MAR. 20, 2017 | USD 20

DIGITAL WEEKLY EDITION

OIL & GAS JOURNAL

International Petroleum News and Technology | www.ogj.com

PennWell

EDITORIAL
NEWSLETTER
STATISTICS

EDITOR'S PERSPECTIVE
GENERAL INTEREST
JOURNALLY SPEAKING
WATCHING GOVERNMENT

USD 20

OIL&GAS JOURNAL®

International Petroleum News and Technology | www.ogj.com

Mar. 20, 2017 | Volume 115.b

GENERAL INTEREST

PennWell®

COVER

Premier Oil PLC's *Anoa Natuna floating production, storage, and offloading vessel, stationed in Anoa field on Block A offshore Indonesia in the Natuna Sea, can process 32,000 b/d of crude oil and store 550,000 bbl of oil. Natural gas from Block A is exported to Jurong Island, Singapore, via the 540-km subsea West Natuna Transportation System pipeline. Premier earlier this month awarded Proserv a contract to supply subsea control for its Bison-Iguana-Gajah Puteri (BIGP) field development also on Block A. Premier expects BIGP to backfill more than 100 bcf of gross deliverable reserves to Singapore. Photo from Premier Oil.*

#PipelineExpo

THE PIPELINE + ENERGY EXPO™

CONSTRUCTION • OPERATIONS • INTEGRITY

MAKE CONNECTIONS WITH LEADING PIPELINE + ENERGY PROS

DON'T DELAY. REGISTER TODAY!

The ninth annual **Pipeline + Energy Expo** will take place 4-6 April 2017, and will be produced for the first time by PennWell Corporation, a 105-year-old global Media and Events company also based in Tulsa.

Since 2009, this event has grown into the most comprehensive energy event in the region. With the support of *PennEnergy*, the *Oil & Gas Journal* and *Oil & Gas Financial Journal*, this annual Conference and Exhibition will offer energy transportation professionals a unique opportunity to network and hear the views of major North American industry leaders, as well as to learn about important technical and regulatory developments in construction and operational management, equipment, and practices, including:

- SCADA
- Health and Safety
- Risk Assessment
- Consequences of Failure
- Cybersecurity
- Valve Automation
- Compression
- Rehabilitation
- Expansion
- Measurement & Instrumentation
- Documentation/ Record Keeping
- ROW
- Environmental Remediation
- Regulatory/Permitting
- Directional Drilling
- Trenching
- Commissioning
- Line Pipe
- Hot Tapping
- Inline Inspection
- Automated Pigging
- Hydrotesting
- IM System Integration
- Data Management
- Corrosion Control
- Direct Assessment
- Cathodic Protection Leak Detection

April 4-6, 2017 // Cox Business Center + Tulsa, Oklahoma

For more information on registration types and rates, visit www.pipelineenergyexpo.com.

PRODUCED BY PennWell®

HOSTED BY PennEnergy

MEDIA SPONSOR OIL&GAS JOURNAL · OIL&GAS FINANCIAL JOURNAL · OIL, GAS &petrochem equipment

IN ASSOCIATION WITH VACUWORX®

ADVERTISING SALES

US Sales
Mike Moss, (713) 963-6221, mikem@pennwell.com
Stan Terry, (713) 963-6208, stant@pennwell.com
Grace Jordan, (713) 963-6291, gracej@pennwell.com

Australia / New Zealand
Mike Twiss, Miklin Business Services, Unit 15, 3 Benjamin Way, Rockingham, Western Australia 6168; Tel +61 8 9529 4466, Fax +61 8 9529 4488
Email: miklinbusiness@bigpond.com

Brazil / South America
Jim Klingele, (713) 963-6214, jimk@pennwell.com
1455 West Loop South, Suite 400, Houston, TX 77027

Canada
Stan Terry, (713) 963-6208, stant@pennwell.com

France / Belgium / Spain / Portugal / Southern Switzerland / Monaco
Stefy Picoitti Thompson, Tel: +33(0)4 94 70 82 63; Cell: +33(0)6 21 23 67 02, stefaniat@pennwell.com.

Germany / Austria / Northern Switzerland / Eastern Europe / Russia / Former Soviet Union
Sicking Industrial Marketing, Kurt-Schumacher-Str. 16, 59872, Freienohl, Germany. Tel: 49(0)2903.3385.70, Fax: 49(0)2903.3385.82; E-mail: wilhelms@pennwell.com; www.sicking.de <http://www.sicking.de> Andreas Sicking

Italy
Ferruccio Silvera, Viale Monza, 24 20127 Milano Italy; Tel:+02.28.46 716; E-mail: info@silvera.it

Japan
e.x.press sales division, ICS Convention Design Inc. 6F, Chiyoda Bldg., 1-5-18 Sarugakucho, Chiyoda-ku, Tokyo 101-8449, Japan, Tel: +81.3.3219.3641, Fax: 81.3.3219.3628, Masaki Mori, E-mail: Masaki.Mori@ex-press.jp

China / Korea / Singapore / Asia-Pacific
Michael Yee, 19 Tanglin Road #05-20, Tanglin Shopping Center, Singapore 247909, Republic of Singapore; Tel: 65 9616.8080, Fax: 65.6734.0655; E-mail: yfyee@singnet.com.sg

United Kingdom / Scandinavia / Denmark / The Netherlands / Middle East
Graham Hoyle, 10 Springfield Close, Cross, Axbridge, Somerset BS26 2FE, Phone: +44 1934 733871 Mobile: +44 7927 889916, grahamh@pennwell.com or ghms@btinternet.com

OGJ Reprints
Rhonda Brown, Foster Printing Co., Reprint Marketing Manager; 866.879.9144 ext 194, Fax: 219.561.2023; 4295 Ohio Street, Michigan City, IN 46360; rhondab@fosterprinting.com. www.fosterprinting.com

Custom Publishing
Roy Markum, Vice-President/Custom Publishing, roym@pennwell.com, Phone: 713-963-6220, Fax: 713-963-6228

Marketing Solutions
For assistance with marketing strategy or ad creation, please contact PennWell Marketing Solutions
VICE PRESIDENT — Paul Andrews
(240) 595-2352 pandrews@pennwell.com

PennWell
1455 West Loop South, Suite 400, Houston, TX 77027
www.ogj.com

OGJ®

In Houston

Publisher Jim Klingele, jimk@pennwell.com

Editor Bob Tippee, bobt@ogjonline.com
Managing Editor-News Steven Poruban, stevenp@ogjonline.com
Managing Editor-Technology Christopher E. Smith, chriss@ogjonline.com
Exploration Editor Tayvis Dunnahoe, tayvisd@ogjonline.com
Upstream Technology Editor Paula Dittrick, paulad@ogjonline.com
Downstream Technology Editor Robert Brelsford, rbrelsford@ogjonline.com
Senior Editor-Economics Conglin Xu, conglinx@ogjonline.com
Assistant Editor Matt Zborowski, matthewz@ogjonline.com
Special Correspondent Alan Petzet, alanp@ogjonline.com
Editorial Assistant Vannetta Dibbles, vannettad@ogjonline.com

In Tulsa

Statistics Editor Laura Bell, laurab@ogjonline.com
Senior Art Director Michelle Gourd, michelleg@pennwell.com
Art Director Clark Bell, clarkb@pennwell.com
Senior Illustrators Mike Reeder, Chris Hipp, Dan Rodd
Production Director Charlie Cole
Production Manager Shirley Gamboa
Ad Services Manager Marcella Hanson

In Washington

Washington Editor Nick Snow, nicks@pennwell.com Tel 703.533.1552

Editorial Offices

Oil & Gas Journal
1455 West Loop South, Suite 400, Houston, TX 77027
Tel 713.621.9720; Fax 713.963.6285
www.ogjonline.com

P.C. Lauinger, 1900-1988
Corporate Officers
Chairman, Robert F. Biolchini
Vice Chairman, Frank T. Lauinger
President and Chief Executive Officer Mark C. Wilmoth
Executive Vice President, Corporate Development and Strategy, Jayne A. Gilsinger
Senior Vice President, Finance and Chief Financial Officer, Brian Conway
Vice-President/Group Publishing Director Paul Westervelt, pwestervelt@pennwell.com
Vice-President/Custom Publishing Roy Markum, roym@pennwell.com

Subscriber Service

P.O. Box 2002, Tulsa OK 74101
Tel 1.800.633.1656; 918.831.9423;
Fax 918.831.9482 ogjsub@pennwell.com
Circulation Manager Jesse Fyler, jessef@pennwell.com

Custom Article Reprints

Reprint Marketing Manager, Rhonda Brown, Foster Printing Co. Tel 866-879-9144 (ext. 194); Fax 219-561-2023 web site www.marketingreprints.com

PennWell Corporate Headquarters

1421 S. Sheridan Rd., Tulsa, OK 74112

Member Alliance for Audited Media & American business Media

OGJ®
Newsletter
International News for oil and gas professionals
For up-to-the-minute news, visit www.ogjonline.com
Mar. 20, 2017

GENERAL INTEREST QUICK TAKES

Barclays: E&P spending growth revised for 2017

Global exploration and production spending will rise 9% in 2017 compared with spending in 2016, according to the latest update of Barclays' E&P spending survey. This compares with 7% indicated in the January survey (OGJ Online, Jan. 9, 2017).

