Week of Nov. 24, 2008/US$10.00

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International Petroleum News and Technology / www.ogjonline.com

Pipeline Report

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West Texas Overthrust outlook expands with 3D
Petrolifera, Brownstone drilling in Rio Negro, Argentina
New regs require lower bunker fuel sulfur levels

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Nov. 24, 2008
Volume 106.44

PIPELINE REPORT

REGULAR FEATURES

COVER

Shown is Technip's CSO Apache in Evanton, Scotland, as pipe is being spooled onto the vessel using the reeling method prior to deployment in the UK North Sea's Forties field. The vessel laid 5.25 km of 14-in. OD, high-frequency induction welded, coated steel line pipe with a 16 mm WT between Charlie and Bravo platforms in the Forties. The pipe replaced the same length of internally corroded 20-in. OD pipe laid in 1975. Corus Tubes manufactured the pipe for Apache North Seas on a 9-week turnaround requested by the latter to meet the lay vessel's window of opportunity and minimize pipeline downtime. Oil & Gas Journal's special Pipeline Report, which begins on p. 50, examines efforts under way in both arctic and deepwater environments to maximize pipelines' usable life by effectively addressing potential environmental problems during a project's design and planning stages. Photo from Corus Tubes.

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Processing

Transportation

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OGJ Newsletter

Nov. 24, 2008

International news for oil and gas professionals
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General Interest — Quick Takes

EU-Russia summit delegates look to next meeting

A summit between Russia and members of the European Union, held Nov. 14 in Nice, France, was seen as an opportunity for EU members to resume negotiations on furthering EU-Russia pacts on economic, energy, and security issues.

Talks occurred despite Russia's not fully complying with its commitment to fully restore the territorial integrity of Georgia following its August attack on that country. The EU had postponed negotiations when the conflict in Georgia broke out. Negotiations, in fact, had not resumed at the summit but are slated to begin again Dec. 2.

The summit talks mostly were used by delegates for what French President Nicolas Sarkozy referred to as "pan-European security" as well as for smoothing out the many "irritants" that have recently cropped up.

These irritants included Russia's threat to deploy missiles in Kaliningrad, a Russian enclave between Lithuania and Poland, to counter the US antimissile sytem in countries bordering Russia, Poland, and the Czech Republic.

Also attending the summit with President Sarkozy, who also serves as EU president until yearend, were Russian President Dmitri Medvedev, Commissioner for External Relations and European Neighborhood Policy Benita Ferrero-Waldner, and Trade Commissioner Catherine Ashton.

European security matters would be discussed further at a meeting in mid-2009 within the framework of the Organization for Security and Cooperation in Europe.

House Dems won't try to restore OCS moratoriums

US House Democratic leaders will not try to reimpose offshore oil and gas leasing moratoriums that expired at the end of September, Majority Leader Steny H. Hoyer (D-Md.) said on Nov. 18.

There probably will be attempts to delineate where leasing will take place, he told an audience at the National Press Club. "I do not believe at this point that there are any proposals being made to reinstate the moratoriums across the board," Hoyer said.

His remarks came a day after US Senate Energy and Natural Resources Committee Chairman Jeff Bingaman (D-NM) said the US needs an intelligent policy to promote more domestic oil and gas production, both onshore and offshore.

"That production has to be undertaken in an environmentally responsible way, and with recognition that multiple users and stakeholders are involved," Bingaman said in remarks at the Center for Strategic and International Studies on Nov. 17.

Bingaman suggested that congressional moratoriums on Outer Continental Shelf leasing began in the early 1980s as a reaction to what he described as "a large and ill-conceived offshore leasing effort" by James G. Watt, former US President Ronald Reagan's first Interior secretary. "I hope that we are smarter and more strategic this time in how we go about dealing with offshore oil and gas resources," he said.

Bingaman said the next step might be "a serious and expeditious inventory" of OCS energy resources. Congress called for an OCS inventory in the 2005 Energy Policy Act but never provided funding to carry it out, he noted.

"Major energy development projects require a steady strategy and steady investments over the long term, so they need to be based on a stable political consensus that isn't reversed every few years. That means that our energy decision-making on the [OCS], as well as onshore, needs to be based on the best data we can collect on both the energy and environmental characteristics of potential areas for production. Getting that data on a priority basis will greatly increase the chances that we will make energy supply choices that will be sustainable economically, environmentally, and politically," Bingaman said.

Responding to Hoyer's comment, the American Petroleum Institute said that it is the right approach. "Neither Congress nor the next administration should set unreasonable, arbitrary limits on leasing because such restrictions could remove some of the nation's most promising oil and gas prospects for development, and the industry has proven it can develop these resources in an environmentally safe manner," it said in a Nov. 18 statement.

In his prepared remarks, Hoyer said the first focus of the next Congress will be to restore US economic health by rebuilding worn-out infrastructure, helping hard-pressed states and demonstrating fiscal responsibility.

IOGCC chair calls for bipartisan efforts

Oklahoma Gov. Brad Henry assumed the chairmanship of the Interstate Oil & Gas Compact Commission by calling upon US lawmakers to work together toward providing policies to ensure stable, sustainable energy supplies.

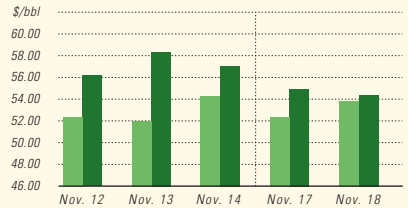
"It's more critical now than ever before that we work together in a bipartisan manner," Henry said in addressing the IOGCC annual meeting Nov. 17 in Santa Fe, NM. He took over as chairman when Alaska Gov. Sarah Palin's term as IOGCC chair ended. Palin, formerly the Republican vice-presidential candidate, did not attend the meeting.

Henry noted how public clamor about energy dies when oil and gasoline prices decline as they have in recent weeks. But he said energy still needs to be a national priority, and that energy-producing states should help steer the direction of energy policy.

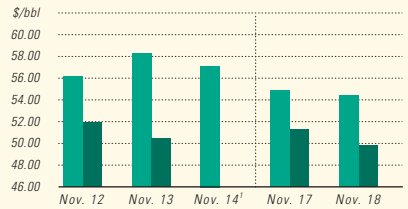
"Nearly 70% of our nation's oil comes from foreign sources," Henry said. "The goal of energy independence is too complex to believe that renewables alone will be the solution."

Industry Scoreboard

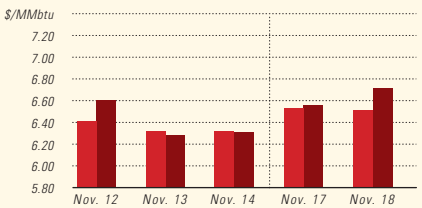
IPE BRENT / NYMEX LIGHT SWEET CRUDE



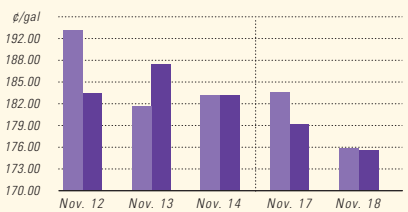
WTI CUSHING / BRENT SPOT



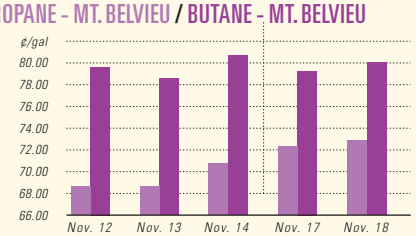
NYMEX NATURAL GAS / SPOT GAS - HENRY HUB



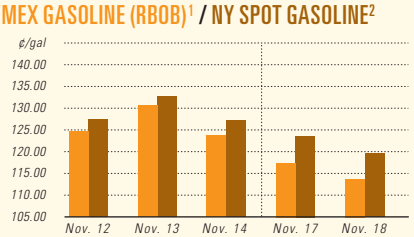
IPE GAS OIL / NYMEX HEATING OIL



PROPANE - MT. BELVIEU / BUTANE - MT. BELVIEU



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



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

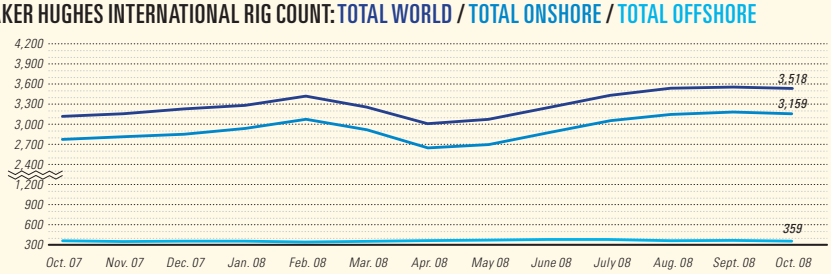
US INDUSTRY SCOREBOARD — 11/24

Latest week 11/7	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	9,055	9,235	–1.9	9,012	9,293	–3.0
Distillate	3,992	4,183	–4.6	3,951	4,206	–6.1
Jet fuel	1,322	1,629	–18.8	1,533	1,626	–5.7
Residual	452	657	–31.2	590	725	–18.6
Other products	4,311	4,785	–9.9	4,633	4,818	–3.9
TOTAL DEMAND	19,132	20,489	–6.6	19,524	20,688	–5.6
Supply, 1,000 b/d						
Crude production	4,742	5,038	–5.9	4,946	5,069	–2.4
NGL production[2]	2,340	2,496	–6.3	2,261	2,388	–5.3
Crude imports	10,053	9,787	2.7	9,790	10,046	–2.5
Product imports	3,045	3,194	–4.7	3,157	3,497	–9.7
Other supply[3]	1,293	1,042	24.1	1,369	1,035	32.3
TOTAL SUPPLY	21,473	21,557	–0.4	21,523	22,035	–2.3
Refining, 1,000 b/d						
Crude runs to stills	14,654	14,988	–2.2	14,654	15,152	–3.3
Input to crude stills	14,901	15,308	–2.7	14,901	15,441	–3.5
% utilization	84.9	87.8	—	84.9	88.5	—

Latest week 11/7	Latest week	Previous week[1]	Change	Same week year ago[1]	Change	Change, %
Stocks, 1,000 bbl						
Crude oil	311,949	311,927	22	314,676	–2,727	–0.9
Motor gasoline	198,095	196,113	1,982	195,027	3,068	1.6
Distillate	128,351	127,835	516	133,412	–5,061	–3.8
Jet fuel-kerosine	36,835	36,652	183	40,933	–4,098	–10.0
Residual	38,976	38,842	134	39,294	–318	–0.8
Stock cover (days)[4]			Change, %		Change, %	
Crude	21.3	21.5	–0.9	21.0	1.4	
Motor gasoline	21.9	21.7	0.9	20.9	4.8	
Distillate	32.2	31.9	0.9	31.0	3.9	
Propane	48.5	50.7	–4.3	52.2	–7.1	
Futures prices[5] **11/14**			Change		Change	%
Light sweet crude ($/bbl)	58.64	64.31	–5.67	95.77	–37.13	–38.8
Natural gas, $/MMbtu	6.60	7.01	–0.41	7.82	–1.22	–15.6

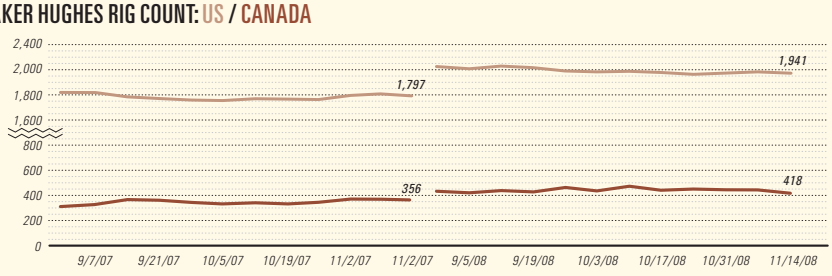
[1]Based on revised figures. [2]Includes adjustments for fuel ethanol and motor gasoline blending components. [3]Includes other hydrocarbons and alcohol, refinery processing gain, and unaccounted for crude oil. [4]Stocks divided by average daily product supplied for the prior 4 weeks. [5]Weekly average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

Marathon Oil Corp. Chairman and Chief Executive Officer Clarence Cazalot said the world faces an energy transition in learning how to deal with the long-term fundamentals of growing global energy demand in the face of constrained energy supplies.

Cazalot called for the US to develop "a comprehensive, fact-based energy plan integrated with climate change" concerns. "All energy sources are going to become increasingly important components of any energy plan," Cazalot said. Nonetheless, he said fossil fuels will dominate world energy supplies through 2030.

The energy plan needs to include efficiency and conservation, diversified energy supply, and the development of new technology, he said.

EIA: OPEC production dropped in October

The Organization of Petroleum Exporting Countries produced a total of 32.3 million b/d of crude oil in October, down 100,000 b/d on month, according to the US Energy Information Administration.

EIA estimated OPEC's production capacity to be 34.24 million b/d and its spare production capacity to be 1.93 million b/d.

It said OPEC's 12 producers, excluding Iraq and Indonesia, produced 29.13 million b/d in October, and exceeded the organization's output target of 28.8 million b/d by 330,000 b/d.

Although Angola increased production, Indonesia, Nigeria, Qatar, Saudi Arabia, and Venezuela all saw declines. Production remained steady in Algeria, Ecuador, Iran, Iraq, Kuwait, Libya, and the UAE.

EIA projects that OPEC crude production will drop even further to 31.3 million b/d in first quarter 2009, where it will remain relatively stable through yearend 2009.

In terms of revenues, EIA said OPEC could earn $979 billion of net oil export revenues in 2008, and $595 billion in 2009. EIA did not explain the substantially reduced earnings projection for 2009.

Through October, OPEC has earned an estimated $884 billion in net oil export earnings in 2008, while in 2007 it earned $671 billion in net oil export revenues, a 10% increase over 2006.

Saudi Arabia earned the largest share of these earnings, $194 billion, representing 29% of total OPEC revenues. On a per capita basis, OPEC net oil export earnings increased by 8% over 2006, reaching $1,137. ✦

Exploration & Development — *Quick Takes*

ExxonMobil signs Black Sea exploration deal

An ExxonMobil Corp. affiliate signed an agreement with Turkey's state oil company TPAO to explore two large deepwater blocks off Turkey, marking ExxonMobil's entry into Black Sea exploration.

ExxonMobil Exploration & Production Turkey BV will be operator in the initial exploration phase and earn a 50% interest in the 8,500 sq km Samsun Block and the 21,000 sq km eastern portion of the 3921 Block, which lie in 2,000 m of water. The two blocks are in the Black Sea basin and are separated by a lease held by TPAO and Brazil's Petroleo Brasileiro SA.

TPAO and ExxonMobil will merge skills and operational abilities during the development and production phases scheduled for completion in 2009. Assignment of the interest to ExxonMobil by TPAO is subject to Turkish government approval.

"ExxonMobil is pleased to team up with TPAO to explore the hydrocarbon potential of these deepwater Black Sea blocks," said Tim Cejka, president of ExxonMobil E&P. "We look forward to bringing our global deepwater experience to this prospective unexplored area."

Mehmet Uysal, TPAO president and chief executive officer, said the two companies "have all the tools required" to evaluate and develop a discovery and plan an "aggressive" exploration program.

ExxonMobil affiliates or predecessor companies have been operating in Turkey for more than 100 years. It has a lubes blending plant in Istanbul as well as finished lubricants, aviation fuels, and marine fuels sales throughout the country.

Syrian oil discovery adds new play type

The Yousefieh-1 exploration well near Khurbet East oil field on Block 26 in northeastern Syria discovered an accumulation of 23° gravity oil, said Gulfsands Petroleum PLC and Emerald Energy PLC.

The 50-50 partners were moving appraise the discovery with a well at the north end of Khurbet East field that seeks to establish the oil-water contact and could be used later for water disposal.

Yousefieh-1, 3 km from Khurbet East production facilities, cut 63 m of net oil pay in the target Cretaceous formations and flowed 900 b/d without treatment from the shallowest 19-m interval. Porosity averaged 18.6%. TD is 2,139 m.

While preparing for the natural flow test, the well flowed at the average rate of 1,450 b/d for 3 hr through a $^{9}/_{64}$-in. choke on gas lift. Preliminary results indicate good permeability. The entire reservoir was cored.

A smaller workover rig may be brought in to run further tests.

The companies, which identified the new play on 2007 3D seismic, plan to shoot more 3D to identify other prospects and leads nearby.

Meanwhile, cumulative production has exceeded 1 million bbl from Khurbet East field, averaging 11,500 b/d from two vertical and three horizontal wells with minimal reservoir production reduction.

Saudi Aramco cancels Manifa contract

Saudi Arabia's state-owned Saudi Aramco said it has cancelled a contract awarded in July to Saipem subsidiary Snamprogetti for development of the Manifa oil field.

Aramco, which recently announced plans to review all of its oil development projects, said it would retender the contract and invite Snam to bid again, along with Bechtel Group, Technip, and Foster Wheeler.

Earlier this month, Khaled al-Buraik, an Aramco executive director, said the company's short-term projects were on track and that the kingdom would reach its target of increasing production capacity to 12.5 million b/d by yearend 2009.

But al-Buraik said that development of the Manifa field, which

could have added about 900,000 b/d of capacity by 2011, was under review, as was a project to produce some 1.5 bcfd of gas from the Karan field.

"We are going back to our partners and discussing with them the new economic circumstances," Buraik said. "We are not talking about delays, we are talking about reviewing" (OGJ Online, Nov. 6, 2008).

With Snam's Manifa contract cancelled, however, it remains to be seen whether Aramco can maintain its schedule for the field and achieve the additional volumes it wanted by the originally planned date of 2011.

StatoilHydro wins licenses off Newfoundland

Canada has granted StatoilHydro operatorship of one license and a 50% interest in another, both off Newfoundland, under its land sale award announced Nov. 17.

One license is in the Flemish Pass basin, near StatoilHydro's Mizzen well, which is to be drilled this winter. StatoilHydro will operate the well with a 65% working interest; Husky Energy Inc. will hold 35%. The second license is in the Jeanne d'Arc basin. StatoilHydro will partner equally with operator Petro-Canada on the well.

StatoilHydro is a partner in the Hibernia and Terra Nova fields off Canada, with 5% and 15% working interest respectively, in addition to being a partner in developing the Hebron offshore field.

Sterling makes oil discovery in UK North Sea

Sterling Resources Ltd. will suspend well 210/29a-4 in the UK northern North Sea to evaluate the size and development options of an oil discovery on the Bowstring East prospect.

The Cladhan well encountered an oil column of more than 110 ft, with no observed oil-water contact, in an Upper Jurassic sequence below 9,450 ft. It contained 25 ft of sandstones with log porosity exceeding 20% and showed high oil saturations.

The well, drilled on Block 210/29a, is in license P1064. Transocean's 704 semisubmersible rig targeted a seismic amplitude-driven Upper Jurassic anomaly down-dip and eastward of the East Shetland platform. The well was in 535 ft of water and reached a total measured depth of 9,735 ft.

"Although the well will not be flow-tested, an extensive pressure test measurement program and the collection of oil samples through a modular formation tester logging tool, suggest good reservoir mobility and therefore promising productive potential," Sterling said.

David Findlater, Sterling's vice-president for exploration, said, "This wildcat well has met all expectations and confirmed the presence of a hydrocarbon bearing stratigraphic trap. Our immediate plan is to integrate the well results with the seismic data and to determine the size of the oil accumulation before submitting our appraisal strategy."

Sterling secured the acreage in 2003 under the Promote Licensing Round in the 21st UK Offshore Round.

Sterling, which has a 39.9% interest, has partners in the license: Revus Energy (UK North Sea) Ltd. 33.5%, Encore Petroleum Ltd. 16.6%, and Dyas (UK) Ltd. 10%.

Wintershall gets license on Block 4N off Qatar

Qatar has granted Wintershall AG an offshore exploration license for Block 4N (Khuff), close to North field. The exploration and production-sharing agreement has a 25-year term.

The acreage, which has gas potential, is 544 sq km and in 70 m of water.

Wintershall, as sole operator, will reprocess seismic data and shoot additional seismic over the next 2 years and plans to drill two exploration wells by 2010.

"Depending on the results of the intensive exploration campaign, Wintershall would develop a discovery through further drilling, and subsequently produce natural gas and condensate," Wintershall said.

It was granted operatorship of offshore Block 11 in Qatar in 2000 and Block 3 last year. It also plans to shoot seismic surveys and drill two exploration wells by 2010 on Block 3. ✦

Drilling & Production — *Quick Takes*

Fort Hills Energy defers oil sands project decision

Officials of Fort Hills Energy LP said they will defer until 2009 a final investment decision on a bitumen upgrader and will focus instead on developing the mine and bitumen production facilities of that integrated oil sands project near Fort McMurray, Alta.

A decision will be made later whether to proceed with an upgrader to be located 300 miles south in Sturgeon County east of Edmonton.

"We're giving ourselves some breathing room on the project schedule, so we can take advantage of a softening market to reduce costs," said Ron A. Brenneman, president and chief executive officer of Petro-Canada. "Given cost pressures, lower crude oil prices, and uncertainty in the financial markets, it's important to scale our efforts to focus on the mine first."

The partnership will use the extra time to evaluate cost reductions, efficiencies, and the overall project schedule. It remains committed to retaining the oil sands leases and is in discussions with the Alberta government on lease terms.

The partnership consists of Petro-Canada with 60% working interest, UTS Energy Corp. 20%, and Teck Cominco Ltd. 20%. Petro-Canada Oil Sands Inc., a unit of Petro-Canada, is operator.

Chevron starts oil production from Blind Faith field

Chevron Corp. reported oil production started from its Blind Faith field in the deepwater Gulf of Mexico.

Initial production is 30,000 b/d of oil and 30 MMcfd of natural gas. Daily production is expected to ramp up to 65,000 b/d of oil and 55 MMcfd of gas in 3 months.

Blind Faith, Chevron's deepest offshore production, is in 6,500 ft of water and lies 160 miles southeast of New Orleans. It has subsea systems in 7,000 ft of water in Mississippi Canyon Blocks 695 and 696.

The Blind Faith discovery well was drilled in June 2001. Chevron owns 75% interest and operates Blind Faith, having acquired its stake from BP PLC (OGJ, Nov. 24, 2003, p. 46). Anadarko Petroleum Corp. holds 25% interest in the project.

StatoilHydro lets Leismer oil sands contract

StatoilHydro Canada Ltd. has let a $41 million construction contract to Flint Energy Services Ltd. to develop its Leismer Oilsands demonstration project, 160 km south of Fort McMurray, Alta.

The company will construct the central plant's mechanical components for the new steam-assisted gravity drainage facilities. The processing facility will have the capacity to produce from oil sands 10,000 b/d of bitumen from 22 horizontal well pairs—one for injection, the other for extraction—linked to four well pads.

Production, planned for late 2009-early 2010, is expected to increase to more than 200,000 b/d by 2020 from an initial 20,000 b/d in 2012 from all of StatoilHydro's oil sands leases.

This is the first lease to be developed. ✦

Processing — *Quick Takes*

Saipem scoops €1.3 billion Algerian LPG contract

Sonatrach has let a €1.3 billion contract to Saipem SPA to develop an LPG processing facility at the Hassi Messaoud oil and gas complex in central Algeria, about 900 km southeast of Algiers.

Sonatrach signed a lump-sum, turnkey contract with Saipem covering engineering, procurement, and construction of three LPG production trains with a total capacity of 8 million cu m/day.

The work will be completed by first-half 2012.

Supergiant Hassi Messaoud is the basin's and the country's largest oil field, with estimated ultimate recovery of 9 billion bbl of 43° gravity oil. It produces from a 900-ft oil column in a Cambrian sandstone reservoir at a depth of 11,000 ft in a 1,300 sq km productive area.

Ecopetrol lets Colombia refinery upgrade contract

Ecopetrol SA has awarded contracts for front-end engineering and design and project management consultancy to Foster Wheeler USA Corp. and Process Consultants Inc., part of its Global Engineering & Construction Group, for the Barrancabermeja refinery upgrade project in Colombia.

The project will increase refining capacity to 300,000 b/sd from 250,000 b/sd, add heavy crude processing capability, and provide a processing configuration to meet the projected 2013 Colombian clean fuels product specifications.

The scope includes the following new units: a crude unit, delayed coker, hydrocracker unit, coker naphtha hydrotreating unit, hydrogen unit, sour water strippers, amine regeneration unit, and sulfur recovery unit, plus associated utilities and offsite units.

The project also will include revamps to the diesel hydrotreater, gasoline hydrotreater, and dismantling of two existing atmospheric and vacuum distillation units. In addition, the contract includes the procurement of long-lead items. ✦

Transportation — *Quick Takes*

AGL starts work on salt-dome gas storage cavern

AGL Resources' Golden Triangle Storage has started construction of a 12-bcf working gas capacity salt dome natural gas storage facility at Spindletop in Beaumont, Tex.

About 7.5 miles of dual 24-in. OD pipelines and 1.5 miles of single 24-in. line will connect the facility to six interstate and intrastate transmission pipelines: Florida Gas Transmission (downstream of Station 6), Texas Eastern Transmission, Centana Pipeline, Energy Tranfer Co.'s Texoma line, Kinder Morgan Texas, and ExxonMobil's Golden Pass Pipeline. The storage site will be able to receive onshore, offshore, and LNG deliveries.

The project will offer 600 MMcfd of deliverable capacity and 300 MMcfd of injection capacity, serving local petrochemical facilities and the Houston Ship Channel through the intrastate pipelines as well as markets in the Northeast, Mid-Atlantic, and Southeast via the interstate lines.

Golden Triangle says the first storage cavern will be ready for operation in 2010 or early 2011, with the second cavern following roughly 2 years later. Capacity can be expanded to as much as 28 bcf. The company expects a third 6-bcf cavern to be added shortly after completion of the second. Five brine-disposal caverns are also being drilled on Golden Triangle's site.

Shanghai receives first spot cargo of Petronas LNG

Shanghai Gas Group Co. (SGG), majority owned by Shenergy Group, has received its first spot cargo of LNG from Malaysia's Petronas.

SGG said a 20,000 cu m LNG carrier from Malaysia arrived at Shanghai's 120,000 cu m capacity Wuhaogou terminal Nov. 15. The terminal, the smaller of the two LNG terminals being developed in Shanghai, receives only spot cargoes.

In October, Shenergy Group completed construction of two 50,000 cu m LNG steel storage tanks at the Wuhaogou terminal after 2 years of construction. The tanks were scheduled to start receiving LNG supplies from Malaysia beginning in mid-November.

Petronas subsidiary Malaysia LNG Tiga Sdn. Bhd. is scheduled to supply Shanghai's other regasification facility, which is comprised of three 165,000 cu m LNG storage tanks. It is a joint venture project of Shenergy Group and China National Offshore Oil Corp.

The Malaysian firm will begin LNG deliveries in February 2009 under a 25-year contract. First-phase receiving capacity will be 3 million tonnes/year building to 3.03 million tonnes/year of LNG in 2012. The terminal will enter a trial run in April and will come online in July.

The Chinese joint venture company also aims to construct an additional 3 million tonnes of LNG receiving capacity for its second phase by 2015, depending on the future gas market. ✦

Is CP worthless?

What kind of question is this? Most in the pipeline industry agree that cathodic protection (CP) is the smart way to provide backup corrosion protection on underground pipelines.

But consider: If you use solid film backed corrosion coatings, you may be wasting money by adding CP to the pipeline.

There is a common sense reason for this statement. CP systems protect pipelines by delivering electrical current to the steel surface. Solid film back corrosion coatings have the property of *resistivity*, which means they *block* electrical current. This blocking effect is called *cathodic shielding.*

The phenomenon of *cathodic shielding,* or blocking of protective CP current, has been the subject of dozens of technical papers since the mid 1980's. You can review a cross section of these papers on Polyguard's website.You can also view a 10 minute explanation of the cathodic shielding process.

Worldwide, we estimate that over half of pipelines are being coated with solid film back coatings, such as shrink sleeves, tapes, and 2 or 3 layer systems. Most of these lines have CP systems. These are the operators who may be wasting their money on CP. Moreover, many install shielding coatings on girth welds, the most vulnerable area for corrosion.

Two corrosion coatings are proven to be non-shielding, and allow passage of protective CP currents. One of these coatings is FBE. The other is Polyguard RD-6.

NACE SP0169-2007 states: *"Materials … that create electrical shielding should not be used on the pipeline"* [1].

49 CFR §192.461 states: *"External protective coating …must …have properties compatible with any supplemental cathodic protection."* [2]

If you are concerned that your organization is behind this curve, we recommend:

1. **Visit polyguardproducts.com/failsafecoating.htm and review the large body of information about shielding problems.**

2. **Talk to operators who have used Polyguard's RD-6 system. *(There are many)* Ask them if they know of any serious corrosion or SCC ever found under RD-6. *(We don't, even after 19 years and thousands of installations).***

3. **Have someone in your organization attend the NACE course *"Coatings in Conjunction with Cathodic Protection"*.**

1. NACE SP0169-2007 *"Control of External Corrosion on Underground or Submergeed Metallic Piping Systems"*.
2. 49 CFR Ch.1 (§192.461 see also §195.559)

Polyguard

Phone: (1) 214.515.5000
www.polyguardproducts.com

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Polyguard has been ISO 9000 certified since 1996.
Current certifications are:
- American Natl. Standards Institute
- Dutch Council for Certification
- Deutscher Akkreditierungs Rat

Calendar

✦ Denotes new listing or a change in previously published information.

