor treatment, she adds.

Cement slurries

One area that is commonly overlooked when cementing oil and gas wells is long-term zonal isolation, Conkle points out.

"Critical zonal isolation must be achieved to comply not only with regulatory requirements but also to ensure cement integrity while wells are producing," he says. "New developments toward self-healing cements will definitively have a large impact, especially in environmentally sensitive areas, where venting gas or flowing hydrocarbon through the cement sheath, is an intolerable risk."

"Critical zonal isolation must be achieved to comply not only with regulatory requirements but also to ensure cement integrity while wells are producing. New developments toward self-healing cements will definitively have a large impact, especially in environmentally sensitive areas, where venting gas or flowing hydrocarbon through the cement sheath, is an intolerable risk."

— Don Conkle, Schlumberger

Self-healing or self-repair cements will provide a true long-term zonal isolation, Conkle notes, adding, "Today's technology for self-healing relies on hydrocarbon presence, but in the future it may rely on water."

The use of special cement slurries can enable an operator to introduce an aggressive, focused multistage frac program, according to Halliburton's John A. Ringhisen, technical advisor, Oklahoma City, and Ronald J. Crook, senior technical advisor, Duncan, Okla. Ringhisen and Crook provided written responses to Oil & Gas Journal Technology Forum's queries.

"In eastern Oklahoma's Woodford shale play, Newfield Exploration Co. has achieved zonal isolation using foamed cement in a horizontal well section, enabling aggressive, focused multistage fracture treatments," they wrote. "Conversely, wells cemented with conventional slurries did not exhibit adequate zonal isolation and lost fracture-treatment volume to other stag-

es because of channeling in the cement sheath at the top of the horizontal borehole."

As of early 2008, operators drilling horizontal Woodford shale wells had cemented 116 horizontal production casing strings with conventional cement slurries and 229 horizontal production casing strings using a cement slurry converted to a stable foam cement slurry by adding nitrogen gas, according to Ringhisen and Crook. Of the 105 wells on which production data are available, wells cemented with foamed cement averaged 28.1% more peak 30-day gas production than conventionally cemented wells did.

Using the ductile, foamed cement increased fracture initiation and successful job placement to more than 96.4% of stage stimulation designs, they wrote. Frac operations in conventionally cemented Woodford wells had been considered successful in 79.9% of the stage stimulation designs.

Sand control

Swelling and sloughing of active, unstable shale can cause gravel pack screen assemblies to become stuck so that part or all of the pay zone cannot be completed, notes Bart Waltman, Halliburton sand control fluids product manager, Houston. Or the screen may be installed, but partial hole collapse may cause the gravel pack to be incomplete, leaving bare screen exposed during production. Resulting problems may not be visible until the producing well starts losing production rate or starts producing sand.

Oil-based drilling and completion fluids can significantly reduce or even eliminate hole stability problems associated with drilling and completing this type of reservoir, Waltman says: "Open hole intervals drilled with oil-based fluids can often be drilled faster with a higher rate of penetration and less rig time. And the oil-based fluids tend to reduce or substantially eliminate shale instability issues that can cause hole restriction or collapse." However, for reservoirs that require sand control, the oil-based fluid is typically switched to water-based fluid before starting the sand control completion operations.

Waltman describes Halliburton's recent fluid development combined with special service tool fluid flow capabilities, FlexPac service, which allows the simplification of the process.

"Now the drill-in fluid conditioning procedure used for base screen completions can be combined with the service tool flow path capability and an oil-based drill-in fluid-compatible fluid to enable running screens to planned depth."

FlexPac service includes coordinated service tools and fluids that enable efficient displacement of oil-based fluid from the openhole pay interval without fluid compatibility upsets or screen plugging. Accordng to Waltman, this provides important benefits:

- Low skin completions to enable better long-term production.
- Improved success rate of installing screens to total depth and achieving a complete gravel pack.
- Facilitated use of oil-based drill-in fluid that can reduce rig time, increase penetration rate, and lower drilling cost.
- More efficient drill-in fluid displacement.
- Reduced exposure time of shales to water-based fluid.
- Reduced hole collapse problems.
- Maintenance of oil-based fluid wall cake to enable return circulation for gravel packing.
- No requirement for the mud to be pumped through the screen during the transition process.
- Lower fluid associated costs due to reduced number of fluids required, improved fluid logistics (reduced rig tankage), decreased contaminated fluid disposal costs, and reduced fluid waste and disposal.

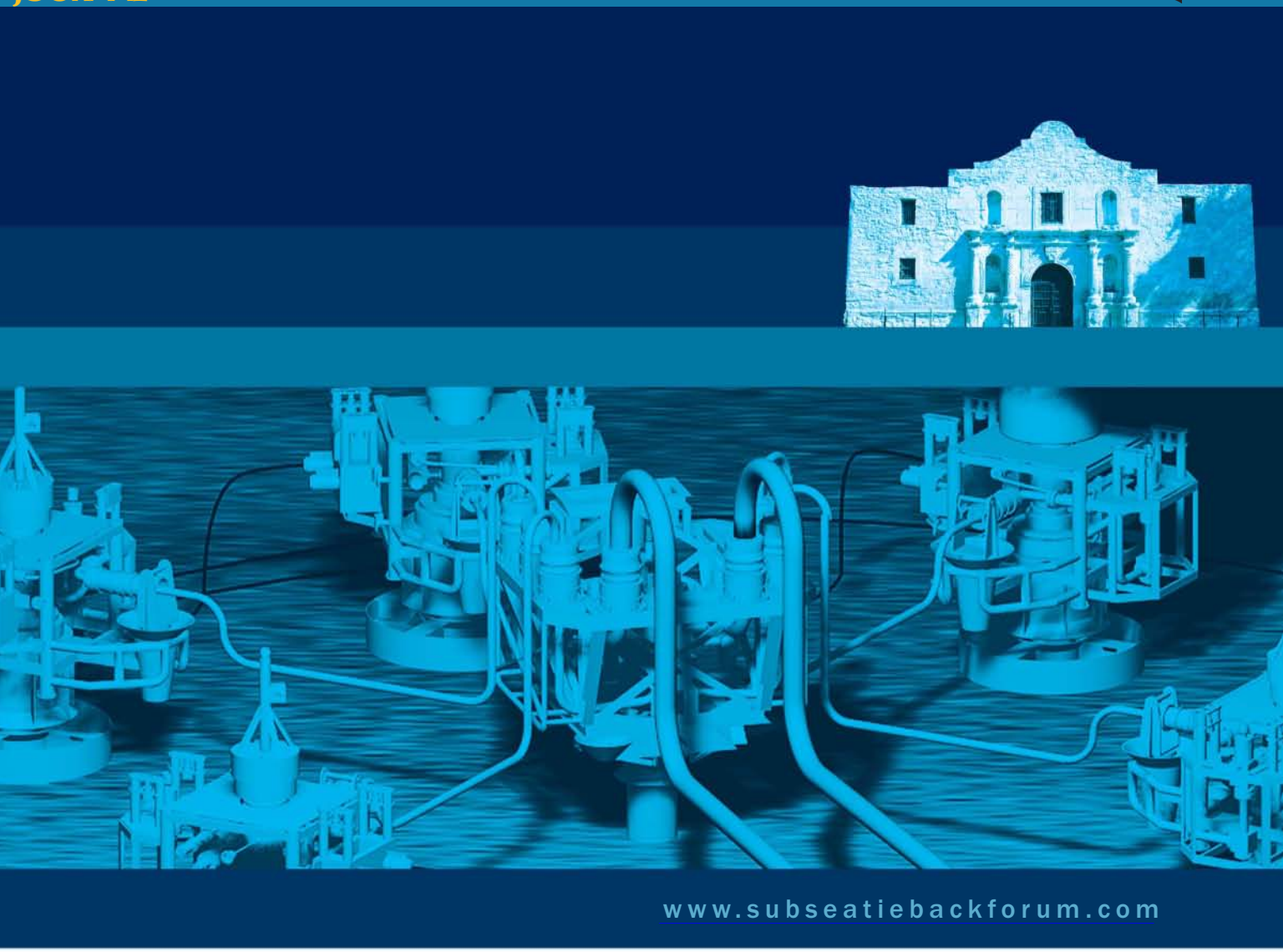
Solids-free lost circulation control

One of the major problems encountered in many operations is excessive fluid loss to the formation. This leakoff and the resulting lost circulation can make it virtually impossible to successfully circulate material into or out of the wellbore. Workovers and completions require, among other things, nondamaging products and systems to control fluid loss and keep fluids in balance, Waltman points out.

A new solids-free, low-viscosity fluid system can be used to help control lost circulation over a broad range of temperatures and permeabilities, according to Waltman: "The service modifies the permeability characteristics of the near-wellbore formation to reduce the relative permeability to aqueous or water-based fluids without impeding the flow of oil or gas through the region."

This new relative permeability modification (RPM) technology can be used for various lost-circulation applications, Waltman notes:

- Enabling running screens to depth in the open hole laterals. "With inadequate circulation to remove cuttings and debris, running screens to depth in the open hole laterals can be hindered or blocked by bad hole conditions. In addition, when screens are run to bottom in a poorly conditioned lateral, plugging with drilling residue often results in poor productivity."
- Gravel pack completions. "For gravel pack completions, excessive fluid loss and inadequate returns flow can prevent efficient gravel transport and complete packing. The new technology used during hole preparation displacement operations or during pumping of the gravel slurry can increase fluid returns flow to allow complete annular packing."
- Additional applications. "RPM technology can be used in almost any situation where limiting fluid losses can simplify and facilitate operational efficiency and reduce damage to well productivity," e.g., coiled tubing cleanouts, workover operations, post-tubing conveyed perforating fluid loss control, and post-gravel pack fluid loss control.]



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This year's theme is "The Deepest Show On Earth." As our industry changes, the sharing of knowledge and collective experiences becomes more and more crucial to improving the quality, safety, and economics of the subsea tieback industry.

The conference board will once again solicit a number of key presentations by industry leaders. As in the past, only by participating in this conference will you be able to receive its benefits, as proceedings will not be published and no Press is ever allowed in the conference area. This is truly a closed forum with open discussion, where the information shared inside the conference room stays inside the conference room. We hope you will join us.

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UNCONVENTIONAL GAS INTERNATIONAL CONFERENCE & EXHIBITION

September 29 - October 1, 2009
Fort Worth Convention Center
Fort Worth, Texas USA
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UNCONVENTIONAL GAS INTERNATIONAL CONFERENCE & EXHIBITION™

New Methods. New Supply.

Unconventional Gas International Conference & Exhibition is now accepting abstract submittals for the 2009 conference program. Submit your abstracts by **January 9, 2009** and take advantage of the opportunity to share your insight with colleagues and attendees.

In its second year the Unconventional Gas International Conference & Exhibition will focus on the new technology driving exploration and producing and the business practices that are shaping the industry. The conference and exhibition will be held at the Fort Worth Convention Center, in Fort Worth, Texas on September 29 – October 1, 2008.

Plan today present your methods of exploring and producing for natural gas to a targeted list of senior executives within major and independent operating companies.

Abstracts are due by **January 9, 2009**.

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Share your ideas, experiences, technology, and expertise with operators and project managers who are eager to improve their operations.

- Author a presentation for the Unconventional Gas International Conference & Exhibition.
- Participate in high-focus technical sessions with industry professionals who are required to keep knowledgeable about the most innovative technology.

To Submit Abstracts

You can submit your abstracts online today for presentation at the Unconventional Gas International Conference & Exhibition. Abstracts are due by **January 9, 2009**.

- Abstracts must have a title and list all authors.
- You must provide full contact information for the primary contact author (company affiliation, telephone, fax number and email address).
- Please designate which author will be the speaker.
- Presentations must be of interest and of practical value to executives, managers, engineers, and operations personnel engaged in the oil sands and heavy oil industry.
- Papers will be selected based on a review of abstracts by the Program Committee.
- Papers must not be commercial in nature.

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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 **January 9, 2009**.

- Online: www.unconventionalgas.net

Session Topics – 2008

- Reservoir Management
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- Field Development Strategies
- Permitting & Regulations
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Technical Focus Areas

- Regulatory Concerns
- Recovery Methods
- Coal Bed Methane
- Tight Sands
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- Frontier Areas
- Sustainability Issues
- Completion Technologies
- Reservoir Management
- Well Control
- Drilling Methods
- Field Geology
- Workforce and Demographics
- Shales
- Market Dynamics
- Field Economics
- Transportation and Logistics
- Risk and Reliability
- Technology Qualification and Implementation
- Intervention
- Project Execution and Management

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1. Final selection of papers will be determined by the Unconventional Gas International Conference Advisory Board. Papers will be evaluated on the basis of abstract submitted. The papers should be in English, completely original, and address issues as outlined in the conference focus areas. Papers and presentations should avoid any commercialism.
2. You are allowed 20-minutes to present a paper (presentation in English). A 10-minute discussion will follow each presentation.
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4. Full instructions on preparation of presentations will be sent to authors of selected papers.
5. Unconventional Gas International Conference & Exhibition assumes no obligation for expenses incurred by authors for travel, lodging, food, or other expenses.

ABSTRACT DEADLINE: JANUARY 9, 2009

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INSIGHT

FALL 2008

Created by energy API | Supplement to OIL&GAS JOURNAL

CULTURE – THE KEY TO SUSTAINABLE PROCESS SAFETY PERFORMANCE

WHAT IS CULTURE?