The upward revision reflects higher upstream spending budgets released or revised by companies over the last 2 months, especially an uptick in expectations for North America.

Barclays since January has revised estimates for 70 companies representing 88% of North America spend for 2016 from budget announcements mostly disclosed as part of yearend earnings. Collectively, those companies now expect North America upstream spending in 2017 to increase 32% year-over-year compared with the overall 27% increase expected 2 months ago.

US international oil companies are also expected to increase North America spending by 4% year-over-year vs. flat spending in January, driven primarily by increased spending from BP PLC and ExxonMobil Corp.

Since the beginning of the year, at least eight companies have announced acquisitions in the Permian basin totaling $16 billion. The largest of these was ExxonMobil's 250,000-acre acquisition from firms owned by the Bass family of Fort Worth, Tex., with an estimated 3.4 billion boe, doubling ExxonMobil's Permian basin resource to 6 billion boe.

However, near-term risk to the oil price, due to a combination of increasing US production, crude inventories continuing to build, and the big decisions facing the Organization of Petroleum Exporting Countries in May, adds downside risk to E&P budgets, which are a function of cash flow, Barclays noted.

"If oil prices stay below $50/bbl, E&Ps are likely to defer some growth by a quarter or two in North America, with little change to our international figures," Barclays said.

International spending is now expected to increase 3% in 2017 compared with the 2% rise expected in January's update.

Marathon Oil to buy Permian acreage for $1.1 billion

Marathon Oil Corp. has agreed to acquire 70,000 net surface acres in the Permian basin from BC Operating Inc., Midland, Tex., and other entities for $1.1 billion in cash.

The deal, effective Jan. 1 and expected to close in the second quarter, includes 51,500 acres in the northern Delaware basin of New Mexico and current production of 5,000 net boe/d.

Marathon will receive as many as 10 target benches within 5,000 ft of stacked pay and 900 million boe of total resource potential with 1,700 total upside locations from both tighter density and secondary targets.

Primary targets on the acreage are in Wolfcamp and Bone Spring areas. The leasehold has one operated rig drilling, and there are plans to add a second rig midyear. The firm also envisions further opportunities for growth from acquired acreage in the Northwest Shelf as well as further bolt-on acquisitions.

"The northern Delaware basin features outstanding well economics that compete at the top of our organic portfolio and is experiencing a positive rate of change in well performance unrivaled in US unconventional basins," commented Lee Tillman, Marathon Oil president and chief executive officer.

Marathon also reported Mar. 9 that it has agreed to sell its Canadian subsidiary, which includes its 20% nonoperated interest in the Athabasca Oil Sands Project (AOSP), to Royal Dutch Shell PLC and Canadian Natural Resources Ltd. for $2.5 billion in cash (OGJ Online, Mar. 9, 2017).

"Historically, our interest in the Canadian oil sands has represented about a third of our company's other operating and production expenses yet only about 12% of our production volumes," explained Tillman.

DOE announces awards from first sale of SPR crude

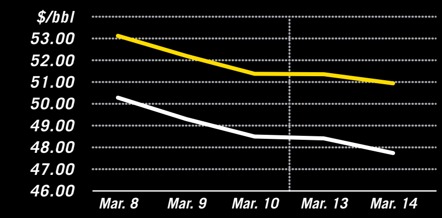
Seven companies have been awarded contracts for 10 million bbl of crude oil from the US Strategic Petroleum Reserve, the US Department of Energy announced on Mar. 10.

Atlantic Trading & Marketing Inc., BP Oil Supply Co., Marathon Petroleum Co., PetroChina International (America) Inc., Phillips 66, Shell Trading (US) Co., and Valero Marketing & Supply received the contract, DOE's Fossil Energy Office said.

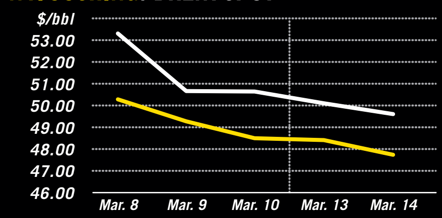
Of the 10 million bbl, 3 million bbl will be sold from the SPR's Bryan Mound, Tex., site, 2.1 million bbl from the Big Hill, Tex., site, and 4.9 million bbl from the West Hackberry, La., site. Deliveries will take place in May and June, with early deliveries in April accommodated to the maximum extent possible, FEO said.

A continuing federal budget resolution, which became law

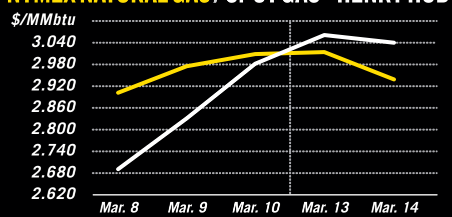
ICE BRENT / NYMEX LIGHT SWEET CRUDE



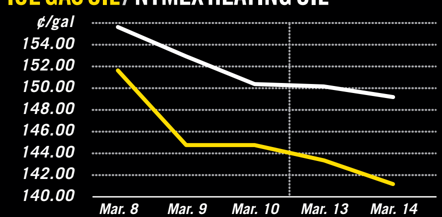
WTI CUSHING / BRENT SPOT



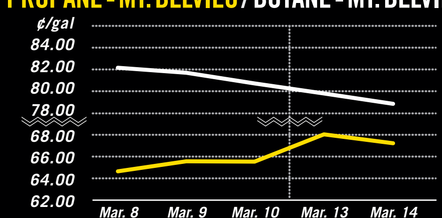
NYMEX NATURAL GAS / SPOT GAS - HENRY HUB



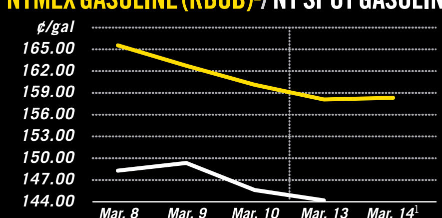
ICE GAS OIL / NYMEX HEATING OIL



PROPANE - MT. BELVIEU / BUTANE - MT. BELVIEU



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



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

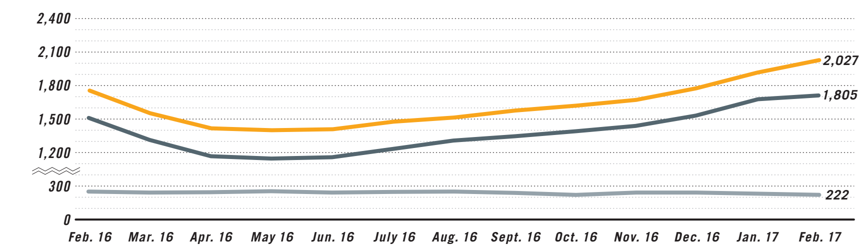
US INDUSTRY SCOREBOARD — 3/20

Latest week 3/3	4 wk. average	4 wk. avg. year ago[1]	Change, %	YTD average[1]	YTD avg. year ago[1]	Change, %
Product supplied, 1,000 b/d						
Motor gasoline	8,763	9,328	(6.1)	8,544	9,033	(5.4)
Distillate	4,012	3,564	12.6	3,878	3,495	11.0
Jet fuel	1,440	1,561	(7.8)	1,569	1,559	0.6
Residual	457	237	92.8	443	243	82.3
Other products	4,933	5,178	(4.7)	5,209	5,366	(2.9)
TOTAL PRODUCT SUPPLIED	19,605	19,868	(1.3)	19,643	19,696	(0.3)
Supply, 1,000 b/d						
Crude production	9,025	9,098	(0.8)	8,984	9,164	(2.0)
NGL production[2]	3,598	3,436	4.7	3,574	3,423	4.4
Crude imports	7,879	8,015	(1.7)	8,243	7,891	4.5
Product imports	2,201	2,042	7.8	2,249	2,055	9.4
Other supply[2,3]	2,353	1,912	23.1	2,388	1,932	23.6
TOTAL SUPPLY	25,056	24,503	2.3	25,438	24,465	4.0
Net product imports	(2,583)	(2,133)	—	(2,632)	(1,976)	—
Refining, 1,000 b/d						
Crude runs to stills	15,471	15,050	2.8	15,927	15,997	(0.4)
Input to crude stills	15,771	16,177	(2.5)	16,217	16,264	(0.3)
% utilization	85.4	88.4	—	87.8	88.8	—