OIL&GAS JOURNAL online

Additional information on upcoming seminars and conferences is available through OGJ Online, Oil & Gas Journal's Internet-based electronic information source at http://www.ogjonline.com.

NOVEMBER

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.

Offshore Energy, Den Helder, +31(0)10 4360112, e-mail: jl@navingo.com, website: www.offshore-energy2008.nl. 27.

DECEMBER

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

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

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

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

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

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

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

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

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

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

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

2009

JANUARY

Petrotech International Oil & Gas Conference & Exhibition,

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

✦Expandable Technology Oil & Gas Conference, Abu Dhabi, +44 (0) 1 483 598000, e-mail: sally.marriage@otmnet.com, website: www.expandableforum.com. 14.

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.

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

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

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

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

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

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

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

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

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

FEBRUARY

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

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

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

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

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

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

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

CERA Week, Houston, (617) 966-5992, e-mail: info@cera.com, website: www.cera.com. 9-13.

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.

EnerCom's The Oil & Services Conference, San Francisco, (303) 296-8834, e-mail: kgrover@enercominc.com, website: www.theoilandservicesconference.com/index.html. 18-19.

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

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

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

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

CERI Natural Gas Conference, Calgary, (403) 282-1231, (403) 284-4181 (fax), e-mail: conference@ceri.ca, website: www.ceri.ca. 23-24.

International Pump Users Symposium, Houston, (979) 845-7417, (979) 847-9500 (fax), e-mail:

Calendar

inquiry@turbo-lab.tamu.edu, website: http://turbolab.tamu.edu. 23-26.

MARCH

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

APRIL

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

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

SPE Digital Energy Conference, Houston, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 7-8.

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

Rocky Mountain Unconventional Resources Conference & Exhibition, Denver, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.RMURconference.com. 14-16.

GPA Mid-continent Annual Meeting, Oklahoma City, (918) 493-3872, (918) 493-3875 (fax), website: www.gasprocessors.com. 16.

Middle East Petroleum & Gas Conference, Dubai, 65 62220230, 65 62220121 (fax), e-mail: info@cconnection.org, website: www.cconnection.org. 19-21.

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

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

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

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

Pipeline Transport Conference & Exhibition, Moscow, +43 1 230 85 35 33, website: www.expopipeline.com. 21-23.

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

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

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

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

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

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

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

MAY

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

Offshore Technology Conference (OTC), Houston, (972) 952-9494, (972)

952-9435 (fax), e-mail: service@otcnet.org, website: www.otcnet.org. 4-7.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

JUNE

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

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

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

PIRA Scenario Planning Conference, Houston, (212) 686-6808, (212) 686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 8.

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

International Oil Shale Symposium, Tallinn, Estonia, +372 71 52859, e-mail: Rikki.Hrenko@energia.ee. 8-11.

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

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

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

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

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

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

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

PIRA London Energy Conference, London, (212) 686-6808, (212) 686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 15.

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

PIRA Scenario Planning Conference, London, (212) 686-6808, (212) 686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 16.

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

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

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

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

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

Calendar

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

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

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

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

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

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

JULY

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

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

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

AUGUST

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

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

EnerCom's The Oil & Gas Conference, Denver, (303) 296-8834, email: kgrover@enercominc.com, website: www.theoilandgasconference.com. 9-13.

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

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

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

SEPTEMBER

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

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

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

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

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

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

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

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

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

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

OCTOBER

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

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

World Gas Conference, Buenos Aires, +54 11 5252 9801, e-mail: registration@wgc2009.com, website: www.wgc2009.com. 5-9.

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

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

NPRA Q&A and Technology Forum, Ft. Worth, Tex., (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 11-14.

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

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

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

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

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

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

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

Offshore Middle East Conference & Exhibition, Manama, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.offshoremiddleeast.com. 27-29.

NOVEMBER

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

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

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

API Fall Refining and Equipment Standards Meeting, Dallas, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org/events. 9-11.

Deepwater Operations Conference & Exhibition, Galveston, Tex., (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.deepwateroperations.com. 10-12.

SPE International Oil and Gas China Conference & Exhibition, Beijing, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 10-12.

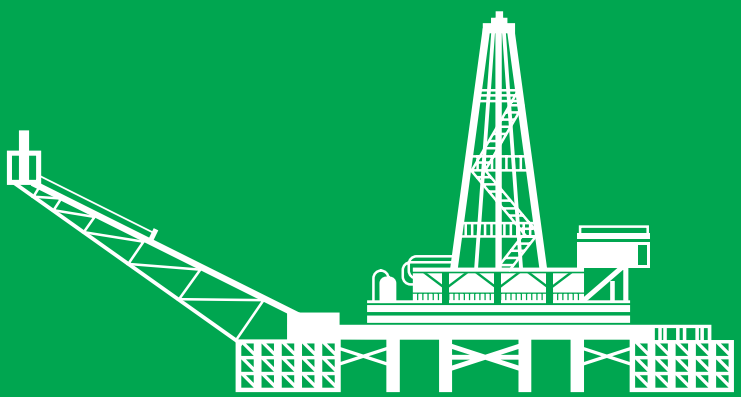
ASME International Mechanical Engineering Congress and Exposition (IMECE), Lake Buena Vista, Fla., (973) 882-1170, (973) 882-1717 (fax), e-mail: infocentral@asme.org, website: www.asme.org. 13-19.

Houston Energy Financial Forum, Houston, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.accessanalyst.net. 17-19.

IADC Well Control Asia Pacific Conference & Exhibition, Bangkok, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 18-19.

DECEMBER

Unconventional Emerging Resources Conference & Exhibition, Shreveport, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.emerginresourcesconference.com. 8-10.



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Journally Speaking

Timely pipeline rules

Christopher E. Smith
Pipeline Editor

On Nov. 17, new rules took effect increasing the maximum allowable operating pressure (MAOP) for natural gas transmission pipelines beyond that allowed by previous regulations. The Pipeline and Hazardous Materials Safety Administration (PHMSA) rule update amends 49 CFR 192 to reflect improvements in pipeline materials, assessment tools, and maintenance practices over the past 25 years.

The final rule will apply to both new and existing pipelines posing a low safety risk based on location, construction, and materials. He also will remove PHMSA from granting case-by-case special permits allowing operation of particular pipeline segments at higher MAOP.

PHMSA began special permitting in conjunction with its 2003 issuance of gas transmission integrity management regulations. A class location waiver allowed an operator to maintain operating pressure on a pipeline following an increase in population, changing its class location, given the operator's ability to demonstrate an alternative integrity management program for the affected pipeline.

Waivers would only be granted when pipe condition and active integrity management provided a level of safety greater than or equal to pipe replacement or pressure reduction, according to an Apr. 23, 2004, PHMSA statement.

Absent a waiver, the operator would have to either reduce pressure or replace the pipe with thicker walled pipe. The first three pipelines to receive special permitting for segments of their systems were Maritimes & Northeast, Rockies Express, and Alliance, all granted July 11, 2006.

Precedent

Both Canadian and British standards have long allowed operation of pipelines at higher stress levels. The Canadian pipeline authority has allowed higher stress levels since 1973, while roughly 1,140 miles of the UK's Northern pipeline system have operated at higher levels for the past 10 years.

In the US, some 5,000 miles of gas transmission lines have operated at higher MAOP since initially being grandfathered when federal pipeline regulations were adopted in the 1970s.

PHMSA bore these examples in mind both when considering individual waivers and when codifying them into new regulations.

Change

The new regulations boost operating pressure for qualifying pipelines in Class 1 areas to 80% of specified minimum yield strength (SMYS) from 72%. The Class 2 ceiling rose to 67% from 60% for qualifying pipelines, with Class 3 increasing to 60% from 50%.

Several types of pipeline will not qualify for a higher MAOP, including:

- Segments in densely populated Class 4 locations.
- Grandfathered segments already operating at higher MAOP but not constructed to modern standards.
- Pipe experiencing failures suggesting a systemic problem during initial hydrostatic testing.
- Pipe manufactured by low-frequency electric welding.
- Segments that cannot be internally inspected.
- Non-steel pipe.
- Bare pipe.
- Pipe with wrinkle bends.

Adoption of the prior standards for calculating MAOP on gas transmission pipelines occurred in 1970 as part of the original set of pipeline safety regulations established as federal law.

Beyond the improvements in materials, tools, and maintenance practices seen since, PHMSA pointed to pipeline operators' implementation of integrity management programs as improving both the industries' understanding of the risks it faces and its ability to reduce these risks in issuing the new rules.

PHMSA also cited the success of case-by-case special permit proceedings in Class 1, 2, and 3 areas as showing the viability of enacting more general standards officially codifying the rule changes allowed in these cases.

In addition to being located in Class 1, 2, or 3 locations and being required to meet the new design and construction requirements set forth in the amended CFR 192, pipelines wishing to operate at a higher MAOP will need:

- Supervisory control and data acquisition (SCADA) systems that include the monitoring of line flow and pressure, compressor start-ups and shutdowns, and the ability to remotely close valves.
- No mechanical couplings used in place of girth welds.
- No failures during normal operations indicative of a systemic fault in materials as determined by root-cause analysis.
- If constructed before Nov. 17, to have subjected at least 95% of girth welds to nondestructive examinations.

The new rules are well timed, increasing the efficiency of the US natural gas transmission pipeline network while maintaining its safety at a time when the capital available for either building new capacity or repairing existing facilities is limited. PHMSA estimates about 3,500 miles of existing pipeline and 700 miles of pipeline built each year will use an alternative, higher MAOP. ✦

Editorial

A chance to play offense

The US oil and gas industry will enter 2009 needing to play hard political defense. With Democrats in charge of both Congress and the White House and the public largely unhinged about energy, the industry will fall under assault on many fronts, including taxation and access to federal land. Opportunities to take the offense will be rare. The industry must take advantage of every one that arises.

An offensive move the industry can seize now relates to energy independence. The industry should start an immediate campaign to repudiate this chimera, which has seduced the US into too many mistakes already and promises to open an entire catalog of horrors next year. Before the damage gets any worse, the US public must know that energy independence is unattainable and wasteful.

The import dragon

It's unattainable partly because the dragon that energy independence is supposed to slay, imported oil, represents far more energy than the US can expect to displace through any combination of domestically produced commercial energy, domestically produced energy requiring government aid, and conservation.

There's one possible exception to this quantitative reality. As is evident now, reduced economic activity cuts energy use and thus lowers oil imports. A severe economic contraction might lower imports to levels approaching true independence. But the goal doesn't warrant such sacrifice.

Even if the US did somehow eliminate oil imports, it wouldn't be energy-independent in the sense of being free from the influence of oil exporters. The costs it incurred to become "independent" would weaken it in competition with economies governed more sensibly. And because the trade partners it managed to retain still would import oil, the country would remain susceptible, however indirectly, to the supposed disadvantages of oil in trade.

The potential for waste in the pursuit of energy independence is limitless. Forcing individuals and businesses to use specified energy forms when cheaper forms are available creates costs. In many cases the government masks the direct costs by subsidizing the uncompetitive energy form. But that only spreads a new burden over all taxpayers. Either way, the practice is wasteful. If undertaken massively while the economy is imploding, it could be ruinous.

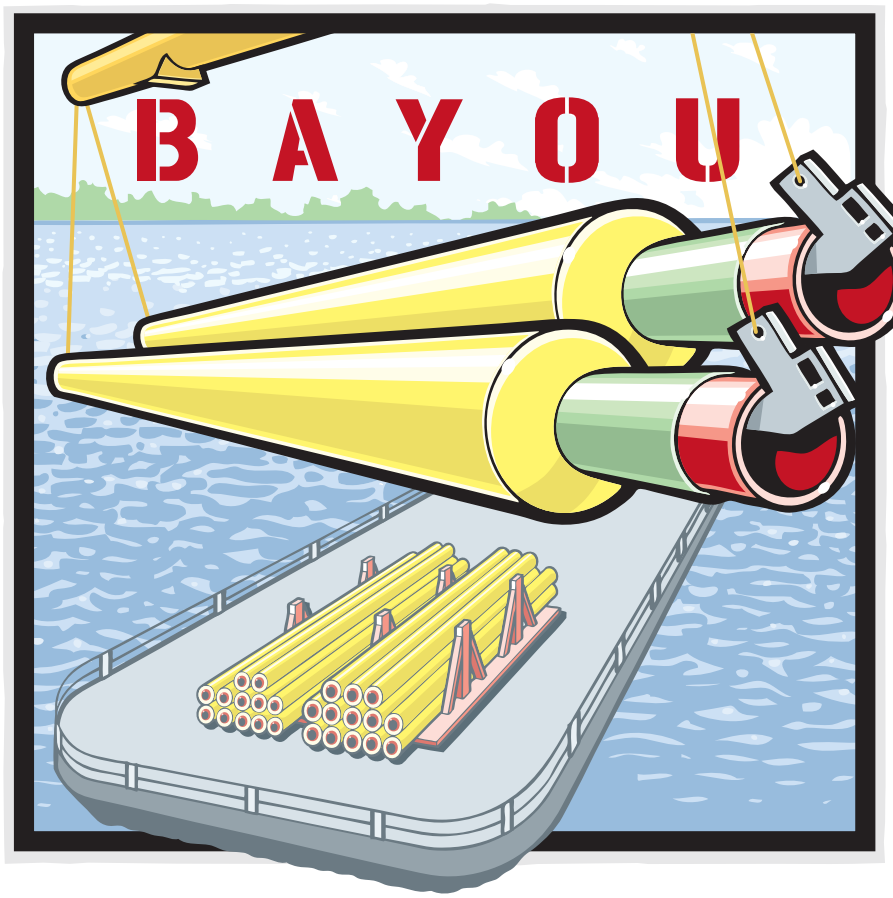
The blind pursuit of energy independence is wasteful, too, because it diverts money the government needs for other activities into nonproductive uses. And it would not, as popularly argued, boost employment. Jobs created by government handouts to "green" energy would be more than offset by jobs lost in parts of the economy forced to absorb the new cost.

For the US economy, futility and waste, bad as they are, don't represent the biggest problems associated with America's lunge for energy independence. The goal's evident popularity bespeaks a xenophobic tendency that policy-makers should find alarming. Prosperity, American no less or more than global, depends on flourishing trade. The world is interconnected as never before—and interdependent as never before. This won't change. Countries that turn away from essential economic engagements are doomed to waste enormous amounts of money on futile domestic enterprises—as the US acts determined to do on economically questionable forms of energy.

Independence propaganda

In the past, oil and gas companies have resorted to energy-independence propaganda when doing so suited their political needs. The argument in fact may have helped persuade Congress this year to lift restrictions on oil and gas leasing of the federal offshore. But companies must recognize that independence works far more often as an argument for energy policies grounded in anything-but-oil nonsense. It will be advanced next year, for example, when Congress proposes a windfall profit tax on oil and gas as a way to fund research and subsidies for alternative forms of energy. It also might reemerge when Congress, as it almost certainly will, introduces activity repellants that undermine newly approved offshore leasing.

Americans don't like to be told they can't have something they want. Someone needs to tell them they can't have energy independence except at regrettable cost. The oil industry has nothing to lose by delivering the message. ✦



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NAPCA

Iran's rationing system working to control gasoline consumption

The launch in 2007 of an elaborate gasoline rationing system by Iranian President Mahmoud Ahmadinejad's cabinet to help stem that country's gasoline consumption was initially met with both skepticism and discontent. However, the system, which was subsequently extended into 2008, has helped the country reduce its gasoline consumption dramatically, according to a report released in August by FACTS Global Energy (FGE), Honolulu.

Although Iran has faced difficulties in its struggle to supplement its vehicle fuel base with alternatives such as compressed natural gas (CNG), FGE said, "It is expected that after the completion of current projects for the upgrading and expansion of existing refineries, Iran will be able to become a net [gasoline] exporter in 2012-13."

Gasoline imports

Although one of the world's largest oil producers, Iran imports roughly 40% of its gasoline due to limited refining capacity as well as rapidly rising domestic demand. The Iranian government also has heavily subsidized the fuel, selling it domestically at about one fifth of real cost. Since late March, according to FGE's August report, Iran's gasoline consumption stood at 396,000-409,000 b/d, while gasoline imports averaged 94,000-107,000 b/d during the same period.

FGE reported that even with the rationing system in effect, Iranian officials have stated that providing gasoline price subsidies is not sustainable in the long run. However, FGE noted that the issue of raising gasoline prices "remains politically sensitive and unpopular."

Before the start of the rationing system, FGE said, Iran's gasoline imports were estimated at 223,000 b/d.

"Despite the turbulence throughout Iran in its first few days of implementation, rationing did have a major impact on gasoline consumption and imports," FGE said, adding, "Imports dropped from an average of 204,000 b/d in May 2007 to an average of 94,000 b/d for the rest of that year," FGE said.

New rationing system

FGE said the Iranian government's current approach to the gasoline crisis seems targeted at phasing out the quota system and eventually abolishing the rationing system.

"Selling gasoline in the free market is how Iran is introducing higher prices within the country. Currently, Iran is selling premium gasoline in the free market at [prices] about five times higher than the previous regulated prices," FGE said. Gasoline sales in the free market have been reported to be at an average of 4,400-6,300 b/d.

The Iranian government intends to cut subsidies for gasoline in a "step-by-step approach by 2011 and eventually eliminate it," FGE said.

Although the original rationing system was extended from 2007 into 2008, the government later amended the quotas. Beginning June 21, FGE said, the Iranian government revised the quotas "to further control consumption and reduce the subsidies paid out for gasoline imports." Table 1 highlights the rationing system in 2007-08.

FGE said the new rationing system, which is expected to be extended until March 2009, specifies the following:

- All premium gasoline is now outside the quota and not qualified for subsidized fuel.
- All regular gasoline of foreign cars

IRAN'S GASOLINE RATIONING SYSTEM, 2007-08

Vehicle	Type	First round Quota, l./month	Second round Quota, l./month	Third round Quota, l./month
Cars and trucks	Private	100 for private cars and 450 for trucks	120 for private cars and 400 for trucks	120 for private cars and 300 for trucks[1]
Cars and trucks	Governmental	[2]300	[2]300	[2]300
Taxi	Gasoline fuel	800	700	650
Taxi	Dual fuel	800	400	200
Motorcycle	—	30	36	36
Boats	—	60	60	60

[1]The quota for dual-fuel trucks has decreased to 250 l./month. [2]From July 23, 2007, the quota for some governmental cars was increased to 600.
Source: FACTS Global Energy

larger than 1,300 cc do not qualify for subsidized fuel.

• All regular gasoline of domestic cars larger than 2,000 cc do not qualify for subsidized fuel.

In March, Iran was fetching 43¢/l. for regular gasoline in the free market, FGE said. Volumes of gasoline purchased under the quota would be sold at 11¢/l, FGE said.

CNG as an alternative

Iran is eyeing the use of CNG as an alternative fuel to help curb gasoline consumption. FGE reported that as of November 2007, Iran had about 415,063 CNG-fueled and duel-fueled cars.

"The Iranian government had an ambitious plan to increase the number of CNG cars to 1 million by March 2008 but was unable to achieve this goal," FGE said.

Iran didn't have much success with plans to increase the number of CNG refueling stations to 550 by October 2007 and to 1,000 by March of this year, FGE reported. These stood at 377 stations as of December 2007. The target date has been extended to the end of first-quarter 2009; however FGE thinks this target date also is unlikely.

Iran, FGE said, faces several challenging issues regarding CNG, including:

• Limited capabilities to provide the necessary equipment for CNG stations.

• Challenges in land acquisition for CNG stations, especially in large cities such as Tehran.

• Lack of financial resources needed to construct CNG stations.

Refinery expansions

FGE forecasts that Iran should have surpluses in gasoline in 2012-13, despite "some hiccups" in plans to expand and upgrade current refineries and construct new facilities. However the following plans, FGE said, must be completed:

• *Abadan.* A catalytic cracking unit is under construction by a consortium of ABB Lummus and Iranian contractors Petrochemical Industries Design & Engineering Co. (PIDEC) and Erection & Construction Co. (ECC). The project is expected to be completed in 2009-10 and would increase gasoline production at the Abadan refinery to 70,000 b/d.

• *Arak.* In one of the largest refinery projects designed to yield more gasoline, the Arak refinery is being expanded and upgraded by a consortium of Universal Oil Products, Axens, Technip, Sinopec Engineering Inc. (SEI), and Iranian contractors Research Institute of Petroleum Industry, Sazeh, and Oil Design & Construction Co. Faced with 8-9 months of delays, the project is expected to be completed in 2011 and could increase the refinery's gasoline production to 100,000 b/d from 34,000 b/d.

• *Isfahan.* The upgrading and expansion of the Isfahan refinery is expected to increase gasoline production to 75,400 b/d. The project, led by a consortium of Hyundai Engineering Co., Aker Kvaerner Powergas Pvt. Ltd., and Iranian contractors Namvaran and Dor Riz, has a completion date of 2012.

• *Bandar Abbas.* Upgrading of the existing Bandar Abbas refinery has been progressing slowly under a consortium of ABB Lummus, PIDEC, and ECC. However, the project is expected to be completed in 2010. By upgrading existing facilities and constructing new units, gasoline production at Bandar Abbas will increase to 80,000 b/d.

• *Tabriz.* The Tabriz refinery is being upgraded and expanded by a consortium of SEI, Energy Industries Engineering & Design, and Tanavob. The project, planned to increase gasoline production by 4,500 b/d, is expected to be completed in 2012.

• *Tehran.* A consortium of Axens, Chegalesh, Petrolinvest, and Iran's Radira are working to upgrade and expand the Tehran refinery. The project is expected to be completed in 2010, adding 11,200 b/d to total gasoline production.

• *Bandar Abbas condensate splitters (Persian Gulf Star condensate splitters).* Design of the Bandar Abbas condensate splitters is based on a 63% gasoline and 25% gas oil yield. This project would be the most important project for increasing gasoline production in Iran.

FGE said, however, this project is faced with several challenges, such as the withdrawal of Snamprogetti SPA as engineering, procurement, and construction contractor (perhaps due to US pressure) and the lack of financial resources.

"So far nothing has been done for this project, and it is unlikely to be completed before 2013 or later," FGE said.

"It should be noted that even without the splitters, Iran will be a gasoline exporter," FGE said, adding that total upgrades to Iran's refineries will add at least 94,000-119,000 b/d of gasoline to the market, which would be more than the demand growth, projected to be 70,000-100,000 b/d during 2008-13. ✦

Emboldened Somali pirates hijack Saudi Aramco tanker

Eric Watkins
Oil Diplomacy Editor

In a clear sign of their determination to escalate attacks on international oil shipping, Somali pirates operating on the high seas southeast of Mombassa, Kenya, Nov. 15, have hijacked the Liberian-flagged Sirius Star, a very large crude carrier owned by Saudi Aramco and operated by Vela International.

The attack coincided with a second hijacking the same day as well as the release of a ship taken earlier this year.

Lt. Nathan Christensen, a spokesman for the US Navy's 5th Fleet, which oversees the region, said the pirates hijacked the Sirius Star about 450 nautical miles

WATCHING THE WORLD

Eric Watkins, Oil Diplomacy Editor

Blog at www.ogjonline.com

The 'arc of instability'

If the oil and gas industry expected comforting news from the election of Barack Obama as US president, it may need a rethink—especially when it comes to the al-Qaeda terrorist organization.

In fact, al-Qaeda No. 2 leader Ayman Zawahiri ridiculed Obama last week and warned him against sending more troops to Afghanistan. Worse, using racist language, Zawahiri even insulted Obama and other African American leaders.

"It is true about you and people like you…what Malcolm X said about the house negroes," Zawahiri said, naming former Sec. of State Colin Powell and the current secretary, Condoleezza Rice.

Zawahiri's remarks followed an interview given by Obama in which he vowed no retreat from his campaign promise to begin pulling troops out of Iraq and switch the military focus to Afghanistan.

But what certainly raised Zawahiri's dander was Obama's statement of plans to renew the US commitment to tracking down the al-Qaeda leader, Osama bin Laden.

Bin Laden targeted

"I think it is a top priority for us to stamp out al-Qaeda once and for all, and I think capturing or killing bin Laden is a critical aspect of stamping out al-Qaeda," Obama said on national television.

"He is not just a symbol, he's also the operational leader of an organization that is planning attacks against US targets," said Obama.

As soon as Obama takes office in January, he has said he will start work on a plan to draw down US troops in Iraq and increase the number of US troops in Afghanistan.

Capturing or killing the al-Qaeda leader will no doubt be a significant step forward in the worldwide war on terrorism, and it may well represent an equally significant step forward for the oil and gas industry—long a key al-Qaeda target.

The 'arc of instability'

But, as a leading intelligence analyst has warned, the future will not be fully secured even with bin Laden's capture or death. Indeed, according to Thomas Fingar, deputy director of national intelligence, the appeal of al-Qaeda-like terrorism is waning in the greater Middle East.

That may sound like the good news, but according to Fingar it does not mean that the greater Middle East—which extends from North Africa to Central Asia—is going to see peace any time soon.

To the contrary, the greater Middle East will still be "at the center of an arc of instability," said Fingar, who spearheaded an effort by a council of US intelligence analysts to divine what the world will look like in 2025.

"The Middle East, really from the Mahgreb across into Central Asia, is one in which almost every problem that will challenge political leadership anywhere around the globe is to be found there, and many at a higher rate of severity or intensity," Fingar said.

That vision of the future may be unsettling for the oil and gas industry—Obama or no Obama. ✦

off Kenya—the farthest out to sea that pirates have ever struck. That distance, according to Christensen, makes them "a threat to many more vessels."

According to Christensen, the attack shows that the pirates are "changing the way they're doing business" in the region. Normally they attack within 200 miles of the shoreline and go after smaller prey.

"What this represents is a fundamental ability of pirates to be able to operate off the coast to an extent we have not seen before," said Christensen. "It's the largest ship we've seen attacked."

Pirates adapt

To a certain extent, the attack off Kenya is the result of antipiracy activities of Coalition naval forces off Somalia, according to naval officials.

"Our presence in the region is helping deter and disrupt criminal attacks off the Somali coast, but the situation with the Sirius Star clearly indicates the pirates' ability to adapt their tactics and methods of attack," Vice Adm. Bill Gortney, commander of the Combined Maritime Forces.

Graeme Gibbon Brooks, managing director of British company Dryad Maritime Intelligence Service Ltd, said the increased international presence trying to prevent attacks is simply not enough.

"The coalition has suppressed a number of attacks—but there will never be enough warships," Brooks said, adding that coalition warships will have to be "one step ahead of the pirates. The difficulty here is that the ship was beyond the area where the Coalition [forces] were currently acting."

Naval officials themselves underscored the difficulty of patrolling the region's waters.

"To put the challenge into geographic perspective, the area involved off the coast of Somalia and Kenya as well as the Gulf of Aden equals more than 1.1 million sq miles. That is roughly four times the size of the US state of Texas or the size of the Medi-

terranean and Red Seas combined," the 5th Fleet said in a statement.

Protection difficult

As a result of the size of the area, Gortney said military forces cannot be everywhere and urged commercial shippers to employ "self-protection measures" to defend themselves, including hiring private security contractors.

Out of the last 15 piracy attacks, at least 10 failed to employ some kind of defensive mechanism, the Navy said.

"Companies don't think twice about using security guards to protect their valuable facilities ashore," said Gortney, who added that, "Protecting valuable ships and their crews at sea is no different."

In addition to Coalition naval forces, ships and aircraft from several other nations, including a NATO task force, are operating in the region.

Their ranks are soon to be augmented by a European Union force of an undetermined composition. While no formal agreement exists between the navies, communication has been constant and effective to ensure optimal use of assets in a unified goal.

"While a military force cannot solve the problem—the solution lies ashore—we welcome the assistance of additional forces," said Royal Navy Commodore Tim Lowe, Deputy Commander, Combined Maritime Forces.

"The long-term solution to piracy requires an international and interagency response," Lowe said. "More forces allow us to address this issue and 'hold ground' while also continuing our ongoing Maritime Security Operations in the area."

Second ship hijacked

The attack on the Sirius Star came the same day that Somali pirates hijacked the 1999-built, 19,455 dwt Chemstar Venus, which was carrying 18 Filipino and five South Korean crew members, in the Gulf of Aden.

The Panama-flagged vessel, operated by Japan's Kaiun Kaisha, was sailing from Indonesia to the Ukraine when it was seized.