Some companies wonder why they keep experiencing the same process safety problems. Others wonder why they have plateaued in process safety performance.

Culture is KEY. It is the individual and organizational "DNA" that represents our tendency to want to do (1) the right thing (2) in the right way (3) at the right time, (4) ALL the time – even when no one is looking.

The safety culture that exists in a plant or company is the result of all the actions - and inactions - in institutional/ workforce memory.

Many facilities use management systems to help control risks of hazardous processes. These management systems are operated by people – people whose inherent attitudes about safety can affect the choices they make in operating these systems and, thus, the overall safety performance of the facility.

EXAMPLES OF CULTURE EVENTS

- A co-worker does not object when an operator writes an "armchair permit"
- Supervisors consistently support workers who shut down a process they believe to be unsafe – even if they were wrong
- An operations manager extends a unit shutdown to await definitive evidence that a thin-walled vessel is safe to operate
- A refinery manager does not wear appropriate PPE when walking out to the control room to eat lunch with a unit crew
- A corporate EHS director persists in her efforts to justify staffing resource commitments to support process safety in spite of company cost-cutting edicts
- A refining SVP pressures the refinery manager to defer the refinery turnaround through the busy season
- A company director eliminates corporate engineering and process safety staff positions without any management of organizational change
- A CEO makes an acquisition without addressing process safety in due diligence reviews
- A Board does not devote sufficient time to review process safety performance metrics and question the company's third-quartile performance

ESSENTIAL FEATURES OF A GOOD CULTURE

Industry has established attributes of a good process safety culture. Focusing on these features allows a company to evaluate existing safety culture and determine how best to improve it.

1. Establish safety as a core value
2. Provide strong leadership
3. Establish and enforce high standards of performance
4. Formalize the safety culture approach
5. Maintain a sense of vulnerability
6. Empower individuals to successfully fulfill their safety responsibilities
7. Defer to expertise
8. Ensure open and effective communications
9. Establish a questioning/learning environment
10. Foster mutual trust
11. Provide timely response to safety issues and concerns
12. Provide continuous monitoring of performance

HOW TO EVALUATE PROCESS SAFETY CULTURE

Process safety culture is hard to measure and more difficult to change. There are few direct indicators of culture, and because of its nature, it cannot be evaluated very frequently. Typical ways to get a handle on process safety culture are:

- Employee surveys
- Interviews
- Work observations
- Process safety leading indicator metrics

Based on lessons from conducting the Baker Panel evaluation, ABS Consulting has devised a formal approach for connecting process safety and EHS performance outcomes to culture. This performance assurance review (PAR) approach consists of the following steps at a facility:

- Develop a current "safety performance picture" and assessing the "historical performance movie"
- Understand employee opinions about safety culture issues
- Map these results to the 12 culture features
- Address technical, management system and underlying cultural issues to create sustainable, improved process safety performance

Companies can perform a PAR at a single facility, but the results will be more robust if the evaluation is done at multiple representative facilities, business divisions, and corporate offices.

PATH FORWARD

Some predict that future major incidents will all have poor safety culture as a contributing factor. Safety culture will be the "root cause" of the next decade. Industry must do more to equip itself to learn and do something about the underlying organizational and culture causes of major accident situations – BEFORE they happen.

ABS Consulting
AN ABS GROUP COMPANY

Steve Arendt, Vice President
Process Industries
sarendt@absconsulting.com

Is tomorrow's energy right in front of us?

Where on earth could we find enough oil to power more than 60 million cars for 60 years? And enough natural gas to heat 160 million households for 60 years?

You might be surprised to learn that the answer is right here, in America – 116 billion barrels of oil and 651 trillion cubic feet of natural gas, just on federal lands.

But, as the saying goes, these vital domestic resources are often "so close, yet so far." Why? Because current government policies – a tangled mix of federal and state regulatory restrictions – put a large portion of these oil and natural gas resources, many on the Outer Continental Shelf (OCS), off-limits to production.

85% of lower 48 OCS acreage is off-limits to oil & natural gas development

In fact, the U.S. government estimates that there are 36 billion barrels of undiscovered technically recoverable oil on federal lands currently closed to development. New technological breakthroughs allow us to tap these resources, even in "ultra deep waters," while protecting fragile marine environments. Recently, oil and natural gas companies employed advanced technologies to discover vast amounts of new oil and natural gas in the Gulf of Mexico – resources beyond our technical reach just a few years ago.

The U.S. Department of Energy predicts America will need 19 percent more energy in 2030 than we used in 2006. Meeting this demand, and ensuring our future energy security, requires developing more energy from more sources, including our own oil and natural gas resources.

Oil and natural gas not only heat our homes and fuel transportation, they also provide the building blocks for everything from medicines to advanced communications equipment. And developing America's untapped energy resources means a stronger economy and more American jobs. That's real economic stimulus – and it would allow increased funding for federal, state and local government budgets.

Oil and natural gas make possible our unequaled quality of life. Ensuring such for future Americans will require policies that permit responsible, respectful access to America's plentiful domestic oil and natural gas resources. These valuable resources are within our reach. Let's work together to realize their potential.

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EXPLORATORY DRILLING RESURGENCE CONTINUES

API's 2008 second-quarter drilling report shows that U.S. oil and natural gas companies completed over 50 percent more exploratory wells in the second quarter of 2008 than they did during the same period the year before – a strong indication that the industry continues to boost activity in the exploration and production sector.

"This demonstrates the industry's resolve to explore for and find the oil and natural gas needed to keep our nation going strong," said Hazem Arafa, director of API's statistics department. "This is remarkable, considering the limited access our industry has to the nation's oil and natural gas resources."

Total estimated exploratory well completions – which accounted for nearly 17 percent of total estimated well completions, increased 53 percent in the second quarter – compared with the same quarter last year. Estimated exploratory oil well completions increased 49 percent, while estimated exploratory natural gas wells completions jumped 99 percent in the second quarter of 2008, compared with last year's second quarter.

An estimated 14,289 oil wells, natural gas wells and dry holes were completed in the second quarter of 2008, up 8 percent from the second quarter a year ago, the report found.

The resurgence in oil well completion activity that began in 2000 is continuing into 2008. An estimated 5,219 oil wells were completed in the second quarter of 2008, up 17 percent from last year's second quarter and the highest second quarter estimated oil activity since 1986.

INSIGHT

INSIDE | FALL 2008

AS THE BABY BOOMERS RETIRE, A NEW GENERATION STEPS IN TO CARRY ON

by Robert Dodge, Cathy Landry and Evette Torres

Fresh faces are going places in the oil and natural gas industry as one generation makes way for the next wave of energy pros.

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CANADIAN OIL SANDS | By Cathy Landry

A MEASURE OF ENERGY SECURITY FROM OUR NEIGHBORS TO THE NORTH

Canadian oil sands are growing in importance to the U.S. energy picture. Here's how one of our closest allies is also our largest supplier of imported oil.

The United States' neighbor to the north is developing a huge reservoir of crude oil – derived from Canadian oil sands – which should play an important role in meeting North America's growing energy needs for decades to come.

"The Canadian oil sands are immensely important to the United States because they are an enormous resource and are located so close in a country that is one of our nation's closest allies," says API Upstream Group Director Doug Morris.

Crude oil derived from Canadian oil sands is expected to grow in importance to the United States in decades to come. Demand for all forms of energy continues to increase, according to the Energy Information Administration (EIA), which projects U.S. primary energy demand in 2030 to be 19 percent higher than 2006 levels.

While the United States will continue to use more alternative sources of energy, such as ethanol, geothermal, solar and wind, in coming years it also will require more oil and natural gas – and more and more oil, thanks to the development of the oil sands, may be coming from Canada.

Canada already is the largest supplier of imported oil and oil products to the United States, with about half of that now coming from oil sands formations. The growth in Canadian oil-sands-derived crude oil is likely to expand even more. The Canadian Association of Petroleum Producers estimates oil sands production growing from about 1.2 million barrels per day currently to potentially 3.8 million barrels per day by 2020. Moreover, Canadian oil reserves are vast at 173 billion barrels – putting Canada second only to Saudi Arabia – and ensure that production will flow for decades into the future.

"The close relationship between Canada and the United States – both politically and from a trade perspective – is probably one of the most exciting things about the Canadian oil sands," says Kyle Isakower, API Director of Policy Analysis.

While most forms of crude oil are extracted by drilling into a formation, Canadian oil sands deposits have traditionally been mined.

But a lot of Americans do not realize the importance of Canada to U.S. energy security or even know about the existence of the Canadian oil sands. For its part, API is working to educate the public and decision-makers about the importance of this supply to the nation's energy security by working to address various issues associated with Canadian oil sands – ranging from production, to transmission and use in refineries. Those outreach efforts also involve educating the public by participating in workshops and community meetings, particularly in the Midwest, where the bulk of Canadian oil now flows.

Oil sands are a naturally occurring mixture of sand or clay, water and extra heavy crude oil or bitumen, Morris explains. While most forms of crude oil are extracted by drilling into a formation, Canadian oil sands deposits have traditionally been mined. Increasingly, though, the oil sands oil is made to flow into producing wells by in-situ techniques that lower the bitumen's viscosity by using steam or solvents, allowing a developer to recover the oil through traditional drilling practices, he adds. With 80 percent of the resources too deep to mine, technological improvements are making in-situ production more cost-effective, and new operations are increasingly using techniques that further reduce the activity's environmental footprint.

Most of the Canadian oil sands are located in three major deposits in northern Alberta. Combined, the three deposits cover more than 54,000 square miles - an area about the size of the state of New York.

Most of the Canadian oil sands are located in three major deposits in northern Alberta: the Athabasca-Wabiskaw oil sands of northeastern Alberta (the biggest), the Cold Lake deposits of east-northeastern Alberta and the Peace River deposits of northwestern Alberta. Combined, the three deposits cover more than 54,000 square miles – an area about the size of the state of New York.

The oil sands of Canada are centered in the western province of Alberta. While the Canadians have known about the existence of these oil-rich sands for decades and began development in the 1960s, work was stymied by low oil prices because the huge upfront costs of development made the projects economically unviable. By early this decade, however, stronger crude oil prices made Canadian oil sands economically feasible and spurred widespread development and production. Technology also improved, allowing companies to consider developing in areas once thought impossible.

Once processed, the petroleum derived from oil sands is a heavy crude oil that can move directly into the pipeline network to refineries that will turn it into petroleum products such as gasoline, diesel, jet fuel and heating oil. Pipeline companies are investing billions to build new and expand existing pipelines in both Canada and the United States to allow additional supplies to be moved south. About 99 percent of all Canadian oil is exported to the United States. Because – like most of the crude oil produced in other countries – the crude derived from Canadian oil sands is heavy, some refiners also are making large investments to expand and upgrade their refineries to be able to accommodate increasing amounts of this crude while still meeting all federal, state and local requirements for permitting, says API Downstream Group Director Bob Greco.

"It makes a lot of sense for refiners in the United States to make these

investments to take the Canadian crude oil because so much of it will be readily available as production grows," Greco says. "Many refiners see this as a safe, reliable, and nearby source of supply and are eager to ensure that they can take increasing amounts of the Canadian crude as it becomes available."

Greco also points out these expansion projects allow the refiners to upgrade their plants and provide well-paying jobs to the local communities. API is working to educate local citizens and lawmakers about the vital importance of these pipeline and refinery expansion projects in improving U.S. energy security by taking additional Canadian oil.

Once the crude oil derived from Canadian oil sands is refined, the resulting product is exactly like any other gasoline, diesel, jet fuel or heating oil made from any other kind of crude oil – whether light, heavy, sour or sweet or produced domestically or imported, says Al Mannato, API's Fuels Issues Manager.

"Petroleum products refined from Canadian crude oil are sold into the market just like any other oil product," he explains.

The Canadian oil sands are not without controversy because, like all mining and development projects, the operations have an effect on the environment. However, the oil industries in Canada and in the United States are making great strides in addressing various environmental issues, including oil sands operations' greater carbon intensity compared with development and production of lighter types of crude oil. The Canadian government is developing climate change programs that cap carbon intensity in oil sands operations by offsetting or reducing emissions, and Alberta's government has planned actions to address the environmental footprint in a meaningful way.

The work is paying off. Technological advances have cut per-barrel greenhouse gas emissions from oil sands production by 32 percent, compared with 1990 levels, according to the Canadian government. In addition, oil sands production is leading to the development of new and innovative technologies to mitigate environmental impacts – including the impacts on water during the separation process – reclaim oil sands development areas and store and capture carbon.

The bigger payoff, however, may be what Canadian oil sands can mean for U.S. energy security.

"There has been a lot of talk in recent years about energy security and the need for the United States to have a secure and reliable source of supply," says API's Isakower. "Crude oil derived from Canadian oil sands, simply put, will make the United States more energy secure."

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API DATA | By Karen Matusic

THERE'S MORE TO THE OIL AND NATURAL GAS INDUSTRY THAN SUPPLY AND DEMAND

Dig down into the data that API provides and you'll uncover statistics about drilling, safety and the environment – data that the world relies on.

API's weekly and monthly petroleum supply and demand reports are must-reads for policymakers, analysts, traders, journalists and others who want to keep their finger on the pulse of U.S. oil market fundamentals. But the work of API's Statistics Department goes well beyond providing the tools the oil and natural gas industry needs to gauge its own performance and make informed decisions about ways to improve that performance.