Latest week 3/3	Latest week	Previous week[1]	Change	Same week year ago[1]	Change	Change, %
Stocks, 1,000 bbl						
Crude oil	528,393	520,184	8,209	490,843	37,550	7.7
Motor gasoline	249,334	255,889	(6,555)	250,463	(1,129)	(0.5)
Distillate	161,532	164,208	(2,676)	162,478	(946)	(0.6)
Jet fuel–kerosine	44,179	44,561	(382)	42,546	1,633	3.8
Residual	39,512	38,278	1,234	45,755	(6,243)	(13.6)
Stock cover (days)[4]			**Change, %**		**Change, %**	
Crude	34.2	33.4	2.4	33.0	3.6	
Motor gasoline	28.5	29.5	(3.4)	26.9	5.9	
Distillate	40.3	41.4	(2.7)	45.6	(11.6)	
Propane	35.2	36.4	(3.3)	41.0	(14.1)	
Futures prices[5] **3/10**			**Change**		**Change**	**Change,%**
Light sweet crude ($/bbl)	50.88	53.57	(2.69)	34.66	16.22	46.8
Natural gas, $/MMbtu	2.92	2.78	0.14	1.69	1.24	73.2

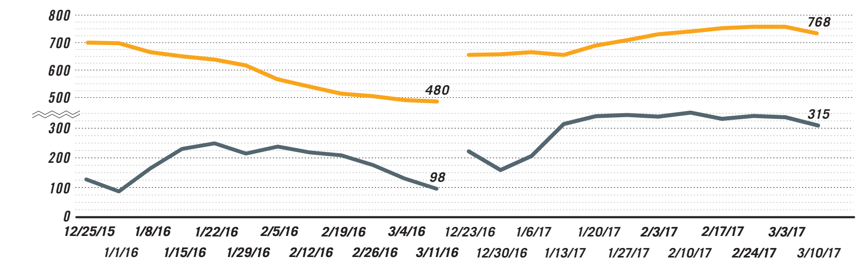
[1]Based on revised figures. [2]OGJ estimates. [3]Includes other liquids, refinery processing gain, and unaccounted for crude oil. [4]Stocks divided by average daily product supplied for the prior 4 weeks. [5]Weekly average of daily closing futures prices.
Source: Energy Information Administration, Wall 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

on Dec. 10, 2016, included a provision to allow DOE to sell as much as $375.4 million in crude from the reserve as the first tranche of oil sales designed to fund operational improvements to ensure the long-term infrastructure integrity under the SPR Modernization program, it said upon announcing the sale. OGJ

EXPLORATION & DEVELOPMENT QUICK TAKES

Interior schedules region-wide US gulf lease sale

The US Department of the Interior will offer 73 million acres offshore Texas, Louisiana, Mississippi, Alabama, and Florida for oil and gas exploration and development in Lease Sale 249, scheduled for Aug. 16.

The proposed region-wide lease sale would include all available unleased areas in the western, central, and eastern planning areas of the Gulf of Mexico, covering 13,725 unleased blocks 3-230 miles offshore in 9-11,115 ft of water.

Proposed Lease Sale 249 will be the first offshore sale under the new Outer Continental Shelf Oil and Gas Leasing Program for 2017-22. Under the new 5-year program, 10 region-wide lease sales are scheduled for the gulf. Two gulf lease sales will be held each year and include all available blocks in the combined western, central, and eastern gulf planning areas.

The US Bureau of Ocean Energy Management estimates that the US OCS contains about 90 billion bbl of undiscovered technically recoverable oil and 327 tcf of undiscovered technically recoverable gas. The gulf OCS, covering about 160 million acres, has technically recoverable resources of 48.46 billion bbl of oil and 141.76 tcf of gas.

BOEM says production from all OCS leases provided 550 million bbl of oil and 1.25 tcf of natural gas in fiscal-year 2016, accounting for 72% of the oil and 27% of the natural gas produced on federal lands.

In the near term, central planning area Lease Sale 247 is scheduled for Mar. 22. The final gulf lease sale in the 2012-2017 5-Year program offers more than 48 million acres offshore Louisiana, Mississippi, and Alabama (OGJ Online, Dec. 22, 2016).

The final sale overall in that program is slated to be Lease Sale 244, which would offer 1.09 million acres in Cook Inlet off Alaska's south-central coast during a June auction. However, Cook Inlet lease sales in the recent past have been canceled by BOEM due to a lack of industry interest.

The 2012-2017 program has offered about 73 million acres, netted more than $3 billion in high bids, and awarded more than 2,000 leases.

Horseshoe discovery extends Alaska North Slope play

Two exploration wells drilled by Repsol SA and Armstrong Energy LLC—Horseshoe 1 and the 1A sidetrack—have extended the Nanushuk play more than 20 miles south of the existing discoveries in the same interval in Alaska North Slope's Pikka Unit (OGJ Online, June 5, 2015).

Repsol reported that the Horseshoe discovery qualifies as the largest US onshore conventional discovery in 30 years.

Drilled during the 2016-17 winter campaign, the Horseshoe 1 well reached 6,000 ft and encountered more than 150 ft of net oil pay in several reservoir zones in the Nanushuk section. The partners drilled the Horseshoe 1A sidetrack to a TD of 8,215 ft and encountered more than 100 ft of net oil pay also in the Nanushuk.

The companies estimate their blocks in the Nanushuk play could contain as much as 1.2 billion bbl of recoverable light oil. Repsol has not reported test results for the Horseshoe discovery, but previous wells—Qugruk 8 (Q-8) and Qugruk 301 (Q-301)—flowed 30° gravity crude at rates of as much as 2,160 bo/d and 4,600 bo/d, respectively.

Preliminary development concepts for Pikka anticipate start of production in 2021 with a potential rate approaching 120,000 bo/d.

Repsol holds a 25% working interest in the Horseshoe discovery and a 49% working interest in the Pikka Unit. Armstrong holds the remaining working interest and is currently the operator.

ExxonMobil to acquire interest in Mozambique Area 4

ExxonMobil Corp. and Eni SPA have signed a sale and purchase agreement to enable ExxonMobil to acquire from Eni a 25% indirect interest in the natural gas-rich Area 4 block offshore Mozambique.

Eni currently holds a 50% indirect share in the block through a 71.4% stake in Eni East Africa, which owns 70% of the Area 4 concession.

The agreed terms include a cash price of about $2.8 billion. The acquisition will be completed following satisfaction of a number of conditions precedent, including clearance from Mozambican and other regulatory authorities.

Eni will continue to lead the 3.3 million-tonne/year Coral floating LNG project as well as a 10 million-tpy onshore liquefaction joint venture in Area 4, while ExxonMobil will lead the construction and operation of natural gas liquefaction facilities onshore.

Following completion of the transaction, Eni East Africa SPA will be co-owned by Eni 35.7%, ExxonMobil 35.7%, and China National Petroleum Corp. 28.6%. The remaining interests in Area 4 are held by Empresa Nacional de Hidrocarbonetos de Mozambique EP, Korea Gas Corp., and Galp Energia, each with 10% interest.

Eni and Anadarko Petroleum Corp. signed a unitization and operating agreement in late 2015 that regulates the development of reserves straddling Anadarko's Area 1 and Eni's Area 4. They jointly proposed a two-train, 10 million-tpy onshore facility that will start up in 2022. Anadarko is developing a separate two-train, 12 million-tpy project that is expected to start up in 2021 for $15 billion, according to recent estimates.

The deepwater Area 4 block is believed to contains 85 tcf of gas. OGJ

Total brings Moho Nord field on stream

Total SA started production at Moho Nord field 75 km offshore Pointe-Noire, Congo (Brazzaville). The project was designed with a production capacity of 100,000 boe/d.

Moho Nord field was developed through 34 wells tied back to a tension-leg platform and to Likouf, a floating production unit. Oil is processed on Likouf and then transported by pipeline to the Djeno onshore terminal.

Total said there will be no routine flaring to minimize environmental impact. An all-electric design improves energy efficiency. All produced water will be reinjected into the reservoir.

Moho Phase 1b and Moho Nord are part of the Moho Bilondo license operated by Total E&P Congo (OGJ Online, Dec. 11, 2015). Total holds 53% interest, Chevron Corp. 31.5%, and Societe Nationale des Petroles du Congo 15%.

Buru to restart Ungani oil field onshore Australia

Buru Energy Ltd., Perth, has restarted production from Ungani oil field in the onshore Canning basin south of Broome in Western Australia.

Buru Energy says oil from the field will be trucked north to Wyndham Port where Cambridge Gulf Ltd. (CGL) will store it in its 80,000-bbl tank. From there, it will be exported by ship to nearby markets as well as South East Asia.

Earlier production from the field was stored in Wyndham in a smaller 30,000-bbl tank. Buru says the larger storage capacity brings significant economies of scale and commercial benefits through access to larger ships on spot charter rather than the previously used smaller time charter vessels.

Planned modifications to the larger tank also will help streamline the storage system and reduce operating costs.

Buru says the timing of the recommencement of production from Ungani will depend on CGL returning the storage tank from diesel service and the required modifications that entails, but the target is to bring the field back on stream by midyear.

Minor modifications at the field also will be undertaken prior to start-up. The field will be on natural flow initially at a target rate of 1,200 b/d. Electrical submersible pumps will be installed later this year to maintain and potentially increase production rates.