Even as they seized the Chemstar Venus, pirates released the Stolt Valor, which was hijacked on Sept. 15. Central Marine, the Japanese owner of the Stolt Valor, which was on time charter to Stolt Tankers, is reported to have paid a ransom of about $1.1 million for the release of the ship and its 22 crew members.

Last week, pirates off Somalia hijacked a second vessel chartered by chemical tanker group Stolt-Nielsen, taking the MT Stolt Strength in the Gulf of Aden despite the presence of a coalition of 10 countries, including Russia, that have naval vessels patrolling the area (OGJ Online, Nov. 11, 2008).

In September, Coalition forces recognized that pirate activity was changing off Somalia. Due to the stepped-up attacks and sophisticated equipment, the US 5th Fleet said it would set up a special patrol area, monitored by American and other naval vessels and aircraft.

"There is a degree of organization" in recent attacks, "which is why we're taking action," said Commodore Keith Winstanley, a British naval officer and deputy chief of the coalition of US-led navy ships operating in the region (OGJ Online, Sept. 17, 2008). ✦

Turkey pipeline blast rekindles security concerns

Eric Watkins
Oil Diplomacy Editor

Oil has resumed flowing through one of the twin Kirkuk-Ceyhan pipelines following an explosion on one of the lines near the town of Bozova, in the mainly Kurdish province of Sanliurfa in southeastern Turkey.

The announcement, which came just as European energy officials were in the country discussing plans for the proposed Nabucco gas pipeline, made no mention of foul play.

"There is currently oil flowing through the pipeline at about 300,000-350,000 b/d," said an official of pipeline operator Botas. "We had to cut the flow after the explosion, but then diverted the oil to the other line, so it is flowing again," he said.

"We expect that the repair won't take more than 3 days, it depends also on the availability of pipe for the line," the Botas official said.

Sabotage downplayed

Iraq's northern crude oil export system, which runs from the northern Kirkuk oil fields to the Turkish Mediterranean export terminal at Ceyhan, is comprised of two parallel pipelines with a nominal capacity of 1.5 million b/d.

Since the US-led war of 2003, the line has been running at a reduced capacity due to attacks by insurgents as well as erratic production from Iraq's northern oil fields.

In September, the privately-owned Sbay media website cited an official from Iraq's North Oil Co. who said the Kirkuk-Ceyhan line had been attacked by armed men near Mosul and that exports would be suspended for 3 days.

In this week's shutdown, Turkish officials downplayed the possibility of sabotage.

"Valves on the double line were closed on Nov. 5 when Botas officials noticed a sharp change in pressure resulting from the explosion. The cause of the blast has yet to be determined," the official said.

Earlier, local officials in the province of Sanliurfa said the explosion had resulted from high pressure within the pipeline and not from sabotage.

"Thank goodness it's not sabotage," said Sanliurfa governor Yusuf Yavas-

can. "According to investigations the pipeline broke from the inside out. This shows the explosion was due to excessive pressure."

Security uncertainty

According to analyst BMI, however, the sector of this week's explosion has been at the center of violence perpetrated by the Kurdistan Workers Party (PKK).

"Violence has increased in the mostly Kurdish region of southeastern Turkey in reaction to Turkish military operations against PKK bases in northern Iraq and its members inside the country," BMI said.

In BMI's view, "if militants are found to be responsible for the attack on the Kirkuk-Ceyhan pipeline, the security of Turkey as a transit country may be further called into doubt."

In particular, BMI said, "Doubts over Turkey's future as an energy transit hub for the EU would make the Union's flagship Nabucco pipeline project far less likely to proceed."

In that regard, the explosion could not have been better timed, coming just as EU energy commissioner Andris Piebalgs met Turkey's President Abdullah Gul and Prime Minister Hilmi Guler to discuss mutual concerns about the Nabucco pipeline.

Concerns over pipeline security in Turkey were raised in August of this year when the separatist PKK claimed responsibility for a blast that shut down the BP PLC-led Baku-Tbilisi-Ceyhan oil pipeline in August.

If this week's attack is linked to the PKK or any other group, it would also undermine broader plans by governments in the region to step up their role as an energy transit hub.

Plans undermined

In October, eyeing cooperation with neighbors Turkey and Iran, Iraqi Oil Minister Hussein al-Shahristani said his country plans to expand the Kirkuk-Ceyhan oil pipeline and construct a parallel natural gas export line.

"Interdependence in the energy sector can help regional economic development," Al-Shahristani said, adding, "Iraq is ready to do whatever is necessary to enhance relations with its neighbors, especially in the field of energy."

Al-Shahristani's remarks followed a July 10 visit by Turkish Prime Minister Recep Tayyip Erdogan to Baghdad.

Erdogan's visit covered a wide range of energy issues, including expansion of the Kirkuk-Ceyhan oil line as well as construction of a parallel gas export pipeline to Turkey to supply the long-planned Nabucco line.

"Plans for the line will be subject to discussion and several sources within Iraq for the gas are being examined," said a spokesman, who added that a number of virgin gas fields in the Kurdish region of Iraq are a possible source.

Ominously perhaps, Erdogan's visit did not include any meetings with representatives of the Kurdish Regional Government, which controls the region of Iraq through which the existing Kirkuk-Ceyhan oil line passes and through which any new gas line would have to pass. ✦

Brazil officials clash over financial crisis' impact on E&P

Eric Watkins
Oil Diplomacy Editor

Brazilian officials have issued conflicting statements concerning the potential impact of the current global financial crisis—as well as other issues—on the exploration and development of the country's subsalt layer.

Brazil's mixed capital oil and gas firm Petroleo Brasilerio SA (Petrobras), due to the current financial crisis, has postponed to 2009 its construction tenders for 28 deep-sea drilling rigs, according to Jose Jorge de Moraes Jr., the firm's general manager for new business in the exploration and production department.

De Moraes said Brazil had hoped to have some 14 rigs drilling in the subsalt blocks in 2012 and producing 1 million b/d in 2015, but current problems with financing had undermined the plan.

"There are no longer the conditions to issue the tender this year," said de Moraes, who added that the current price of oil at around $60/bbl is an impediment to developing the subsalt layer—considered a priority area for Petrobras.

While acknowledging the current problems, de Moraes nonetheless said the economic crisis may eventually lead to lower prices for rigs and allow Petrobras to cut its costs for exploring and developing the subsalt layer.

High cost, tight market

De Moraes' views about current impediments fit observations by analyst BMI, which said that in the medium term "oil prices of around $60/bbl, tight capital markets, and uncertainty surrounding the impending reform of Brazil's licensing framework may inhibit subsalt development."

BMI thinks "the Deloitte Petroleum Service's estimated required crude oil price of $90/bbl for profitable subsalt development is a more realistic assessment of the challenge of producing oil from 7,000 m."

The BMI view contrasts with remarks by mines and energy minister Edison Lobao, who is on record saying oil and gas production is viable at Brazil's subsalt reserves even with oil at $60/bbl.

"It's perfectly possible to exploit subsalt oil at this price. Of course, for the good of the country we'd want a bigger gain," he said (OGJ Online, Nov. 4, 2008).

'No delays,' says minister

Lobao has not changed that view,

this week telling the Estado news agency that the ongoing global financial crisis will not cause delays to the development of the subsalt oil reserves.

"The subsalt layer will not suffer any delays," said Lobao, who earlier in the week had said, "We are not going to stop spending" and that, "All these investments will be fully accomplished."

Estimates vary on development costs for Brazil's subsalt oil and gas reserves, with one Brazilian official saying up to $400 billion in investment could be required over the next 10 years.

Haroldo Lima, director of Brazil's hydrocarbons regulator Agencia Nacional do Petroleo (ANP), also said that his $400 billion estimate was not very precise and that subsalt reserves should be at least 50 billion bbl of oil, possibly reaching 80 billion bbl.

Estimates of the subsalt layer's reserves also have varied among Brazilian officials.

Demuring on estimates

On Nov. 13, Petrobras said it was premature to speculate on the size of the subsalt oil reserves, a statement that came just a day after Lobao told analysts and investors at a luncheon in New York that the subsalt reserves could hold "50-150 billion bbl of oil of the finest kind."

At the time, Lobao observed that estimated recoverable reserves of 12 billion boe had been confirmed so far, but that, on the basis of reports by analysts and experts, "a much larger number would not surprise us."

Petrobras responded that estimates of reserves are possible only after declarations of commerciality. Refuting Lobao, the Brazilian firm said, "In light of the articles published in the press about estimates in the subsalt, Petrobras reaffirms the figures it has already given."

Petrobras and its partners have announced discoveries estimated at 8-12 billion boe at the Tupi and Iara prospects in the Santos basin in the past year, while several other new subsalt prospects are said to have potentially large reserves.

Balancing investment versus reserves, BMI underlined the issues of development off Brazil: "While the potential of Brazil's subsalt acreage appears vast, so too do the challenges and costs of extracting oil and gas from total water depths exceeding 5,000 m and a further 2,000 m of rock."

Oil law delayed again

Meanwhile, officials also continue to disagree concerning revisions to the country's oil law.

According to Lobao, changes will be designed in a way to maintain the interest of foreign investors in the country, and the new regulatory model covering the subsalt region will maintain the "attractiveness" of the area for investors.

That assumes that the law is issued, and soon—something that Lima said might not happen until next month, possibly just ahead of the country's latest licensing round on Dec. 18-19.

Lima, who spoke at the Foreign Relations Committee of Brazil's Chamber of Deputies, said the interministerial committee considering changes to the oil law "should be" ready to deliver its report to President Luiz Inacio Lula da Silva at the start of December—months later than previously announced.

"The committee is not working under the pressure of a deadline," said Lima. "We've already forecast the conclusion of work two or three times, but the deeper we study the matter the more questions are raised."

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

According to the state news agency, that delay was occasioned by a failure of panel members to reach a consensus on how best to maximize development of the country's promising subsalt oil deposits (OGJ, Oct. 20, 2008, p. 29). ✦

Bodman: Caspian remains vital to global energy security

Eric Watkins
Oil Diplomacy Editor

US Secretary of Energy Samuel W. Bodman, recalling the recent conflict between Russia and Georgia, reaffirmed the need for Europe to diversify its sources of energy and stressed the role of the Caspian region in promoting energy security.

"The Russia-Georgia conflict underscored how important it is for Europe to diversify sources of energy supply," Bodman told delegates at the Baku Energy Summit.

"The good news is that the pipelines operating on Georgian territory through what is emerging as the Southern Corridor were not affected by the brief war in Georgia," Bodman said.

Further Bodman said these southern corridor routes "will enable the transport of competitively priced Caspian energy resources to European and world markets, thereby furthering global energy security," adding, "It is our hope that this will bring willing sellers and potential new buyers together."

Bodman called the summit the latest in a series of beneficial outcomes that began with the 1994 signing of the "Contract of the Century," which began movement of Azerbaijani oil resources to the global market.

Bodman said that contract was the first step "toward the development, processing and deployment of this region's vast energy resources in successful ways to the benefit of producers and consumers alike."

Stating that the Caspian region "will be a priority for the next administra-

tion," Bodman said, adding that oil production from the Caspian states is already a significant source of supply to world markets outside of the Organization of Petroleum Exporting Countries.

"We expect it to continue to play a vital role as oil production continues to increase over the next decade," he said.

Bodman said the US has been working with Azerbaijan, Georgia, and Turkey for 15 years to ensure that Caspian oil and gas can reach European and global markets through commercially viable and secure export routes.

"We are now building on the success of the Baku-Tbilisi-Ceyhan [oil pipeline] and South Caucasus gas pipelines to develop a new generation of export routes known as the Southern Corridor," he said.

"The US is committed to working with Azerbaijan, Turkmenistan, Georgia, Turkey, and our European partners to realize the Turkey-Greece-Italy and Nabucco pipelines that will form the foundation of the Southern Corridor," he said.

However, he noted, "It remains crucial that gas producers and consumers put in place the framework agreements required to ensure these projects will be commercially viable."

"If we continue to promote a strong investment climate—including transparency and the rule of law—we can look forward to additional energy projects that will bring great benefits to the citizens and economies of this region and, as a result, the entire world," Bodman said. ✦

BLM finalizes oil shale regulations

Nick Snow
Washington Editor

The US Bureau of Land Management published final regulations on Nov. 17 to establish a commercial oil shale development program on public lands in Colorado, Utah, and Wyoming. Lease sales probably will not occur for another 5-10 years, however, a leading US Department of the Interior official said.

"We would have to make certain that there is sufficient demand. We also need to develop a [National Environmental Policy Act] document to cover those proposed lease sales. I would not expect it for at least 5-10 years," said C. Stephen Allred, assistant US Interior secretary of lands and minerals management.

The new regulations provide critical "rules of the road" for private investors considering whether to make future financial commitments to prospective oil shale projects, he told reporters in a teleconference. "They are a thoughtful, phased approach to leasing oil shale on public lands in the west, though actual development is not expected to occur for several years," Allred said.

The leasing regulations incorporate provisions of the 2005 Energy Policy Act and the 1920 Mineral Leasing Act relating to maximum oil shale lease size, maximum acreage limitations, rental, and lease diligence, BLM said in a written statement. They also establish a time-adjusted royalty rate, beginning at 5% during the first 5 years of commercial production, and then rising 1% every year afterward until the rate reaches 12.5%.

A starting point

"The 5% royalty rate is a compromise based on the approximately 75,000 comments we received," Allred said. "That's a starting point [that] reaches 12.5%, which is the standard oil and gas royalty rate."

Forty-nine percent of the royalties would be shared with the states within which BLM issues leases, BLM's announcement said. The regulations also address EPACT provisions establishing work requirements and milestones to assure diligent development of oil shale leases, it indicated. Standard lease administration and operations components of a BLM leasing program are included as well as additional NEPA documentation requirements, it said.

Oil shale development on public land in Colorado, Utah, and Wyoming potentially could add up to 800 billion bbl of oil to US reserves, Allred observed. "That is enough to meet US demand for oil, at current levels of consumption, for 110 years," he said.

Response to the prospect has been mixed in the states, however. Govs. Bill Ritter of Colorado and Dave Freudenthal of Wyoming have expressed reservations. Utah Gov. Jon Huntsman supports the concept.

The new oil shale leasing regulations were delayed when members of Colorado's congressional delegation inserted a 1-year moratorium on developing the rules into DOI's fiscal 2008 budget in early December 2007. BLM published proposed regulations on July 22. The ban expired Sept. 30, and Congress did not make it part of its continuing resolution to keep the government operating for another 6 months, Allred noted.

Additional requirements

An additional site-specific NEPA analysis would be completed on any proposed development before an oil shale lease was issued, according to BLM. It said that once a lease was issued, the lessee also would have to obtain all required permits from state and local authorities, under their respective permitting processes, before any operations could begin. Another round of NEPA analysis would be conducted before any site-specific plan of development is approved, the agency said.

BLM's approval of final oil shale development regulations followed its adoption of a final programmatic environmental impact statement on Sept. 4 to guide the use of public land containing oil shale and tar sands in the three states. Allred signed a record of decision

on the PEIS on Nov. 17. The agency also has issued research, development, and demonstration leases for five oil shale leases in Colorado's Piceance basin and one in Utah.

Allred said the regulations are necessary to accommodate such commitments, which involve proprietary technologies. "The companies involved are going to spend hundreds of millions of dollars. They, as well as the general public, need rules of the road to make sure the development occurs properly. [The rules] bring certainty not only to those companies that are going to invest the money but also to those who want to make sure there's due diligence and that environmental impacts are fully considered," he said.

Other companies are working on privately-held land, but the DOI official said he is not aware of the extent of their efforts. Leasing could proceed if a state supported it, but that would depend on technologies that were developed, and projects would still have to fully comply with NEPA and other applicable federal, state, and local requirements, he said. ✦

Slump's varied effects present mixed opportunities

The varying effects of economic troubles on exporting countries and national oil companies present a mixed slate of opportunities to international oil companies with cash to invest.

Lew Watts, chief executive officer of PFC Energy, told the RMI Oilfield Breakfast Forum in Houston Nov. 12 that most Persian Gulf members of the Organization of Petroleum Exporting Countries can weather the slump in the price of crude oil.

National "break-even" West Texas Intermediate crude prices in 2010 are $54.26/bbl in Saudi Arabia, $52.07/bbl in Kuwait, and $45.59/bbl in the UAE, Watts estimated.

By contrast, in Venezuela, where the government has spent heavily on social and international projects and subsidizes domestic oil products, the break-even crude price in 2010 is $102.68/bbl. In Iran, another high-subsidy country, it's $83.31/bbl.

The financial crisis contributing to the oil price slump has mixed effects. Watts assessed a group of national oil companies on the basis of how likely they are to offer increased opportunities to international oil companies as a function of their likelihood to encounter project delays because of financial stress.

Lowest in his ranking of NOCs likely to encounter project delays and therefore to present opportunities to outsiders were those from Saudi Arabia, Abu Dhabi, and China. Highest in the ranking were NOCs from Nigeria, Angola, Malaysia, Thailand, India (Oil & Natural Gas Corp.), Iran, and Kazakhstan.

Eventually, he said, economies will regain health, energy markets will resume normal rates of growth, and oil and gas will again encounter physical limits.

For reasons unrelated to the resource pessimism of "peak-oil" adherents, he said, "The world cannot generate the capacity to produce more than 100 million b/d."

He predicted, "The big breakthrough in energy is going to come from outside of energy."

Focus on technology

Janet Clark, executive vice-president and chief financial officer of Marathon Oil Corp., said IOCs have to concentrate on technology to gain access to unconventional resources and other technically challenging projects.

Companies, she said, compete for those opportunities on the basis of their skill in areas such as seismic imaging, reservoir characterization, enhanced oil recovery and carbon dioxide injection, drilling and completion, stimulation, heavy oil in situ recovery, and gas conversion.

She cited a proprietary "gas-to-fuels" technology Marathon has in the pilot-plant phase that can be applied to small gas fields and that yields high-octane gasoline and diesel fuel.

With national companies controlling most conventional oil and gas resources, Clark said, international oil companies must emphasize technology and address the question, "How do we make ourselves the preferred partner?"

John Gibson, chief executive officer of software supplier Paradigm, called for a collaborative approach to technical problem-solving and described how his company is using the internet to solicit solutions to complex business and technical problems.

"We still have an innovation shortage in this industry," he said.

Gibson agreed with Watts that major energy innovations will come from outside the energy industry and cited imaging algorithms developed in the medical, satellite, and defense businesses.

Douglas L. Becker, Banc of America Securities vice-president and research analyst, said the stock market, which he called "a leading indicator of oil patch fundamentals," is indicating a WTI oil price of $50/bbl and a Henry Hub gas price of $5.50/MMbtu.

Although he said there's a 30% chance that demand for crude oil will be suppressed for "multiple years," Decker noted signs of an end to the current slump in OPEC's production cut, a downturn in the US rig count (which will limit gas supply and restore prices), reduced expectations by analysts for oil service company earnings, and the seasonality of service-firm stock performance. ✦

Cazalot: US at risk of losing energy security race

Judy R. Clark
Senior Associate Editor

The US is running the risk of losing the global race for energy, said Marathon Oil Corp. Chief Executive Officer Clarence Cazalot at a recent American Petroleum Institute meeting in Houston.

Cazalot said it is crucial that US government officials and the public be educated to the energy challenges facing the nation and its energy providers, along with the most effective solutions, because some proposed governmental policies could result in unintended consequences that exacerbate the situation rather than remedy it.

"'Energy security' isn't just some glib phrase" that is used by the energy industry, Cazalot said. "It's what our work is all about. Few industries have contributed more to the well-being of the world than ours."

But increasing global energy demand, driven by explosive population growth and rapidly developing economies, is intensifying competition for energy worldwide. "The 6.5 billion people today will be 8 billion by 2030," he said. And although today's difficult global economic situation is impacting demand, "the fundamentals haven't changed, and this is really just a temporary phenomena. The prognosticators say 2009-10 will be a time of economic downturn, but we need to stay the course because we are already seeing, in our service stations, demand coming back."

Meeting demand will require a substantial increase in all forms of energy, he said, to ensure security of supply, while guarding the environment and maintaining economic competitiveness. "Not letting [the US] standard of living slip will take a strategy fully consistent with the climate change plan," Cazalot insisted.

What is needed, he said, is "a rational, fact-based approach that taps the leadership and finest thinking of people across the entire spectrum" to solve the energy problem.

"President-elect [Barack] Obama and all of us must join together to find solutions to the global challenges," he urged. "It doesn't matter what your ideology or political affiliation is; the time is now to tackle our energy issues together. If we fail to do so now, America is at the very real risk of losing the global race for energy."

Competition for energy

The US Energy Information Administration projects energy demand will increase more than 50% during 2005-30, with 70% of that from developing countries relying primarily on fossil fuels.

The demand growth is not unconstrained. In making the projections, EIA built in efficiency improvements and a reduction in energy intensity.

Meeting this demand will require a substantial increase in all forms of energy.

Fossil fuels comprise 80% of global usage and will continue to do so until 2030, Cazalot said, mainly because of the infrastructure advantage. Of that supply, oil and gas are 55%, and coal is 25%.

All other forms of energy such as nuclear power, biofuels, hydroelectric power, geothermal, and wind, represent the remaining 20% of global energy consumption.

Coal and gas consumption are growing the fastest, driven by rising demand for electricity. Coal demand rose by 35% during 2000-06. "China builds two new coal-fired 500-Mw power plants every 7-10 days," Cazalot said.

Energy security strategy

Cazalot outlined a three-pronged strategy for addressing the energy challenge:

- Initiating energy efficiency and conservation.
- Developing supply diversity.
- Investing in technology to ensure environmental protection and sustainability.

Energy security does not mean energy independence, "which is neither possible nor desirable," he said. "Calling for energy independence creates uncertainty in our global trading partners around the world and hinders both their investment and ours."

He defined energy security as "having an adequate, reliable, and sustainable supply of energy to meet the needs and aspirations of private citizens, commercial enterprises, and public sector functions while ensuring environmental protection and sustainability.

"Secondly the cost of our energy must be comparable to that of other nations, so we can maintain our economic competitiveness, growth, and stability," he said.

Conservation

Energy efficiency and conservation are the quickest and cheapest forms of demand reduction, Cazalot said. "A 6% reduction in energy use over all [of the] petroleum base, would reduce US crude oil imports by 29%." Efficiencies should focus on key areas such as improving fuel economy, reducing energy consumption in residential and commercial venues by applying new building codes and appliance standards, and increasing efficiency of the industrial sector.

He said US oil and gas firms are making solid progress toward a pledge made in 2002 to the government to improve energy efficiency by 10% over 10 years.

In 2006 alone, US refineries saved the energy equivalent of taking 528,000 vehicles off the road. Marathon estimates that "over the last 5 years our seven refineries have improved

energy efficiency by over 4.5% and are on track to achieving the 10% goal by 2012," said Cazalot.

Supply diversity

The second energy strategy component is diversity in supply sources or geographic diversity and the forms of energy used, he said.

US access to resources is becoming more difficult and costly due to an intense wave of nationalism in countries that hold the bulk of the world's resources. National oil companies (NOC) have access to world class technology and the full backing of their respective governments, but the US enacts restrictive policies against its industry, partly because of the perception of "Big Oil."

"But on a global scale, US companies are really quite small compared to our competitors," Cazalot said. The total of US companies, from Exxon to the smallest, hold only about 6-8% of the world's proved oil and gas reserves compared with NOCs and their host governments, which control about 80%.

"It is important for Washington and the American people in general to realize that our nation is in a tough global competition for oil and gas. US oil and gas companies are allies of the American people," he said, "and it makes no sense to hinder our ability to compete by unfair taxation, excessive regulation, and unreasonably restricting access to oil and gas that could supply our nation for decades."

Required investment for new discoveries, enhanced oil recovery, and development of unconventional fuels will reach $10 trillion by 2025, he added.

Technology, investments

Marathon is investing $8 billion this year—twice what it earned in 2007—to increase refining capacity, upgrade other refineries, and participate in oil sands projects.

"We are investing heavily in something called 'gas-to-fuels,'" Cazalot said. "We are in the start-up phase of a pilot plant near San Antonio, which basically will take natural gas and turn it into clean, sulfur-free diesel and gasoline. We would be able to use [that technology] around the world and turn gas into transportation fuels on site."

Unconventional oil and gas resources include an estimated 175 billion bbl of oil in the oil sands of Alberta. About a year ago, Marathon invested $7 billion to acquire interest in the Athabasca oil sands project. It also is investing $2 billion in upgrades to its Detroit refinery to process that bitumen.

In addition, US oil and gas companies in 2000-07 invested $121 billion in new technology for producing shale and oil sands and in emerging technology such as fuel cells. These investments are more than double that invested by the federal government, he said.

Refiners used 6.85 billion gal of ethanol in 2007, 46% more than legally mandated, Cazalot said. "In 2008 the volume will jump to almost 9 billion gal. We can blend to a 10% level of ethanol in all our gasoline across the US."

Cazalot expressed concern over prescriptive renewable fuel requirements signed into law in December 2007 requiring an increase to 36 billion gal/year of renewable fuels in 2022, including 15 billion gal/year of corn-based ethanol and 21 billion gal/year from advanced biofuels.

The technology to manufacture 21 billion gal/year of biofuels has not yet been established, which creates additional uncertainty in the industry. "Fourteen years is a very short time given all that must be done," Cazalot said. "The potential is very high for negative unintended consequences not seen by legislators, such as the impact on food and water supply."

Technology also is vitally important in meeting supply, moderating demand, and protecting the environment. "No area of innovation in technology is of higher priority than carbon capture and sequestration (CCS)," said Cazalot. While technology exists for CCS, much must be done to improve the capture stage on a large scale and to lower the cost.

Volatility in oil and gas prices also makes it difficult to formulate long-term plans, he said. And looming threats such as a windfall profits tax and other punitive legislation will have a chilling effect on much needed investment required to build and enhance US energy security.

Getting the message out

"I remain optimistic that the new administration will want to have a truly rational, fact-based strategy," said

"'Energy security' isn't just some glib phrase that is used by the energy industry. It's what our work is all about. Few industries have contributed more to the well-being of the world than ours."
—Marathon Oil Corp. Chief Executive Officer Clarence Cazalot

Cazalot. "I'm of the personal opinion that whether it is health care or energy, immigration or national security, the president must bring together the finest minds we have in this country, completely nonpartisan, and keep politics out of it. We need comprehensive answers to come up with the right kinds of solutions. I remain hopeful because I believe people understand that we are running out of time; we've gone for a long time without an energy strategy in this country. Global competition is just too great."

He added, "I have to believe that... logic will prevail. It's not gong to be easy; we're going to have to spend a lot of time educating people on the facts. That it takes time to develop leases we already have, for example. You pay a bonus, you have to run seismic, then you drill multiple wells and build platforms and pipelines. It takes years to get all that done."

People know how much ExxonMobil Corp. earns, he said, but they don't realize the investments the company must make and the risk it takes. "So educating people is a battle every day; we have to keep fighting," he said.

When asked about actions being pushed by House Speaker Nancy Pelosi (D-Calif.), Majority Leader Harry M. Reid (D-Nev.) and Sen. Barbara Boxer (D-Calif.) against the industry, Cazalot responded: "[We] just have to have access to them to tell our story. We all have a common interest. They'll do what they have to do, say what they have to say, but...they've got to get to what they are convinced are the right answers.

"I have to believe...the people who are elected to those offices want to do the right thing; if I didn't, I don't think I could get out of bed in the morning." ✦

BTC oil pipeline to boost throughput by yearend

Eric Watkins
Oil Diplomacy Editor

The Baku-Tblisi-Ceyhan oil pipeline will resume shipments of 1 million b/d by the yearend, according to Azerbaijan's Energy Minister Natiq Aliyev.

The BTC line has been operating at reduced capacity of 850,000 b/d due to a partial shutdown of the Azeri-Chirag-Gunashli (ACG) fields in the Caspian Sea after a gas leak near one platform.

The Central Azeri platform, one of four producing oil from the ACG fields, will resume output in late December, said Rovnaq Abdullayev, head of the State Oil Co. of the Azerbaijan Republic (SOCAR).

The announcements coincided with plans revealed Nov. 14 that SOCAR and Kazakhstan's state-owned KazMunaiGas agreed on the basic principles of a project to bring Kazakh oil across the Caspian Sea from 2013—some of it intended for transport through the BTC line.

Under the agreement, Kazakhstan will build a pipeline network from the Tenghiz and Kashagan oil fields to export terminals on its Caspian seaboard. The oil will then be shipped by tanker to terminals yet to be constructed on the Azeri coast.

Once in Baku, oil will be shipped through the BTC line or by trans-Caucasus rail to Georgian ports on the Black Sea.

The system's initial shipment capacity will stand at 500,000 b/d, eventually rising to 0.75-1.2 million b/d.

The current accord is based on a June 16, 2006, intergovernmental agreement signed by both countries on the transportation of 25 million tonnes of Kazakh oil through the BTC.

Kazakh Energy Minister Sauat Mynbayev said the trans-Caspian project will give much-needed relief to Kazakhstan's energy business, which is struggling to provide enough capacity for the export of its rising crude output to buyers in Europe and China.