API Statistics Director Hazem Arafa and his team of statisticians, economists, analysts and administrators also provide reliable and accurate facts and figures that enable API to "tell the story" of how America's oil and natural gas companies are hard at work to bring consumers reliable fuel supplies in an environmentally and socially responsible way. API's Statistics Department provides data that not only measures productivity and hydrocarbon use, but also safety performance, investments in environmental improvements and emerging energy technologies, drilling activity and pipeline spills.

API has been supplying accurate, timely statistical information since 1919, and Arafa says his group is mindful that it has a nearly century-old reputation for meticulous analyses to maintain. All numbers are checked and double-checked for any discrepancies before the data is released.

"All of my staff are numerical with a very keen eye for detail," Arafa says. "I tell them there are some forgivable mistakes in life and some unforgivable mistakes. In our department, if we do not check our data to make sure it is accurate, that is unforgivable.We put a considerable amount of work into making sure API data is accurate." Much of API's statistical output is generated through industry-wide surveys that go to companies inside and outside API membership. Arafa says his group typically gets an excellent response rate because the final results are extremely valuable for all companies.

"Companies are able to use this data to see how they stand in the industry and learn what they are doing well and learn from others on how to get even better," Arafa says. "There is always room for improvement and this way you can learn from the best."

API also makes good use of federal government data on oil spills, refining-toxics release inventories and workplace and process safety to gauge how the industry is performing in such important areas. In its raw form, some of this data is confusing and difficult to interpret, Arafa says.

"Sometimes the data is double- and triple-counted. We analyze the data, put it into clear categories and look at actual trends," he says. "All of the caveats in the government data are there but someone looking to make a quick analysis would have to really look close at all the footnotes and most people do not.We have also caught some mistakes in reporting by detecting anomalies that may have not been caught in the original format," Arafa says.

The latest JAS showed that spending on drilling and equipping wells in the United States surged in 2006 to a record high of nearly $110 billion, a 44 percent increase from the previous year.

Here is a closer look at some of the statistical offerings of API:

DRILLING

Against a backdrop of record-high oil prices and growing global demand, a lot of attention on Capitol Hill and beyond has been focused on domestic production and the possibility of opening more federal properties to drilling. API media relations staff and spokespersons are often asked, "What is the industry doing to find more supplies here at home?"

Thanks to data compiled by API in its *Quarterly Well Completion Report,* the facts speak for themselves. According to API's first-quarter 2008 drilling estimates in the *Quarterly Well Completion Report,* drilling activity was twice the level of corresponding quarters during the 1990s, even though federal policy limits access to nonpark land and most of the outer continental shelf for development.

"Using these numbers, we are able to demonstrate that the oil and natural gas industry is committed to finding new sources of oil and gas to increase U.S. production," Arafa says. API also publishes the Joint Association Survey on Drilling Costs (JAS), the only long-term source of information on U.S. drilling expenditures.

The latest JAS showed that spending on drilling and equipping wells in the United States surged in 2006 to a record high of nearly $110 billion, a 44 percent increase from the previous year.

"This unprecedented level of spending clearly demonstrates the industry's commitment to actively invest in exploration," Arafa says.

ENVIRONMENT

Meeting the increasing demand for energy while protecting the environment is a challenge that the oil and natural gas industry takes very seriously, spending billions of dollars to address pollution and to lessen the environmental footprint. The latest annual environmental spending survey (Environmental Expenditures by the U.S. Oil and Natural Gas Industry) showed that the industry set a new record for environmental spending of $11.3 billion in 2006, the latest year reported.

Total investment between 1990 and 2006 exceeded $169 billion. And that spending and the industry's focus on new technology and cleaner-burning fuels are contributing a cleaner environment for all Americans. According to the Environmental Protection Agency, the nation's air quality is improving even though energy demand is rising.

SAFETY

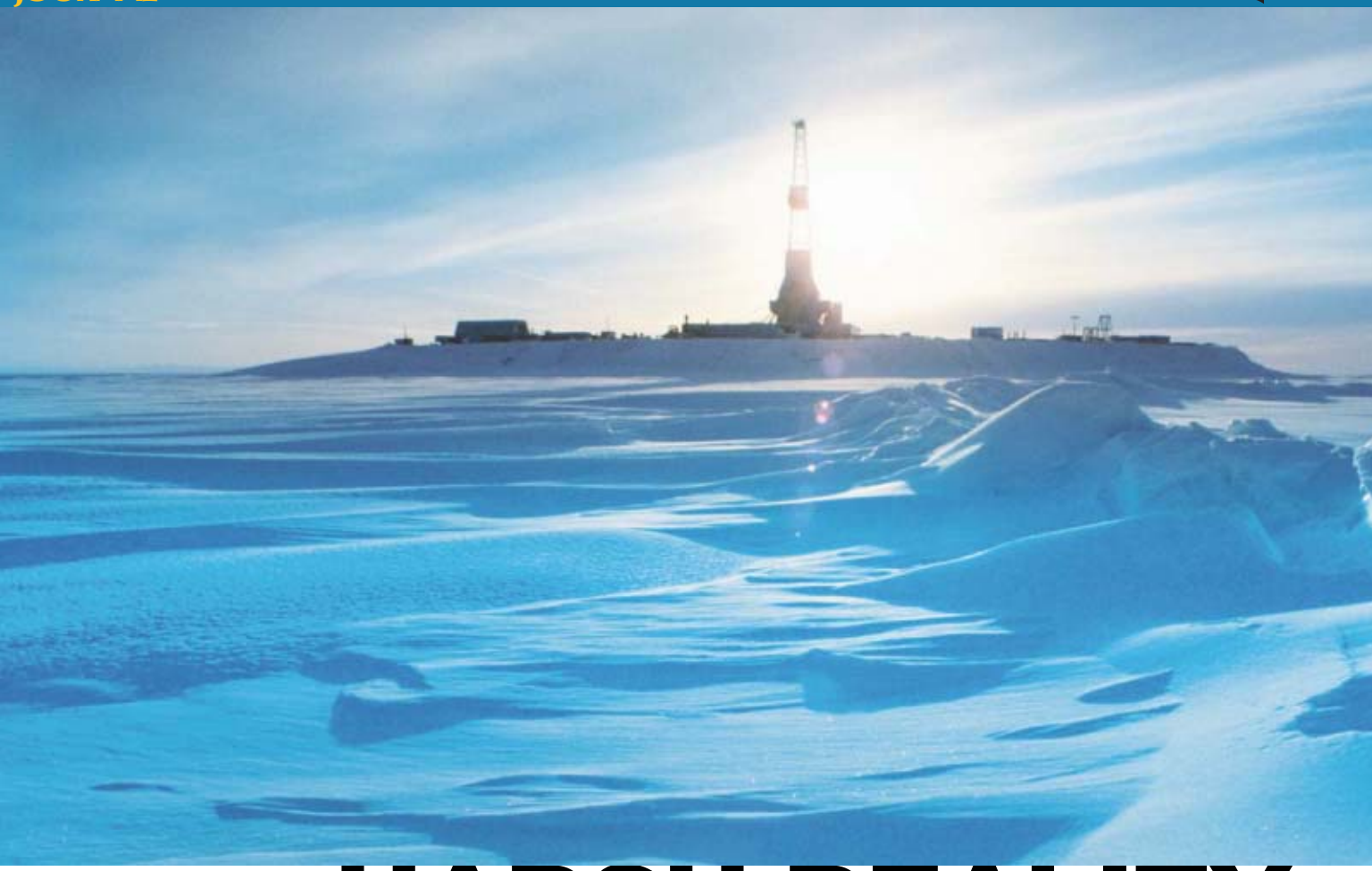
Safety has always been a top priority for API members, and statistics on the oil and natural gas industry's safety record – as measured in three separate studies on workplace safety, process safety performance measurement and occupational injuries, illnesses and fatalities – ranks above that of other industries in the private sector.

But no accident is acceptable and preventing the possibility of a fatal accident is a goal toward which API member companies all work, day in and day out.

"Accurate safety data is indispensable and really helps our companies be the best they can be," Arafa says.

API's Statistics Department serves many functions and its data acts as the check and balance to the government data to make certain that the world has the best possible numbers and estimates on U.S. oil and natural gas.

"We serve all segments of the industry, since there is hardly an issue that does not need some data to verify claims and positions," Arafa says. "We help develop databases and software to measure industry performance while helping individual companies benchmark that performance relative to their peers. Most important, we collect data that helps the industry perform better in the safety and environmental arenas. By mining our data, we play a role in helping the industry continually improve on its already stellar safety record."



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A DAY IN THE LIFE | By Robert Dodge, Cathy Landry and Evette Torres

AS THE BABY BOOMERS RETIRE, A NEW GENERATION STEPS IN TO CARRY ON

Fresh faces are going places in the oil and natural gas industry as one generation makes way for the next wave of energy pros.

Every day a new generation of workers reports for duty in the oil and natural gas industry. Some show up in the gas fields of Texas. Others find their workplace offshore. And still others work in refineries and processing plants in places such as southern Louisiana.

Wherever they work, they bring fresh faces to each day-in-the-life of the industry. And the business needs them: At least 50 percent of the workforce will be leaving in the next five to 10 years as the Baby Boom Generation begins to retire.

Five workers recently told their stories, sharing how they decided on careers in the oil and gas industry, what they do at work and their ambitions for the future.

Stacey Hebert, 31, found her niche with Shell Chemical LP in Geismar, Louisiana.

STACEY HEBERT

Stacey Hebert, 31, did not know what she wanted to do when she got out of high school. And she was not terribly satisfied with the jobs that came her way: video store clerk, driver education instructor and file clerk.

Living in southern Louisiana, and having some relatives in the oil and natural gas industry, she picked up information about a possible career in energy. "I wanted to do something that would require both physical and mental ability," she says.

Hebert enrolled in the Baton Rouge Community College and began studying process technology, an area she learned would give her the hands-on work she was seeking.

"I had heard these jobs were thinking jobs that rely on math, chemistry and physics to safely and efficiently produce products," she says. "But I had never been around this industry before, so I had absolutely no idea what to expect."

Hebert got a chance to learn more when she followed up with an instructor's encouragement to apply for an internship at the Shell Chemical LP facility in Geismar, Louisiana. She got

the internship and learned more about the role of a process technician in the petrochemical industry.

"Most people believe operators sit behind a control board and open and close valves," she says. "But there is much more involvement in being a technician."

Hebert says it is also important to develop skills in communication, computers and teamwork.

"My internship helped me decide whether this was what I wanted to do for the next 25 or 30 years of my life," she says.

After earning her associate degree in May 2003, Hebert returned to the Shell Chemical LP facility in Geismar as a full-time operator where she could focus all her new skills on the primary task of making a product.

As a technician, Hebert is responsible for keeping the processes running within the approved limits and product quality specifications.

And the thing that makes her job fun: No two days are the same.

"I never know what to expect when I come in," says Hebert, who works an alternating 12-hour shift schedule. "When I come into work, I have no idea what happened in the previous 12 hours."

It can be a routine day where unit operation has run quite smoothly. But other times, it may be more challenging because there are problems that require trouble-shooting and repairs. "You want to find and solve these problems in a timely manner to maintain production rates and product quality," she says.

MARSHALL KIMBALL

Marshall Kimball, 19, of Baton Rouge, had wanted to work on an offshore oil rig since he was a boy growing up in Lake Charles, Louisiana.

"When I was little, my brother-in-law, who was a driller offshore, and a neighbor, who worked on a jack-up rig, would talk about working offshore," Kimball says. "They talked about the opportunities to advance and that you could make a really good living. When I graduated from high school, I applied for offshore jobs, but I was told I was too young and had no experience. Nobody wanted to take a chance on someone who hadn't proved he was up to the job."

So, Kimball shelved his dream and took jobs working at the concession counter at the local zoo and at a local fast food chain at night.

"I was doing lots of work – working all the time, and I was getting nowhere," he says. A casual conversation with his sister and her husband during a car ride changed Kimball's life.

"We were riding around and my sister told me she had heard about API's Oilfield Training Program," says Kimball. "The program wasn't far away, and I decided to give it a shot."

The Oilfield Training Program helps young adults learn critical entry-level skills they need to get started and succeed in their first jobs in the oil and natural gas industry.

Kimball – who completed the program (which is part of the Carville Job Corps Academy in Carville, Louisiana) in January after five months "of pretty much just studying and sleeping" – is now living his dream: working offshore for Parker Drilling Company, leasing his own apartment, and on the verge of buying his first car.

Kimball acknowledges that none of this could have happened if it were not for the training program.

Marshall Kimball, 19, of Baton Rouge, had wanted to work on an offshore oil rig since he was a boy growing up in Lake Charles, Louisiana.

"I learned all the skills I needed at the Carville program, and it opened the door for me," Kimball says. "People were willing to take a chance on me because they knew I had put in the time to get the training. They knew I was serious about working on a rig."

Kimball has big plans for the future. He's hoping to move up from his current position as an offshore roustabout – an entry-level position that involves mostly cleaning and painting and other support duties on the rig – to roughneck, a jack-of-all-trades position on the rig, within a few months. And he has high hopes to then move up to more specialty positions, such as a derrickman, who handles the drilling mud, or driller, and then eventually to become a company man.

"One thing they told us at Carville, and then when I got to Parker, is really true: 'The more effort you put in, the more you move up. The higher you get, the cleaner the stay.'"

Kimball admits right now as a roustabout he's "dirty – from head to toe – being a roustabout is a dirty job. It's a hard job. But it's a good job. I'm learning every day and I have room for advancement."