Noble to batch-drill two Leviathan wells

Noble Energy Mediterranean Ltd. and partners will batch-drill two production wells in the development of deepwater Leviathan gas field offshore Israel (OGJ Online, Mar. 2, 2017).

The partners had approved drilling of the Leviathan 5 appraisal well in December, stipulating that the well also could be a producer. They sanctioned development last month.

Partner Delek Group reports the group has decided to drill the Leviathan 7 appraisal and production well at the same time.

Drilling will begin after the Atwood Advantage drillship finishes work on the Tamar 8 production well in nearby Tamar gas field.

The rig will drill the Leviathan 7, about 120 km west of Haifa in 1,630 m of water, to 2,900 m below sea level (bsl). It then will move to the Leviathan 5 location about 130 km west of Haifa in 1,740 m of water.

After drilling Leviathan 5 to its target depth of 5,200 m bsl, the drillship will return to Leviathan 7 and drill to final depth of 5,100 m bsl.

Total drilling time is expected to be 7 months. Delek estimates drilling cost at $71 million.

The wells will be completed and connected to the production system later. OGJ

PROCESSING QUICK TAKES

ExxonMobil marks $20 billion for USGC expansions

ExxonMobil Corp. will invest $20 billion over a 10-year period to expanding its chemical manufacturing capacity along the US Gulf Coast to support increased exports to overseas markets.

The Growing the Gulf expansion program will cover major chemical, refining, lubricant, and LNG projects at 11 proposed new and existing manufacturing sites in Texas and Louisiana, ExxonMobil said.

Most of the new chemical capacity that will come online as part of the program will target export markets in Asia and elsewhere, the company said.

"These projects are export machines, generating products that high-growth nations need to support larger populations with higher standards of living," said ExxonMobil Chairman and CEO Darren Woods. The investment decision is a result of growing US oil and natural gas production amid rising demand abroad, Woods said. "The supply is here; the demand is there," Woods said. "We want to keep connecting those dots."

ExxonMobil, which started the investment in 2013, said it expects to continue investing into the program at least through 2022.

Vietnam's first petrochemical complex project advances

Siam Cement Public Co. Ltd. (SCG) subsidiary Vina SCG Chemicals Co. Ltd. (VSCG) has entered a share purchase agreement with Qatar Petroleum International Ltd. (QPI) to acquire all of subsidiary QPI Vietnam Ltd.'s (QPIV) 25% equity stake in Long Son Petrochemical Co. Ltd.'s (LSP) long-delayed project to build Vietnam's first petrochemical complex on Long Son Island in Vung Tau City, Ba Ria Province, about 100 km southeast of Ho Chi Minh City (OGJ Online, Oct. 9, 2009).

Valued at $36.1 million, the equity transaction will increase SCG's total ownership interest in the LSP project to 71% from its previous 46% stake held through subsidiaries VSCG 28% and Thai Plastic & Chemicals Public Co. Ltd. (TPC) 18%.

The QPIV buyout follows QPI's 2015 notification to fellow LSP shareholders VSCG, TPC, and Vietnam's state-owned PetroVietnam and Vinachem 29% of Qatar's intention to withdraw from the project, according to a Nov. 13, 2015, release from SCG.

SCG said it plans to reach financial investment decision on the estimated $4.5-billion LSP project by the end of this year's first half, which if approved, will begin a 3-4-year construction period for a proposed startup date sometime in 2021.

As currently planned, LSP's complex would include a 1 million-tonne/year flexible-feed cracker capable of switching between ethane, propane, and naphtha feedstock to produce about 1.6 million tpy of ethylene depending on the feedstock mix, SCG said.

In a series of presentations during 2013-16, PetroVietnam told investors the new complex—which will be fully integrated with supporting infrastructure that includes a deep-sea port, jetty, storage installations, power plant, and other utilities—also would be equipped to produce 450,000-468,000 tpy of polypropylene, 450,000 tpy of high-density polyethylene, 500,000 tpy of linear low-density polyethylene, and 400 tpy of vinyl chloride monomer.

Dangote lets contract for Nigerian refining complex

Dangote Oil Refining Co. (DORC), a division of Nigerian conglomerate Dangote Industries Ltd. (DIL), has let a contract to MAN Diesel & Turbo SE (MDT), Augsburg, Germany, to provide equipment and associated technology services for its grassroots integrated refining complex now under construction in southwestern Nigeria's Lekki Free Trade Zone, near the capital of Lagos (OGJ Online, Nov. 25, 2013).

MDT will build and deliver two axial compressor trains driven by 30-Mw turbines to support operations at the refinery's fluid catalytic cracking plant, as well as provide a comprehensive auxiliary service package, including equipment commissioning services, MDT said.

While a precise cost of the contract was not revealed, the service provider valued the order in the double-digit million dollars.

MDT said it expects to deliver the equipment sometime in 2018, ahead of DORC's planned startup of the entire $12-billion refining and petrochemical complex in 2019.

According to social media posts from the state government of Lagos as well as details of a previous contracts awarded for the former $11-billion project, the integrated complex will include a 650,000-b/d crude distillation unit and 3.6 million-tonne/year polypropylene plant, as well as units for the following major processes: residual FCC; diesel hydrotreating; continuous catalyst regeneration; and alkylation.

While Nigeria holds the second-largest amount of proved oil reserves in Africa—more than 37 billion bbl—the country currently imports most of its refined product requirements due to lack of domestic refining capacity.

Once completed, however, DORC's refinery will be able to satisfy 100% of Nigeria's fuel demand, said Alhaji Aliko Dangote, DIL's president and chief executive.

Additional planned capacity of the refinery comes alongside a series of efforts under way by the Nigerian government to modernize and expand capacities of refineries operated by state-owned Nigerian National Petroleum Corp. beginning this year as part of a strategy to meet Nigeria's domestic demand for refined products and reduce its reliance on foreign imports. OGJ

TRANSPORTATION QUICK TAKES

Canada okays NGTL's Towerbirch expansion project

Nova Gas Transmission Ltd. (NGTL) has received approval from the Canadian government for the Towerbirch Expansion Project in northwest Alberta and northeast British Columbia.

NGTL, a subsidiary of TransCanada Corp., said the $439-million (Can.) project includes 55 km of 36-in. pipeline that will parallel the existing NGTL Groundbirch mainline and a 32-km Tower Lake section of 30-in. line that will parallel existing third-party pipelines.

The project also includes four receipt meter stations and expansion of an existing meter station. Facilities are expected to be in-service in the fourth quarter (OGJ Online, Nov. 17, 2015).

Jim Carr, Canada's minister of natural resources, said the project will create as many as 750 jobs during construction, address the need for increased natural gas transmission capacity along the existing NGTL system, and support economic growth. About 82% of the project will parallel existing rights-of-way or "existing disturbances." The approval includes 24 binding conditions.

Carr said the government took into consideration the National Energy Board's recommendation report on the project, Environment and Climate Change Canada's assessment of upstream greenhouse gas emissions, the views of Canadians gathered through an online questionnaire, and consultations with indigenous peoples.

MPC completes $2-billion midstream dropdown

Marathon Petroleum Corp. has closed on a deal to contribute certain terminal, pipeline, and storage assets to MPLX LP for $2.015 billion.

The assets include 62 light-product terminals with 24 million bbl of storage capacity; 11 pipeline systems consisting of 604 miles of pipeline; 73 tanks with 7.8 million bbl of storage capacity; a crude oil truck unloading facility at MPC's refinery in Canton, Ohio; and eight NGL storage caverns in Woodhaven, Mich., with 1.8 million bbl of capacity.

"This drop-down of additional high-quality logistics assets to MPLX represents the first of several drops expected to occur in 2017," said Gary R. Heminger, MPC chairman, president, and chief executive officer.