"We're putting a lot of hope into transporting oil across the Caspian," said Mynbayev, adding, "We're interested in different export routes."

By 2015 Kazakhstan expects to be exporting 100 million tonnes of crude, Mynbaev said Nov. 14 at the signing ceremony in Baku.

The Kazakh government pegs the cost of the trans-Caspian transport project, including terminals and tankers, at $3 billion.

The announcement of a firm date for shipments to Azerbaijan came after Kazakhstan last month ended a dispute with foreign investors over the development and operation of its Kashagan oil field.

The government and the international oil companies developing the Kashagan field agreed to double Kazmunaigas' stake in the project.

The other consortium members include Royal Dutch Shell PLC, ExxonMobil Corp., Total SA, ConocoPhillips, and Inpex Holdings Inc.

The Eni SPA-led Kashagan development, in which KazMunaiGas will now have a 16.81% stake, is expected to start production in 2013.

Earlier this month, the first shipment of Kazakh oil—supplied by Tenghiz field—entered the BTC line after being transported across the Caspian Sea by tanker, according to Tamam Bayatli, a spokesman for pipeline operator BP PLC.

The spokesman declined to say how much oil was shipped, but SOCAR officials have said as much as 100,000 b/d of Kazakh oil could ultimately be shipped through the 1,700-km line. ✦

Japan 'unlikely' to buy on LNG spot market this winter

Eric Watkins
Oil Diplomacy Editor

Japan is unlikely to purchase further cargoes of LNG on the spot market this winter, according to Akio Nomura, chairman of Osaka Gas Co. Ltd. and the Japan Gas Association.

"I do not foresee further spot purchases unless the electricity market experiences dramatic changes," Nomura told reporters on the sidelines of the Gas Information Exchange for the Western Pacific (GASEX) 2008 conference in Hanoi.

Nomura added that such a change might be something like a nuclear plant outage, but otherwise, in the longer term, Japan's demand for gas is likely to fall given the impact of the financial crisis on the economy.

"We have not yet seen the direct impact from the crisis as well as wide variations in oil prices and LNG prices," he said. "However, although we have not yet seen the impact, over the long term we will see it."

LNG consultants Waterborne confirmed the downturn, estimating recently that Japan imported 5.85 million tonnes of LNG in October, a slight fall from official data showing 5.869 million tonnes imported in September.

Osaka power plant sale

Separately, Nomura also said Osaka Gas is in talks to sell a stake in one of its electric power plants to Oman in return for stable supplies of LNG.

"We haven't reached any specific decisions yet but the point is to reach stable [LNG] supplies. If getting stable supplies requires selling a specific stake, then that's something we may have to do," Nomura said.

The discussions for a minority stake in its subsidiary Senboku Natural Gas Power Generation Co. were part of general business discussions with its potential suppliers, said Nomura.

Osaka Gas expects Senboku's four units, each with 277-277.5 Mw of capacity (for a combined total of 1,109 Mw), to come online between April and November 2009.

Osaka establishes LNG buyer

In August, Osaka Gas announced plans to set up two new companies in November to operate the Senboku natural gas power plant. While one of them will operate the facility, the other one, called Senboku Power Fuel Co., will buy LNG for its operations.

"We have separated the companies to clarify the accounts for receipts and disbursements," said an official of Osaka Gas, which buys 7.3 million tonnes/year of LNG from 10 countries.

Last month, Osaka Gas and Marubeni Corp. said they would spend $470-537 million to take an 80.1% stake in a gas and pipeline operating unit of APA Group.

The two Japanese firms will jointly operate gas pipelines, power generation plants and processing plants in Australia with APA through the investment in its wholly owned unit GasNet Australia Investment Ltd. ✦

Nigeria president proposes Lukman as oil minister

Uchenna Izundu
International Editor

Nigeria's Rilwanu Lukman, former president of the Organization of Petroleum Exporting Countries, has been nominated to lead Nigeria's Ministry of Petroleum Resources. Lukman has experience as petroleum minister.

Nigeria's president, Umaru Yar'Adua, submitted Lukman's name to the Senate for approval following his sacking of 20 cabinet ministers last month to revamp his administration.

Some analysts have questioned whether he can bring fresh ideas to Nigeria's petroleum sector as it undergoes major reform. Others said his experience and knowledge will be crucial in reviving relationships with oil firms.

Yar'Adua assured oil companies in Nigeria that the administration will take their views into consideration as it restructures personnel.

Presently Odein Ajumogobia is the petroleum minister.

Speaking in Abuja on Nov. 18 at an industry conference, Ajumogobia urged companies to continue with oil investment in Nigeria despite market volatility and to carry out exploration in its other six basins Anambra, Benue, Bida, Chad, Dahomey, and Sokoto. Currently the Niger Delta basin is the most active.

Nigeria plans to declare oil reserves of 40 billion bbl by 2010. "There has been no appreciable growth in Nigeria's oil and gas reserves in the last 5 years despite the known potential both onshore and in the deep offshore," the minister added.

He said investment decisions in Nigeria were difficult with OPEC production cuts and low oil prices. "For us in Nigeria, similar to other OPEC members, we are now faced with the double impact of reduced production quota and low crude oil price. This has created a climate of uncertainty and directly impacts global crude oil demand and supply dynamics. In particular are the questions of how much future production capacity will be required and what levels of investment will be ideal?"

Ajumogobia stressed rising global demand in the long term and the need to invest in technologies to access unconventional oil and gas resources.

Yar'Adua will announce the new ministers after the Senate has approved the list of 13 nominees. ✦

West Texas Overthrust outlook expands with 3D

SandRidge Energy Inc., Oklahoma City, expects to be operating 20 rigs in the West Texas Overthrust by the end of 2008, down from 27 rigs in early November and a third quarter average of 34.

The company has halved its planned 2009 capital budget from the $2 billion previously anticipated. It is also selling its East Texas assets.

SandRidge continues to exploit and expand Pinon field using 3D seismic and well control to identify new reservoirs in the three primary thrusts: Dugout Creek, Warwick, and Frog Creek. More than 600 wells have been drilled at Pinon since the 1980s.

The company still doesn't know how large Pinon field will become.

WTO thrusts

Pinon and other fields associated with the thrusts are spread across Pecos and Terrell counties 20 miles north of Sanderson, Tex. (Figs. 1 and 2).

SandRidge holds more than 650,000 net acres in the area and has acquired virtually all of the leases in the WTO.

The 5.1 tcf of net proved, possible, and probable reserves identified in the 72,000-acre Pinon field are almost exclusively in the Dugout Creek and Warwick thrusts.

The Frog Creek thrust is the most recent of the three thrusts discovered in the Pinon field to have commercial production, SandRidge said. SandRidge hasn't booked reserves from Frog Creek and hasn't yet drilled the Haymond thrust.

The Frog Creek thrust provides drilling opportunities in the Caballos chert at 3,500-5,500 ft. The thrust as interpreted from 3D data appears to be similar in size to the Dugout Creek and Warwick thrusts.

"We have started to drill wells targeting specifically the Frog Creek Caballos and have very encouraging results," SandRidge said. "We are in the process of mapping this thrust with geological information from the few penetrations we have and tying into 3D seismic data to high-grade locations as we prepare to drill more Frog Creek Caballos wells in 2009."

Recent production tests from Frog Creek analyzed methane with less than

MAJOR THRUSTS ACROSS THE WEST TEXAS OVERTHRUST*

Fig. 1

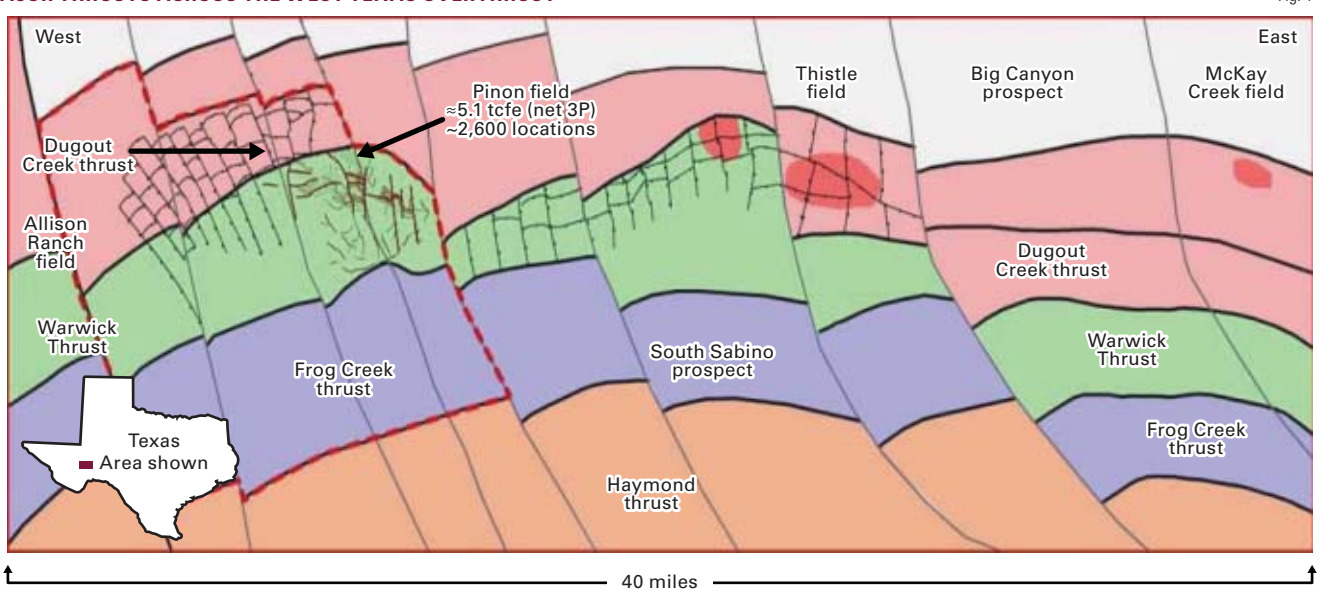


*Diagram is not to scale and is for illustration purposes only.
Source: SandRidge Energy Inc.

3% carbon dioxide. The company believes the Frog Creek thrust may contain substantial quantities of reserves that can be developed at or below current Pinon finding costs.

"Until we had our first interpretation of our proprietary 3D seismic over the Pinon field in July (2008), we did not even realize that the Frog Creek or Haymond thrusts existed," SandRidge said in late October. "This realization has increased the potential for continued expansion of the Pinon field and across the West Texas Overthrust."

MAJOR THRUSTS ACROSS PINON FIELD*

Fig. 2

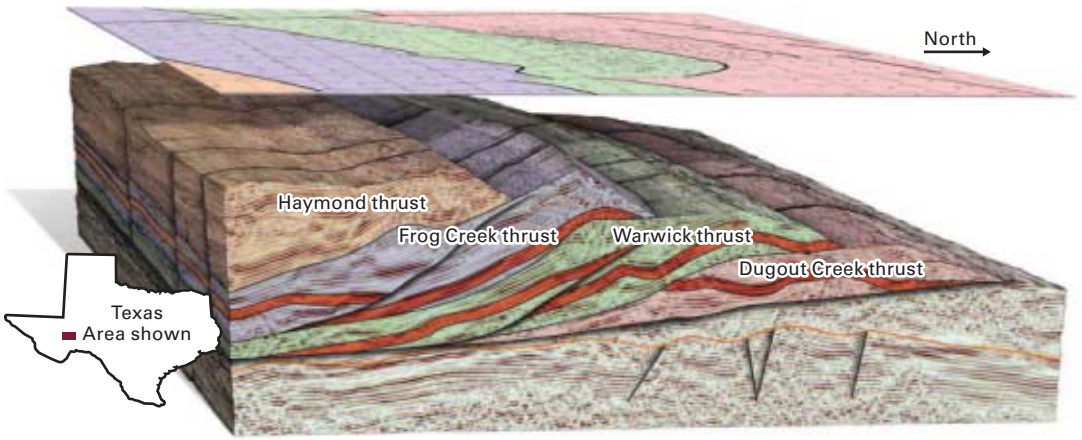


*Diagram is not to scale and is for illustration purposes only.
Source: SandRidge Energy Inc.

Drilling and seismic

SandRidge drilled 76 wells and completed and placed on production 60 gross wells in the WTO in the quarter ended Sept. 30, when it owned and operated 612 gross wells.

The vast majority of the production growth the past 2 years has occurred in the Dugout Creek thrust. The Warwick thrust is the field's most prolific producer.

SandRidge shot 265 sq miles of 3D seismic data in the third quarter of 2008, bringing the total shot to date to 1,115 sq miles. The company expects to have 1,250 sq miles of the planned 1,500 sq mile 3D shoot completed by the end of 2008.

SandRidge believes it can use 3D seismic and well control data to high-grade its drilling locations in the multiple thrusts in Pinon field and continue to deliver drilling finding costs below $1.70/Mcf.

The most prolific reservoir at Pinon is the Warwick Caballos chert high CO_2 reservoir at 6,000-8,000 ft with average estimated ultimate recovery of 7 bcf/well of total gas based on 125 wells drilled.

The Warwick thrust "is one of the keys to the future of our company as it represents the best reservoir for capital spend of any large scale play that I am aware of," said Tom L. Ward, chairman, chief executive officer, and president of SandRidge.

The company is nearly down at the Big Canyon 1-21-1A exploration well 30 miles east of Pinon field. Drilling at 15,400 ft and believed to have entered the Warwick thrust, it has had encouraging shows. Results are expected by the end of 2008.

Two other wells on the South Sabino prospect produced sweet gas at initial rates below 500 Mcfd, but this production is "not from the overthrusted chert that we have found in the Big Canyon well," SandRidge said. "The presence of sweet gas outside Pinon field is important to our goal of finding additional Pinon fields on our more than 650,000 acres in the WTO."

Gas processing

Production from the Warwick Caballos reservoir is limited to 150 MMcfd of inlet high CO_2 gas processing capacity of the company's legacy plants.

SandRidge is expanding the capacity of existing plants and is building the Century plant in a joint venture with Occidental Petroleum Corp. funding construction and operating the facility for 30 years. The project allows SandRidge to capture and accelerate development of a net 1.6 tcf of methane from high-CO_2 gas.

Century is designed to have 800 MMcfd of processing capacity. The first phase is to start up in the second quarter of 2010, and the second phase is to start in the second quarter of 2011.

Given the current limited availability of CO_2 treating capacity, the risk of finding gas containing CO_2 at levels above pipeline specifications limits the company's ability to aggressively develop the Warwick thrust.

The company continues to find relatively sweet gas in the Warwick thrust on the east side, but even transition wells with low amounts of CO_2 are not able to maximize production due to the lack of processing capacity.

Once the Century plant starts up in 2010, the company intends to implement a more aggressive drilling program and accelerate production and reserves growth from the Warwick thrust.

"We believe that there are additional reservoirs containing high CO_2 gas that can be developed once this plant is full, but that's a bit too far out for us to discuss in detail at this point," SandRidge said.

"If we only keep our existing production flat from 2009 through 2011, we will grow our production from our current 305 MMcfd to about 525 MMcfd by yearend 2011 with just the addition of the Century plant." ✦

Hungary

The drilling pad is being prepared for a deep, high-pressure high-temperature well in the Kiskunhalas trough on the Tompa block in southeastern Hungary near the border with Serbia.

Toreador Resources Corp., Dallas, has a 25% working interest, and a joint venture partner is funding the well, expected to spud in December and take 70-90 days to drill.

The well is expected to test an 1,800-m section of overpressured sands, shales, and conglomerates below a 1,400-m shale cap. The unconventional deep gas play in Carpathian gas sands was discovered in the 1980s.

Delta Hydrocarbons, a private European energy fund, is earning a 75% working interest in any unconventional gas resources in Toreador's Tompa exploration block by funding the first well.

Iraq

Addax Petroleum Corp., Calgary, tested 470 b/d of 23° gravity oil from the fractured Eocene Pila Spi formation at 1,000 m at the No. 11 appraisal well in Taq Taq field in Iraq.

The flow test was from a 52-m gross oil column on a ½-in. choke, and Addax expects the rate to be increased substantially with artificial lift. It looks to develop this part of the field to supply local demand in Kurdistan.

Two secondary targets, the Tertiary Khurmala and Sinjar formations, were confirmed as water bearing.

Taq Taq appraisal continues with the TT-10 well, which targets the previously tested Cretaceous Shiranish, Kometan, and Qamcheuqa reservoirs as deep as 2,500 m. The rig will then move to drill the Kewa Chirmila exploration well on the license.

New Zealand

Australian Worldwide Exploration, Sydney, took a farmout from Global Resource Holdings LLLP, Denver, to partly fund a planned 3,100 line-km 2D seismic survey on PEP 38451 in the deepwater Taranaki basin off New Zealand.

The Pacific Titan vessel is to shoot 1,000 km with 6-km streamers over Global's southern third of the 8.1 million acre permit and later about 2,000 km in the northern part of the permit with high-resolution, long offset 10-km streamers to infill existing data.

Once the AWE farmout is complete, interest in the permit will be Global operator with 50%, Hyundai Hysco, Seoul, 30%, and AWE and Randall C. Thompson LLC 10% each.

AWE has the option to increase its equity in the southern part of the permit to 40% by funding 70% of the drilling of one exploration well, which option must be exercised by April 2010, following the acquisition, processing, and interpretation of the new seismic.

AWE plans extensive seismic shooting five permits in preparation for its $300 million (Aus.), six to seven-well drilling campaign.

Saharawi Republic

Saharawi Arab Democratic Republic (Western Sahara) extended the date of its second licensing round to Mar. 31, 2009.

The republic is offering three onshore and six Atlantic blocks in the underexplored Aaiun and Tindouf basins that total 48 million acres in as much as 3,600 m of water. One Tindouf block appears to have potential for Silurian shale gas. The round is extended due to the global financial crisis and recent plunge in oil prices.

Eight companies that acquired nine licenses in the first bid round in early 2006 are evaluating prospects.

Turkey

Toreador Resources Corp., Dallas, completed shooting and is processing a 1,000 line-km 2D seismic survey in shallow waters of the Sea of Marmara off Turkey in the Thrace basin.

Toreador is operator of the permits with 50% working interest. Thrace Basin Natural Gas Turkiye Corp. and Pinnacle Turkey Inc. each have 25% working interest in the joint venture.

Louisiana

Meridian Resource Corp., Houston, plans to hook up by the end of the year a well in Weeks Island field in Iberia Parish, La., that tested at as much as 685 b/d of oil. The Weeks Bay-15 well was sidetracked to 8,900 ft measured depth and logged 43 ft of overall oil pay in Miocene sand. The flow rate was gauged on a $^{13}/_{64}$-in. choke with 1,175 psi flowing tubing pressure.

Meridian Resource, which owns 92% working interest in the No. 15 well, is sidetracking the Goodrich-Cocke-3 well in which it owns 63% working interest and is targeting Miocene sands at 7,500 ft.

Pennsylvania

Seneca Resources Corp., Buffalo, NY, bid successfully on 24,000 acres on four large blocks in the Devonian Marcellus shale trend in Pennsylvania.

The leases, in Lycoming and Tioga counties, Pa., have 10-year primary terms and are incremental to the 425,000 acres high-graded in this play.

Meanwhile, Seneca and EOG Resources Inc. modified the terms of their Marcellus shale joint venture to require EOG to select all prospect acreage by March 2009. The change will more quickly free up the nonselected acreage and allow Seneca to evaluate, explore, and develop the remaining lands independently or with other partners.

Petrolifera, Brownstone drilling in Rio Negro province, Argentina

Nina M. Rach
Drilling Editor

Calgary-based Petrolifera Petroleum Ltd. and Toronto's Brownstone Ventures Inc. are acquiring 1,250 sq km of 3D seismic and drilling 12 wells in an exploration program on the Vaca Mahuida Block, west-central Argentina. Petrolifera estimated the actual cost of the work program proposed to the Rio Negro provincial government at about $20 million.

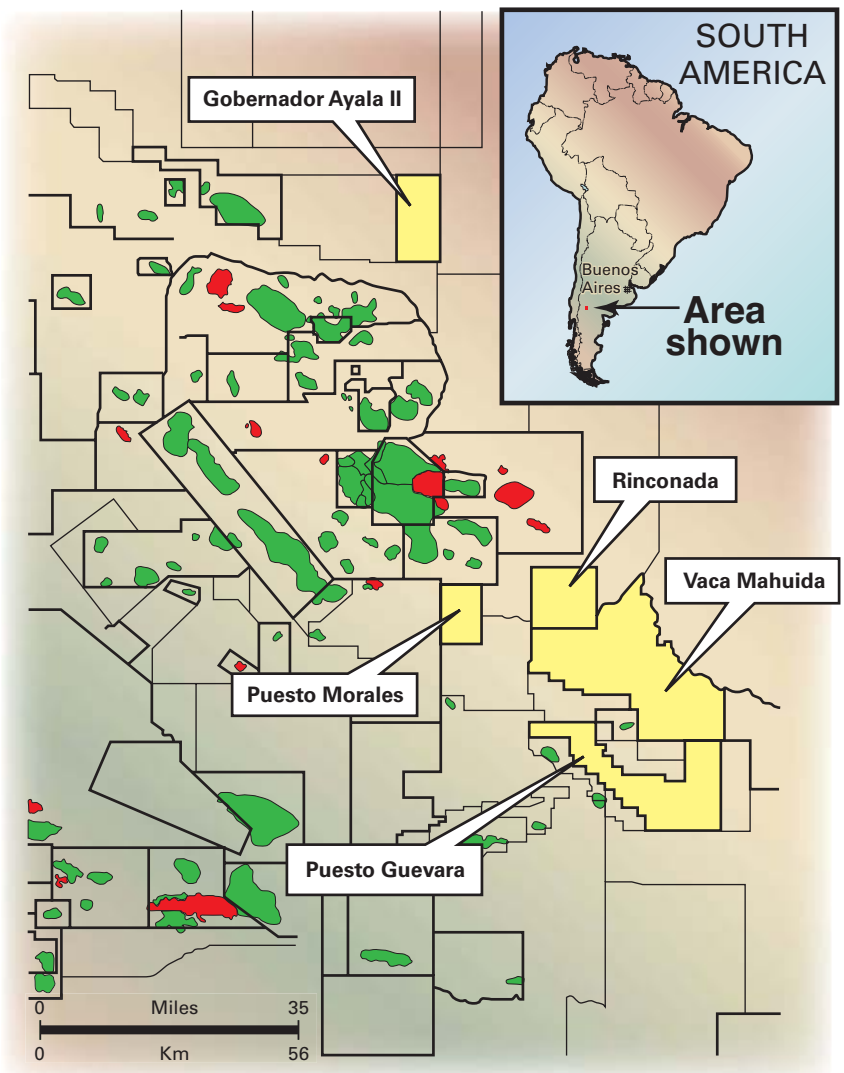
Brownstone is paying 50% of the costs of the Vaca Mahuida project to earn 25% working interest.[1]

In October, Petrolifera was testing exploratory well VM 2007 on the Vaca Mahuida Block. The company encountered live 29° API oil during drilling and initial swab tests and plans to stimulate the well over several intervals using hydraulic fracturing.[1]

The Centenario sandstone was the primary objective of this well, with several shallow reservoirs about 800 m sub-

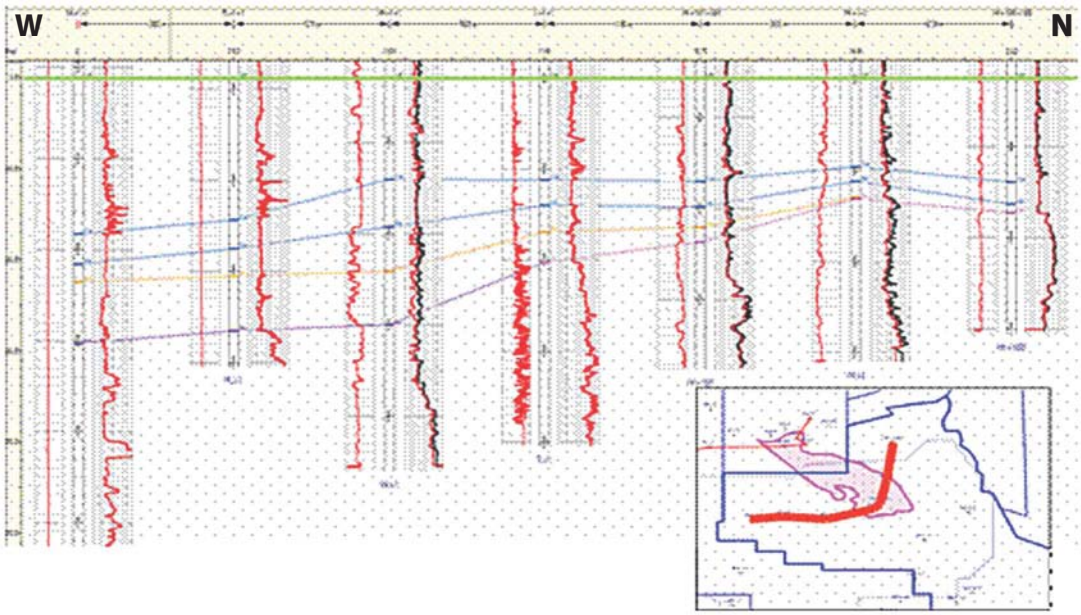
PETROLIFERA'S NEUQUEN BASIN BLOCKS, ARGENTINA

Fig. 1



STRATIGRAPHIC SECTION* THROUGH VACA MAHUIDA BLOCK

Fig. 2



*Hung on Loma Montosa formation top.

surface. Should the well prove commercial, Petrolifera said it "anticipates early production with good follow-up potential."

Vaca Mahuida

The 253,000-acre (1,025 sq km) Vaca Mahuida Block is in the northeastern shelf area of the Neuquen basin, Rio Negro Province (Fig. 1). The primary objective is a combination stratigraphic and structural play within the Jurassic Sierras Blancas formation, conceptually proven by Petrolifera in the Rinconada Block to the north. Petrolifera expects the play to continue southwards into Vaca Mahuida (Fig. 2).

Chevron shot 540 sq km of 3D seismic over the Vaca Mahuida Block in the late 1990s and Petrolifera also has 2D seismic of multiple vintages. Operators have drilled 13 exploration wells in the block, one of which tested 10 MMcfd natural gas from a thin interval in the Jurassic Loma Montosa formation, according to Petrolifera.[2] There have also been multiple shows in the Sierras Blancas formation, as well as in the deeper Triassic section and the shallower Cretaceous Centenario formation.

Petrolifera drilled the first well on the Vaca Mahuida Block under the new program, VM 2001, in 2008. It was the twentieth consecutive successful well drilled, according to the company, and is now cased and awaiting testing. It's situated on a four-way dip closure immediately south of the Rinconada Block and southwest of the Rx-1029 well. The Rx-1029 well was drilled and cased as potential production well, with oil in the Sierras Blancas and Loma Montosa formations.

Petrolifera operates one drilling rig and one workover rig in the area, down from four rigs in 2007, from Buenos Aires-based Quintana WellPro SA, a division of Houston's Quintana Capital Group LP (Fig. 3). Quintana WellPro is operating in Argentina's known producing regions: Neuquen, Comodoro Rivadavia, Las Heras, Rio Grande, and Punta Arenas.[3]

Petrolifera drilled dozens of wells on the Rinconada Block in 2007-08. Each well typically required about 11 days, including rig move, drilling time, logging, testing, and running casing.[2]

In early October, Petrolifera announced that the sole drilling rig was drilling a shallow exploratory well on the Rinconada Norte Block, to be followed by two low-risk infill wells in Puesto Morales field.

Quintana WellPro's Rig 3, a National Oil Well 400 model, was preparing to drill for Petrolifera Petroleum in the Rinconada Block, Neuquen basin (photo from Petrolifera Petroleum Ltd., Fig. 3).

Argentina

According to the EIA International Energy Annual, Argentina was the third-largest oil producer in South America in 2006 (802,000 b/d), after Venezuela (2.8 million b/d), and Brazil (2.2 million b/d).[4]

Two onshore basins, Neuquen and Golfo San Jorge, produce most of the country's oil.

Repsol-YPF dominates oil exploration and production activities; other significant oil-producing operators are Pan American Energy LLC,

Chevron Argentina SRL, and Petrobras Energia de Argentina SA.[4]

In October, Petrobras Energia purchased Burlington Resources Argentina Holdings Ltd. for $77.6 million, increasing its holdings in Sierra Chata gas field in the Neuquen basin to 45.5523%, and the Parva Negra Block, to the north of Sierra Chata, to 100%.[5]

Petrolifera

Calgary's Petrolifera Petroleum is involved in exploration and production in Colombia and Peru, as well as in Argentina. Petrolifera was founded by Connacher Oil & Gas Ltd., and Connacher currently controls 26%.