The skills Kimball learned at Carville are serving him well offshore.

"All the things I learned in the program have come in handy. I'm using them on the job," he says.

By the time he's 26, Kimball wants to have his vehicle paid off, and he wants to buy a house or trailer. In the meantime, he says he's going to try to work as hard as he can and learn as much as he can.

His advice to other young people considering entering the API Oilfield Training Program: "Do it. If you are 16-24, it's the right time to get into this. You can always party later. Just get in there. Get established. Make something of your life. If I can do it, anyone can. It's hard work, but it's going to pay off in the end."

ERICK NAVAS

Erick Navas is overcome with a sense of awe as he considers the responsibilities placed on him.

The 23-year-old production engineer has been in his job at Marathon Oil Corp. for only 10 months. But based on his demonstrated capabilities through internships, he is now responsible for the production and operations of the Oletha Field, a 46-well gas field about 90 miles south of Dallas near Fairfield, Texas.

"They handed it over to me, and it is an enormous responsibility," Navas says. "It's a ton of responsibility. I am solely responsible for this field."

Navas, who was born in Venezuela and immigrated to the United States at age 11 with his parents, says he has moved up quickly because of his education and internships. He majored in petroleum engineering at Pennsylvania State University and received two internships with Marathon during his final years of college.

Erick Navas, 23, production engineer at Marathon Oil Corp., has been in his job for ten months.

During high school, Navas thought he might want to be an architect. But a conversation with someone in the field left him cold. He recalled his grandfather, a farmer in Venezuela, urging him to consider the oil and natural gas industry.

"I knew I wanted to be in science and math, and engineering is the first thing that comes to mind," says Navas, adding that he retreated to the high school library to do research on the oil and natural gas industry. It appealed to him right away as he found a business that offered indoor and outdoor work, the chance to travel and see extreme tropical and arctic venues in far-flung corners of the globe.

"It's very attractive for a young person who wants to travel. A light definitely went on with me," says Navas, adding that his sister is also now studying to become a petroleum engineer.

During his two internships, Navas spent one summer working offshore, and then spent the next summer working in the Oletha Field where he would return after graduation to begin full-time work. He says the two internships gave him a good overview of working offshore and onshore, as well as some exciting training, such as evacuating a helicopter.

Though he begins most days by checking the previous day's natural gas production, checking to see if any wells went down and talking to field operators to inquire about any other problems, Navas says no two days have been the same since he started working full-time.

After his usual morning checks, he may then work on an ongoing project, such as installing a new pumping unit. He will work on the design, confer with colleagues about the proposed solution and finally write a proposal to fund the project.

In the afternoon, Navas likes to get out of the office to make sure safety expectations are being followed, and to look for some "hands-on" work in the field.

"I try to be out there as much as I can," he says.

"There are a lot of expectations, but there also are quick rewards," Navas says. "For instance, if you are working on a well, two or three days later you can see if you did a good job. You see the results quickly."

Right now, Navas may be focused on the Oletha Field, but he also is looking ahead and has big plans.

In the future, he wants to work abroad and get some international experience. He also wants to work offshore, and then with the scientific staff that looks at geologic formations for oil and natural gas deposits.

"I never thought I would have so much fun doing this," Navas says. "It is quite exciting to think that we are producing the energy that the world demands. It is an ever-changing environment and the challenges just keep coming. These are very exciting times."

ALVIN FLOURNOY

Alvin Flournoy, an 18-year-old from Lake Charles, Louisiana, was not fully aware of how much he would limit his career opportunities when he decided to drop out of high school.

While he got a job easily enough – at a local fast food chain – he soon realized the pay was low and there were few opportunities for advancement.

"I knew there wasn't a future there," Flournoy says.

When he learned of API's Oilfield Training Program, he decided to give it a shot.

"I wanted to get a head start in life. It was a good opportunity, and the money was good," Flournoy says.

Within two weeks of finishing the API program at the Carville Job Corps Academy, Flournoy landed a job as an offshore roustabout with Parker Drilling Company. He's now working as a floor hand, which entails making drill pipes connect.

Flournoy has high praise for Carville, which is part of the nationwide Job Corps program, designed to help disadvantaged youth between the ages of 16 and 24 years old.

After his Carville graduation, he thought he was prepared to work in the industry but "I found out I was over-prepared – I knew more than many of the guys who had been here a long time." That, he says, "made me feel proud. I was very glad I went to Carville."

While he found the API Oilfield Program challenging at Carville, "if you paid attention you could get through," Flournoy says.

Flournoy works offshore, seven days on, seven days off.

"The first couple of hitches offshore were hard, because you're away from your family and your friends, but once you get used to it, and you get to know people better, it's all right."

Alvin Flournoy, 18, landed a job as an offshore roustabout with Parker Drilling Company.

He appreciates the care the company takes to make the workers feel at home.

"The food is great and you can eat all you want," he says. Some rigs even offer Internet connections so he can talk to his family.

"It's almost like being at home, except you're surrounded by water."

For the most part, Flournoy, who has been on the job for nine months, finds his work fun.

"It's interesting, and it's challenging," he says. "You're always learning something new."

In addition to the good salary and challenging work, he appreciates the health insurance and being able

to travel, buy company stock and participate in a 401K.

"That is very, very important to me," he says.

Flournoy believes he'll stay in the industry for the rest of his working life and his goal is a simple one: "To be somebody's manager."

SCOTT WAGGENSPACK

When Scott Waggenspack, age 27, has an opportunity to work with a student intern at the Shell Chemical LP facility at Geismar, Louisiana, he eagerly accepts. After all, he remembers how the internship he completed in 2002 helped prepare him for a productive future as a process operator at the facility.

Waggenspack had one semester left to earn his associate degree in process technology at nearby Louisiana Technical College, River Parishes Campus, when he started his internship with Shell. For almost three months, Waggenspack accompanied operators as they performed their daily duties.

"I figured it would give me better insight into the inner workings of the plant's operations," he says. "I didn't just work with one person, I worked side-by-side with operators on many units in both maintenance and operations, during both day and night shifts."

Waggenspack knew at an early age he wanted to work in the oil and natural gas industry. His father was a process operator and liked to tell his son about the challenges and interesting work. And, it did not hurt that the young Waggenspack loved science and math.

"I was mechanically inclined and I was good at science and physics," he says. "It seemed like working in the petrochemical industry would be a good thing for me."

He gave chemical engineering a try at Louisiana State University. But his work convinced him he needed to make a change in his career plans.

"I got a warehouse job and got to deliver to people throughout the plant," he says. "I got to meet everybody, and it was during that time I learned that I was more suited to be an operator than an engineer. I was more mechanically inclined, and I like to be outside."

Scott Waggenspack, 27, knew from an early age he wanted to work in the oil and natural gas industry.

His internship gave him hands-on experience he could not get in the classroom.

He inspected equipment when it was down to see what it looked like inside. He turned valves to see how just a small movement could have an effect. And while working in the plant's tank farm, he climbed on vessels to collect and analyze product samples.

"I even helped get ready to shut down some units in preparation for a hurricane," he says, "and that was exciting."

Just as exciting was the job offer he got from Shell Chemical after graduation.

Now, he is working 12-hour shifts that start at either 6 a.m. or 6 p.m. He loves his job but finds it a challenge to adjust to the night-day shift changes, and has adopted his own strategy to keep his body clock on track and himself feeling good.

"It is very tough," Waggenspack says. "I try to eat at regular intervals and that seems to help regulate my body."

On a typical day, Waggenspack gets a briefing from a co-worker when he gets to work about what happened on the previous shift.

"Then the whole shift gets together and has a meeting to discuss any threats, including those to the environment and safety," he says.

He then makes rounds to ensure everything is working the way it is supposed to. His facility makes ethylene glycol, which is used to manufacture automotive coolants and synthetic fibers.

Waggenspack says he likes working with Shell and would like to go overseas with the company. While he would like to broaden his experience, he does not aspire to be a manager: "I wouldn't necessarily like to be in leadership, but I would like to be seen as a leader."

He's already in that role. He works with interns so they have the same learning experience that gave him a jumpstart with his career. "I am taking what I learned during my internship," he says, "and showing them things they have to see firsthand to fully understand. I remember being in their shoes and the eagerness and excitement to get your life started." ◐

TECHNOMEDIA: FAST-TRACK ONLINE TRAINING FOR THE BIG CREW CHANGE

The crisis is real. A growing shortage of qualified workers at every level has already delayed some oilfield projects, and many of the industry's most experienced employees are reaching retirement age. The senior operators, petroleum engineers and geologists that remain find themselves too busy to train new hires.

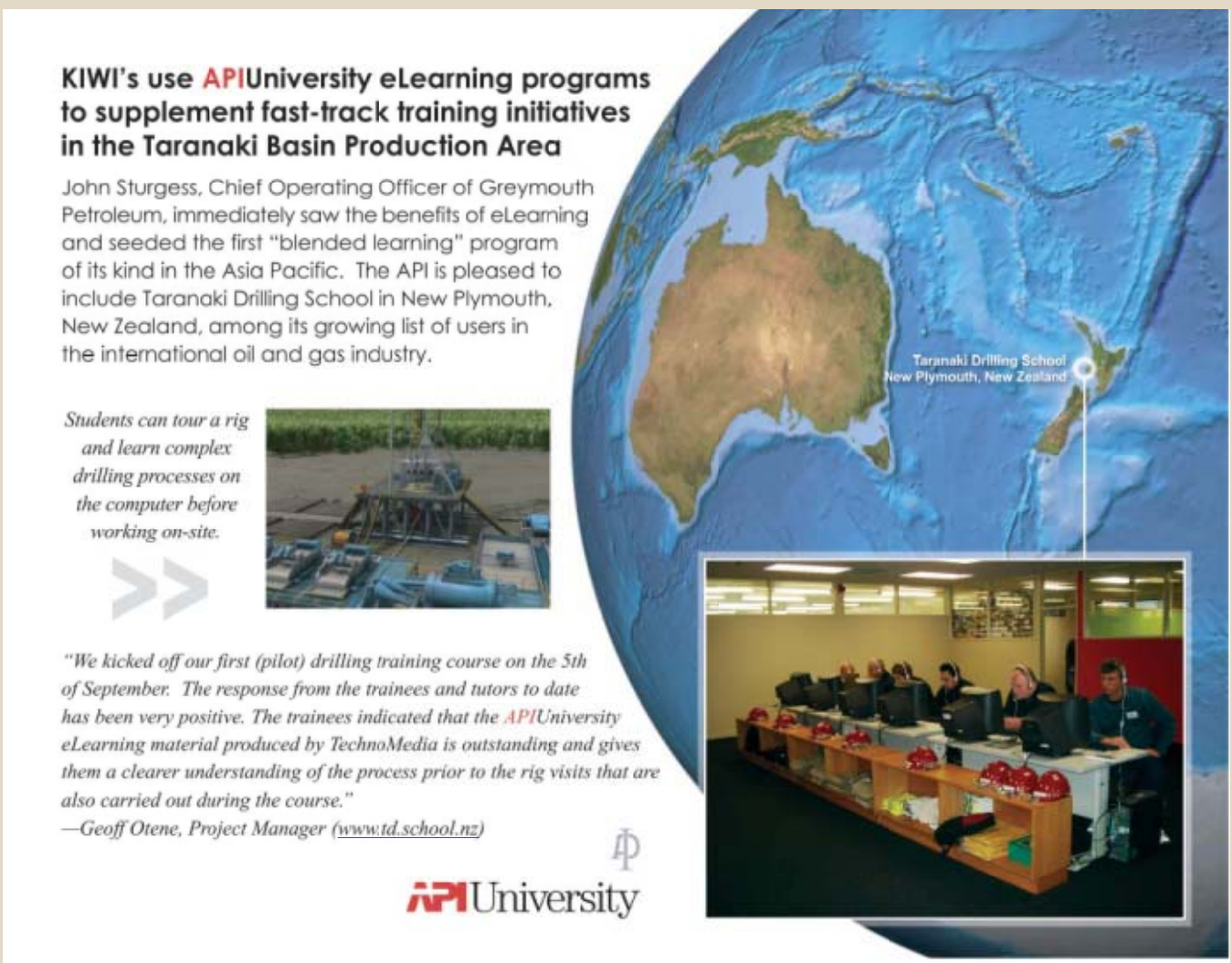
People call it the Big Crew Change, and it's hitting North American oil and natural gas producers particularly hard. Houston-based TechnoMedia, one of the largest providers of online technical training for the petroleum industry, is addressing a significant part of the problem: how to bring new employees up to speed fast.