MPC will receive an issuance of $504 million in MPLX equity and $1.511 billion in cash. The equity to be issued in the deal consists of MPLX common units and general partner units to maintain MPC's 2% general partner interest in MPLX. The units will be valued based on the 10-day volume weighted average price of MPLX common units prior to the closing. OGJ

■ *Denotes new listing or a change in previously published information.*

MARCH 2017

SPE/ICoTA Coiled Tubing & Well Intervention Conference & Exhibition, Houston, web site: www.spe.org/events/ctwi/2017/ **21-22.**

New Zealand Petroleum Conference 2017, New Plymouth, web site: www.petroleum-conference.nz/ **21-23.**

North Africa Petroleum Exhibition & Conference (NAPEC), Algeria, web site: www.napec-dz.com/ **21-24.**

IADC Drilling HSE&T Asia Pacific Conference & Exhibition, Kuala Lumpur, web site: www.iadc.org/event/asia-pacific-drilling-hset-2017/ **22-23.**

National Stripper Well Association 2017 Annual Meeting & Energy Gala, Oklahoma City, web site: http://nswa.site-ym.com/event/nswaam17 **23-24.**

Corrosion 2017 Conference & Expo, New Orleans, web site: nacecorrosion.org/ **26-30.**

EAGE: Tyumen 2017, Tyumen, Russia, web site: www.eage.org/event/index.php?eventid=1491&Opendivs=s3 **27-30.**

SPE Oklahoma City Oil & Gas Symposium, Oklahoma City, web site: www.speokcsymposium.org/ **27-31.**

IADC/SPE Managed Pressure Drilling & Underbalanced Operations Conference & Exhibition, Rio de Janeiro, web site: www.iadc.org/event/2017-iadcspe-managed-pressure-drilling-underbalanced-operations-conference-exhibition/ **28-29.**

International SAP Conference for Oil & Gas, Lisbon, web site: www.oilandgastechnology.net/events **28-30.**

Cost-Effective Produced Water Management 2017, Pittsburgh, web site: www.shale-water-marcellus-utica.com/ **29-30.**

Ghana Summit—Oil, Gas, LNG & Power, Accra, web site: www.cwcghana.com/ **29-30.**

Offshore Mediterranean Conference 2017 (OMC 2017), Ravenna, Italy, web site: www.omc2017.it/ **29-31.**

APRIL 2017

AAPG 2017 Annual Convention & Exhibition, Houston, web site: www.aapg.org/events/conferences/ace/ **2-5.**

International Conference on Petroleum Industry & Energy, Brisbane, web site: www.waset.org/conference/2017/04/brisbane/ICPIE **3-4.**

International Conference on Oil, Gas & Petrochemistry, Dubai, web site: petrochemistry.madridge.com/ **3-5.**

SPE International Conference on Oilfield Chemistry, Montgomery, Tex., web site: www.spe.org/events/en/2017/conference/17occ/homepage.html/ **3-5.**

SPE Oil & Gas India Conference & Exhibition, Mumbai, web site: www.spe.org/events/en/2017/conference/17ogic/homepage.html **4-6.**

Ocean Business 2017, Southampton, UK, web site: www.ths.org.uk/event_details.asp?v0=512 **4-6.**

SPE Asia Pacific Health, Safety, Security, Environment & Social Responsibility Conference, Kuala Lumpur, web site: www.spe.org/events/en/2017/conference/17aphs/homepage.html/ **4-6.**

Gastech Conference & Exhibition, Tokyo, web site: www.gastech-event.com/ **4-7.**

■ SPE International Bergen One-Day Seminar, Bergen, Norway, web site: www.spe.org/events/en/2017/conference/17berg/homepage.html **5.**

Mexico Energy Assembly, Polanco, Mexico, web site: www.oilandgascouncil.com/conference/mexico-oil-and-gas-assembly **5-6.**

GPA Midstream Convention, San Antonio, web site: gpaconvention.org/ **9-12.**

11th Global Oil & Gas Atyrau Conference, Kazakhstan, web site: www.oilgas-events.com/Oiltech-Atyrau-Conference/ **11-12.**

Global Oil & Gas Atyrau Exhibition, Atyrau, Kazakhstan, web site: www.oilgas-events.com/Atyrau-Oil-Gas-Exhibition **11-13.**

East Africa 2017 Oil & Gas Exhibition & Conference, Nairobi, web site: www.expogr.com/kenyaoil/ **11-13.**

Neftegaz 2017 17th International Exhibition for Equipment & Technologies for Oil & Gas Industries, Moscow, web site: www.neftegaz-expo.ru/en/neftegaz_2017/ **17-20.**

International Conference on Oil, Gas & Petrochemical Engineering, Paris, web site: www.waset.org/conference/2017/04/paris/ICOGPE **18-19.**

Society of Petroleum Engineers (SPE) Health, Safety, Security, Environment & Social Responsibility Conference–North America, New Orleans, web site: www.spe.org/events/hsse/2017/ **18-20.**

India Oil & Gas Pipeline Conference (IOGPC), Mumbai, web site: https://www.asme.org/events/iogpc **20-22.**

SPE Western Regional Meeting, Bakersfield, Calif., web site: www.spewrm.org/ **23-27.**

International Conference on Petroleum & Petrochemical Technology (ICPPT), Boston, web site: www.waset.org/conference/2017/04/boston/ICPPT **24-25.**

LNG International Summit, Barcelona, web site: lngsummit.org/ **24-25.**

European Symposium on Improved Oil Recovery, Stavanger, web site: www.eage.org/event/index.php?eventid=1496&Opendivs=s3 **24-27.**

International Chemical & Oil Pollution Conference & Exhibition, Marina Bay Sands, Singapore, web site: www.icopce.com/ **25-28.**

International Chemical & Oil Pollution Conference & Exhibition (ICOPCE), Marina Bay Sands, Singapore, web site: www.icopce.com **25-28.**

Singapore Maritime Technology Conference (SMTC), Marina Bay Sands, Singapore, web site: www.smtcsingapore.com **26-28.**

International Conference on Energy, Power, Petroleum & Petrochemical Engineering, Beirut, Lebanon, web site: sdiwc.net/e3pe2017/ **26-28.**

MAY 2017

Pipeline Technology Conference, Berlin, web site: www.pipeline-conference.com/ **2-4.**

International Conference on Gas, Petroleum & Chemical Sciences (ICGPCS), Rome, web site: www.waset.org/conference/2017/05/rome/ICGPCS **4-5.**

International Conference on Oil Reserves & Energy Systems, Rome, web site: www.waset.org/conference/2017/05/rome/ICORES **4-5.**

International Conference on Oil, Gas & Petrochemical Engineering, Los Angeles, web site: www.waset.org/conference/2017/04/los-angeles/ICOGPE/home **5-6.**

Asia Oil & Gas Conference (AOGC 2017), Kuala Lumpur, web site: aogc.com.my/conference/ **7-9.**

Iran Oil Conference 2017, Tehran, web site: iranoilconference.com/ **7-9.**

Colombia Oil & Gas Conference & Exhibition, Cartagena, web site: 10times.com/colombia-oilgas-exhibition **7-9.**

SPE Reservoir Characterization & Simulation Conference & Exhibition, Abu Dhabi, web site: www.spe.org/events/en/2017/conference/17rcsc/homepage.html **8-10.**

Oil, Gas & Mines Africa Conference, Nairobi, web site: www.eage.org/event/index.php?eventid=1515&Opendivs=s3 **9-11.**

Pipeline Simulation Interest Group 48th Annual Conference, Atlanta, web site: https://psig.org **10-12.**

2017 APPEA Conference & Exhibition, Perth, web site: www.appea.com.au/event/appea-2017/ **14-17.**

International Oil Spill Conference, Long Beach, Calif., web site: iosc2017.org/ **15-18.**

International Oil Rail & Ports Conference, Tehran, web site: http://www.ite-exhibitions.com/Event-Management/ITE-TURKEY/Oil-Rail-Ports **15-16.**

European Association of Geoscientists & Engineers: Horizontal Wells 2017, Kazan, Russia, web site: www.eage.org/event/index.php?eventid=1492&Opendivs=s3 **15-19.**

EIC Connect Oil & Gas UAE 2017, Dusit Thani, Abu Dhabi, web site: www.the eic.com/EIC-Connect/MiddleEast/AbouttheEvent.aspx **16.**

International Downstream Technology & Strategy Conference, Dubrovnik, Croatia, web site: www.europetro.com/en/idtc_2017 **16-17**.

Cape Town Conference 2017, Cape Town, web site: www.oilandgascouncil.com/event/cape-town-conference **16-17**.

Canada LNG Conference & Exhibition, Vancouver, web site: www.canadalngexport.com/**16-18.**

International Downstream Week 2017, Dubrovnik, Croatia, web site: https://europetro.com/en/international_downstream_week_2017 **16-19.**

Gas-To-Power World Congress 2017, Cape Town, web site: www.oilandgascouncil.com/event/gas-power-world-congress **17-18.**

GPA 2017 Spring Conference, Milan, web site: https://www.gpaeurope.com/event-details.aspx?event=55 **17-19.**

CWC China LNG & Gas International Summit & Exhibition, Beijing, web site: chinalngsummit.com/ **17-19.**

OGU Oil & Gas Uzbekistan Conference, Tashkent, web site: www.oilgas-events.com/OGU-Conference **17-19.**

SPE Latin America & Caribbean Petroleum Engineering Conference, Buenos Aires, web site: www.spe.org/events/en/2017/conference/17lacp/homepage.html/**17-19.**

IADC Drilling Onshore Conference & Exhibition, Houston, web site: www.iadc.org/event/2017-iadc-drilling-onshore-conference-exhibition/ **18.**

International Conference on Gas, Petroleum & Chemical Technologies (ICGPCT), Paris, web site: www.waset.org/conference/2017/05/paris/ICGPCT **18-19.**

International Bottom of the Barrel Technology Conference (BBTC), Dubrovnik, Croatia, web site: https://www.europetro.com/en/bbtc_2017 **18-19.**

International Conference on Shale Oil & Gas Engineering, Paris, web site: www.waset.org/conference/2017/05/paris/ICSOGE **18-19.**