Petrolifera controls nearly 500,000 net developed and exploratory acres in Argentina's Neuquen basin, in four concession areas: Puesto Morales-Rinconada, Gobernador Ayala, Vaca Mahuida, and Puesto Guevara (Fig. 1). The company's production centers on its 100%-owned Puesto Morales-Rinconada concession, where it made several discoveries of light oil from 2005 to 2008.

Late last year, Petrolifera announced that light oil tested from the Jurassic Sierras Blancas sandstone in its PMN 1038 well suggested continuity between the north and central lobes of Puesto Morales Norte field in the Neuquen basin (OGJ, Dec. 17, 2007, p. 37).

Petrolifera has drilled more than 60 wells in Argentina and has recently installed waterflood treatment and water injection facilities. The company reported in quarterly results that it activated the Puesto Morales North waterflood in January 2008.

The light crude (29-46° API) and gas are transported by pipeline.

Brownstone

Brownstone is also participating in oil and gas exploration projects in the US (Piceance and Uinta basins in Colorado and Utah; Columbia River basin in Oregon), onshore Brazil, and the Arakan basin, India (OGJ Online, June 24, 2008). ✦

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New wireless sensor network monitors water-injection wells off Abu Dhabi

Majid Al Braik
Abu Dhabi Marine & Operating Co.
Abu Dhabi

Hatem Nasr
vMonitor
Houston

Fahd Saghir
vMonitor
Abu Dhabi

Abu Dhabi Marine and Operating Co. (ADMA-OPCO) has embarked on a project with vMonitor to deploy a new generation wireless-sensor-network technology for monitoring continuously injection well surface pressure and flow rates.

These sensors, installed on each water-injection wellhead, are demonstrating substantial well operation and reservoir management benefits.

Water injection is common in many oil fields worldwide. The injected water can have two functions for improving recovery from oil reservoirs:

1. Maintain reservoir pressure, allowing longer natural flow from wells.
2. Displace oil in the reservoir and push oil towards producing wells.

Managing water injection, however, is important to ensure that the reservoir is not damaged. If unclean water enters the reservoir, particles can bridge off in the reservoir impairing injectivity and causing increased injection pressures. These pressures can fracture the reservoir, allowing injected water to enter unwanted zones. Or, if wells are offline, it can alter the sweep pattern of fluid flow and push oil in the wrong direction.

Successful injection management can provide 15-25% more oil recovery from the reservoir, providing the operator with much economic value.

Keys to successfully managing the injection include:

- Knowing when injection is shutdown (downtime tracking).
- Measuring the injection rate in each well.
- Monitoring (increasing) injection pressure.
- Immediate notifying when pressures are high enough to cause fracturing.
- Knowing when pressures drop below normal pressures (may indicate a leak).

Lower Zakum field off Abu Dhabi has more than 110 water-injection wells on about 26 platforms (Fig. 1).

ADMA operations

Today operators do not monitor continuously most water-injection wells. Monitoring requires wellhead instrumentation and remote connectivity to the office so that production and reservoir engineers can evaluate data continuously.

ADMA's operations are entirely offshore. The company has more than 110 water-injection wells on about 26 platforms in Lower Zakum field (Fig. 1).

Currently, ADMA's water-injection wells have conventional mechanical

chart recorders (Fig. 2). To collect and replace the charts and forward them to headquarters, operations personnel make weekly helicopter trips. This operational process has several problems.

Weekly trips to about 26 platforms with helicopters are complex and expensive logistically. Also, data from these chart recorders require manual input before production and reservoir engineers can evaluate the data.

As a result, the current system has many limitations:

- Data are error prone because of manual evaluation of charts associated with manual data entry.
- Real-time data are unavailable to petroleum and reservoir engineers. This time delay can cause major well and reservoir problems.
- Operating expenses for monitoring and maintaining wells and collecting data are high.

Well monitoring options

The industry has had traditional supervisory, control, and data acquisition (SCADA) technology available for many years. ADMA has not installed this technology for monitoring its water-injection wells for several reasons.

Such systems are bulky for installation on platforms with limited topsides space. Also laying new cables on existing offshore platforms to connect the various sensors and instruments is complex and expensive.

Another cost prohibitive and time-consuming factor for installing SCADA is the running of subsea cables to facilitate data transmission between various platforms.

Providing power for a SCADA monitoring system on remote platforms is also problematic. Solar panels can provide power but require constant cleaning of bird excrement.

Key factors for ADMA in implementing a monitoring technology were:

- Wireless system with high reliability and accuracy.
- Battery-powered system that required neither an additional power source nor solar panels.
- Low-power system capable of transmitting data for several kilometers (5-10 km) to the nearest data gateway (hub).
- A system that the company could install quickly and easily with minimal disturbance of existing operations.

WELL ZL 265 DATA COMMUNICATION RELIABILITY

Table 1

Device	Site	Failure	Successful communication rate
ZI265 pressure transmitter sting 1	Zakum West	3	About 100%
ZI265 flow transmitter sting 1	Zakum West	5	About 100%
ZI265 pressure transmitter sting 2	Zakum West	0	About 100%
ZI265 flow transmitter sting 2	Zakum West	4	About 100%

Implementing system

To automate the data gathering process from these water-injection wells, ADMA with vMonitor installed new generation wireless-sensor-network technology on several water-injection wells in Zakum West field.

Installation of these small hand-size sensors on water-injection wellheads is quick. The sensors measure surface wellhead pressure and water flow.

Convention mechanical chart recorders required ADMA operators to make weekly helicopter trips to collect data (Fig. 2)

These sensors are in contrast to the traditional, bulky, and power-hungry SCADA remote terminal units, telemetry system, power system, and antennas.

Fig. 3 shows the system architecture.

These new generation wireless sensors (Fig. 4) have the advantages of:

- Long range (up to 10 km) communication, even when running on battery power. This allows the units to transmit data from the wells to a central gateway on a platform several kilometers away, where in turn another installed long-range radio transmits the data back to the main platform.
- High accuracy compared to mechanical chart recorders. The data measured and benchmarked against high-accuracy instruments (for pressure and flow) showed that these wireless sensors have more accuracy than conventional equipment, in many cases.
- The system demonstrated high degree or data transmission reliability and availability, even during adverse weather conditions.

Data reliability, accuracy

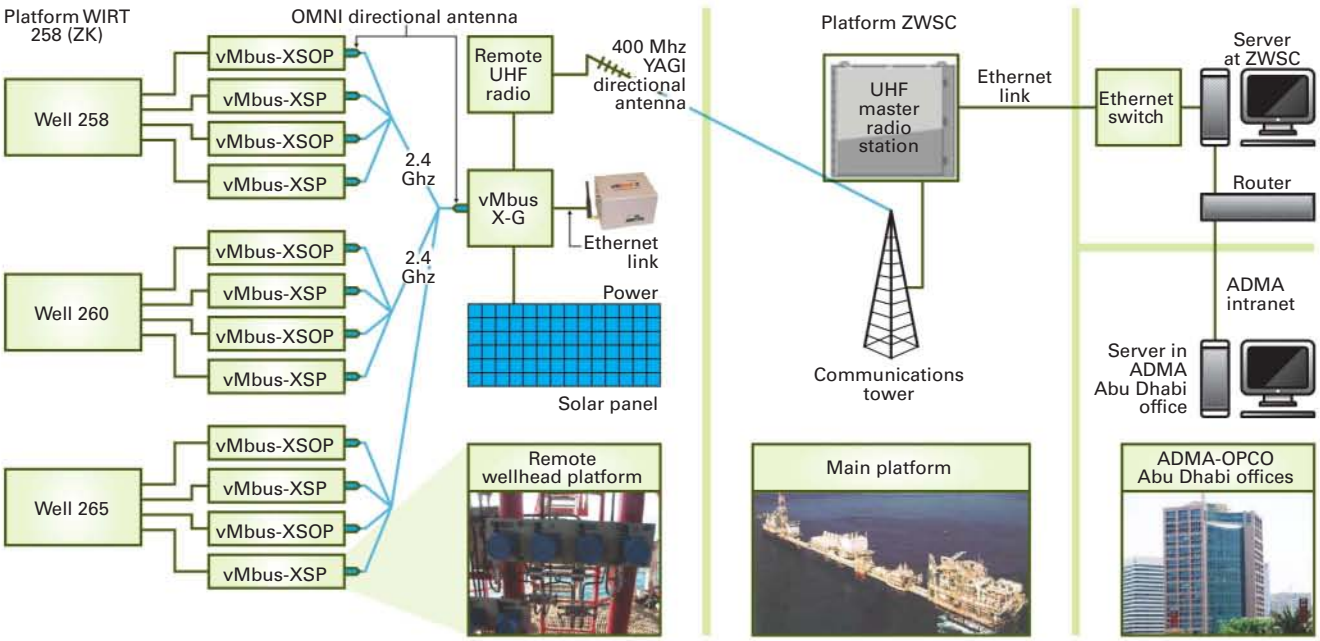
Main criteria for any system performance are data reliability and accuracy. A wireless sensor network involves relatively new technology. For this new technology to replace existing mechanical chart recorders, the system must demonstrate that it can deliver highly accurate measurements.

Before installation of the system, a benchmarking effort tested and validated the system's reliability and accuracy.

The validation monitored measurements during 3 months. During that period, operations personnel collected data manually from mechanical chart

SYSTEM ARCHITECTURE

Fig. 3



Wireless sensors are less bulky than traditional SCADA installations (Fig. 4).

recorders and compared the data against readings transmitted from the wireless sensors.

The wireless sensors had a minimum and maximum accuracy limit. The focus was more on observing the trends if they approached the minimum accuracy threshold.

A second performance criterion was the number of failures in data transmission.

Fig. 5 charts flow and pressure accuracy. The data indicate relatively high measurement accuracy for the wireless sensors compared with measurements from a mechanical chart recorder.

In some cases, the wireless sensor accuracy exceeded the measurement accuracy of the existing recorders.

Measured also was the reliability of the communication link and data availability during the same period. Table 1 summarizes one well's reliability results.

Remote monitoring

The implementation of the wireless sensor network on the water-injection wells now allows ADMA reservoir engineers to monitor continuously the pressure and flow of these wells from their offices hundreds of miles away.

The wireless sensors transmit the data to vMonitor TotalAccess web-based software that provides the following features:

- Well overview performance screens (Fig. 6).
- Real-time well pressure and flow data and daily reports.
- Alarms and sensors for monitoring conditions at the well, such as the sen-

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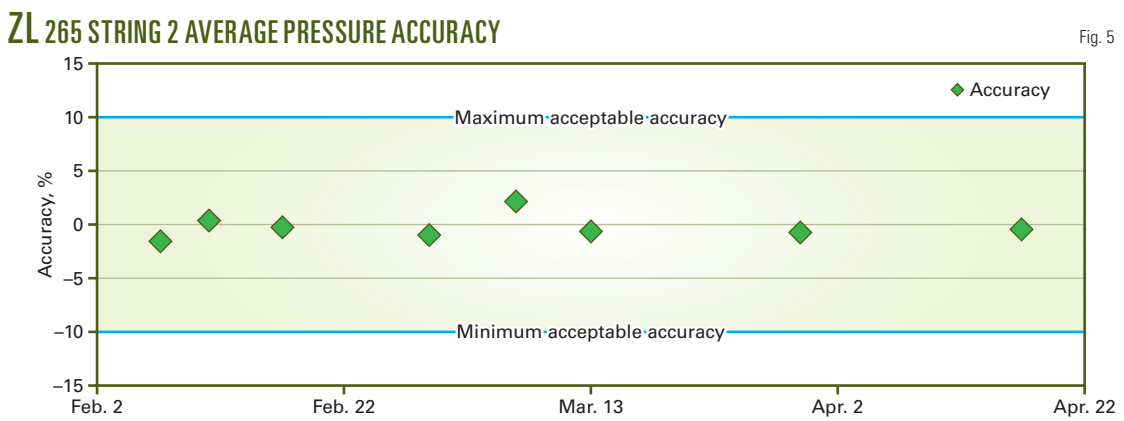

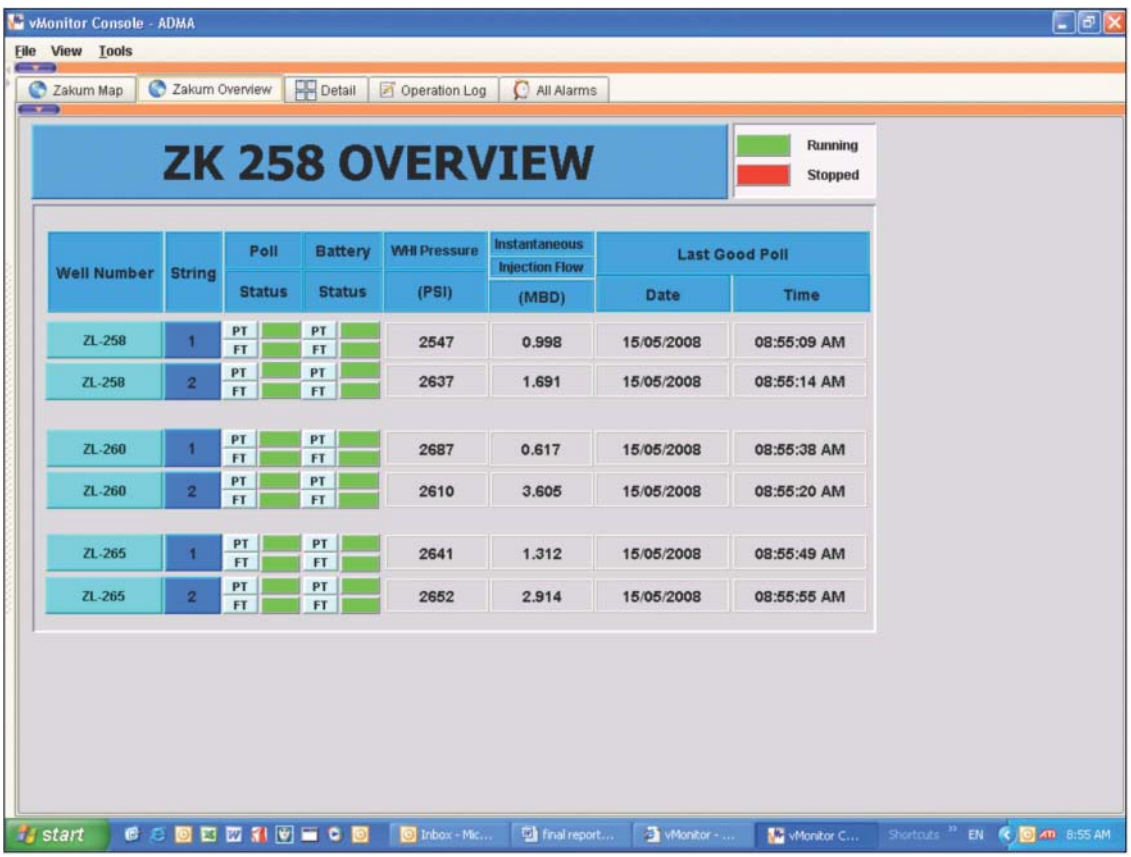

Software receiving data from wireless sensors allows engineers to monitor injection-well performance and sensor condition (Fig. 6).

sor battery condition.

Engineers use continuous live monitoring of water-injection flow rate and pressure for reservoir monitoring and simulation studies. This allows for better overall management of the reservoir for improving recovery. The system also allows production engineers to estimate the injected water amounts required to keep the reservoir producing oil.

Reservoir and petroleum engineers now can identify problems and act faster instead of having to wait for more than a week for information as with the present system of mechanical chart recorders.

Close monitoring of well performance trends can direct work activities to areas with identified problems and ensure that the problems are resolved before they expand and affect oil production.

The ADMA water-injection well monitoring and reservoir management system will move into the next phase of deployment in 2009.

The system has a wide range of implications on the ADMA's Zakum reservoir management enhancement initiative. Better reservoir management requires better well data for improving water injection and control. This leads to better diagnostics for improved well screening and detection and correction of water entry points among other things.

Availability of such data to reservoir engineers will help them detect fracture problems and faults between injector and producing wells. Monitoring can help in early detection of a common problems such as leaks in well casing and tubing.

They may also detect other problems including coning when excessive water moves into the oil production zone.

Many other parameters carefully observed in the reservoir can significantly affect production. Better data are critical for improved reservoir diagnostics and is important for enhancing recovery

that depends on oil displacement and sweep efficiency.

Reservoir engineers are now encouraging early intervention in water-injection control, whereas operations personnel traditionally did not interfere with the injection until a problem arose. ✦

The authors

Majid Al Braik is a control engineer and has worked for Abu Dhabi Marine and Operating Co. (ADMA-OPCO) since October 2000. His main interests are advanced control systems and wireless communication. Al Braik holds a BE in engineering systems control from University of Huddersfield, UK, and an ME in advanced control systems from University of Manchester, UK.

Hatem Nasr 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 including senior principal scientist and several research and management positions. He completed his PhD studies at the University of Minnesota in computer engineering, and obtained BS and MS degrees in systems engineering at the University of Houston.

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New regs require lower bunker fuel sulfur levels

John Vautrain
Purvin & Gertz
Singapore

Recently ratified International Marine Organization regulations that call for a decrease in the sulfur level of marine bunker fuels may cause refiners to invest in more desulfurization and conversion capacity. In the past, refiners have traditionally used the unregulated marine bunker fuel pool as a way to dispose of bottom-of-the-barrel streams high in sulfur.

This article reviews the current and future regulations for bunker fuel and the effect they will have on the global refining industry.

Bunker fuel

Marine bunker fuel comprises only about 5% or less of total global petroleum consumption. The product, however, has been an important outlet for difficult-to-handle, high sulfur residues as well as other undesirable streams such as slurry oils, low-quality distillates, and others.

Historically, bunker fuel quality was lightly regulated. The IMO historically did not regulate bunker fuel for emissions; instead regulations were to ensure ship and crew safety and operability of the ship's engines.

Regulation of marine fuel quality for environmental reasons is currently being adopted.

Since the 1970s, the IMO has controlled and sought to reduce the environmental impact from international shipping. The overall program comes under the International Convention on the Reduction of Pollution from Ships (MARPOL). That treaty has been in force for decades and has been effective in reducing waterborne pollution arising from oily water wastes, bilge-water disposal, tank-cleaning emissions, and others.

MARPOL has progressed despite the fact that the principal goal of shipping regulation has been safety. Measures intended to avoid disastrous accidents have had a good record of success. Now, however, the principal focus of new marine regulations is for air quality.

MARPOL Annex VI governs air pollution aspects of marine shipping. The original Annex VI introduced global bunker fuel sulfur limits at 4.5%.

MARPOL's Annex VI Amendments were adopted by the IMO's Marine Environment Protection Committee (MEPC) in April 2008 and ratified at the MEPC 58 meeting in October 2008. The Annex VI Amendments represent a step forward in controlling air pollution from marine sources. National legislation of maritime governments is needed to implement the Annex VI Amendments.

Annex VI amendments

Controlling sulfur is a key feature of the Annex VI amendments. Annex VI Amendments incorporate two features of bunker-fuel sulfur control.

First, Annex VI Amendments call for Emissions Control Areas (ECAs). The ECA feature can apply to either SOx or NOx. Thus far, ECAs have been designated only for SOx. The current SOx ECAs are the Baltic Sea Area and the North Sea-English Channel area.

The US, a signatory of MARPOL and Annex VI, proposes an SOx ECA for California, the Pacific Coast, and possibly other areas. Considerable work is required to fulfill all the IMO's data requirements for the ECA program. The US Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) are taking the lead in that process.

Until 2010, SOx emissions within the ECAs are limited to the level that would come from burning fuel at 1.5% sulfur. After 2010, the limit is 1.0% sulfur, until 2015 when the required level becomes 0.1% sulfur.

Annex VI Amendments provide for alternative means of meeting sulfur emissions requirements. Effective emissions scrubbing technology may allow shippers to use bunker fuels with higher sulfur levels.

The basic technology takes advantage

of naturally occurring calcium carbonate dissolved in seawater to remove SOx emissions. As part of the scrubbing process, soot, unburned fuel, and other particulates such as fuel-derived metals are also recovered in a waste material that can be disposed of onshore.

Formal approval of scrubbing technology has not occurred and ultimately may depend on approval of the maritime states' environmental and marine safety regulators.

Outside the ECAs, sulfur in bunker fuel is more tightly controlled than in the past.

The figure shows that the current limit is 4.5% globally. This will fall to 3.5% by 2012 and then to 0.5% in either 2020 or 2025. By 2018, a feasibility review will determine whether sufficient low-sulfur fuel will be available by 2020. If that review finds that insufficient fuel will be available, then the compliance data can be delayed to 2025.

Annex VI Amendments also call for the control of NOx (see table). NOx controls apply to large marine engines with power output of as little as 130 kw, about 175.

Unlike SOx, marine NOx emissions are only partly a function of fuel quality. Although bound nitrogen in fuel contributes to NOx, emissions originate also with atmospheric nitrogen. Controlling NOx emissions is more obviously related to the combustion process than SOx emissions and the engines are the focus of NOx emissions standards.

MARPOL Annex VI Amendment program anticipates new standards for ship efficiency and CO_2 emissions. Thus far, however, those efficiency standards have not been set. Several possible formats of greenhouse gas regulation and compliance are possible.

Regulating engine efficiency may seem like an obvious step. Opportunities for reducing maritime CO_2 emissions, however, go far beyond engine efficiency. Considerable CO_2 gains are possible with improvements in hull form, propeller design, hull and propeller coatings, vessel routing and speed optimization, and engine exhaust-heat recovery. Notwithstanding a lack of greenhouse gas regulation currently, ship operators have experienced a powerful incentive to minimize fuel consumption due to high prices alone.

In the US, bunker fuel regulation is moving as fast as it is internationally. The US is a signatory to the MARPOL treaty and in 2008 ratified Annex VI.

Regulation is moving forward on parallel state and federal paths. CARB adopted a new marine engine emissions regulation. That regulation would govern emissions in the offshore airshed areas of the South Coast air basin. Within 24 miles of the coast, ships are forbidden from using intermediate fuel oil (IFO) bunker fuel entirely and must burn solely marine gas oil or marine diesel. Sulfur content is limited to 0.1%.

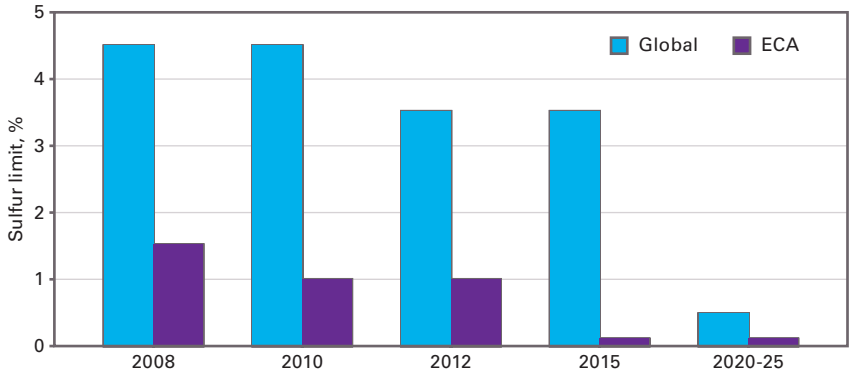
CARB, regulator of mobile emissions sources in California, is preparing a submission to EPA and IMO to have the Pacific Coast designated a SOx ECA under MARPOL Annex VI Amendments.

The US Congress has several bills before it to establish a nationwide sulfur emissions control area. The bills would control emissions from marine vessels entering US ports or offshore terminals.

House Resolution 2548 and companion Senate Bill S1499 would provide for low-sulfur fuels within 200 miles of the West Coast and also within an as-yet-undetermined distance from the US Gulf Coast and East Coast. The requirements of either bill could be met by use of alternative control technologies such as sulfur scrubbers.

Cleaner fuels could be required as early as 2011. Both bills would require "greatest degree of emissions reductions available" through available technologies for NOx and particulate matter among other air contaminants.

Bunker fuel sulfur limits



Key uncertainties

The effect of these regulations on the refining industry is still uncertain. Several key factors remain undetermined.

The SOx ECA program could expand considerably. SOx ECAs could be established in various areas around the world where ship-derived emissions contribute to onshore pollution problems. Such areas may include most of North America and European waters, including the Mediterranean and Straits of Malacca, and seas off Northeast Asia.

Nations will establish NOx ECAs. The areas likely to incorporate NOx ECAs are basically the same as the areas probable for SOx ECAs.

Suitability of scrubbing technology for both SOx and NOx must be established. Widespread application of scrubbing technology may limit the amount of low-sulfur fuel that needs to be manufactured while at the same time cap the price premium that might be paid for it.

Extent of greenhouse gas or CO_2 controls and interaction with other pollutants are as yet unknown. Production of low-sulfur fuels contributes CO_2 emissions at the refinery level, which must be accounted for and balanced

against gains in shipping. It is possible that more-efficient marine engines can be designed that burn higher-quality fuels.

Marine fuel quality requirements will change. The International Organization for Standardization (ISO) is undertaking that effort. Sulfur grades will be added and the detail of viscosity regulation will be simplified. More importantly, other aspects of fuel quality will be reevaluated.

New limits may be adopted for organic acid content (total acid number, TAN) in lieu of, or in addition to, the current limit on strong acid content. Introducing such limits may affect the use of high-TAN crude oils as convenient, low-priced feedstock for manufacturing low-sulfur marine fuels.

Nitrogen content may be regulated. Many heavy crudes such as Venezuelan or California grades commonly contain considerable nitrogen. Using those crudes to manufacture marine fuels may be affected depending on the stringency of any nitrogen specification that is adopted.

More-stringent standards on ignition characteristics may be adopted. Improving these characteristics may contribute to improved emissions levels. Fuel stability is important and improved stability standards are expected.

Possible new standards will more carefully regulate the use of non-refinery-derived blendstocks used for marine fuels. The marine fuels market long has been in part a disposal opportunity for unattractive stocks such as petrochemical wastes, oleochemical or biofuels wastes, recycled lube oil components, and others. The new ISO standards may directly ban some of these components.

A current problem for refiners is blending FCC slurry oils to bunker fuels. Slurry oils are attractive to bunker fuel suppliers partly because they usually are relatively low-sulfur stocks. Alumina and silica derived from the FCC catalyst in the slurry oils, however, creates problems with current bunker fuel requirements. The catalyst particles contribute to erosivity of the bunker fuel and increased stringency in that area may compound refiners' difficulties in this area.

Refining industry

The refining industry faces major obstacles in producing higher-quality marine fuels. The average sulfur content of IFO-grade marine fuels is currently more than 2.5%. Refiners may need to reduce the sulfur level to 0.5%.

In the short term, many refiners can blend acceptable fuels for the SOx ECAs. SOx ECAs comprise only a small portion of marine fuels burned currently.

A typical container ship traveling from Singapore to Rotterdam will burn about 7,500 tonnes of bunker fuel in 24 days. Only the last 400 miles of that journey are in SOx ECA waters. A cargo ship traveling from Shanghai to Los Angeles travels about 5,800 nautical miles, of which the last 24 miles are in the sulfur-control area.

Although problems of fuel availability and segregation must be resolved for such vessels, the refining industry faces only a minor obstacle to produce small fractions of bunker fuel at current or 2010 ECA-quality levels. The new global bunker sulfur specification of 3.5% in 2012 will affect about 15% of bunker fuel from high-sulfur crudes. The preponderance of fuel already meets the requirement.

The longer term difficulties are greater. Less than 5% of current bunker fuel production meets the 0.5% sulfur level. Producing SOx ECA fuel to a 0.1% sulfur level will be quite difficult. Will low sulfur IFO be produced or will marine gas oil-type distillate materials largely displace IFO fuels?

Although running lower-sulfur crudes can help some refiners ease some refining difficulties, crude slate will not be a major contributor to solving marine fuels quality issues in the long term. Unlike diesel, gasoline, or stationary-application fuel oil, marine fuels are global. The same set of regulations is governing quality all around the world at the same time. When the 0.5% global specification comes into force, all bunker fuel producers will face the same problem at the same time and crude selection will play only a minor role.

Desulfurizing fuel oil components to the levels required is problematic. Capital and operating costs for desulfurization are high.

Although the technology exists to desulfurize residual fuels to low levels, it is not practiced to these levels in ordinary commercial fuel oil practice. It is an open question what role desulfurization may play to help produce needed fuel qualities.

The shipping industry understands that fuel quality in the 0.1-0.5% range probably implies refiners using conversion technology, not just desulfurization. Marine engines run effectively on marine gas oil as an alternative to IFO-grade residual fuels. Such fuels now are used for a minor fraction of ship fuels. Will ship owners be willing to pay the higher cost of marine gas oil fuels in such large quantities?

Of the conversion technology families available to refiners, coking and hydrocracking have the most obvious application to the marine fuels problem. It is the nature of bunker fuels that the lowest-quality conversion feedstocks often are directed to bunker fuels to preserve higher-quality resids and gas oils for conversion processing in exist-

ANNEX VI AMENDMENTS NOX

Tier	1	2	3
Application	Ships built after Jan. 1, 2000	Ships built after Jan. 1, 2011	Ships built after Jan. 1, 2016, and operating in NOx ECAs
NOx limit, g/kw-hr	17	14.4	3.4

ing equipment. As compared to desirable resid FCC feedstock, typical bunker fuel is high sulfur, high asphaltene, and high metals.