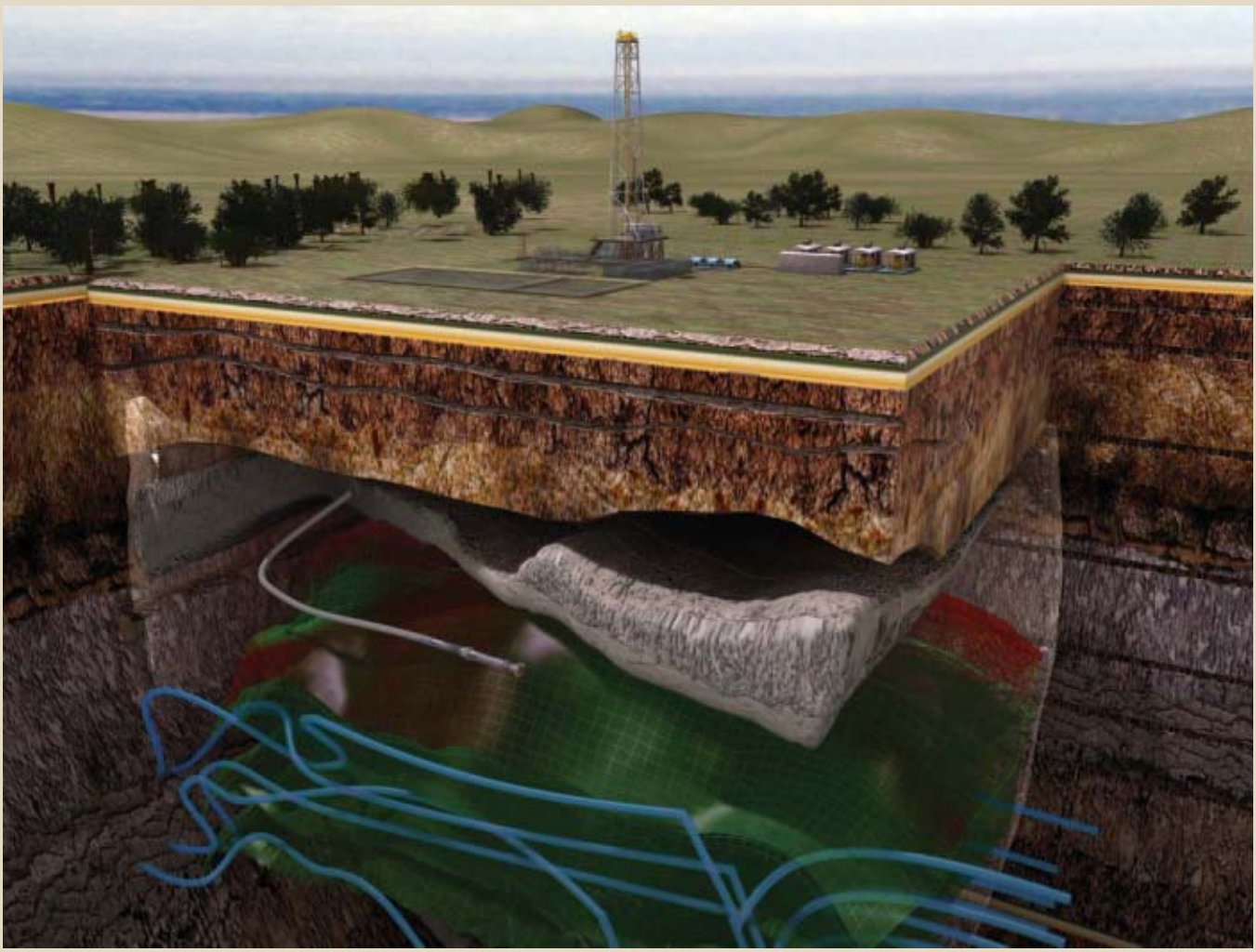
"TechnoMedia provides a flexible, eLearning framework," says Greg Bihn, president of TechnoMedia International, Inc. "Since we began in 1991, our goal has been to give entry-level workers the basic knowledge they need to begin working safely in the oilfield. The training covers both upstream and downstream, so our courses can also benefit experienced workers who are changing from one job to another, say from drilling to production or refining operations."

The interactive programs not only reduce training time, they provide consistency and standardized instruction for every new employee. Since the courses can be viewed whenever an employee has time, even in areas without Internet access, training schedules are completely flexible. Students take the tests when they feel they have mastered the material. The scores become part of their online record, which training managers can easily track, either through a learning management system offered by TechnoMedia, or legacy systems already in place with their employer.

API UNIVERSITY RELATIONSHIP

In 2004 API and TechnoMedia began negotiations to provide eLearning for the oil and natural gas industry. From these initial discussions emerged "API University" in 2005. API's educational initiative with TechnoMedia produced an immediate impact on the availability of educational deliverables for the Industry. Drawing from its own eLearning curriculum and innovative





partnering strategies, TechnoMedia was able to quickly expand the API University library to more than 220 eLearning course titles covering a broad range of topics for entry-level workers.

Newly hired personnel within the energy industry will certainly be the primary user base. The course can be beneficial in providing cross-training to seasoned staff in either engineering or support roles within the organization.

The course also offers professionals working in allied fields a highly visual overview of the activities associated with oil and natural gas recovery and processing, from both the upstream and downstream perspective. Because the material is digital and runs over IP networks, licensing on a per-employee basis can be quite cost-effective.

TechnoMedia's curriculum now forms the core of API's expanded training program.

API University is dedicated to providing excellence in petroleum industry training and has access to the largest pool of subject experts in the industry.

The programs are taught by the best trainers, utilizing today's most innovative methods. The practical knowledge gained from API University training enables participants to maintain professional competency and meet ever-changing statutory requirements, in addition to networking with peers. API University now offers more than 300 eLearning courses designed to provide flexible training opportunities. We'll even bring the courses to you.

With the accelerating changes in the energy industry and the need to address upcoming workforce challenges, it is important to have a trusted source for your industry training needs. Making sure that you meet your training needs in a creative, systematic and cost-effective way is easy to accomplish with API University.

A FLEXIBLE FORMAT

Flexibility is the key to TechnoMedia's presentation. A major selling point is that students control the delivery of information. Through the use of a highly intuitive user interface, anyone taking the course can repeat individual slides or topics as often as needed to understand the concepts being presented. Because TechnoMedia employs the latest multimedia technology, the eLearning courses work both online (either Internet and corporate intranets), or via CDs or DVDs.

An innovative approach to deploying media-rich content allows TechnoMedia products to be delivered even in minimal bandwidth environments, as you might find on a drilling rig, and since the material is digital and runs over IP networks,

licensing costs on a per-employee basis can be quite cost-effective.

THE VISUAL APPROACH

TechnoMedia's team of interactive programmers, computer graphic artists, writers and training specialists uses the latest technologies and techniques to create training experiences that engage the learner.

"Our courseware development engineers communicate with technical experts in designing material to meet specific needs, and our skilled multimedia specialists, most of whom are intimately familiar with the oilfield, provide full production and deployment services," Bihn says. "Because the emerging oilfield workforce has been weaned on media-rich, multimedia gaming, the 'Nintendo-generation' expects training materials that conform to this expectation. The truth is, most young people see books and manuals as stodgy remnants of the past generations."

The Drilling Fundamentals Library includes 53 hours of courses in eight major categories: Oilwell Drilling, Horizontal Well Drilling, Kick Detection, Primary Cementing, Bit Hydraulics, Underbalanced Drilling, Well Control Fundamentals and Introductory Well Control.

"All courses employ periodic quizzes, real-world calculations, 3-D animations, interactivities, charts and graphs to increase comprehension and retention," Bihn explains.

This popular oilfield training program is perfect for new-hires in the drilling industry. The material provides students with a solid foundation in terminology, drilling jargon, concepts and procedures such as the types of fluid pressures in a well. It covers the advantages and disadvantages of specific drilling techniques, and the significance of formation porosity and permeability in the development of a drilling kick. Drilling Fundamentals also makes a great orientation program for administrative and support services.

"Our visual learning approach also pays huge dividends to oilfield workers that are not native English language speakers," Bihn adds. "An interactive animation, presented in 3D, allows users to grasp highly technical subjects without a great deal of language proficiency. That is particularly important when you consider the safety issues."

INTERNATIONAL REACH

More than 70 percent of TechnoMedia's user base is outside of North America. In addition to leveraging the benefits of visual learning, TechnoMedia has developed innovative solutions that address the challenge of training a culturally diverse workforce. Many of the courses are available in multiple languages, including English, French, Spanish, Portuguese, Russian, Indonesian, Arabic and Thai.

INTEGRATED LEARNING: PUTTING IT ALL TOGETHER

TechnoMedia's Integrated Learning Solution (ILS) manages the training and assessment of employees in diverse locations and technical environments. The ILS format allows students to progress at their own pace, working one-on-one with the program on their personal computers.

"Our Integrated Learning Solution is an à la carte combination of structured curriculum, computer-based training and learning management software," Bihn says. "The training is typically provided through IP networks, but it is also available in a hybrid delivery format for use on CDs or DVDs for use in remote locations. Our hybrid format is particularly desirable when your are training employees at the job site in order to take advantage of downtime."

The Integrated Learning system can even accommodate third-party courses, which means that a company's existing PowerPoint presentations, videos or technical manuals can be imported and available to students as they work through the material.

The ILS manages the deployment of the courses and tracks student progress. Subscribers can select the components that best meet their needs, then customize those elements to increase the effectiveness of their training programs. The ILS framework has been effectively deployed by many international companies, including Chevron, Halliburton, Transocean, Smith International, and FMC Technologies.

CUSTOM COURSES

TechnoMedia's courses are designed to be used right off the shelf, but clients can also have a customized eLearning courses, such as employee orientation packages, developed on a turnkey basis for a fraction of the cost and time of producing one from scratch. Because TechnoMedia can tap into its library of over 20,000 media assets related specifically to the oil and natural gas industry, course designers have the flexibility of using or modifying exiting illustrations when possible rather than creating each one new. And since its team is 100 percent focused on the petroleum industry, it can get new training projects ready quickly.

"The digital nature of our material allows us to retool entire courses to fit a company's operational profile," Bihn explains. "Through a TechnoMedia product called Pathways to Petroleum, for example, we can include actual reservoir descriptions, specific safety guidelines and even the names and photos of the client's own facilities. This truly is the fast track for online training."

TechnoMedia

For more information,
contact TechnoMedia at 713-461-5200
or visit online at www.techno-media.com/

TECH TOUR | By Jessica Pointer

HANDS-ON HIGH TECH LETS AMERICA GET UP CLOSE AND PERSONAL WITH THE INDUSTRY

API's Tech Tour travels the country explaining advanced technology and gives the country a glimpse into the new world of energy.

Chris and Denise Jones and their two Pomeranians, Honey and Punkin, transport the Tech Tour around the country. "We've learned so much about the industry over the past year," says Chris.

Walk into almost any state capitol around the country and you'll encounter similar and predictable sights and sounds. Portraits and statues of the state's historical figures, framed copies of the state's constitution and maps and posters of the state lining the halls and corridors.

You'll see guards and tour guides directing visitors, and you'll see teachers shepherding their excited and noisy students from one legislative chamber to another.

The emphasis is almost universally and exclusively on the old – on the state's history. Imagine then, the curiosity that might be generated by an exhibit that focuses on innovation and technology, which encourages hands-on participation and challenges people to think and overcome technological challenges.

This is what API's interactive technology exhibit – or "Tech Tour" – does as it travels around the country from state capitol to state capitol.

For those API representatives who have traveled with the Tech Tour to various capitols, the look on people's faces when they see others playing the video games and watching the exhibit's videos is priceless.

"Their eyes light up, and you can see the curiosity in their faces," says Rayola Dougher, API Senior Economic Advisor. "Their natural reaction is to want to see what it's all about."

The exhibit, built in 2007 to highlight the industry's increased efficiency and advanced technology through interactive elements, is designed to be fun as well as educational, explains Erin Thomson, API's Director of Communications. It is a major part of API's Educational Advocacy


THE people OF AMERICA'S
OIL AND NATURAL GAS INDUSTRY
eyes
underground
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The Tech Tour will complete 40 stops by the end of the year.

program, initiated in 2007 to better educate the public and policy makers on energy issues.

"We know that people are interested in technology and this was a way to show people the high-tech way the industry gets people the products they depend on," says Thomson.

The exhibit consists of four large panels and four interactive kiosks – highlighting refineries, exploration and production, transportation and supply – that allow visitors to learn about the industry by watching videos and animations, playing games and testing their knowledge on energy.

The videos and animations – designed to be enjoyed by both young people and adults – show the many different areas of the industry. For instance, one animation shows how the industry uses seismic surveys to find resources underground without disturbing the surface. Another shows how drill ships, relying on satellite guidance systems, can drill for oil and natural gas five miles below the ocean. A video on drilling and discovery shows some of the industry's latest technology and how oil and natural gas companies are using it to lessen the environmental impact.

The 3-D visualization video shows how companies are using 3-D visualization to be able to more accurately locate oil and natural gas. The refining video gives an overview of recent refinery advancements. The kiosk where visitors find the deepwater drilling animation also has a corresponding game where they can lower a drill from a ship into a wellhead. In another game, visitors can try their skills at directional drilling by maneuvering a drill bit to hit the pockets of oil without releasing the pressure from the surrounding natural gas.

"Some of our games have been very popular with young people," says Denise McCourt, API Director of General Membership, who has accompanied the exhibit around the country. "Once they get fascinated, then we know we've passed information along."

The exhibit has traveled around the country to state capitals, conferences and universities and made 21 stops in 16 states in 2007.

"The way the information is presented catches people's eye," says Steve Dodge, Massachusetts Petroleum Council Associate Director. "They see it and wonder what it's all about."

As energy increasingly became a major topic of conversation throughout the year, Thomson says, interest in the exhibit grew and it quickly became evident that a second Tech Tour needed to be added. The second exhibit allowed for doubling the number of stops.

An online version of the exhibit was also launched in 2008 for people who are unable to see the exhibit in person. The online version, found at energytomorrow.org, tries to recreate the experience that people would have if they were to visit the actual exhibit with the help of a guide.