World Fuel Oil Summit X, Athens, web site: www.worldfueloilsummit.com/index.php **18-20.**

Iraq Petroleum 2017, London, web site: www.cwciraqpetroleum.com/ **22-23.**

Turkmenistan Gas Congress (TGC) 2017, Turkmenbashi, Turkmenistan, web site: www.turkmenistangascongress.com/Home **23-24.**

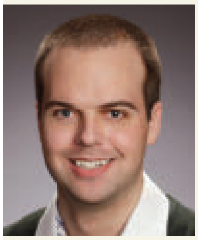
16th Africa Independents Forum, London, web site: www.oilgas-events.com/Find-an-Event/Africa-Independents-Forum **24-25.**

Turkmenistan Gas Congress, Turkmenbashi, web site: www.oilgas-events.com/TGC **24-25.**

International Gas Union Research Conference (IGRC), Rio de Janeiro, web site: www.igu.org/events/igrc-2017 **24-26.**

International Conference on Gas, Petroleum & Chemical Sciences & Technologies (ICGPCST), London, web site: www.waset.org/conference/2017/05/london/ICGPCST **25-26.**

Dharma and gas



MATT ZBOROWSKI
Assistant Editor

Executives of Energy Transfer Partners LP (ETP) breathed sighs of relief during January and February when newly inaugurated US President Donald J. Trump signed an executive order to advance work on the Dakota Access Pipeline, and the Army Corps of Engineers subsequently granted an easement needed to complete construction on the project.

Protestors cleared the site near the Missouri River on Feb. 22, but the fight continued as the Standing Rock Sioux and Cheyenne River Sioux tribes undertook last-ditch legal efforts to prevent the line from becoming fully operational. The months of intense feelings associated with the saga will continue to burn for the foreseeable future.

During the same time period in which Dakota Access was revived, ETP, which has tens of thousands of miles of pipeline servicing the country's most prolific oil and gas regions, found itself in another conflict involving sacred lands—albeit with a lesser known spiritual entity. Unlike with Dakota Access, however, this dispute was resolved quickly and quietly.

The New Vrindaban Holy Dham community outside Moundsville, W.Va., sued ETP in March to prevent the company from constructing part of the 713-mile, 3.25-bcfd Rover Pipeline on a 3,000-ft by 50-ft right-of-way through two of the community's properties. The 24-in., 30-in., 36-in., and 42-in. OD underground Rover line will pass through Pennsylvania, West Virginia, Ohio, and Michigan and transport shale gas from the Marcellus and Utica formations.

The community asserted the pipeline's presence on its land would have violated its religious rights. Upon notification of the legal action, ETP almost immediately decided to reroute the pipeline around the complex even though it received approval from the US Federal Energy Regulatory Commission a month earlier to proceed with work.

Universal Society of Hinduism Pres. Rajan Zed thanked ETP in a Mar. 5 statement "for giving due regard to the feelings of the area and worldwide Hindu community and sacredness of Hindu sites." He also commended the New Vrindaban Holy Dham community for seeking a solution to preserve the sacred sites.

Ethical dilemmas

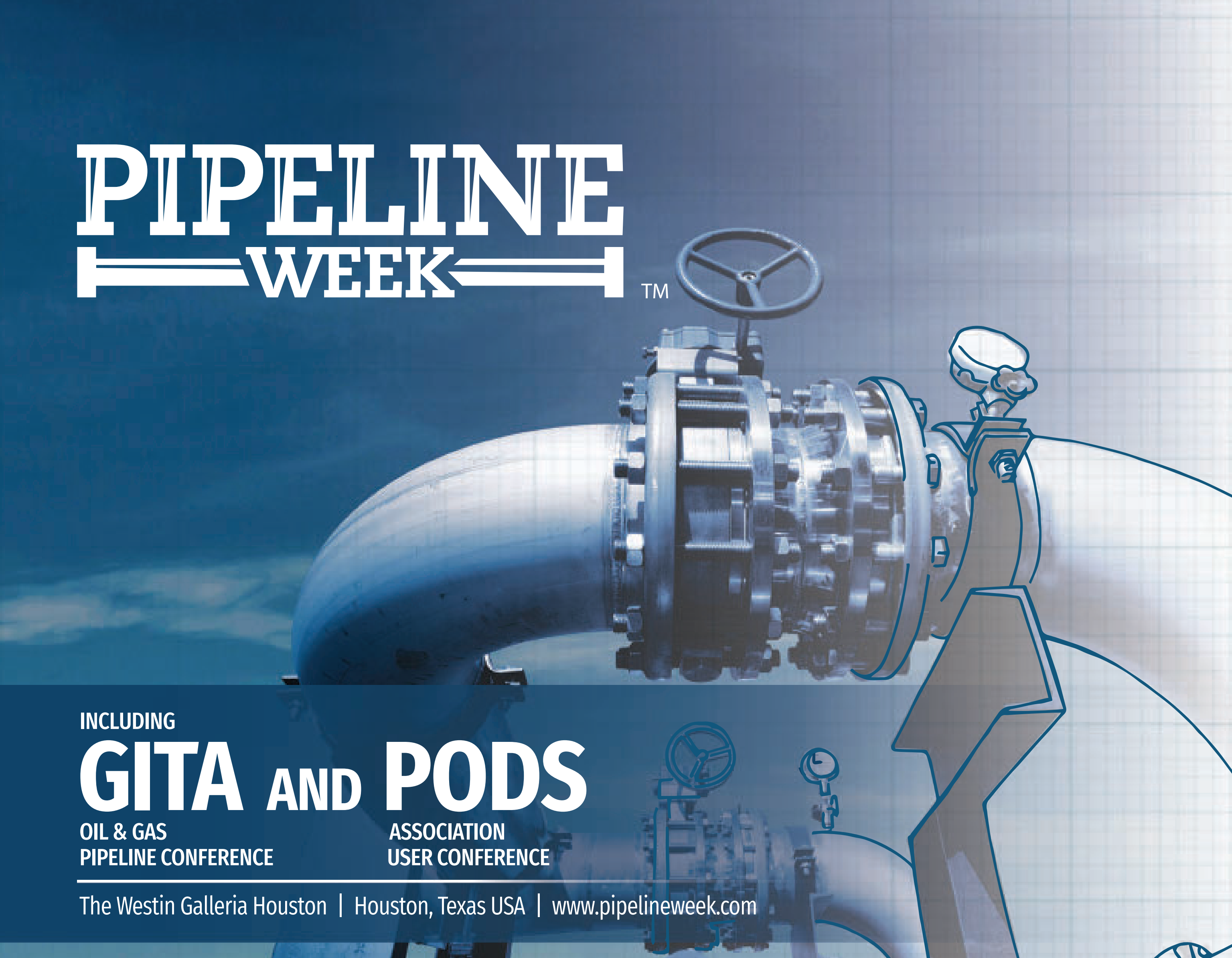
Not what you typically imagine dotting the Appalachian landscape, New Vrindaban, meaning the land of Krishna and known as "sacred village," was founded in 1968 in the rural West Virginia panhandle and was once America's largest Hare Krishna settlement. As the site of various Hindu festivals—including Diwali, Janmastami, Ramnavami, and Holi—the community hosts thousands of pilgrims and visitors each year.

The complex includes Sri Sri Radha Vrindaban Chandra Mandir, the main temple hall and main attraction; Prabhupada's Palace of Gold, which is adorned by rose gardens and more than 100 water fountains; a 50-cow barn that some consider the "longest running cow protection program in the Western World"; and a retreat center and yoga platform. A second of the seven proposed temples, Radha Gopinath Mandir, is reportedly under construction.

The complex also sits on top of a wealth of shale gas, development of which was a point of contention within the community when oil and gas companies were sniffing around the area ahead of the shale revolution. Some on the community morally objected to extracting fossil fuel from beneath the holy site as well as its contribution to a culture of excess, while others focused on the much-needed funds the gas would provide for the complex.

The community eventually signed a lease with AB Resources LLC in 2010 for production of the Marcellus gas, and another pair of companies followed a few years later targeting the Utica. But the money comes with certain stipulations for use within the community. According to a 2015 article in the Pittsburgh Post-Gazette, for example, some of the proceeds have gone toward an eco-village.

The dilemma faced by the New Vrindaban Holy Dham community reflects one encountered by countless other communities, cities, states, and countries all over the world when it comes to extraction and consumption of hydrocarbons. It also serves as a reminder that the answers aren't always as clear cut as certain political factions on both sides of the aisle would have you believe. OGJ



PIPELINE WEEK™

INCLUDING

GITA AND PODS

OIL & GAS PIPELINE CONFERENCE | ASSOCIATION USER CONFERENCE

The Westin Galleria Houston | Houston, Texas USA | www.pipelineweek.com

CALL FOR ABSTRACTS | October 3-5, 2017

DEADLINE TO SUBMIT: MARCH 17, 2017

Abstracts are now being accepted for the 4th annual Pipeline Week featuring the 26th annual GITA Oil & Gas Pipeline Conference & Exhibition and the 13th annual PODS User Conference.