Coking technology often is found most applicable to low-quality feedstocks. Coking is tolerant of the lowest quality ranges and can solve a refiner's requirement of residue destruction effectively.

Hydrocracking technology offers the needed flexibility of products that is more difficult to achieve with FCC-based technologies. Global demand growth patterns have increased demand for distillate fuels and lowered gasoline demand. Consequently, the typical gasoline-heavy product pattern for FCC technology is not highly oriented to the refinery output required. Indeed, converting marine IFO fuels to low-sulfur fuels could add as much as 200 million tonnes/year to distillate fuel demand at the expense of residual fuel.

Outlook

Refiners require a clear signal from the shipping industry as to the quality of fuel required. The schedule is the most daunting obstacle, providing 11-16 years for the refining industry to respond. Still, only limited progress is possible until key decisions are made.

Regulators must come to a decision on the detailed acceptability of all the various scrubbing technologies for NOx and SOx. Rapid determination of the boundaries and any tighter national requirements for NOx ECAs and SOx ECAs would be helpful to all parties to resolve the optimal means of meeting regulatory requirements while still providing cost-effective fuels and shipping services.

Ship owners must determine the extent to which they will install such technologies and what types of fuel they will require for the fleet. Of course that decision depends on the costs of the various fuels from the refining industry.

Refiners must enter into a dialogue with the shipping industry. IMO and ship owners need information on the costs of alternatives in order to make beneficial decisions.

The IMO program for a "feasibility" review in 2018 is too late to constitute the signal the refining industry requires. Whenever the IMO undertakes its review, the purpose will be to confirm for the shipping industry that enough fuel is ensured, not to confirm for the refining industry that enough demand exists.

The US refining industry must undertake its own review of marine fuels requirements to determine how these programs will affect US refiners and the best position for the refining industry to take on this global issue. ✦

The author

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Arctic field test offers method for estimating pipeline heave

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Pipeline heave in cold environments is influenced by the transition zone between permafrost zone (frozen soil) and nonpermafrost zone (unfrozen soil) as well as the heaving behavior of the unfrozen soil in response to an advancing frost front. Operating a chilled pipeline in the transition zone between soils with different frost-heave susceptibilities faces problems. These transition zones often lead to pronounced differential heave in the pipeline, inducing stresses.

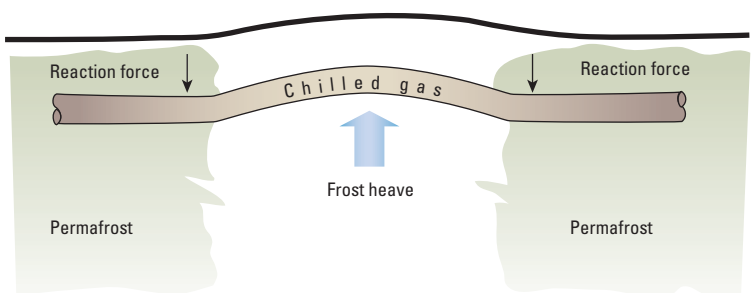
Chilled pipelines have become more necessary as interest in transporting natural gas from northern energy fields has grown. Natural gas transported via pipeline from these fields will encounter both continuous and discontinuous permafrost regions. Chilled gas pipelines prevent permafrost thawing. A new problem, however, arises: the freezing of previously unfrozen soil and associated frost heave (Fig. 1).

Papers presenting the results of the Calgary frost heave chilled pipeline experiment, the Caen, France, chilled pipeline experiment, and the Northwest Alaska Pipeline Ltd., chilled pipeline experiments give a good overview of problems and concerns related to

Based on presentation to the 7th International Pipeline Conference, Calgary, Sep. 29-Oct. 3, 2008.

CHILLED PIPELINE FROST HEAVE

Fig. 1



chilled pipelines.[1-6] The literature generally accepts that natural gas would be chilled through continuous and discontinuous permafrost zones.

Continuous permafrost zones would have little effect on a chilled pipeline. But operating a chilled pipeline in the transition zone between soils with different frost-heave susceptibilities poses problems. These transition zones often lead to pronounced differential heave in the pipeline, inducing stresses.

Differential heave also leads to questions regarding how much frost heave may occur over the design life of a pipeline and whether it will be within allowable ranges for pipe deformation. These questions in turn govern many design and operational considerations.

This article addresses thermal patterns and pipeline-ground movements found by placing a 105-m long, 0.9-m OD steel pipeline across a transition zone between thawed and permafrost soils, typical of discontinuous permafrost regions. This article also analyzes pipeline deformational behavior and strain induced by soil heave.

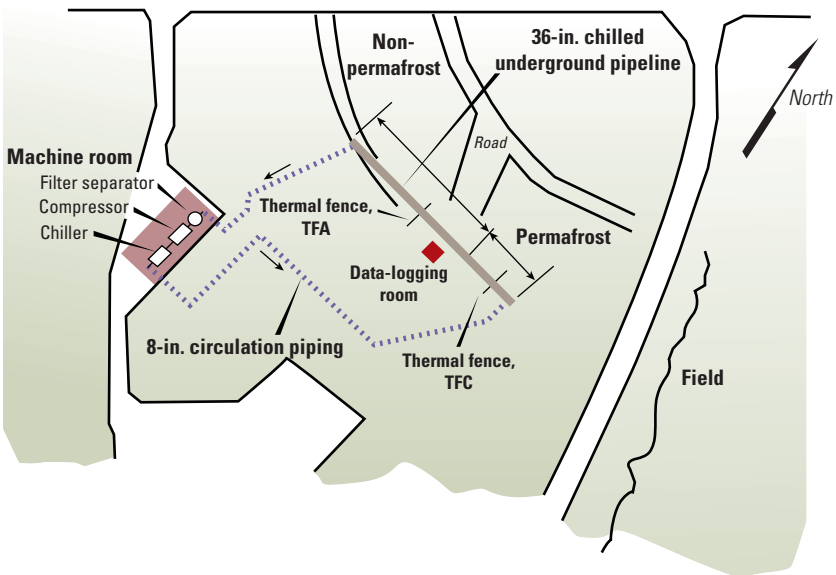
The Japan Science and Technology Corporation (JST) operated and funded the full-scale field experiment facility in cooperation with the University of Alaska Fairbanks. The test pipeline is about 10 km from Fairbanks at the old Northwest Alaskan Pipeline Ltd., Fairbanks Frost Heave Facility. The prevalence of discontinuous permafrost regions in interior Alaska, western Yukon Territory, and Siberia make this field experiment of current interest to the worldwide oil and gas industry.

Test facility

Construction of the 0.9-m OD, 105-m long chilled pipeline test facility, using API 5L X-65 grade steel with 8.5-mm WT, occurred near Chena Hot Springs Road in Fairbanks in December 1999. Fig. 2 shows the general alignment of the pipeline at the test facility. Low, gently rolling hills dominate the terrain to the north of the facility, while to the south the terrain changes into the Chena River floodplain. The facility

TEST FACILITY LAYOUT

Fig. 2



EQUATIONS

$$EI\frac{d^4y_1}{dx^4} + E_{s1}\cdot(y_1 - \delta_1) = 0 \text{ (permafrost zone)} \quad (1)$$

$$EI\frac{d^4y_2}{dx^4} + E_{s2}\cdot(y_2 - \delta_2) = 0 \text{ (nonpermafrost zone)} \quad (2)$$

Boundary condition:

$$x = 0\ y_1 = y_2\ \frac{dy_1}{dx} = \frac{dy_2}{dx},\ \frac{d^2y_1}{dx^2} = \frac{d^2y_2}{dx^2},\ \frac{d^3y_1}{dx^3} = \frac{d^3y_2}{dx^3} \quad (3)$$

$$x \to -\infty\ y_1 = \delta_1 \quad \frac{dy_1}{dx} = 0 \quad (4)$$

$$x \to \infty\ y_2 = \delta_2 \quad \frac{dy_2}{dx} = 0 \quad (5)$$

Solution of (1) and (2) yields (6) and (7), by which pipeline displacement can be calculated.

$$y_1 = e^{\alpha x}\cdot(A_1\cdot\sin\alpha\cdot x + A_2\cdot\cos\alpha\cdot x) \quad (6)$$

$$y_2 = e^{-\beta x}\cdot(A_3\cdot\sin\beta\cdot x + A_4\cdot\cos\beta\cdot x) \quad (7)$$

$$\alpha = \sqrt[4]{\frac{E_{s1}}{4EI}} \quad \beta = \sqrt[4]{\frac{E_{s2}}{4EI}} \quad (8)$$

$$A_2 = \frac{\beta^2}{\alpha^2+\beta^2}\cdot(\delta_2 - \delta_1) \quad (9)$$

$$A_1 = \frac{\beta^2}{\alpha^2+\beta^2}\cdot\frac{\alpha-\beta}{\alpha+\beta}\cdot(\delta_2 - \delta_1) \quad (10)$$

$$A_3 = -\frac{\alpha^2}{\alpha^2+\beta^2}\cdot\frac{\alpha-\beta}{\alpha+\beta}\cdot(\delta_2 - \delta_1) \quad (11)$$

$$A_4 = -\frac{\alpha^2}{\alpha^2+\beta^2}\cdot(\delta_2 - \delta_1) \quad (12)$$

Bending stress in pipe can be calculated using the following equations:

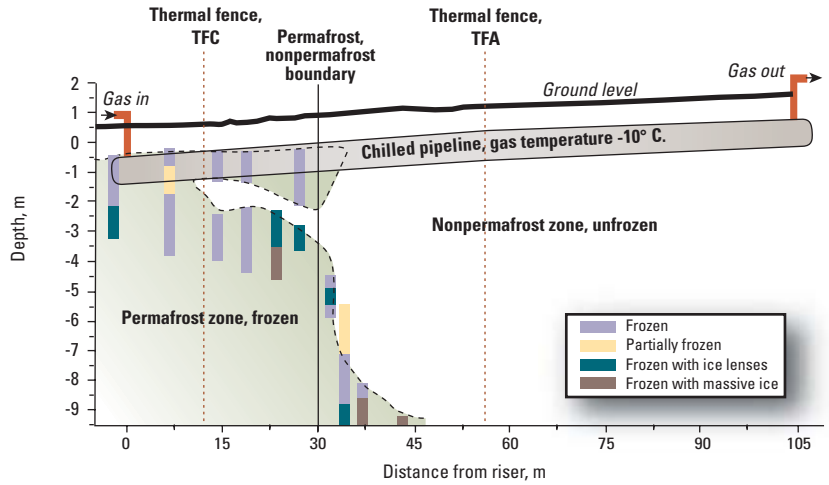
$$\sigma_1 = -E\cdot D\cdot\alpha^2\cdot\frac{\beta^2}{\alpha^2+\beta^2}\cdot\Delta\delta\cdot e^{\alpha x}\cdot\left(-\sin\alpha x + \frac{\alpha-\beta}{\alpha+\beta}\cdot\cos\alpha x\right) \quad (13)$$

$$\sigma_2 = -E\cdot D\cdot\beta^2\cdot\frac{\alpha^2}{\alpha^2+\beta^2}\cdot\Delta\delta\cdot e^{-\beta x}\cdot\left(-\sin\beta x + \frac{\alpha-\beta}{\alpha+\beta}\cdot\cos\beta x\right) \quad (14)$$

$$\Delta\delta = \delta_1 - \delta_2 \quad (15)$$

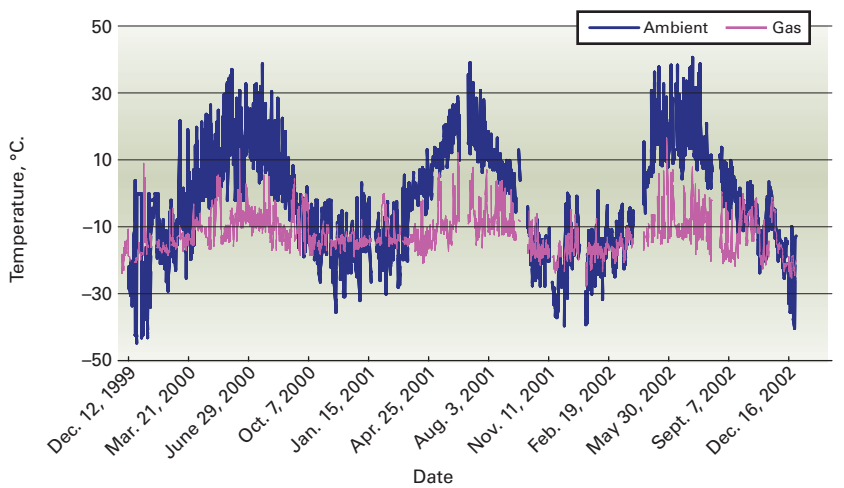
TEST FACILITY PERMAFROST, SOIL CONDITIONS

Fig. 3



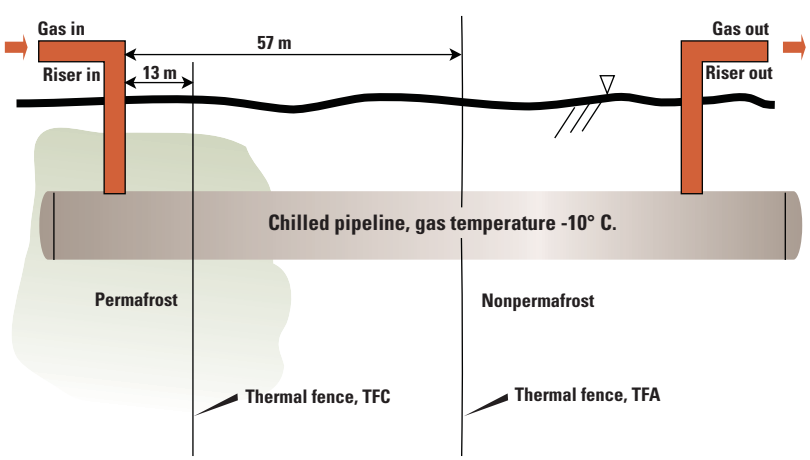
TEST LINE TEMPERATURES

Fig. 4



THERMAL FENCE LOCATIONS

Fig. 5



itself lies in the gently sloping transition between the two terrains.

The experimental pipeline rests about 1.8 m below the surface, with backfill of dry sand around and on top of the pipe, including an additional 0.9 m of crushed in situ soil and a thin crown of uncrushed in situ soil. The first 30 m of the pipeline cross shallow permafrost and the remaining section is in unfrozen ground (Fig. 3).

Operating conditions

Test pipeline operations started in December 1999 and ended in December 2002. Table 1 summarizes operating conditions. Fig. 4 shows gas temperature fluctuations inside the pipeline and surrounding air temperature.

Instrumentation included installation of 150 thermistors, 40 strain gauges at 11 locations along the pipeline, 24 heave rods welded to the top of the pipeline, 5 heave gauges installed below the pipeline, and several other types of soil settlement detection devices. Monitoring of heave rods occurred once every 2 weeks with a rotating laser-leveling device. Three automated data-acquisition systems recorded temperatures and strains twice daily.

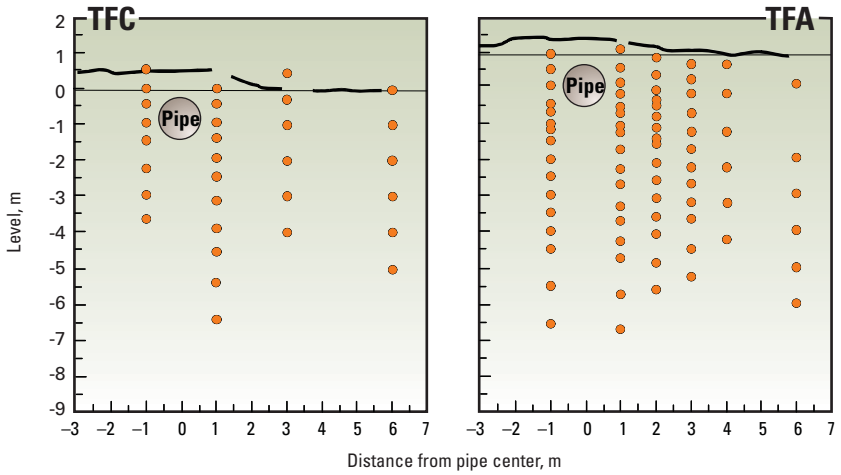
Temperature monitoring

One hundred thermistors located in two of the three thermal fences monitored changes in the soil system (Figs. 5-6). Thermal fence A ran through the initially unfrozen zone and thermal fence C ran through the shallower permafrost region.

Thermal fence A, 58 m from the inlet riser, contains six thermistor strings with depths ranging from 0.14 to 8.14 m (elevation of 1.13 to –6.87 m) beneath the surface. Thermistor spacing ranged from 0.25 to 1.0 m with the closer spacing occurring near the pipeline. Thermal fence C, located 13 m from the inlet riser in the permafrost zone, contains four thermistor strings with depths ranging from 0.04 to 7.00 m (elevation 0.54 to –6.42 m) beneath the surface. Thermistor spacing ranged from 0.5 to 1.0 m. Nine thermistors

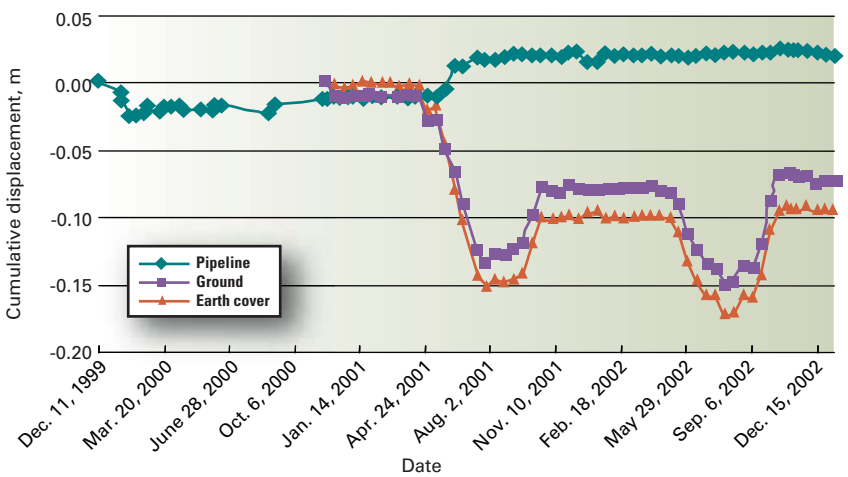
THERMISTOR PLACEMENT, FENCE CROSS-SECTION

Fig. 6



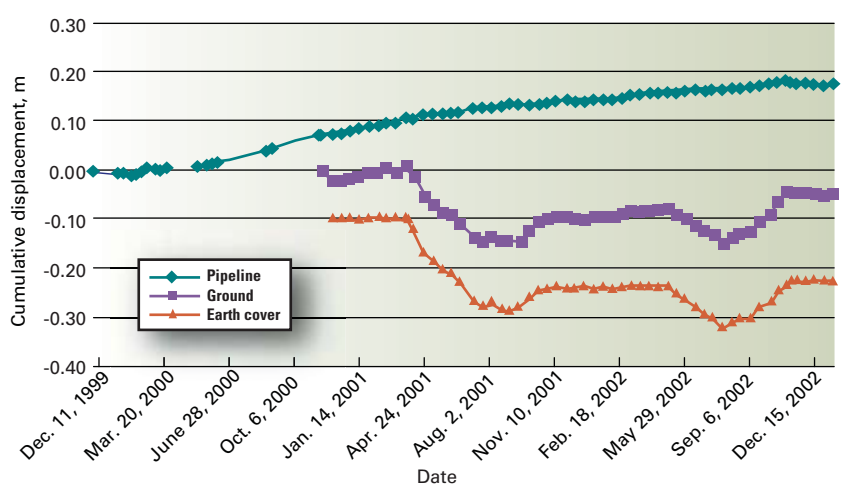
MOVEMENT, PERMAFROST ZONE

Fig. 7



MOVEMENT, NONPERMAFROST ZONE

Fig. 8



ran along the outside of the pipeline to monitor temperature variation of the pipeline itself.

Displacement, strain

Monitoring vertical displacement of the ground surface required placing six heave plates on the ground. Twenty-four heave rods (HR) welded directly to the top outer surface of the pipeline between 0 and 52.7 m from the inlet riser monitored movement of the pipeline. The highest concentration of heave rods lay near the assumed transition zone.

Two independent benchmarks referenced elevation. Each consisted of 7.6-m long, 16 mm steel rebar. Benchmark installation in permafrost to the south of the pipe placed about 6.6 m underground and about 1 m above ground. A 50-mm OD PVC pipe surrounded the upper 3 m of each benchmark to reduce active layer effects. A 150-mm OD PVC pipe placed over the above-grade portion of each benchmark served as a protective casing. The assumed reference elevation for analysis purposes was 1 m.

Monitoring induced strain used 40 strain gauges attached to the pipe surface.

Thermal analysis

In the permafrost zone (TFC), soil remains frozen through the year, except for the top 1 m, which becomes unfrozen in the summer. In the nonpermafrost zone (TFA) the thaw depth extends deeper in the summer but all soil remains frozen in winter.

A 2D thermal simulation model conducted numerical simulation for the full-scale experiment. Before the 2D thermal simulation, simplified 1D simulation determined adequate parameters for thermal simulation.

Field data matched well with both the simulation results and analytical solution, implying that these methods of simulation or analysis could be applied to design. The parameters used (Table 2) provide a good reference for the actual design stage.

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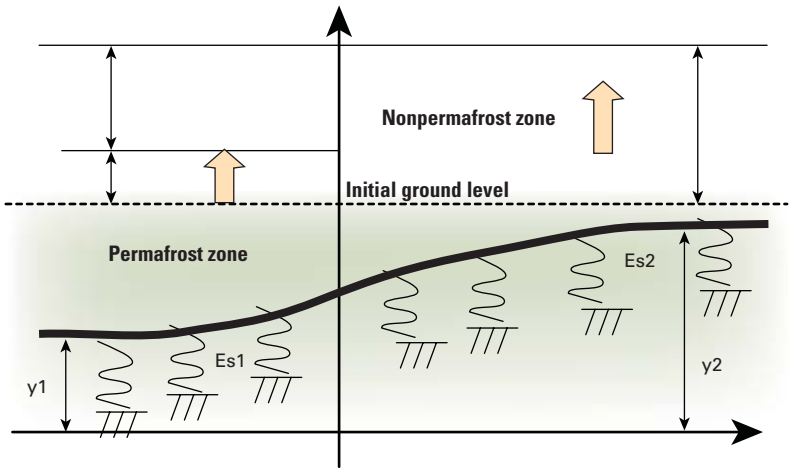
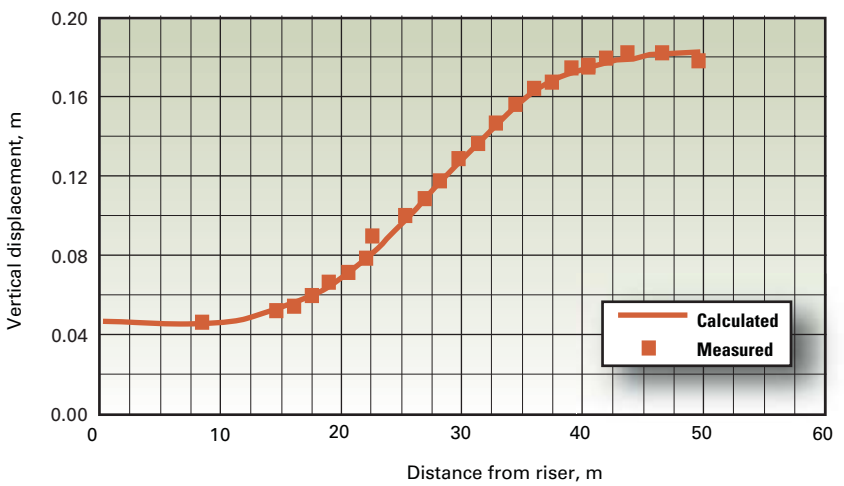
STRUCTURAL MODEL

Fig. 9



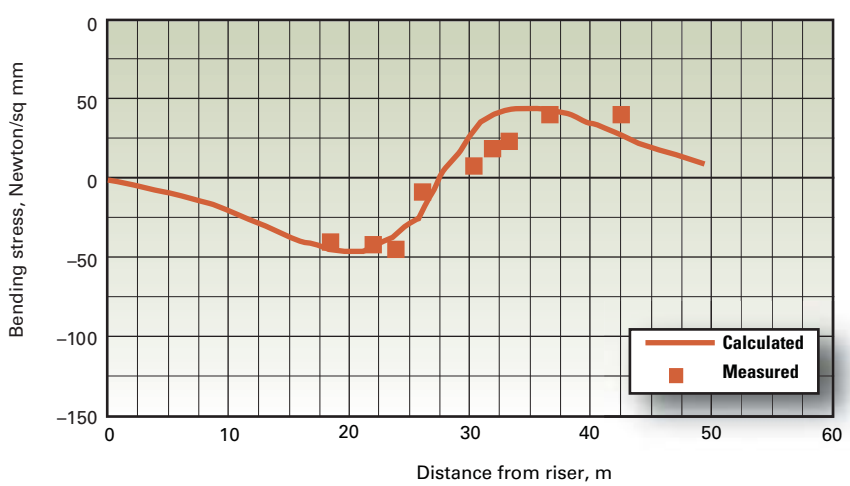
DEFORMATION CONFIGURATION

Fig. 10



BENDING-STRESS DISTRIBUTION

Fig. 11



Pipeline movement

Heave rods (HR) welded directly to the top of the pipeline monitored pipeline movement. HR-1 stood 8.5 m from the inlet riser and HR-24 52.7 m away. Pipeline vertical displacement is relatively large in the nonpermafrost zone. The largest displacement occurred at HR-22 (45 m from the riser), with an incremental displacement during 3 years monitoring of about 0.2 m. The minimum movement within the permafrost section measured 0.049 m, resulting in a differential heave of 0.148 m. Maximum heave occurred next to the permafrost-unfrozen transition and not solely in the deep permafrost zone. Pipe-bending stress assumed an S-shaped distribution, with a maximum stress measuring 50 Newton/sq mm.

Fig. 7 shows chronological displacement of pipeline and ground surface together with the change of earth cover in permafrost zone. Fig. 8 displays the same in a nonpermafrost zone.

Pipeline analysis

The field experiment showed greater upward displacement in the nonpermafrost sections than in the permafrost section, causing an S-curve shaped pipeline deformation near the boundary between the two. Chilled-pipeline design requires analyzing pipeline deformation and induced stress near permafrost and nonpermafrost boundary using the proper structural mode.

Common practice models a pipeline as a beam supported by elastic springs. A similar approach allows analysis of pipeline deformation near the permafrost and nonpermafrost boundary.

Fig. 9 shows the structural model of chilled pipeline near a permafrost and nonpermafrost boundary. In the model, $\delta 1$ and $\delta 2$ represent upward displacement at permafrost section and nonpermafrost boundary section respectively. Greater frost heaving increases $\delta 2$.

Pipe-soil interaction is modeled by elastic springs (Es). The accompanying equations calculate chilled gas pipeline deformation due to frost heave. Applying the structural model to an actual

TEST PIPELINE OPERATING CONDITIONS Table 1

Pressure, MPa	15
Temperature, °C.	Average, –10; Typical, –35 to 15
Ambient temperature, °C.	Actual, –40 to 40; Typical, –20 to 20
Duration	December 1999 to December 2002

RECOMMENDED THERMAL ANALYSIS PARAMETERS Table 2

Thermal conductivity, frozen soil	13 W/mK.
Thermal conductivity, unfrozen soil	0.98 W/mK.
Specific heat, frozen soil	2,000 J/kgK.
Specific heat, unfrozen soil	1,275 J/kgK.
Latent heat	140 MJ/m, R

design stage of a chilled gas pipeline requires appropriate values for Es1 and Es2. Multiple parameter studies found Es1 = Es2 = 300,000 Newton/sq m provides good agreement with the pipeline deformation shape and pipe-bending stress distribution obtained in the field experiments (Figs. 10-11).