"People have seen or heard about the exhibit and want to see it again," says Thomson. "The online version is a great way to show the industry to people so they can gain a better understanding

through the interactive elements."

A lighter, condensed version of the exhibit is being developed so that the exhibit can accommodate the smallest venues. That version will be on the road in late 2008.

One of the more popular parts of the exhibit is the Energy IQ kiosk, where visitors are able to test their knowledge about energy from the touch-screen quiz. In most cases, what the visitors thought they knew about the energy industry does not match what the test results reveal. Many people are surprised to learn, for instance, that Canada is the largest supplier of oil to the United States. Many also don't realize that the world's 10 largest oil and natural gas companies are owned and operated by foreign governments.

"The Energy IQ is a great way to talk to people about the issues and many of the misconceptions people have about the industry," says Dodge.

Once people start seeing that some of their preconceived notions about the industry are not correct, he explains, they begin to be more receptive to the idea that perhaps other assumptions may also be wrong, and they become more open to acquiring more information and learning.

"Many people think that they know all of the answers and are very surprised when they find out they don't," adds Dodge. "Anyone who spends a few minutes at the exhibit learns something."

The tech tour has crisscrossed the country, over thousands of miles of highways. It made 27 stops in 18 states during the first half of 2008 and will complete 40 stops by the end of the year. It is transported on a tractor trailer with the help of Chris and Denise Jones and their two Pomeranians, Honey and Punkin.

Setting up the exhibit is not without challenges. A crew of local laborers is hired at each location to set up the exhibit. It usually takes the workers about four hours to unload and set up the exhibit at each location and about two hours to break it down. Many hours of preparation are required before each stop to ensure the exhibit will have enough electricity, proper ceiling heights and sufficient light.

"A lot of times we're assured that everything will fit before we get to the location, but then find out that something is not quite right," says Chris, explaining that the exhibit is generally able to accommodate almost every space.

The Joneses say they enjoy taking the exhibit around the country, visiting places that they'd never visit otherwise, and meeting a lot of great people.

There's one other benefit, explains Chris: "We've learned so much about the industry over the past year." ❶

ONE ON ONE | With Red Cavaney, interviewed by Juan R. Palomo

THE RIDE OF A LIFETIME

A look at Red Cavaney's remarkable tenure at API and how his exceptional leadership will always be remembered.

On October 1, 1997, Red Cavaney became API's president and CEO, beginning an 11-year tenure he describes as "the ride of a lifetime." During this ride, crude oil prices went from near-record lows to a record-high, and fuel prices skyrocketed. The dramatic fluctuations were the result of a growing instability in the energy markets caused by geopolitical strife, supply disruptions and increasing demand for energy – not to mention back-to-back Category 5 hurricanes that played havoc with supplies and led to calls for investigations.

Cavaney also undertook a major reorganization of the trade association, converting it into a much more effective and efficient entity, capable of responding rapidly and strategically to ever-changing challenges. Two years ago, following the twin hurricanes, Rita and Katrina, Cavaney facilitated the adoption by API member companies of a large, multi-year Educational Advocacy campaign to press for a more fact-based approach to energy policy by increasing the level of understanding of the oil and natural gas industry among key audiences.

On November 1, Cavaney will step down as API's president and CEO, having reached the association's retirement age. He recently sat down with *Insight* to reflect on his tenure – and his future:

What was going through your mind when you walked into the API headquarters on your first full day on the job?

I was incredibly honored to have the opportunity to serve as the staff association leader for the CEOs of one of our nation's great industries. I also felt the weight of expectations that needed to be addressed in order to make API more effective and relevant to its members.

What do you think will be your thoughts on your last day at API?

Great pride in the organization as it exists when I walk out the door, coupled with sadness for having to leave behind people who have become my extended family over the last 11 years.

What were your goals and mandates when you took this job?

The mandate given me by the leadership was to revitalize the organization to significantly increase its relevancy and the weight of its impact in the public policy arena.

My goal was to ensure that API became one of the most highly respected trade associations in the field of public policy and within the overall oil and natural gas industry.

Do you feel you have accomplished them?

Yes. I credit the API staff's tremendous resiliency, dedication, commitment to success, and hunger for professional growth as being principally responsible for where we are today.

What has been your greatest satisfaction about leading this association?

Turning over to my successor a staff and organization that is as close to being "all it can be" as any organization with which I've ever been associated or ever observed.

Were there any disappointments?

None that time didn't resolve.

What has been your greatest challenge?

To increase the energy literacy of our key advocacy audiences. Energy literacy improvement is a prerequisite for the enactment of federal, state and local energy policies that would ensure sufficient oil and natural gas supplies-particularly those developed domestically – to affordably meet anticipated future demand.

To what extent did the success of the industry in getting supply to Americans at affordable cost contribute to this lack of energy literacy?

To a degree, the industry has suffered from its own success. In the face of challenging times in the '80s and '90s, in particular, the industry reliably delivered energy supply – certainly at affordable prices – and that allowed the public the luxury of not having to think about energy for almost a generation. That luxury, in turn, proved to be one of our

RED CAVANEY

Professional Experience: President and CEO of API, the American Plastics Council, the American Forest and Paper Association, the American Paper Institute, and Ericson Yachts; Senior White House aide in the Reagan, Ford, and Nixon Administrations.

Directorships: U.S. Energy Association, Rebuilding Together, Council of Capital Formation, Strategic Partnerships LLC, and Buckeye Technologies, Inc.

Other Related Activities: Former director, U.S. Chamber of Commerce and National Association of Manufacturers (NAM); former chairman, American Society of Association Executives (ASAE), Associations Division of U.S. Chamber of Commerce, and NAM Council of Manufacturing Associations; Trustee, Gerald R. Ford Foundation and the Center for Excellence in Education.

Recognitions: Certified Association Executive; *Association Trends* magazine's 1997 Association Executive of the Year; 2005 Bryce Harlow Foundation Business-Government Relations Award; 2006 ASAE Key Award.

Education, Military Service: 1964 NROTC graduate in Economics and History, University of Southern California; three tours of combat duty in Vietnam; honorably discharged as U.S. Navy Lieutenant in 1969.

industry's biggest obstacles, once the nation was faced with rapidly squaring energy supply and demand upon entering the 21st century.

What was your most rewarding experience?

It wasn't necessarily anything I did. It was my great pride in the API staff and the oil and natural gas industry, in general, following the unprecedented success in keeping oil and natural gas flowing throughout Hurricanes Katrina and Rita and in their immediate aftermath. I can't imagine a more successful performance in the face of such unprecedented circumstances. Unfortunately, the public's lack of understanding of the energy industry resulted in much greater criticism than accolades. However, that should not diminish the fact that the industry never stood taller during my time at API.

Looking back at your tenure, is there anything that you would do differently if you had to start over again?

I am sure there are many things, but API's superb staff typically saved me from myself before I did any harm.

You've always brought great enthusiasm to the job, and you always seemed to be having fun. Were there ever days when you just wanted to throw in the towel and say, "This just isn't worth it."?

Never. I accepted the job because I thought the challenge would be great. I enjoy great challenges, and I derive my passion from trying to work through those challenges. API has afforded me the opportunity to come to work every day feeling that there are things that we can do that will improve our industry's circumstances. API has become incredibly relevant, and I've been blessed with tremendous CEO leadership and an unselfish, loyal API staff.

You introduced the Educational Advocacy initiative and have guided it through its first year and a half. Is it too early to judge whether it's been successful or not?

I think its biggest successes have yet to come, if we continue building and learning from our actions. I feel it has already more than proved its worth, as a result of the increased understanding of the industry by key audiences and, more importantly, the legislative and regulatory successes that have flowed from implementation of the multiple elements of the broader EA program. I'm confident that the approval and adoption of the Educational Advocacy effort by API's CEO leadership will be one of the hallmark decisions made by API during the first decade of the 21st century.

What is the one thing about this industry, that most surprised you – that you didn't expect?

Its incredible diversity and reach.

What will you miss most?

I will miss the API staff family and my relationship with API's CEO leadership. Throughout my entire time at API, I have always felt the strong bond of being a partner and a colleague to both.

How has the industry changed since you first became the head of API?

Wow! Night and day is probably an overused metaphor, but in my brief 11 years, it's been enormous.

How has the industry's relationship with government changed?

Government, itself, has changed significantly during my time here. Importantly, I think API's relevance as a vitally important voice in the development and implementation of our nation's energy policy has grown as well.

We appear to be in a gridlock when it comes to forging a sound energy policy for this country. What is the solution?

The political gridlock that government is now experiencing on energy policy has got to change, and it will. The current lack of a national energy policy framework is tantamount to asking someone to drive across the country without a roadmap or any street signs. Our country has major decisions

to make, and it can't make those with much success absent a broader framework. Such a framework will help highlight where needs exist and where prioritization and allocation of resources should take place.

Looking down the road, what do you think the industry will be like in the next 10 to 20 years?

I think oil and natural gas will be as relevant in the future as it is today, if not more so. I have been consistently impressed with the industry's commitment to facilitating adaptation and adoption of emerging energy technologies and how that new technology has consistently enhanced the energy industry's future potential.

What do you think API's role will be?

API's global role will be enhanced, as the continuing importance of oil and natural gas increases. API's standards, certifications and educational training efforts will be increasingly more valued as the demand for energy increases and the search for hydrocarbons expands throughout the world.

What will be your legacy at API?

The quality and professionalism of the staff that I turn over to my successor.

If you were to write a book about your tenure at API, what would its title be?

"The Ride of a Lifetime."

One of the things that impresses people at API the most has been your style of leadership, your ability to always treat people with respect. Where did that come from?

From my mother. She taught me to treat others as you would like to be treated yourself, and everything else will take care of itself. I have embraced that philosophy ever since, and there isn't a day that I'm not grateful for her early example of one of the great lessons of my life.

What are you going to do now? I don't think anybody here expects you to simply play golf or travel.

I'm retiring from API because I've reached API's retirement age. I am not, however, retiring from the workforce. I'm excited about opportunities to make a contribution, just as much today as I was the day I walked into API. I am hopeful that my next career opportunity will be equally as challenging, exciting and rewarding.

You served in the military, and you spent much of your adult life in the world of politics and government. You are obviously a man who is very much in love with his country. Do you see yourself going back to involvement in politics?

I've always believed that each of us has an obligation to give back to our country for the blessings we enjoy, and I will be doing that through volunteer efforts. I don't envision any fulltime service in government.

Do you have any parting words of wisdom for API employees?

Believe in yourself. Never accept limits. Embrace the anything-is-possible mindset. And make sure you have fun along the way!

In closing, I hope that my tears and the lump that will arise in my throat when I take my leave from API won't keep me from saying how grateful I am for the experience and how I will never be able to say thank you enough for everyone's commitment and support.

API LEADERSHIP | By Robert Dodge

THE OPPORTUNITY HAS

Jack Gerard's rural Rocky Mountain upbringing, coupled with his career experience in Washington, gives him a unique background to navigate the capital's political culture and understand the variety of crosscurrents that shape public policy as he assumes the API helm.

JACK GERARD

Professional Experience: President and CEO of American Chemistry Council and the National Mining Association; Founding partner, Chairman and CEO of McClure, Gerard and Neuenschwander, Inc.; senior staff member, U.S. House of Representatives and the Senate.

Directorships: Congressional Coalition on Adoption Institute; Council on American Politics at George Washington University's Graduate School of Political Management.

Community Service: Chairman of the National Capital Area Council of the Boy Scouts of America; Northern Virginia Stake President of The Church of Jesus Christ of Latter-day Saints.

Recognitions: Named among the "Best of K Street" by *The Hill*; ranked 14th in the ICIS 2007 Top 40 Power Players in global chemistry.

Education: 1983 Bachelor of Arts in Political Science, and 1989 Juris Doctor from George Washington University.

NEVER BEEN BETTER

Jack N. Gerard started his homework early when many people were thinking about the beach and summer barbecues. But he wanted to be ready when he takes over as president and chief executive officer of API on November 1 – prep work that has already generated ideas about how he will assume the post held for 11 years by Red Cavaney.

When he joins API, Gerard will leave the American Chemistry Council, where he has been president and CEO for three years. That job, plus experience leading the National Mining Association and working on Capitol Hill, have helped him recognize what he needs to know to take over the helm at the national trade association that represents all aspects of the nation's oil and natural gas industry.

"Most importantly, I need to understand what the customers want and, in this case, that is the member companies," Gerard says. "I intend to spend a fair amount of time going to their places of work, sitting down with them and getting their views about how they see the world, how they see the industry and their individual companies."

As he travels to meet the leaders of member companies and introduces himself to the industry, Gerard knows exactly what kind of impression he wants to make.

"I am a straight-shooter," he says. "To me this is all about integrity and hard work. That is the way I conduct my business and I expect the same out of my people. My message is that we will work hard together, and we are going to work in the best interests of our customers, which are the member companies."

With gasoline prices high and the mood on Capitol Hill dark, a *Washington Post* columnist wrote that Gerard is "about to become the most hated man in Washington." Gerard laughs at the characterization and said that's not the way he would write the job description.

"It's a tough job, but with every challenge, there is opportunity," Gerard says. "I am competitive by nature and I want to win. I fully intend to work hard for my views and the views of the industry I represent."

Indeed, with a history of firing up the advocacy activities of the mining and chemical associations, Gerard says he sees a great opportunity to advance the oil and natural gas industry's position as the public seeks factual information to questions raised by high energy prices.