GENERAL CATEGORIES INCLUDE:

- Asset Management
- Mobility
- Analytical Planning
- Regulatory Compliance
- Operational Awareness
- Integration/Interoperability
- Project Planning and Records Management
- Construction Standards/Data Standards
- Existing and Emerging Standards
- Pipeline Integrity/Integrity Management
- Emerging Technologies/Trends
- Site and Facility Management
- Social License to Operate

FOR ABSTRACT GUIDELINES AND SUBMISSION INFORMATION, VISIT WWW.PIPELINEWEEK.COM/CONFERENCE

OWNED & PRODUCED BY: PennWell

PRESENTED BY: gita GEOSPATIAL INFORMATION & TECHNOLOGY ASSOCIATION | PODS Pipeline Open Data Standard www.pods.org

FLAGSHIP MEDIA SPONSORS: OIL&GAS JOURNAL | OIL&GAS FINANCIAL JOURNAL

FOLLOW US ON: #PipelineWeek

A global experiment

Two months into their historic experiment, agreements to cut oil production in support of crude prices provide more questions than answers.

A giddy market received a jolt of reality this month, when marker prices slipped below $50/bbl. Stubbornly high inventories in the US reminded buyers and sellers that abundance still dominates.

Yearning for coordination

Clearer now than ever is the market's yearning for supply coordination. Price instability always has bedeviled the oil business. Through most of the industry's history, some mechanism has buffered supply to moderate price: cooperation outside the US by major companies; prorationing by state commissions in the US, production restraint by the Organization of Petroleum Exporting Countries.

Indeed, when OPEC refused in November 2014 to ask members to cut production, the market panicked. And when the group announced at the end of last November that it would reinstate quotas starting in January, Brent crude quickly gained $7/bbl in value, according to the International Energy Agency. Companion promises by a group of non-OPEC producers early in December added $3/bbl more to the Brent price.

Those price hikes materialized before any production cuts occurred and before any assurance was in sight that curtailment would happen. The market's craving of supply management is the clearest message yet from OPEC's project.

On compliance, early signs are encouraging—though maybe wavering. In its Oil Market Report published Mar. 15, the IEA estimates the 11 OPEC members agreeing to cut production met an aggregate average of 98% of their commitments during January and February. IEA "provisionally" estimates the 11 non-OPEC collaborators managed 37% compliance over the period.

But the effort is asymmetric. Saudi Arabia anchors OPEC's performance with a compliance rate of 135%. Angola and Qatar also produced below quotas in February. Kuwait met its quota. And the UAE is approaching its target. Compliance is important. History pointedly suggests Saudi Arabia won't balance the market solo.

Whether Russia will trim output by its promised 300,000 b/d remains a pivotal question. As the most important of the non-OPEC collaborators, it said at the outset cuts would be phased. It's probably paring drilling by state-owned companies, rather than ordering well closures, and letting depletion in old fields do the rest.

To some extent unknowable outside Riyadh, Saudi enthusiasm for supply coordination depends on Russian adherence to the non-OPEC accord. Russia has a less than noble record with promises to trim oil output alongside OPEC. Furthermore, Saudi officials loathe the Moscow's siding with Tehran in Iranian interventions in Iraq, Syria, and Yemen. Recent diplomatic gestures—including agreement to let Iran increase production while all but two other OPEC members were cutting—hint at an easing of tensions. Still, reciprocity between Riyadh and Moscow is central to the production accords. Diplomacy notwithstanding, it must be considered fragile.

Beyond questions about cohesion of the supply agreements looms the new unknown: the response to price elevation of prompt production from tight oil plays. The US Energy Information Administration, in its March Short Term Energy Outlook, added 200,000 b/d each to its projections for US crude production this year and next. For the seven shale plays it tracks in its monthly Drilling Productivity Report, EIA recently projected a 109,000-b/d increase in April alone.

With costs and break-even prices falling in some tight-oil plays, with drilling in those plays rising, and with production enhancements occurring steadily, further gains are inevitable. To the extent they're not offset by declines elsewhere outside the production agreements, the increases take market share from parties to the accords. It was that prospect that made OPEC abandon supply management in 2014.

The experiment

The latest version of production restraint thus remains perishable. If it fails, a touchy market will punish oil prices. And surprise supply from tight oil plays seems to be a question of not whether but how much.

A global experiment tests whether production restraint works in an oil market supplied increasingly from unconventional resources. Results so far? Inconclusive. OGJ

Better agency coordination needed for energy projects, senators told

Nick Snow
Washington Editor

The Trump administration will have only limited success in pursuing its ambitious US energy infrastructure improvements unless federal regulatory agencies do a better job coordinating their reviews of proposed transportation projects, witnesses told the US Senate Energy and Natural Resources Committee on Mar. 14.

"Coordination among several federal agencies is critical to the timely review of a project, and as designed today, the federal permitting process is challenging," said Dominion Energy Chief Executive Diane Leopold.

The Dominion Resources Inc. natural gas subsidiary has been in discussions with those agencies about its proposed interstate Atlantic Coast Pipeline (ACP) since May 2014, months before it filed an application for approval with the US Federal Energy Regulatory Commission the following September, Leopold told the committee.

"In addition, to facilitate interagency coordination, the [ACP] was placed on the FAST-41 list of high-priority, nationally significant projects. And to address agency resource constraints, Dominion has entered into cost-sharing agreements with the US Fish and Wildlife Service and National Park Service. As of this date, we are continuing to seek guidance from the agencies on a number of schedule-critical issues of great importance to the overall project schedule," Leopold said.

While virtually all of the 600-mile system will be underground, the ACP is taking extraordinary steps to protect views from the Blue Ridge Parkway and the nearby Appalachian Trail by boring under a mountain for nearly 1 mile using horizontal directional drilling, she said.

"This construction method, while…more costly, was selected precisely to ensure that there will be no surface disturbances, tree clearing, or interference with public access to the parkway or trail," Leopold said. "Even with this diligence, the Park Service took 14 months to review our 22-page application just to survey the area. Once permission was granted, the survey work was accomplished in one afternoon."

The approval did not address the extensive permitting review under way by the NPS for the crossing's actual construction permit, she added.

Nearly 10-year delay

PacifiCorp received a record of decision for its Gateway West electricity transmission expansion project on the Obama administration's final day in January, nearly 10 years after the initial application was filed in May 2007, said Stefan Bird, chief executive of the utility holding company's Pacific Power division.

"We kept having to refile as new policies and guidelines were rolled out," Bird said. "It would have made more sense if decisions could have been grandfathered and not subject to new conditions and requirements."

Schedule predictability is essential, with the greatest potential efficiency improvements coming from better permit application and coordination under the National Environmental Policy Act, Bird told the committee. Berkshire Hathaway Energy, PacifiCorp's parent, recommends focusing improvement efforts there, he said.

Laborers International Union of North America (LIUNA) Gen.-Pres. Terry O'Sullivan called for regulatory reforms that would streamline necessary review processes, allow reviews by separate agencies and entities to proceed concurrently, and make permitting processes more definitive so projects can be built without delay once all regulatory concerns have been addressed.

LIUNA also calls for the speedy filling of vacant spots at FERC so it has the quorum necessary to complete regulatory reviews and approvals in a thorough—and timely—manner, O'Sullivan said.

"Moving forward with a nonpartisan energy agenda will facilitate…private investment that will create millions of new jobs across…the economy. It is also critical to addressing and improving the vital energy infrastructure that keeps our lights on, that heats and cools our homes and businesses, and that moves people and goods across the country," O'Sullivan said.

"This infrastructure is in desperate need of repair and modernization," he said. "In its most recent report card on the state of America's infrastructure, the American Society of Civil Engineers gave our energy infrastructure a grade of D+."

Possible improvements

Leopold said sponsors of major energy transportation projects support and understand each federal agency's requirement for careful analysis to ensure the protection of the natural and cultural resources under its stewardship. Dominion Energy also believes the NEPA process undertaken by FERC and the interagency coordination called for in the FAST-41 legislation strive for project schedule coordination and timely reviews, she testified.

She said Dominion and other sponsors of major energy transportation projects also would like to see:

• Concurrent NEPA analysis and review of permits by FERC and other permitting agencies. "Given FERC's lead agency status for the NEPA review of interstate gas pipelines, it is essential that there be a predictable schedule followed by other agencies as they complete permit reviews required by other laws," Leopold said.

• A requirement for other permitting agencies to determine when an application is complete to ensure compatibility with FERC's timeline. "To ensure that an agency has ample time to review an application within the FERC schedule, such a determination should be made within a specific time period," she said. "This action would improve the transparency of the FERC permitting process and put the applicant on notice if its permit application was deficient."