Acknowledgments

This research project was operated and funded by the Japan Science and Technology Corp. in cooperation with the University of Alaska Fairbanks. ✦

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CRUDE EXPORT RISER— Conclusion

Pipeline design allows continued use beyond field's life

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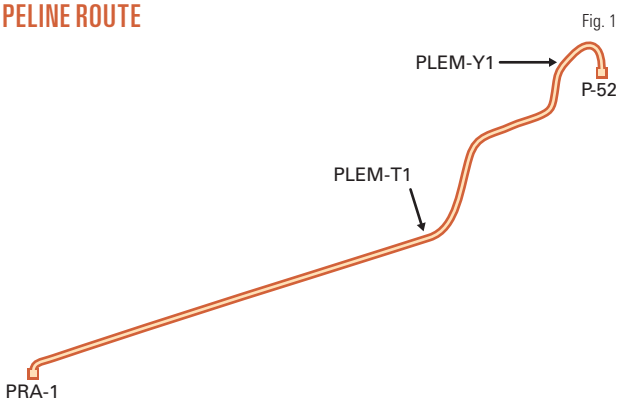
V.C. Mello
L.F. Marques
Petrobras
Rio de Janeiro

PIPELINE ROUTE

Fig. 1

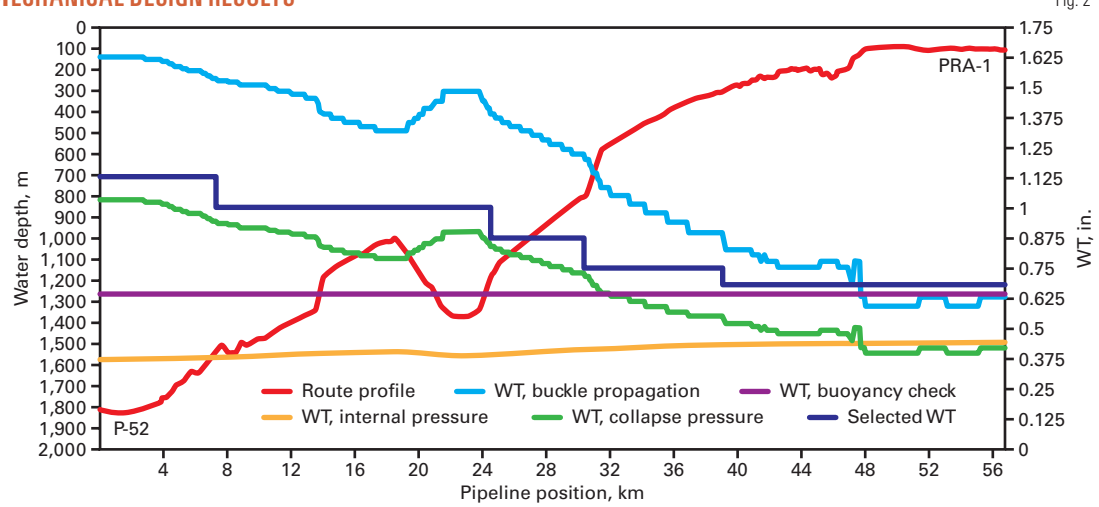


The export pipeline system includes two modules permitting future connections and another serving as a contingency for the freestanding hybrid riser (FSHR), making the infrastructure flexible enough to be used in its full capacity after the original field is depleted. A pipeline end termination (PLET) begins the line, which is connected to the FSHR base by a rigid-base jumper (RBJ). The line splits in four major sections to allow for subsea equipment installation and is terminated by a by-pass pipeline end manifold (PLEM), directing the flow to an FSO prior to PRA-1 commissioning and redirecting it afterwards.

The first article in this three-part series described the FSHR in detail before examining its design and installed responses (OGJ, Nov. 10, 2008, p. 58). The second article detailed FSHR installation and monitoring (OGJ, Nov. 17, 2008, p. 56), with this concluding article discussing its integration with the export pipeline.

MECHANICAL DESIGN RESULTS

Fig. 2



Design basis

Designed under DNV OS-F101 2000 and in accordance to API 5L 2000 for a life in service of 25 years, the 18-in. pipeline can sustain internal and external pressure, as well as local buckling and collapse, to a depth of 1,800 m. WT measures 0.688, 0.750, 0.875, 1.000, and 1.125 in. at various points along the pipeline. Corrosion protec-

tion and thermal insulation consist of a triple-layer FBE-adhesive-solid polypropylene (SPP) and an additional 2-in. SPP to achieve an overall heat transfer coefficient of 5.2 W/sq m K. A 2-in. thick polyurethane layer over primer coats all field joints.

Temperature proved to be a major design driver due to the thermo-buckling effect which causes lateral buckling and pipeline walking. Table 1 shows operating data.

OPERATING PARAMETERS Table 1

	Min.	Max.
Design temperature, °C.	0	70
Design pressure, MPa	0.1	11

Three in-line structures placed along the pipeline between P-52 and PRA-1 provide contingency relief.

- PLEM Y, to make a direct connection from P-52 to the pipeline through a flexible riser.
- Rigid jumper, providing an additional entrance to allow future development.
- PLEM T, for use as an entrance flow for future pipeline installations.

Analysis, design

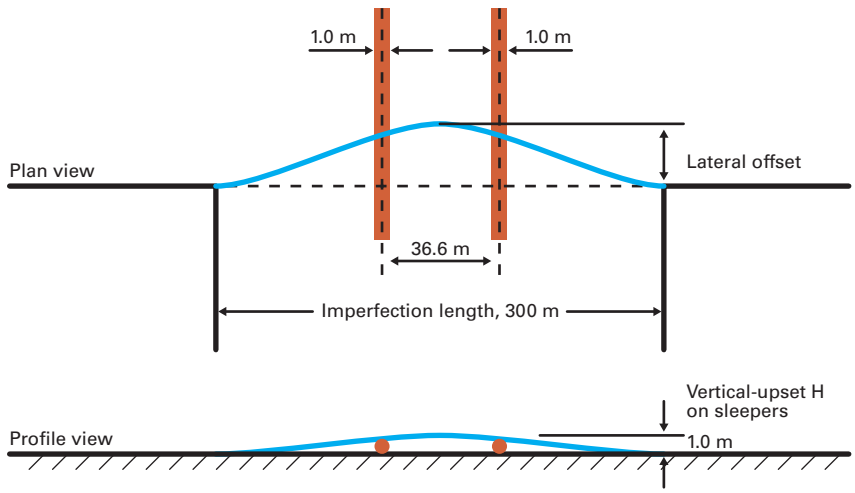
Pipeline analysis and design requires definition of the route, including soil and stability evaluations, to find the best route for keeping risks minimal while also reducing constraints on the lay vessel's capabilities. Petrobras chose the general route used to avoid both natural obstacles and existing or to-be-installed Roncador subsea structures. Route optimization focused on minimizing material and resource use through assessment of free spans, on-bottom stability, crossings, and slope. Results showed minimum curve radius and other installation restrictions to be met by the pipelay vessel.

Fig. 1 shows the pipeline route. Project engineering addressed stability of both equipment and pipeline, taking estimated friction coefficients into account to evaluate risks and optimize routing. Bottom roughness analysis showed 21 free spans requiring remediation; 5 with mechanical supports and 16 with grout bags. Sensitivity analysis on design parameters along the pipeline route included uncertainties regarding soil parameters and lay conditions along different paths inside the pipeline corridor. Results showed a greater number of free span corrections for any of the other possible routes, concluding the selected route was the best option.

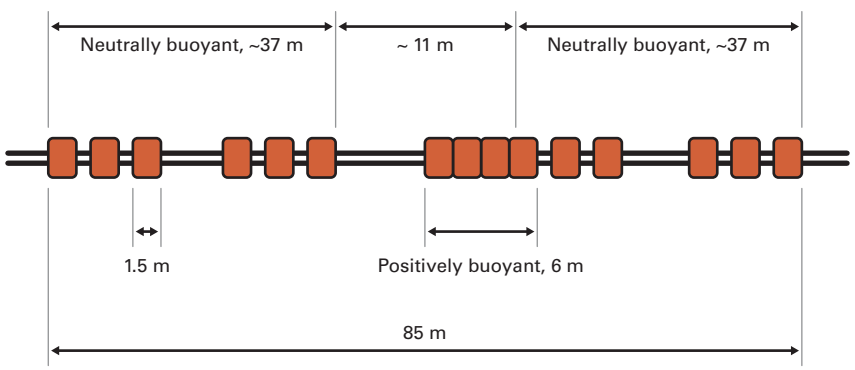
WT calculations accounted for internal pressure and potential collapse, checking results for buckling propagation. Local buckling limits determined the maximum bending moments and strains to which the pipe could be subjected. Selected thicknesses address internal pressure and collapse, but not buckle propagation, making buckle arrestors mandatory.

Fig. 2 shows mechanical design and route profile.

DUAL SLEEPER CONFIGURATION Fig. 3



DISTRIBUTED BUOYANCY Fig. 4



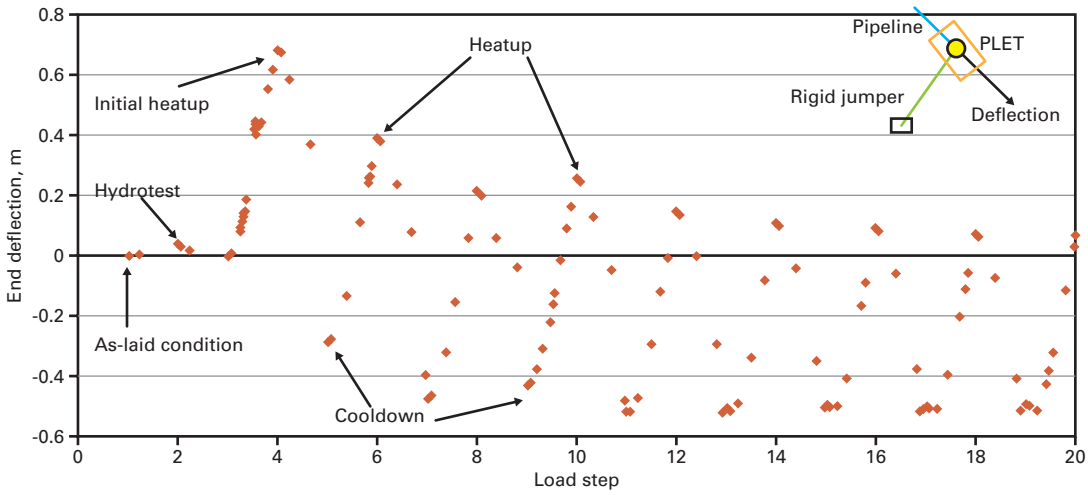
Thermomechanical analysis

High temperature-high pressure pipelines may face high loads-strains due to the thermomechanical behavior. Moreover, issues like end expansion, thermal cycle fatigue, ratcheting, and longitudinal walking, among others, can cause severe damage to the entire flow system if it is not properly designed.

Soil-pipeline interaction, pipeline expansion, maximum stresses and strains, girth-weld fatigue, pipeline axial-lateral ratcheting, free-span assessment, buckling initiation, pipeline crossings, and FEA model details provide the primary

PLET END DEFLECTION AT P-52

Fig. 5



bases for describing methods and parameters required for expansion design.

Deep water and soil conditions often make methods such as burial or rock dumping impractical or overly expensive. More equipment on the line makes it more difficult to design for thermal expansion. Three design goals therefore become paramount:

- Large axial (longitudinal) end deflection.
- Global lateral buckling and fatigue.
- Axial-lateral ratcheting.

Excessive axial-lateral distortion of the line can cause severe damage. As the ends are allowed to expand, axial soil resistance builds toward the middle of the line until lateral buckling occurs. If this phenomenon remains uncontrolled, local buckling may result and even plastic collapse of the cross section or fatigue failure at girth welds become possible due to cyclic thermal loading.

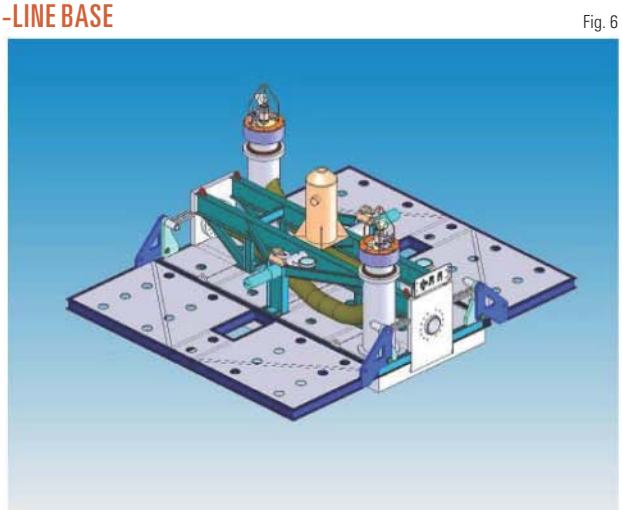
Planning to initiate global buckling at certain points of the pipeline can reduce stress-strain and avoid undesired effects. Installing buoyancy sections and sleepers (short pipes to provide vertical upsets) can reduce lateral resistance between the pipe and the soil, effective in reducing buckling curvatures and stress ranges across a number of heating and cooling cycles.

P-52 oil export pipeline runs at a high temperature gradient of up to 70° C. as well as cyclic thermal loads due to planned oil-flow shutdowns. A complete FEA assessment of lateral buckling, ratcheting, and walking showed the need to use lateral buckling mitigation to avoid these problems. Both sleepers and buoyancy modules were chosen to overcome lateral buckling effects and a suction pile at P-52 location controls pipeline walking.

Finite-element software ABAQUS constructed a full three-dimensional model of the pipeline. The model includes seabed terrain effects and several operational heating and cooling cycles. In-line structures, jumpers, pipeline crossings, and lower and upper-bound soil properties were included in the model to best describe the system. Because the entire 56-km pipeline with all boundary conditions proved unmanageable for a single detailed FEA run, we split it into four segments long enough to be manageable and still correctly

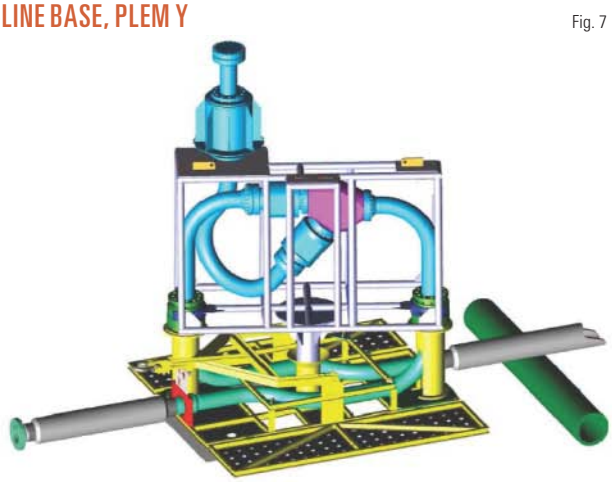
IN-LINE BASE

Fig. 6



IN-LINE BASE, PLEM Y

Fig. 7



represent global behavior.

Buckle initiation and mitigation applied along the route (across each of the four segments) absorb midline thermal expansion in a controllable manner by applying buoyancy modules and dual sleepers at discrete locations to work as planned points for global buckle initiation. Detailed FEA assessed midline expansion in global buckles, whether planned or unplanned, and determined if project requirements were met.

The first approach used standard single sleepers, but these did not meet fatigue acceptance criteria due to in-line and cross-flow vortex-induced vibration effects. The dual sleeper configuration met acceptance criteria (Fig. 3). The pipes are about 30-m long with a vertical upset of about 1 m. Ten dual sleeper sets previously laid and six distributed buoyancy sections (Fig. 4) are the mitigation devices. The distributed buoyancy makes the line almost neutral buoyant; reducing lateral friction and permitting lateral buckle initiation.

Pipeline walking

Pipeline walking also needs to be mitigated. Cyclical thermal loads from shutdowns and start-ups of the system tend to displace the PLET at the FSHR base from its original position. The PLET would displace about 2 m (retraction) along the pipeline axis if no control device were present in the soft-soil condition (more conservative). The same 5-m OD, 17-m long suction pile installed for pipeline lay initiation limits pipeline end displacement to about 0.5 m.

Fig. 5 shows PLET displacements. Walking direction is from the hot end (P-52) towards the first buckle location.

Pipeline installation

The J-lay method's ability to manage large loads, in this case due to a combination of water depth and pipe weight, led it to be chosen for pipeline installation. The method positions prefabricated 48-m quad joints of pipe into the J-lay tower where they are welded to another quad joint before the 96-m assembled pipe length is deployed into the sea. The process results in a free-hanging catenary from seafloor to the vessel.

The hang-off module supports the pipeline during J-lay operations and is the final attachment point before the line moves into free-catenary suspension. Vessel crew can move the module fore and aft, adding the flexibility needed to deploy such structures as in-line bases.

Pipelay took place with the line empty from 1,800 m to about 760 m. Stability issues prompted a flooded lay from 760 m to 100 m. Shallower depths required adjustments to the J-lay tower angle to avoid excessive loads potentially hazardous to the pipeline. Angles varied from 83° to 61°.

PLEM, base

Petrobras first considered connecting any equipment along the pipeline (PLEM Y, rigid jumper, and PLEM T) to the line with rigid-base jumpers to deal with thermal expansion. This approach, however, required thermomechanical analysis results at an early stage of design; leading to potentially complex geometry and RBJs too heavy for the installation vessels. This alternative's large number of connections also posed a potential leak problem. Adopting in-line structures helped overcome these problems by allowing equipment design and thermomechanical analysis to be performed in parallel.

Fig. 6 shows an in-line base (ILB) composed of piping, two mandrels, and a guiding system for the valve module connection, installed after deployment of the ILB. The PLEM Y (Fig. 7), rigid jumper, and PLEM T have the same ILB structure, allowing interchangeability and simplifying design and installation.

ILB installation involved positioning the structure on the J-lay tower, aligned to the pipe end of the catenary supported by the hang-off module. Welding the pipeline to the ILB preceded lowering the assembly into the water and welding another quad joint to its upper end, continuing the J-lay process. ✦

Pride International Inc.,

Houston, has appointed new financial, legal, and human resources managers in Pride's mat-supported jack up rig business. Steven A. Manz has been appointed vice-president and CFO, Alejandro (Alex) Cestero has been appointed vice-president and general counsel, and Oscar German has been appointed vice-president, human resources. The management decisions follow the recent appointment of Randall D. Stilley to CEO of the business.

Stilley is a 32-year veteran of the oil field services industry. From October 2004 through June 2008, he served as president and CEO of Hercules Offshore Inc. Prior to that, he was president and CEO of Seitel Inc. and held management positions with Weatherford International and Halliburton Co. Stilley is a member of the Society of Petroleum Engineers and a past chairman of the Petroleum Equipment Suppliers Association's Gulf Coast and Far East region chapters. He holds a BS in aerospace engineering from the University of Texas at Austin and currently serves as nonexecutive chairman and a director of ThruBit LLC.


Stilley

Manz was most recently a director of research for the investment bank Simmons & Company International until August 2008. From January 2005 to September 2007, he was with Hercules Offshore, where he last served as senior vice-president of corporate development and planning and previously was CFO. From May 1995 to January 2005, Manz was with Noble Corp., where he served in a variety of management roles. He holds a BBA in finance from the University of Texas at Austin.


Manz

Cestero currently serves as deputy general counsel, business affairs, and assistant secretary for Pride International and has been with the company since April 2002. He has been responsible for legal oversight of the operational, commercial, and general legal affairs of Pride's worldwide operating divisions, as well as legal oversight of Pride's strategic and business development transactions. Prior to joining Pride, he was with Bracewell & Giuliani LLP and Vinson & Elkins LLP. Cestero earned his JD from Stanford Law School and has a BA and MBA from Rice University.


Cestero

German currently serves as director, human resources, Western Hemisphere, for Pride International and has been with the company since March 2006. He has been responsible for organizational effectiveness, employee and industrial relations, compensation and benefits, and performance and change management. German has more than 15 years of international human resources experience. Previously he was with BHP Billiton, where he last served as vice-president, human resources, Americas. German has a BBA in finance from the University of Houston.


German

Pride International is one of the world's largest offshore drilling contractors.

R.W. Beck,

Seattle, has hired Alan Bedell and Jake Richardson as consultants in the firm's Denver and Dallas offices, respectively. Both will work within the firm's Barnes & Click division, which delivers business and technical consulting services to the hydrocarbon processing industries.

Bedell has 13 years of experience in the refining industry, including posts at Koch, Valero, Purvin & Gertz, and Saudi Aramco. He holds an MBA with an emphasis in global management and a BS in chemical engineering.

Richardson has experience in the design and construction of oil refining and natural gas liquids facilities and previously worked for Commonwealth Engineering & Construction. He has a BS in chemical engineering and is studying for his MBA.

R.W. Beck is a business and technical consultancy to the financial, energy, water/wastewater, and solid waste industries.

Honeywell International,

Morris Township, NJ, has been selected to help protect Woodside Ltd.'s Pluto onshore liquefied natural gas plant with a sophisticated industrial security system. Built on the Honeywell Enterprise Buildings Integrator (EBI) security management platform, the system for the Pluto LNG Project will provide convenient monitoring and single-window control of all access control, intrusion detection, and video surveillance subsystems. Woodside will use EBI to control video surveillance technology, including thermal imaging night-vision cameras. All video information will be fed to the Honeywell Digital Video Manager, a digital closed-circuit television system that facilitates instant retrieval of relevant video history, as well as video analytics, archiving, and export. The Pluto industrial security system will also include access controllers and card readers, perimeter fence intrusion detection, and biometric readers so that only authorized personnel will have access to specific areas of the plant. Woodside previously contracted Honeywell to design, engineer, test, and stage the system, which is scheduled for completion in December 2008. When commissioned, the Pluto facility is expected to produce 4.3 million tons/year of LNG.

Honeywell International is a diversified technology and manufacturing company, serving customers worldwide with control technologies for buildings, homes, and industry; aerospace products and services; automotive products; turbochargers; and specialty materials.

InterMoor Inc.,

Houston, has launched its subsea services division facility in Lafayette, La. The facility specializes in subsea heave compensation, abrasive water jet cutting services, and riserless intervention technology

InterMoor, an Acteon company, is a leading supplier of mooring technology, providing innovative solutions for rig moves and mooring services, including engineering and design, fabrication, and subsea installation.

Acteon is a group of specialist engineering companies serving the global oil and gas industry.

Dover Corp.,

New York, has named Dan Newman president of its combined companies Norris and Alberta Oil Tool. He will lead the process of further integrating Norris and Alberta Oil Tool activities and strategies and expanding the combined companies' international presence. He will be based in Tulsa, home to Norris.


Newman

With over 28 years of experience in the oil and gas industry, Newman most recently held the position of senior vice-president of supply chain and manufacturing with Exterran Holdings. He was deeply involved in the integration of Hanover and Universal during the Exterran merger process. Newman began his career with Halliburton in various roles, including research and engineering, manufacturing, quality, field operations, and business development.

Norris is a world leader in sucker rod production. Alberta Oil Tool, Calgary, is a leader in manufacturing specialty drive rods for progressive cavity pump application products.

Dover is a global producer of innovative equipment, specialty systems, and value-added services for the industrial products, fluid management, engineered systems, and electronic technology markets.

KBC Advanced Technologies Inc.,

London and Houston, has announced a contract award by National Cooperative Refinery Association (NCRA), McPherson, Kan., to redesign and enhance the Linear Program (LP) model of NCRA's 85,000 b/d McPherson refinery. KBC will use best practice industry standards to improve the data, structure, accuracy, and methodologies of an enhanced LP to allow development of improved refinery operating plans for the site. The KBC SIM Suite of kinetic reactor models running in a Petro-SIM flowsheet will be used to create accurate representations of the refinery's units as part of the project. The Petro-SIM LPU (LP Utility) will be configured for each crude distillation unit and processing reactor unit to generate accurate, consistent operating yield and property data for direct entry into the NCRA LP model. NCRA will also execute a multiyear license with KBC for the same simulation software tools, which are expected to make continuing optimization and improvement of the facility possible in the future. Included in the licensing is Petro-SIM, the KBC proprietary flowsheeting tool, plus the FCC-SIM (fluid catalytic cracking), HCR-SIM (hydrocracking), DC-SIM (delayed coking), and D HTR-SIM (distillate hydrotreating) unit models.

NCRA provides three farm supply cooperatives (CHS, GROWMARK, and MFA Oil) with fuel through its McPherson refinery. NCRA also owns Jayhawk Pipeline, minority interests in two other pipeline companies, and an underground oil storage facility.

KBC, a leading independent consulting, process engineering, and software group, delivers improved operating performance to the oil refining, petrochemical, and other process industries worldwide.

IDM Group,

Houston, has named Michael Stansberry COO. He will have overall operational and financial responsibility for all IDM operations and subsidiaries, including Southwest Oilfield Products. Stansberry has held senior management positions at drilling capital equipment and rig manufacturing oil field service companies, including vice-president of Skytop Brewster, president and CEO of Enterra Oilfield Rental, president and COO of Continental Emsco, and founder, president, and CEO of T3 Energy Services. Most recently, he was CEO at Energy Services International.

IDM manufactures drilling rigs, integrated drilling systems, and comprehensive fluid-end pump parts from its two Houston facilities.

ABS,

Houston, has named Sudheer Chand director of offshore technology. He will join a team of offshore engineers and researchers within the organization's corporate technology department in Houston. Chand will address rules and requirements for drilling and production in harsh environments; criteria for the conversion of floating, production storage, and offloading (FPSO) units from ship-shaped trading tankers and criteria for newbuild FPSOs; and technology challenges associated with deeper-water drilling units, such as position keeping and the drilling equipment itself. The offshore technology group is also addressing issues associated with the monetization of stranded gas and commercialization of marginal fields.


Chand

Chand had previously worked for ABS and most recently worked for a leading offshore operator involved with the design and construction of FPSOs and drilling rigs. He will also be responsible for oversight of the ABS Singapore Offshore Technology Center (SOTC), a satellite branch of ABS's corporate technology department. SOTC takes a collaborative approach toward addressing offshore technology issues by working with the Singaporean government, universities, and industry.

Founded in 1862, ABS is a leading international classification society devoted to promoting the security of life, property, and the marine environment through the development and verification of standards for the design, construction, and operational maintenance of marine-related facilities.

Seismic Micro-Technology,

Houston, has announced that it will donate $250,000 to the Society of Exploration Geophysicists' SEG Foundation to help launch its campaign "Advancing Geophysics Today, Inspiring Geoscientists for Tomorrow." The campaign involves developing a comprehensive, internet-based offering and geophysical knowledge and education. The multiyear program will provide global access to all current applied geophysical knowledge, including publications, conference presentations, distinguished lectures, continuing education courses, research activities, vendor expertise, career information, university programs, and peer consultation. The initial release, completed in early 2008, provides the hardware and software infrastructure to deliver the new capabilities and content.

SEG is a not-for-profit organization that promotes the science of geophysics and the education of applied geophysicists.

SMT is a market leader for PC-based geoscientific interpretation designed to help organizations find oil and gas faster.

New four-gas detector

The GX-2009, which measures 2.75 in. high by 2.95 in. long by 0.98 in. deep, is a lightweight four-gas monitor that weighs 4.6 oz and fits in the palm of your hand.

It simultaneously monitors and displays combustibles, oxygen, carbon monoxide, and hydrogen sulfide. Features include dual audible alarm ports and alarm LEDs on three sides of the instrument so that alarm conditions are obvious from multiple perspectives, especially in high noise environments. Other features include a waterproof and dustproof design with an IP 67 rating, an impact resistant rubber overmold body that is RFI resistant, and a large capacity data logging system included as standard.

Other standard items are vibration alarm, autocalibration, calibration lock out or reminder control, STEL/TWA readings, peak hold, and autobacklighting at alarm on a large LCD display. These controls and features are operated through two glow-in-the dark, glove friendly buttons. The battery set will operate for 20 hr and will fully charge in 3 hr.

A large capacity data logging function is a standard feature on all GX-2009 instruments, and ubnits will store as many as eight alarm trend sessions where readings are recorded 30 min before and after an alarm event. The data logging has a 3,600 data point capacity with a log time range of 10-300 hr based on programmable interval times. The data logging software will also store up to 100 calibration records and is Windows XP and Vista compatible.

The GX-2009 is designed around this firm's sensors utilizing catalytic combustion, electrochemical, and galvanic sensor technologies.

Source: **RKI Instruments Inc.,** 33248 Central Ave., Union City, CA 94587.

Data sheet discusses new water frac service

A new data sheet, yours free for the asking, features new AquaStim UR water frac service.

The service uses a fracturing fluid package that contains no hydrocarbons. The system is designed to help reduce fracture face damage, improve load recovery, and boost production from coal formations and other unconventional formations such as shale and tight gas.

The service includes:

1. New water-based friction reducer.
2. Microemulsion additive to minimize phase trapping.
3. Viscosity reducing agent to help return the viscosity of solutions containing treating agents, such as friction reducer, to that of water.

The system can be easily foamed.

A conductivity-enhancing proppant coating specially formulated for water frac treatments can be effective when used with AquaStim UR service to help maintain long-term conductivity and control formation fines production, the data sheet points out.

Source: **Halliburton Co.,** Box 3, Houston, TX 77001.