"The industry has done well, and the member companies recognize the need to expend the resources to engage in this debate. The opportunity has never been better," he says. "I am confident that a lot of the great things we are doing today will continue, and perhaps we can fine-tune some other things or perhaps add some other arrows to our quiver.

"When we step back, we have a story to tell. We have to be compelling in our storytelling. We have to be aggressive. And now is the perfect opportunity because we have the public's attention."

At the Chemistry Council, Gerard built membership, signing up 33 companies from the $635 billion industry. He also redirected the council's efforts to become more of an advocacy organization and is proud of a number of legislative victories, including the council's role in opening up new areas in the Gulf of Mexico – which helped provide supplies of natural gas to his industry.

Earlier in his career, Gerard was president and chief executive officer of the National Mining Association. Before joining the mining association, he was a founding partner, chairman and chief executive officer of McClure, Gerard and Neuenschwander, Inc., a Washington-based government relations consulting firm, which he co-founded with former U.S. Sen. James McClure, who served as chairman of the Senate Energy and Natural Resources Committee. Gerard also spent a decade working in the U.S. Senate and House of Representatives.

Living in the Virginia suburbs of Washington with his wife and eight children, Gerard's activity list reflects his belief in the value of public and community service. He is chairman of the board of the National Capital Area Council of the Boy Scouts of America, serving 86,000 young people. He serves on the Congressional Coalition on Adoption Institute (he adopted twin boys from Guatemala two years ago), and serves on the Council on American Politics at George Washington University's Graduate School of Political Management. He also is active in The Church of Jesus Christ of Latter-day Saints, serving as Stake President of the church in Northern Virginia, presiding over eight congregations with 3,200 members.

"I have got my hands in a little bit of everything," Gerard says. "To me, it is very important. There are only so many hours to the day and it is important that we do as much as we can in those hours."

Gerard grew up in a small Idaho town of 190 people. His father was a John Deere dealer, and his mother was a school teacher. He believes his rural Rocky Mountain background, coupled with his career experience

in Washington, gives him a unique background to navigate the capital's political culture and understand the variety of crosscurrents that shape public policy.

"Having the diversity of experience helps in understanding that there are different ways to look at issues and it makes us all more tolerant and able to see and understand other people's points of view," he says. "It also helps me be mindful of the impact, particularly with the issues we are dealing with now in high energy costs. What does it mean to the citizenry, the local farmer, the banker and school teacher?"

Gerard says the energy debate has been driven by opinions – and lacks facts. Once the American people understand the facts, he argues, he believes policymakers will be compelled to change course and amend existing laws to allow for expanded development of American oil and natural gas resources.

"When the public begins to understand that the United States sits on vast resources of oil and natural gas, they will not tolerate public policy officials pointing fingers at each other and having a partisan debate over should we use our assets or shouldn't we," Gerard says. "I believe we can already see the groundswell developing today.

"Americans want to use American resources for the good of our nation. And once we put the facts on the table and the public understands those facts, they will rise up with a harmonious chorus and express that view to their elected officials."

He says it is up to API and its member companies to shift the debate from one of opinion to one of fact.

"There are some in this country who have negative opinions of the oil and gas industry," Gerard says. "If we allow them to continue without calling them on that and stating what the facts are, we will continue to have this debate in an opinion-laced forum."

He adds that Americans must understand that the United States can no longer afford to have an insular energy policy that only considers the nation's needs. "Our needs are in direct competition with the needs of other nations around the world," he says.

Gerard finds it disappointing that many Americans do not appreciate that major companies in oil and natural gas, chemicals, mining and other industries are national treasures. He notes that few other countries have developed companies with such a depth of talent and the ability to solve problems, innovate and create wealth.

"These companies are the backbone of our economy. They are the ones that have made us the envy of the world," he says. "And we have gotten there because the American people are smart, sophisticated and entrepreneurial.

"The oil and gas industry should be one of the most respected in our country. It has allowed us to innovate, it has allowed us to grow and it has allowed us to develop and enjoy the highest standard of living in the world."

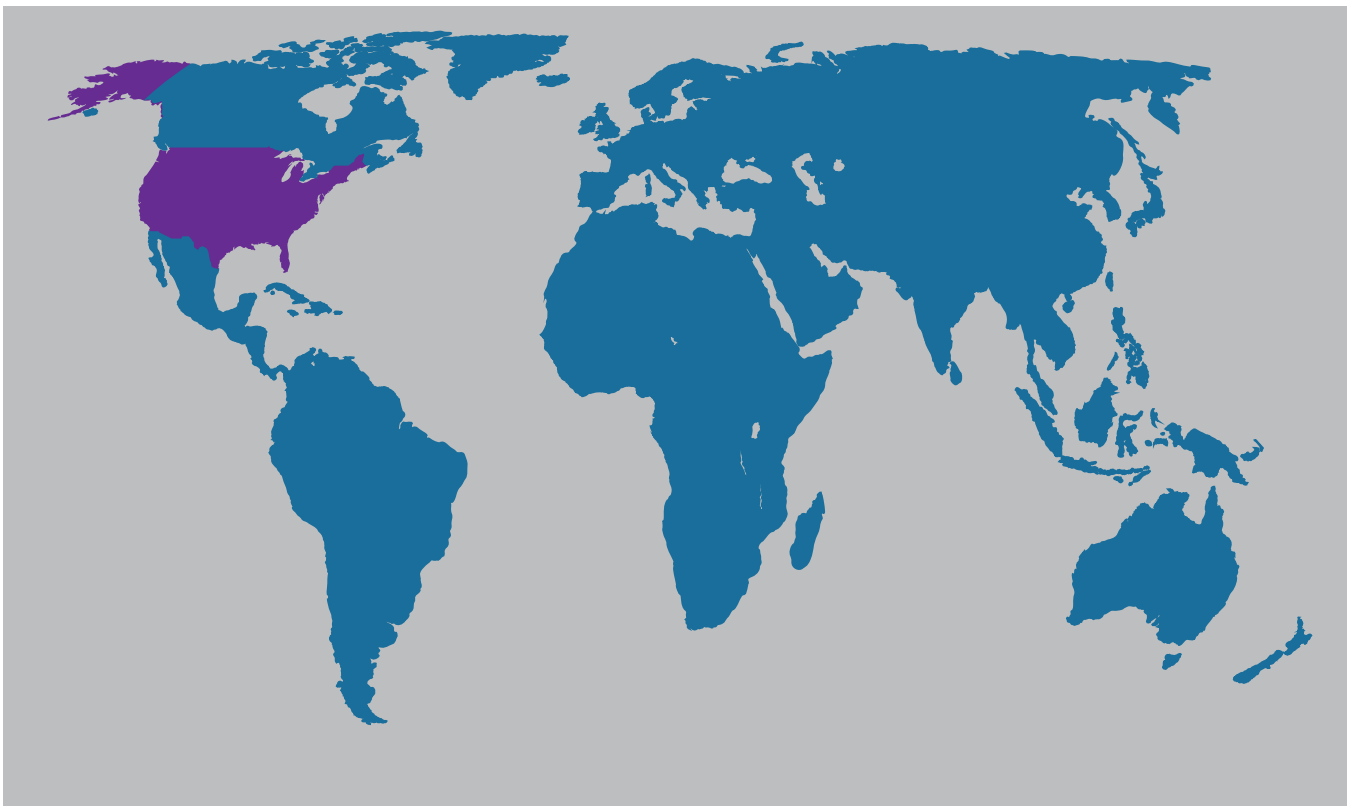
Gerard says a better-informed American public will prevail in moving lawmakers to enact policies that provide fuel for consumers and businesses, as well as improve the nation's energy security.

"At the end of the day, all the bluff and bluster seems to float out and people finally have to settle down to deal with the challenges at hand," he says. "And I am optimistic. Based on past experience and what I see as the challenges before us, at some point cooler heads will prevail."

ENERGY IQ | By Juan R. Palomo

AMERICANS' KNOWLEDGE ABOUT ENERGY IMPROVING, BUT THEIR ENERGY IQ REMAINS LOW

Misperceptions about key energy issues abound, but national polls show broad public support for increased access to U.S. oil and natural gas resources.



Only 6 percent of respondents knew that 100 percent of the world's 10 biggest oil and natural gas companies (based on reserves) are owned and operated by foreign governments. Source: Oil & Gas Journal

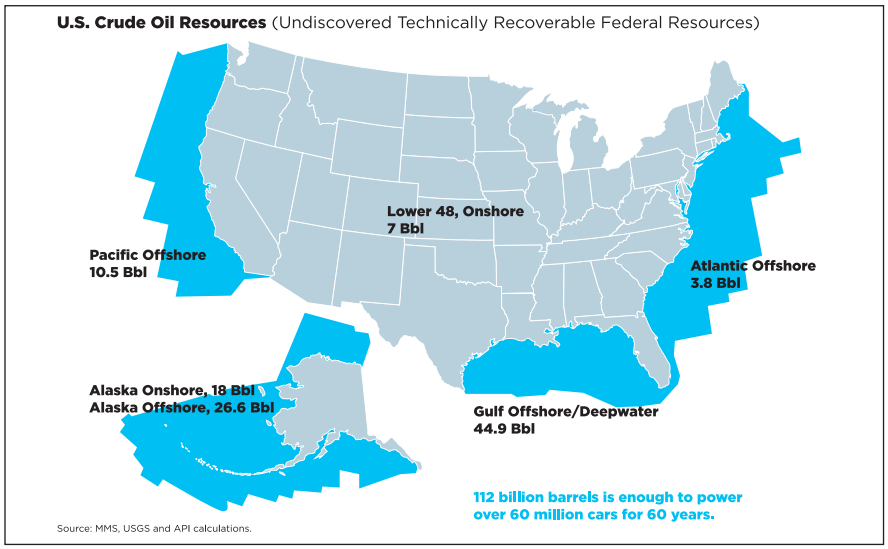
With energy one of the most hotly debated issues in both Washington and in everyday conversations as consumers cope with higher energy costs, logic would dictate that most Americans would be very well versed when it comes to energy. The reality is that even as the energy literacy of Americans is improving, a wide knowledge gap remains.

A new survey, conducted for API by Harris Interactive, the international research firm, finds that Americans still have fundamental misperceptions on key energy issues – including the importance of oil and natural gas in meeting future demand – at a time when elected leaders are considering policies that could affect the country for decades to come.

Jim Hoskins, senior Harris Interactive vice president, explained that, when presented with a series of multiple choice questions, many of the respondents said they did not know the answer, but that of those who picked an answer, there were many who chose the wrong answer.

There are some bright spots. Many U.S. adults, for instance, now recognize that the United States will need more energy in the next 20 years and that renewable sources currently meet less than 10 percent of energy needs.

The release of the second "Energy IQ" survey comes after a series of national polls found broad public



Current government policy restricts access to 85 percent of potential offshore U.S. oil and natural gas development sites off the coasts of the lower 48 states – but only 17 percent of Americans know that.

support for increased access to U.S. oil and natural gas resources. In comparing the results to last year's survey, Harris Interactive found that respondents showed increased knowledge on key issues such as the competitive advantage foreign government-owned oil companies have over U.S. companies and the restrictions that current policies place on the development of America's own resources.

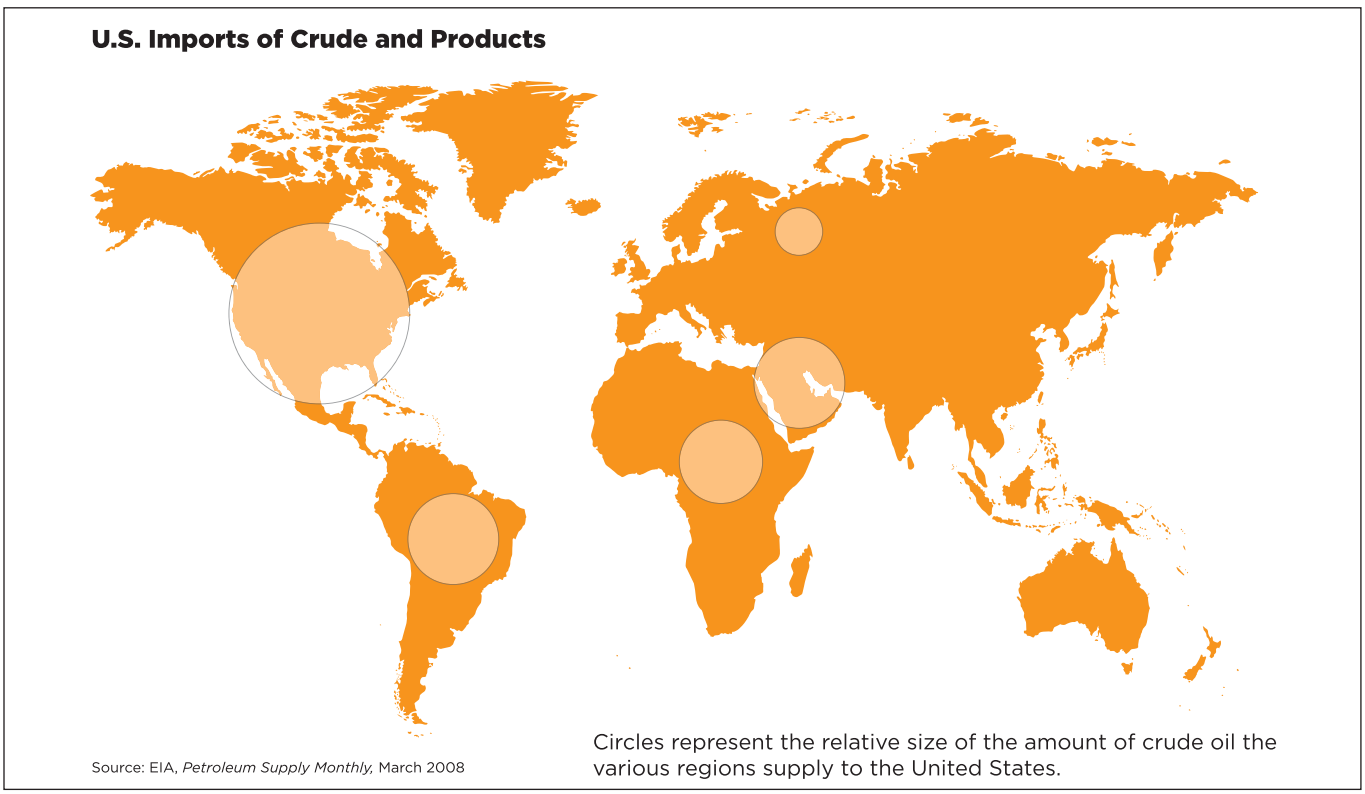
However, U.S. adults continued to underestimate the importance of fossil fuels in meeting future global demand, the amount of known oil and natural gas reserves in the world and the level of investments that the industry is making in emerging technologies, Hoskins explained. Conversely, he said, respondents overestimated the role that renewables will play in meeting future energy demand, the amount of oil the U.S. imports from the Middle East and industry earnings as a percentage of sales.

Red Cavaney, API's president and CEO, said that it is clear, from recent polls, that the majority of Americans see energy as a top priority and favor increased development of U.S. resources.

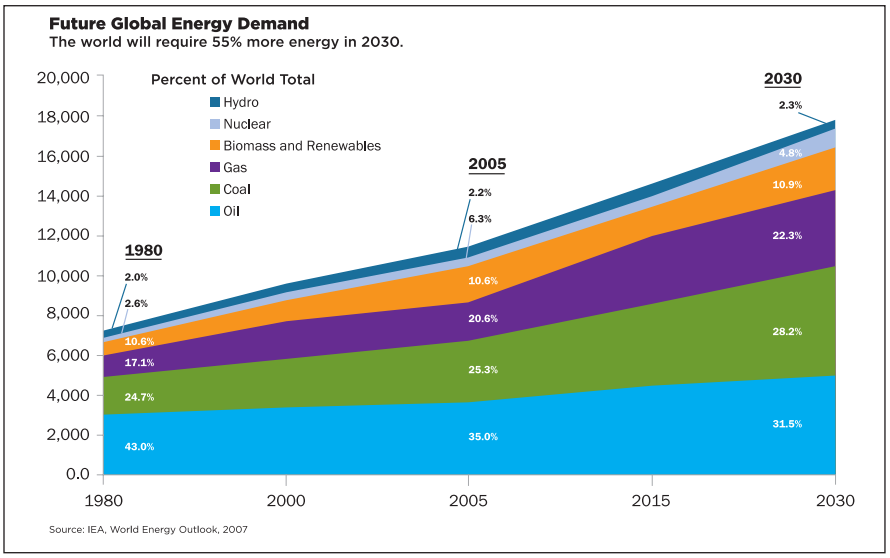
"This latest survey shows that many people still lack an understanding of the issues that shape our business and should inform public policy debates," Cavaney said. "Our industry remains committed to an ongoing dialogue on these issues, and while we still have work to do, we are seeing progress in both attitudes and knowledge."

Cavaney added that other ways of gauging whether people are beginning to understand today's energy world also indicate an improvement.

"You can look at news coverage, blog discussions, and things of this nature, and it's very clear that the energy knowledge base is increasing," he said.



In 2007, less than 15 percent of oil consumed in the U.S. came from Persian Gulf countries. In 2008, only 7 percent of respondents knew the correct answer.



12 percent of Americans know that 80 percent of global energy demand will be met by fossil fuels in 2030.

When asked what percentage of gasoline prices at the pump accounted for federal, state and local taxes in the first quarter of 2008, 20 percent of Americans answered correctly that the range was between 10 percent and 15 percent.

"It obviously is increasing at a slow pace, because people have a lot of different things that are competing for their attention, but it's increasing."

One can now see a lot of terms and phrases being used in the conversation on energy that wouldn't have been used as recently as two years ago, he explained. These terms and phrases, he said, reflect the facts the industry has been trying to get across over that period of time.

"This is a critical time in the national conversation around energy," Cavaney said. "We must work together with elected officials to increase public understanding and enact policies that ensure a reliable, sustainable energy future."

High energy costs have brought some issues into focus, said Hoskins.

"Our survey found that a majority of Americans understand that the United States will need more energy, and they are becoming more aware of how current policies limit increased domestic production," he said. "On the other hand, Americans continue to demonstrate a lack of knowledge, and in some cases serious misperceptions, on a range of key energy questions."

API commissioned the online research by Harris Interactive of 1,528 U.S. adults between June 3 and June 12, 2008.

One of the survey's key findings was that while a majority of those surveyed understand the United States will need more energy in future decades, they underestimate the vital role that fossil fuels will play in meeting that demand while overestimating the impact of renewable sources.

When asked how much more energy the United States will need in the next 20 years, 53 percent of respondents answered correctly that we will need between 16 and 20 percent more energy.

While the International Energy Agency projects that more than 80 percent of global energy demand in 2030 will be met by fossil fuels such as oil, natural gas and coal, only 12 percent of respondents chose this answer. The majority believed it would be 60 percent or less.

The U.S. Energy Information Administration (EIA) projects that 55 percent of U.S. energy demand will be met by oil and natural gas in 2030. Yet only 16 percent of respondents chose this answer. The majority thought it was less than 45 percent.

On the other hand, while the EIA projects that less than 10 percent of U.S. energy use will be supplied by renewable sources in 2030, only one in 10 respondents chose this answer. One in three respondents thought renewable sources would account for more than 20 percent of all energy – more than double government projections.

Another finding shows that the majority of people are not aware that current policies restrict access to 85 percent of U.S. offshore areas in the lower 48 states, and they underestimate the amount of oil and natural gas produced in North America.

At a time when national surveys find broad public support for increased offshore drilling, only 17 percent of respondents understand just how restrictive current U.S. policies are. Still, this is up 6 percent from last year's survey.

Only 8 percent of respondents knew that more than 45 percent of the oil and natural gas the U.S. consumed in 2007 was produced in North America; the majority thought it was less than 30 percent.

HOT
OFF THE PRESSES

Since 1924, API has been a cornerstone in establishing and maintaining standards for the worldwide oil and natural gas industry. Here are just a few of the newly published standards available.

For a complete list of publications that will be updated or completed in the coming months, visit **www.api.org/publications.**

EXPLORATION AND PRODUCTION

PRODUCTION EQUIPMENT

RP 11V10
Recommended Practices for Design and Operation of Intermittent and Chamber Gas-Lift Wells and Systems, 1st Edition, June 2008

STD 11D3
Progressing Cavity Pump Systems for Artificial Lift- Surface-drive Systems, 1st Edition, June 2008

OFFSHORE SAFETY

RP 14F
Design and Installation of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Division 1, and Division 2 Locations, 5th Edition, July 2008

SUBSEA PRODUCTION SYSTEMS

RP 17B
Recommended Practice for Flexible Pipe, 4th Edition, July 2008

SPEC 17J
Specification for Unbonded Flexible Pipe, 3rd Edition, July 2008

COMPLETION EQUIPMENT

RP 19C
Recommended Practice for Measurement of Properties of Proppants Used in Hydraulic Fracturing and Gravel-packing Operations, 1st Edition, May 2008

RP 19D
Recommended Practice for Measuring the Long-term Conductivity of Proppants, 1st Edition, May 2008

OFFSHORE STRUCTURES

RP 2I
In-Service Inspection of Mooring Hardware for Floating Drilling Units, 3rd Edition, April 2008

TUBULAR GOODS

SPEC 5B
Threading, Gauging, and Thread Inspection of Casing, Tubing, and Line Pipe Threads, 15th Edition, April 2008

VALVE AND WELLHEAD EQUIPMENT

SPEC 6D
Specification for Pipeline Valves, 23rd Edition, April 2008

DRILLING EQUIPMENT

SPEC 7-2
Specification for Threading and Gauging of Rotary Shouldered Thread Connections, 1st Edition, June 2008

OIL WELL CEMENTS

TR 10TR4
Technical Report on Considerations Regarding Selection of Centralizers for Primary Cementing Operations, 1st Edition, May 2008

TR 10TR5
Technical Report on Methods for Testing of Solid and Rigid Centralizers, 1st Edition, May 2008

PETROLEUM MEASUREMENT

CH. 10.3
Determination of Water and Sediment in Crude Oil by the Centrifuge Method (Laboratory Procedure), 3rd Edition, May 2008

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MATERIALS ENGINEERING

PUBL 938-B
Use of 9Cr-1Mo-V (Grade 91) Steel in the Oil Refining Industry, 1st Edition, June 2008

RP 934-A
Materials and Fabrication Requirements for 2-1/4/3Cr Alloy Steel Heavy Wall Pressure Vessels for High Temperature, High Pressure Hydrogen Service, 2nd Edition, May 2008

TR 934-C
Materials and Fabrication of 1-1/4CR - 1/2Mo Steel Heavy Wall Pressure Vessels for High Pressure Hydrogen Service Operating at or Below 825°F (441°C), 1st Edition, May 2008

PRESSURE RELIEVING SYSTEMS

STD 521-A1
Pressure-relieving and Depressuring Systems - Petroleum and natural gas industries-pressure-relieving and depressuring systems, 5th Edition, May 2008

MECHANICAL EQUIPMENT STANDARDS

STD 614
Lubrication, Shaft-Sealing, and Control-Oil Systems and Auxiliaries for Petroleum, Chemical and Gas Industry Services, 5th Edition, April 2008

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Each year, API offers meetings, conferences and workshops designed to keep you informed of current topics, technologies and trends in the oil and natural gas industry.

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Below is a selection of meetings, conferences, workshops and API University courses. For additional information, please visit www.api.org/meetings or www.api-u.org.

2008 CALENDAR OF MEETINGS AND EVENTS

September 24 – 25	Overview of API Spec 6A, 19th Edition	Houston, Texas, USA
October 6 – 9	Storage Tank Conference and Safe Tank Entry Workshop	Fort Worth, Texas, USA
October 7 – 8	Aboveground Storage Tanks: Introductory Course	Freeport, Maine, USA
October 7 – 8	API Specification Q1 Course	Houston, Texas, USA
October 7 – 8	Workshop on USCG Regulations for Facility Security Officers	San Francisco, California, USA
October 9 – 10	Workshop on Security Vulnerability Assessments (SVAs)	San Francisco, California, USA
October 13 – 16	Fall Committee on Petroleum Measurement Standards Meeting	Long Beach, California, USA
October 14 – 16	API RP 579 Fitness-for-Service Course	Shaker Heights, Ohio, USA
October 16 – 17	API RP 753 Facility Siting Update – Process Plant Portable Plant Portable Building Hazard Management	Knoxville, Tennessee, USA
October 16	API RP 752 and 753: Facility Siting Regulations and Compliance	Knoxville, Tennessee, USA
October 17	Facility Siting Consequence Analysis Techniques	Knoxville, Tennessee, USA
October 21 – 23	API 520/521 Pressure Relieving Systems Course	Shaker Heights, Ohio, USA
October 21 – 23	API 580/581 Risk Based Inspection Course	Houston, Texas, USA
October 30 – 31	Workshop on Security Vulnerability Assessments (SVAs)	Washington, DC, USA
November 4 – 5	API Specification Q1 Course	Houston, Texas, USA
November 4 – 5	Workshop on USCG Regulations for Facility Security Officers	Houston, Texas, USA
November 6 – 7	Workshop on Security Vulnerability Assessments (SVAs)	Houston, Texas, USA
November 10 – 12	Fall Refining and Equipment Standards Meeting	Los Angeles, California, USA
November 11	API/NPRA Fall Operating Practices Symposium	Los Angeles, California, USA
November 11 – 12	3rd Annual IT Security Conference for the Oil and Natural Gas Industry	Houston, Texas, USA
November 13 – 14	Overview of API Spec 6D, 23rd Edition	Houston, Texas, USA
November 16	API RP 752 and 753: Facility Siting Regulations and Compliance	Houston, Texas, USA
November 17	Facility Siting Consequence Analysis Techniques	Houston, Texas, USA
November 19 – 20	API RP 753 Facility Siting Update – Process Plant Portable Plant Portable Building Hazard Management	Houston, Texas, USA
December 3 – 4	Overview of API Spec 6A, 19th Edition	Houston, Texas, USA
December 5	Designing Bolted Flanges to API and ASME Requirements	Houston, Texas, USA

Many of our meetings and conferences offer excellent sponsorship and exhibit opportunities. Laura Barcaskey of Durable Mecco said of one API conference: "It was a well spent three-days to get better acquainted with the key industry leaders of your industry, and to learn more about the application of our products in the oil industry. As with most industries today markings for traceability is a key topic, and technology is allowing data to be captured in new ways in heavy applications such as down-hole drilling and those subject to harsh environments/processes. We, at Durable Mecco, look forward to strengthening our relationship with API to handle their diverse marking and identification needs."


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