Imports of crude and products

	Districts 1-4		District 5		Total US		
	11-7 2008	10-31 2008	11-7 2008	10-31 2008	11-7 2008	10-31 2008	*11-9 2007
	1,000 b/d						
Total motor gasoline	589	1,040	0	0	589	1,040	1,014
Mo. gas. blending comp.	447	835	0	0	447	835	612
Distillate	7	149	29	0	36	149	210
Residual	228	352	0	0	228	352	239
Jet fuel-kerosine	7	79	29	57	36	136	152
Propane-propylene	182	232	36	13	218	245	107
Other	1,032	375	(3)	93	1,029	468	826
Total products	**2,492**	**3,062**	**91**	**163**	**2,583**	**3,225**	**3,160**
Total crude	**8,290**	**8,852**	**1,213**	**1,120**	**9,503**	**9,972**	**10,487**
Total imports	**10,782**	**11,914**	**1,304**	**1,283**	**12,086**	**13,197**	**13,647**

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

Purvin & Gertz LNG netbacks—Nov. 14, 2008

Receiving terminal	Liquefaction plant					
	Algeria	Malaysia	Nigeria	Austr. NW Shelf	Qatar	Trinidad
	$/MMbtu					
Barcelona	11.83	9.72	11.01	9.62	10.31	10.93
Everett	6.03	4.12	5.70	4.23	4.60	6.30
Isle of Grain	8.97	6.98	8.36	6.93	7.44	8.39
Lake Charles	4.19	2.61	3.99	2.75	2.89	4.74
Sodegaura	9.79	12.02	10.05	11.72	11.01	9.13
Zeebrugge	11.86	9.54	11.22	9.39	10.23	11.22

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	12,943	49,970	27,253	8,891	52,246	13,901	4,160
PADD 2	64,906	48,487	18,174	7,066	26,488	1,220	22,603
PADD 3	165,696	66,154	32,264	11,181	33,434	18,464	30,814
PADD 4	14,774	7,385	2,828	553	2,889	228	[1]2,758
PADD 5	53,630	26,099	20,569	9,144	13,294	5,163	—
Nov. 7, 2008	**311,949**	**198,095**	**101,088**	**36,835**	**128,351**	**38,976**	**60,335**
Oct. 31, 2008	**311,927**	**196,113**	**101,088**	**36,652**	**127,835**	**38,842**	**60,410**
Nov. 9, 2007[2]	**314,676**	**195,027**	**90,647**	**40,933**	**133,412**	**39,294**	**61,609**

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

Refinery report—Nov. 7, 2008

District	REFINERY OPERATIONS		REFINERY OUTPUT				
	Gross inputs	Crude oil inputs	Total motor gasoline	Jet fuel, kerosine	Fuel oils: Distillate	Fuel oils: Residual	Propane-propylene
	1,000 b/d						
PADD 1	1,413	1,410	2,211	81	491	125	71
PADD 2	3,231	3,203	2,093	202	1,008	60	204
PADD 3	6,845	6,661	2,882	591	2,103	284	578
PADD 4	523	520	317	18	184	8	[1]212
PADD 5	2,885	2,669	1,521	422	585	133	—
Nov. 7, 2008	**14,897**	**14,463**	**9,024**	**1,314**	**4,371**	**610**	**1,065**
Oct. 31, 2008	**15,017**	**14,617**	**9,110**	**1,313**	**4,389**	**535**	**1,064**
Nov. 9, 2007[2]	**15,295**	**15,048**	**8,895**	**1,439**	**4,217**	**671**	**1,068**
	17,610 Operable capacity		**84.6% utilization rate**				

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

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

OIL&GAS JOURNAL online research center

OGJ crack spread

	*11-14-08	*11-16-07	Change	Change, %
	$/bbl			
SPOT PRICES				
Product value	65.50	103.02	–37.52	–36.4
Brent crude	53.32	91.46	–38.14	–41.7
Crack spread	12.18	11.57	0.62	5.3
FUTURES MARKET PRICES				
One month				
Product value	64.42	102.57	–38.15	–37.2
Light sweet crude	58.64	93.68	–35.04	–37.4
Crack spread	5.78	8.89	–3.10	–34.9
Six month				
Product value	72.32	103.58	–31.27	–30.2
Light sweet crude	63.05	89.17	–26.12	–29.3
Crack spread	9.26	14.41	–5.15	–35.7

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

Statistics

OGJ GASOLINE PRICES

	Price ex tax 11-12-08	Pump price* 11-12-08	Pump price 11-14-07
	¢/gal		
(Approx. prices for self-service unleaded gasoline)			
Atlanta	181.8	228.3	310.8
Baltimore	195.9	237.8	301.6
Boston	186.3	228.2	299.3
Buffalo	156.8	217.7	322.3
Miami	179.0	230.6	325.3
Newark	190.0	222.6	290.9
New York	176.7	237.6	306.3
Norfolk	179.3	217.7	294.0
Philadelphia	184.8	235.5	309.3
Pittsburgh	186.7	237.4	308.6
Wash., DC	200.0	238.4	307.6
PAD I avg	183.4	230.2	306.9
Chicago	170.9	235.3	340.1
Cleveland	173.8	220.2	312.4
Des Moines	174.9	215.3	301.3
Detroit	170.9	230.3	322.4
Indianapolis	165.9	225.3	311.7
Kansas City	163.1	199.1	297.9
Louisville	184.4	225.3	306.4
Memphis	169.5	209.3	300.9
Milwaukee	172.8	224.1	314.0
Minn.-St. Paul	174.4	218.4	305.4
Oklahoma City	153.5	188.9	303.7
Omaha	153.0	198.3	311.2
St. Louis	173.6	209.6	299.8
Tulsa	152.1	187.5	297.7
Wichita	156.6	200.0	297.2
PAD II avg	167.3	212.5	308.1
Albuquerque	183.4	219.8	306.1
Birmingham	169.6	208.9	302.5
Dallas-Fort Worth	166.0	204.4	297.0
Houston	155.6	194.0	290.4
Little Rock	169.3	209.5	302.0
New Orleans	186.2	224.6	295.1
San Antonio	180.9	219.3	291.5
PAD III avg	173.0	211.5	297.8
Cheyenne	188.9	221.3	297.2
Denver	209.5	249.9	306.7
Salt Lake City	197.3	240.2	301.4
PAD IV avg	198.6	237.1	301.8
Los Angeles	198.8	265.9	331.6
Phoenix	218.2	255.6	293.2
Portland	226.8	270.2	316.2
San Diego	208.5	275.6	341.6
San Francisco	213.5	280.6	358.1
Seattle	209.7	265.6	329.7
PAD V avg	212.6	268.9	328.4
Week's avg.	**181.2**	**226.8**	**308.5**
Oct. avg.	**272.3**	**317.6**	**280.9**
Sept. avg.	**322.7**	**367.2**	**280.4**
2008 to date	**300.9**	**345.0**	—
2007 to date	**231.7**	**275.3**	—

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

REFINED PRODUCT PRICES

	11-7-08 ¢/gal		11-7-08 ¢/gal
Spot market product prices			
Motor gasoline (Conventional-regular)		Heating oil No. 2	
New York Harbor	140.40	New York Harbor	196.35
Gulf Coast	131.90	Gulf Coast	191.85
Los Angeles	138.40	Gas oil	
Amsterdam-Rotterdam-Antwerp (ARA)	128.32	ARA	201.05
Singapore	131.40	Singapore	166.90
Motor gasoline (Reformulated-regular)		Residual fuel oil	
New York Harbor	140.40	New York Harbor	101.50
Gulf Coast	131.15	Gulf Coast	92.57
Los Angeles	144.90	Los Angeles	128.15
		ARA	117.17
		Singapore	97.89

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

BAKER HUGHES RIG COUNT

	11-14-08	11-16-07
Alabama	4	4
Alaska	10	9
Arkansas	59	47
California	46	41
Land	46	39
Offshore	0	2
Colorado	124	111
Florida	1	0
Illinois	1	0
Indiana	2	2
Kansas	10	15
Kentucky	12	8
Louisiana	178	165
N. Land	85	62
S. Inland waters	21	25
S. Land	21	27
Offshore	51	51
Maryland	0	1
Michigan	1	1
Mississippi	14	8
Montana	7	11
Nebraska	0	0
New Mexico	80	73
New York	5	6
North Dakota	90	48
Ohio	12	14
Oklahoma	189	196
Pennsylvania	27	18
South Dakota	0	0
Texas	899	857
Offshore	8	9
Inland waters	0	2
Dist. 1	27	20
Dist. 2	33	36
Dist. 3	64	64
Dist. 4	94	88
Dist. 5	169	175
Dist. 6	125	113
Dist. 7B	26	41
Dist. 7C	68	63
Dist. 8	124	119
Dist. 8A	28	20
Dist. 9	45	41
Dist. 10	88	66
Utah	48	42
West Virginia	29	33
Wyoming	74	75
Others—NV-8; OR-1; TN-3; VA-6; WA-1	19	12
Total US	**1,941**	**1,797**
Total Canada	**418**	**356**
Grand total	**2,359**	**2,153**
Oil rigs	429	337
Gas rigs	1,498	1,455
Total offshore	64	64
Total cum. avg. YTD	**1,886**	**1,763**

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

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

SMITH RIG COUNT

Proposed depth, ft	Rig count	11-14-08 Percent footage*	Rig count	11-16-07 Percent footage*
0-2,500	87	3.4	59	5.0
2,501-5,000	139	53.2	103	57.2
5,001-7,500	262	11.8	225	25.3
7,501-10,000	459	2.8	446	1.1
10,001-12,500	424	1.4	448	3.3
12,501-15,000	391	—	286	—
15,001-17,500	167	—	114	—
17,501-20,000	72	—	63	—
20,001-over	35	—	34	—
Total	**2,036**	**6.2**	**1,778**	**7.8**
INLAND	32		38	
LAND	1,947		1,689	
OFFSHORE	57		51	

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

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

OGJ PRODUCTION REPORT

	[1]11-14-08	[2]11-16-07
	1,000 b/d	
(Crude oil and lease condensate)		
Alabama	20	20
Alaska	685	726
California	660	663
Colorado	62	67
Florida	6	6
Illinois	28	26
Kansas	105	107
Louisiana	1,128	1,175
Michigan	15	15
Mississippi	60	60
Montana	96	93
New Mexico	163	163
North Dakota	126	130
Oklahoma	175	174
Texas	1,295	1,328
Utah	53	54
Wyoming	149	149
All others	66	73
Total	**4,892**	**5,029**

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

US CRUDE PRICES

	11-14-08 $/bbl*
Alaska-North Slope 27°	93.39
South Louisiana Sweet	59.25
California-Kern River 13°	43.25
Lost Hills 30°	51.30
Wyoming Sweet	42.04
East Texas Sweet	53.00
West Texas Sour 34°	49.00
West Texas Intermediate	53.50
Oklahoma Sweet	53.50
Texas Upper Gulf Coast	50.00
Michigan Sour	46.50
Kansas Common	46.50
North Dakota Sweet	40.50

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

WORLD CRUDE PRICES

$/bbl[1]	11-7-08
United Kingdom-Brent 38°	60.45
Russia-Urals 32°	59.75
Saudi Light 34°	57.77
Dubai Fateh 32°	57.44
Algeria Saharan 44°	62.34
Nigeria-Bonny Light 37°	64.58
Indonesia-Minas 34°	62.29
Venezuela-Tia Juana Light 31°	58.68
Mexico-Isthmus 33°	58.57
OPEC basket	60.24
Total OPEC[2]	58.80
Total non-OPEC[2]	58.49
Total world[2]	58.66
US imports[3]	56.26

[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]

	11-7-08	10-31-08	11-7-07	Change, %
	bcf			
Producing region	965	938	1,063	–9.2
Consuming region east	2,041	2,010	2,006	1.7
Consuming region west	461	457	469	–1.7
Total US	**3,467**	**3,405**	**3,538**	**–2.0**
	Aug. 08	**Aug. 07**	**Change, %**	
Total US[2]	**2,867**	**3,017**	**– 5.0**	

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

World oil balance

	2008 2nd qtr.	2008 1st qtr.	2007 4th qtr.	2007 3rd qtr.	2007 2nd qtr.	2007 1st qtr.
	Million b/d					
DEMAND						
OECD						
US & Territories	19.96	20.15	20.90	21.06	20.95	21.09
Canada	2.26	2.37	2.39	2.43	2.29	2.38
Mexico	2.16	2.10	2.16	2.06	2.14	2.12
Japan	4.59	5.41	5.25	4.70	4.64	5.43
South Korea	2.09	2.33	2.31	2.06	2.12	2.35
France	1.92	1.98	2.02	1.94	1.86	1.98
Italy	1.61	1.62	1.75	1.65	1.69	1.72
United Kingdom	1.72	1.72	1.73	1.75	1.78	1.80
Germany	2.41	2.47	2.54	2.55	2.37	2.37
Other OECD Europe	7.23	7.41	7.60	7.52	7.25	7.35
Australia & New Zealand	1.14	1.13	1.15	1.12	1.10	1.12
Total OECD	**47.09**	**48.69**	**49.80**	**48.84**	**48.19**	**49.71**
NON–OECD						
China	7.94	7.72	7.87	7.59	7.52	7.33
FSU	4.49	4.34	4.32	4.22	4.32	4.25
Non-OECD Europe	0.80	0.86	0.79	0.73	0.78	0.85
Other Asia	8.92	8.86	8.93	8.64	8.83	8.74
Other non-OECD	15.99	15.57	15.25	15.54	15.22	14.93
Total non-OECD	**38.14**	**37.35**	**37.16**	**36.72**	**36.67**	**36.10**
TOTAL DEMAND	**85.23**	**86.04**	**86.96**	**85.56**	**84.86**	**85.81**
SUPPLY						
OECD						
US	8.75	8.64	8.58	8.36	8.50	8.38
Canada	3.26	3.35	3.40	3.48	3.37	3.45
Mexico	3.20	3.30	3.35	3.46	3.61	3.59
North Sea	4.33	4.46	4.57	4.28	4.49	4.80
Other OECD	1.59	1.54	1.57	1.56	1.54	1.50
Total OECD	**21.13**	**21.29**	**21.47**	**21.14**	**21.51**	**21.72**
NON–OECD						
FSU	12.60	12.60	12.66	12.55	12.60	12.61
China	3.99	3.93	3.86	3.87	3.96	3.92
Other non-OECD	11.06	10.83	11.13	11.21	11.04	10.70
Total non-OECD, non-OPEC	**27.65**	**27.36**	**27.65**	**27.63**	**27.60**	**27.23**
OPEC*	**36.92**	**36.69**	**36.18**	**35.44**	**35.07**	**35.98**
TOTAL SUPPLY	**85.70**	**85.34**	**85.30**	**84.21**	**84.18**	**84.93**
Stock change	**0.47**	**–0.70**	**–1.66**	**–1.35**	**–0.68**	**–0.88**

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

OECD total net oil imports

	July 2008	June 2008	May 2008	July 2007	Chg. vs. previous year Volume	Chg. vs. previous year %
	Million b/d					
Canada	–1,269	–1,073	–1,257	–1,089	–180	16.5
US	10,995	11,202	11,056	12,248	–1,253	–10.2
Mexico	–1,007	–978	–1,120	–1,609	602	–37.4
France	1,841	1,653	1,720	1,782	59	3.3
Germany	2,425	1,980	2,043	2,113	312	14.8
Italy	1,491	1,498	1,441	1,510	–19	–1.3
Netherlands	1,057	1,042	1,005	1,029	28	2.7
Spain	1,524	1,473	1,496	1,621	–97	–6.0
Other importers	3,974	3,798	3,901	3,999	–25	–0.6
Norway	–1,387	–1,899	–1,960	–2,148	761	–35.4
United Kingdom	20	48	–112	–12	32	–266.7
Total OECD Europe	**10,945**	**9,593**	**9,534**	**9,894**	**1,051**	**10.6**
Japan	4,793	4,578	4,681	4,917	–124	–2.5
South Korea	2,167	1,891	2,251	2,270	–103	–4.5
Other OECD	951	798	965	867	84	9.7
Total OECD	**27,575**	**26,011**	**26,110**	**27,498**	**77**	**0.3**

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

OECD* total gross imports from OPEC

	July 2008	June 2008	May 2008	July 2007	Chg. vs. previous year Volume	Chg. vs. previous year %
	Million b/d					
Canada	419	459	375	443	–24	–5.4
US	6,121	6,084	5,926	5,931	190	3.2
Mexico	45	45	20	10	35	350.0
France	864	779	837	815	49	6.0
Germany	560	399	471	566	–6	–1.1
Italy	1,157	1,213	1,212	1,237	–80	–6.5
Netherlands	516	661	640	759	–243	–32.0
Spain	594	788	789	629	–35	–5.6
Other importers	1,327	1,333	1,242	1,167	160	13.7
United Kingdom	289	391	304	310	–21	–6.8
Total OECD Europe	**5,307**	**5,564**	**5,495**	**5,483**	**–176**	**–3.2**
Japan	4,456	3,606	4,275	4,233	223	5.3
South Korea	2,605	2,347	2,354	2,363	242	10.2
Other OECD	629	688	693	734	–105	–14.3
Total OECD	**19,582**	**18,793**	**19,138**	**19,197**	**385**	**2.0**

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

US petroleum imports from source country

	July 2008	June 2008	Average YTD 2008	Average YTD 2007	Chg. vs. previous year Volume	Chg. vs. previous year %
	1,000 b/d					
Algeria	456	492	524	722	–198	–27.4
Angola	652	649	527	554	–27	–4.9
Kuwait	122	183	208	200	8	4.0
Nigeria	822	1,020	1,052	1,054	–2	–0.2
Saudi Arabia	1,675	1,493	1,558	1,435	123	8.6
Venezuela	1,340	1,215	1,196	1,363	–167	–12.3
Other OPEC	1,054	1,032	1,021	633	388	61.3
Total OPEC	**6,121**	**6,084**	**6,086**	**5,961**	**125**	**2.1**
Canada	2,390	2,359	2,460	2,458	2	0.1
Mexico	1,290	1,254	1,302	1,593	–291	–18.3
Norway	94	122	115	168	–53	–31.5
United Kingdom	187	286	218	319	–101	–31.7
Virgin Islands	294	314	330	327	3	0.9
Other non-OPEC	2,688	2,948	2,518	2,792	–274	–9.8
Total non-OPEC	**6,943**	**7,283**	**6,943**	**7,657**	**–714**	**–9.3**
TOTAL IMPORTS	**13,064**	**13,367**	**13,029**	**13,618**	**-589**	**-4.3**

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

Oil stocks in OECD countries*

	July 2008	June 2008	May 2008	July 2007	Chg. vs. previous year Volume	Chg. vs. previous year %
	Million bbl					
France	179	177	177	175	4	2.3
Germany	275	273	277	280	–5	–1.8
Italy	135	137	136	132	3	2.3
United Kingdom	96	99	99	102	–6	–5.9
Other OECD Europe	698	684	682	676	22	3.3
Total OECD Europe	**1,383**	**1,370**	**1,371**	**1,365**	**18**	**1.3**
Canada	206	197	193	192	14	7.3
US	1,699	1,686	1,673	1,733	–34	–2.0
Japan	627	619	617	632	–5	–0.8
South Korea	153	147	146	165	–12	–7.3
Other OECD	104	108	105	108	–4	–3.7
Total OECD	**4,172**	**4,127**	**4,105**	**4,195**	**–23**	**–0.5**

*End of period.
Source: DOE International Petroleum Monthly Report
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Jim Schmulen died October 26, 2008 at his home in Colleyville, Texas. He worked for 27 years at Texas Electric in Colorado City & Ft. Worth and Texas Utilities in Dallas. After retiring he worked at TEPSCO in Grand Prairie, TX. – www.schmulen.com

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The bright side of bankruptcy: a political fantasy

In the rush to make financially troubled companies wards of the US government, a strange misconception seems to be at work: that bankrupt entities cease to exist.

That's not so. Bankruptcy enables the hopelessly indebted to continue to function economically.

It's a drastic step. It shouldn't be taken casually.

Sometimes, though, it's inevitable. But the people involved don't vaporize. They get a chance to start over.

Imagine a politically implausible but possibly illuminating scenario in which the government rescued just one of the three big US automakers now pleading for bailout.

Politics would steer aid to the weakest. The move would force the second-weakest automaker into bankruptcy, leaving the other—presumably the strongest at the beginning of all this—to slog on unaided.

Creditors and shareholders of the bankrupt automaker would sustain varying degrees of financial loss. Depending on how serious the court proved to be about making the emergent company competitive, labor contracts would change, and there would be fewer levels of management, less lavishly compensated than before.

So there'd be hardship. But that word doesn't apply to the new inability of "workers" to claim wages for doing nothing under a job-bank program or managerial salaries with only six figures.

If everything went as it should, the US would have one more major automobile manufacturer able to compete than apparently it has now.

The new competition would be tough on the other two companies—toughest, probably, on the one that missed out on the first dole, formerly the strongest.

By then, the rescued manufacturer would have its own problems, such as abysmal sales of the unpopular "green" vehicles it had to make as a condition of aid.

So the government still would have to deal with automakers forced into jeopardy by chronic competitive disadvantages.

It would, in other words, face the same problems it has now, notwithstanding the expenditure of tens of billions of dollars or assumption of equivalent risk, but with two troubled automakers rather than three.

It's not hard to guess which of the original trio investors would, at that stage of the cycle, like best.

(Online Nov. 14, 2008; author's e-mail: bobt@ogjonline.com)

The Editor's Perspective

by Bob Tippee, Editor

Market Journal

by Sam Fletcher, Senior Writer

Outlooks differ on slack demand, tight supplies

Financial analysts differ in expectations for a continuing fall in world demand for energy or a tightening of supplies as demand revives in 2009.

The average price for the Organization of Petroleum Exporting Countries' basket of 13 reference crudes dropped to a 42-month low of $47.73/bbl Nov. 13, prompting OPEC Pres. Chakib Khelil to invite non-Arab members for sideline discussions at the Nov. 29 meeting of the Organization of Arab Petroleum Exporting Countries in Cairo, ahead of the scheduled OPEC meeting Dec. 17 in Oran, Algeria.

The November session would mark the third meeting of OPEC ministers over market issues in as many months. They agreed Sept. 10 to "strictly comply" with the official 28.8 million b/d production quota adopted in September 2007, which would have eliminated more than 500,000 b/d of overproduction. They voted Oct. 4 to reduce that quota by 1.5 million b/d effective Nov. 1. Less than 2 weeks after that effective date, they were signaling another probable cut.

"It really is primarily about sending signals," said Paul Horsnell, Barclays Capital Inc., London. "In reality the 2 million b/d cut [as] already agreed left quite a bit in hand to cover further demand weakness. Further, it seems that OPEC supply may well have contracted sharply even before the cut became effective." The Middle East Economic Survey estimated Saudi Arabian output at 9.1 million b/d in October, 400,000 b/d less than in September and 600.000 b/d lower than in July.

With non-OPEC supply "looking dead in the water" and OPEC supply already coming off market, the cartel's next cut is likely to be "more than necessary" and will contribute to an over-tightening of the market in the first quarter of 2009, Horsnell said.

Economy 'worsening'

On the other hand, Adam Sieminski, chief energy economist, Deutsche Bank, Washington, DC, sees global oil demand falling 500,000 b/d in 2009, pulling down crude prices perhaps to $30-35/bbl "at the lower end." However, Deutsche Bank expects West Texas Intermediate to average $60/bbl in 2009 and $57.50/bbl in 2010.

In a Nov. 14 report, Deutsche Bank analysts said they expect in 2009 the worst economic performance among industrialized countries "since the Great Depression." They said, "We forecast global growth rising 1.2%, its weakest performance since the early 1980s, as economic weakness spreads to the emerging markets."

Both the US Energy Information Administration and the International Energy Agency in Paris have sharply reduced their estimates of oil demand growth in 2009, citing a weaker world economy. Taking into account lower 2008 estimates, IEA cut its 2009 demand forecast by 670,000 b/d to a growth of 350,000 b/d, while EIA reduced its earlier outlook by 1 million b/d to virtually no growth at all next year. "OPEC, which early in 2008 used to have one of the comparatively lowest demand growth forecasts, was [at this point] still using a figure of 760,000 b/d growth for 2009. We are nearly certain this will be reduced with their November report," Sieminski said.

He expects the call on OPEC crude to decline by 2 million b/d in 2009, roughly the same amount as the reductions the cartel indicated in its September and October meetings. Supply growth outside of OPEC lagged behind industry expectations in 2008 as a result of project delays and because of hurricane damage in the US in the second half of the year. "We expect non-OPEC supply growth will disappoint again in 2009 after falling in 2008. However, we envisage some production growth supplemented by 600,000 b/d of OPEC natural gas liquids," said Sieminski.

Meanwhile, the forward cover for member nations of the Organization for Economic Cooperation and Development could reach 57 days by third quarter 2009, up by 1 day from Deutsche Bank's October forecast. "We expect this will put even more pressure on OPEC to trim production," Sieminski said.

Still, he said, OPEC will have to struggle to cut its production as fast as world demand is expected to drop during the next 12 months. According to a Deutsche Bank study of past production reduction cycles by OPEC, such cuts often take 3-6 months to affect crude markets.

"Since we expect the current quota reduction cycle to persist until the fourth quarter of 2009, it implies any sustained rally in crude oil will have to wait until sometime in 2010," Sieminski said. "On all counts we view the chances of a rebound in energy and industrial metal prices as a remote possibility in 2009, but the likelihood of price recovery taking hold in 2010 are slightly more compelling."

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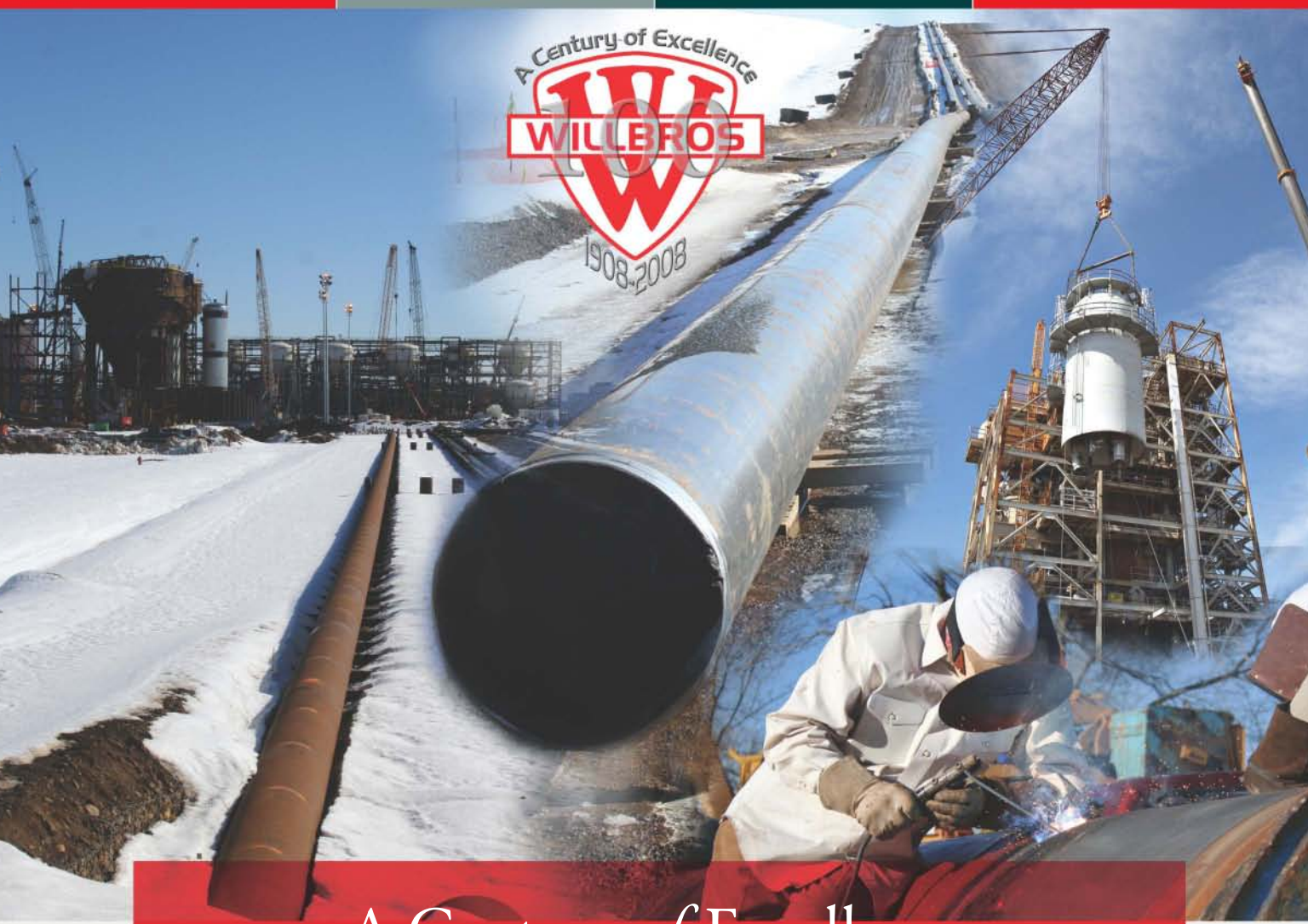

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