• Stronger coordination of FERC's NEPA environmental reviews with cooperating agencies. Leopold said she sees a very real need to give meaning to the responsibilities of "lead agency" and "cooperating agency" so that all federal agencies work together efficiently for a robust environmental review. "It is equally important to ensure that once the NEPA process is completed and a review is issued, that other agencies use the information already contained in the NEPA document as the basis for permits required under other statutes," she noted.

In her opening statement, Committee Chair Lisa Murkowski (R-Alas.) said, "Energy infrastructure is central to our way of life and our standard of living, but it is almost always an afterthought—until it breaks down. We have seen that too often in recent years, making this a perfect time to look at our options to either rebuild or, in many cases, build energy infrastructure for the first time." OGJ

Ozone limits implementation reform bill reintroduced in US Senate

Nick Snow
Washington Editor

Sen. Jeff Flake (R-Ariz.) has reintroduced legislation aimed at giving states and communities more time to implement 2015 ground-level ozone limits under National Ambient Air Quality Standards. The measure, S. 452, also would revise the US Environmental Protection Agency's existing timeline for reviewing NAAQS and air-quality criteria from 5-year intervals to 10-year intervals.

The measure was one of three Flake introduced on Feb. 27. A second bill, S. 454, would streamline EPA regulations to ensure that states and localities are not considered in violation of federal air-quality standards due to uncontrollable, naturally occurring events.

States now must submit costly and complicated demonstration projects to EPA for review that can become indefinite, cumbersome, and often arbitrary and unpredictable after "exceptional events" such as dust storms and wildfires occur, Flake said.

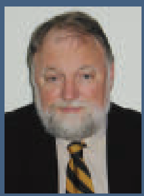
The third bill, S. 453, would require the EPA administrator to include a financial offset in any proposed rule to limit greenhouse gas emissions that imposes increased costs on other federal agencies to cover the proposed rule's projected costs for those agencies.

"By holding EPA accountable for its actions, we can keep our air clean without creating job-killing regulatory uncertainty," Flake said.

An American Petroleum Institute official expressed approval of the legislation. "We support the direction of the legislation introduced by Sen. Flake to modify the implementation of air-quality requirements, while still protecting public health and the environment," API Regulatory and Scientific Affairs Senior Director Howard J. Feldman said on Feb. 28.

The American Chemistry Council specifically sited S. 452, formally called the Ozone Regulatory Delay and Extension of Assessment Length (ORDEAL) Act, in a Feb. 27 statement. "Many state agencies need more time to fully implement new air-quality standards, while manufacturers with plans to build or expand need sufficient time and guidance to understand new rules," it said. "The ORDEAL Act is an important step forward, and we urge swift passage by both chambers."

EPA announced in October 2015 that it would reduce allowable ground-level ozone limits to 70 ppb from the 75 ppb level it set in 2008 (OGJ Online, Oct. 1, 2015). OGJ



NICK
SNOW
Washington Editor | Blog at www.**ogj**.com

ASCE's troubling report card

The American Society of Civil Engineers (ASCE) gave US transportation systems barely a passing grade, D+, when it issued its 2017 Infrastructure Report Card on Mar. 9. Energy systems received the same mark, with potential problems looming for electricity as well as oil and gas.

"Since 2013, oil and gas pipeline construction has continued at a fairly brisk pace to address new sources, with 2016-19 construction expected to modestly increase over the previous 5-year period. Despite recent construction, a large percentage of higher-pressure gas transmission lines were installed before 1980," it noted.

Refineries have operated at or above 90% of their throughput capacity since 1985, with limited new additions, the report noted. Existing facility upgrades have kept up with demand for gasoline, other fuels, and raw products for manufacturing, it said.

"Periodic failures in existing oil and gas pipelines and quality concerns in new construction point to the need for increased monitoring and maintenance spending. The concentration of processing plants on the shores of southern states creates significant exposure to future storm and climate change impacts," ASCE's report card said.

It said that permitting problems pose a particular challenge. Pipeline owners and operators' operations and maintenance spending will continue to climb as new regulatory guidelines aimed at increased safety are issued by states and the US Pipeline and Hazardous Material Safety Administration, and as pipeline miles increase.

"Periodic oil and gas pipeline leaks and failures present risks to the environment and the public. Most domestic oil refineries are situated along the coasts, subjecting them to risks from receding shorelines, climate change, and storm-related impacts," it pointed out.

The report card's recommendations included streamlining permit processes so critical new power lines and gas pipelines can be built promptly—with full consideration of alternate routes to ensure they are prudent and safe.

ASCE also called for a national "storm hardening" plan that considers transportation and distribution, refining, and power generation investments to withstand storms and restore energy services rapidly after hurricanes and similar events.

Further recommendations

Remote sensing and inspection technologies should be promoted to reduce energy system monitoring costs, with operation and maintenance spending focused on higher-risk components, it recommended. Performance-based regulations that mandate verification of pipeline integrity and increased investment in early correctives action for inadequate pipelines also should be implemented, the report card said.

In response, National Association of Regulatory Utility Commissioners Pres. Robert Powelson of Pennsylvania said ASCE's report card confirms that US infrastructure is near a crisis level. "We hope to bring members of ASCE into our national dialogue this year, which is focused squarely on infrastructure, innovation, and investment," he said on Mar. 10. OGJ

Perry pledges strong support for technology research, development

Nick Snow
Washington Editor

The new US Energy Secretary intends to keep federal research in his department strong and vibrant, he told employees on his first day on the job. "You all are brilliant, hard-working, dedicated Americans who care about the future of this country. My job is going to partly be listening to you and getting feedback from you," former Texas Gov. Rick Perry (R) declared on Mar. 3.

In an address to Department of Energy employees across the country as well as in Washington a day after the US Senate confirmed his nomination (OGJ Online, Mar. 2, 2017), Perry said that he did not appreciate DOE's importance until he became acquainted with its National Energy Technology Laboratories while he was governor when two universities in the state became involved in NETL projects.

"There are so many of you that have solutions to challenges we have, but maybe for whatever reason it just hasn't flowed up to the right place. I want you to know this office is going to be open to you, to your ideas, to the solutions, to the results that can really affect this country and this world we live in," Perry said.

DOE's energy research and development programs are exceptional because they explore seemingly unworkable concepts and find ways to move them toward commercialization, he indicated. That basically happened beginning in the 1980s when an NETL conducted basic research that helped Texas oil producer George P. Mitchell tap previously inaccessible deposits with hydraulic fracturing, a technology that literally changed global energy, Perry said.

"What's next? Is it in cybersecurity? Is it in supercomputing? Is it in something that even you haven't dreamed up yet? That's the exciting thing," he maintained. "Whether you're here in this auditorium or listening somewhere outside this building, I want you to know that I care about your ideas."

He also acknowledged DOE's other primary responsibility. "We have this extraordinarily sobering responsibility for the safety and modernization of a nuclear arsenal that has the potential to be as devastating as the world has ever seen," Perry said. "It's really, really powerful. We understand its importance. We take it extraordinarily seriously." OGJ

CERAWeek: Permian persistence, no debt keys to Sheffields' success

Matt Zborowski
Assistant Editor

Lessons passed down from Permian pioneer Joe M. Parsley to his son-in-law Scott Sheffield and then to Scott's son Bryan Sheffield hold true for any US onshore operator outside of their lineage.

A strict focus on a basin that brought the family success, a devotion to capital discipline, and continued innovation—namely though horizontal drilling—has ensured the father-son executive duo success in their respective careers even through industry downturns.

"Wall Street hated the Permian basin for 30 years" because it was seen as boring with no upside, recalled Scott Sheffield, Pioneer Natural Resources Co. executive chairman and the firm's chief executive officer from August 1997 through December 2016, during a Permian plenary session at CERAWeek by IHS Markit in Houston on Mar. 7.

He noted Time Magazine in the 1950s said the Spraberry was the most uneconomical oil field in the world, and now, as one of the world's largest oil fields, firms are flocking to it. Pioneer has a 785,000-acre position in Spraberry, which was built over decades through property acquisitions, mergers, and exploratory efforts.

Pioneer drilled its first Permian shale well in 2009 and had its "ah-ha" moment in 2011 when its geoscientists said it had more than 10 billion bbl underneath its acreage in the Midland basin, Scott said. Pioneer then "went on a buying spree" for deep rights for around $200-400/acre.

In 2017, the firm is planning to operate 18 horizontal rigs in the Spraberry-Wolfcamp. Production costs for Pioneer's horizontal Spraberry-Wolfcamp wells are expected to range $4-5/boe. The firm's forecasted 2017 production growth rate for the Spraberry-Wolfcamp ranges 30-34% with oil production increasing 33-37%.

Lessons in debt management

Bryan Sheffield, Parsley Energy Inc. founder, chairman, and chief executive officer, has overseen his firm, growth from a two-person startup in 2008 to a major acreage holder in the white-hot Permian Midland and Delaware basins despite the plunge in crude oil prices beginning in summer 2014.

Bryan's Permian success story, however, has come with his own growing pains against the better advice of his father, namely in the form of debt, the accumulation of which sank less fortunate companies during the downturn.

"I maxed out my first lien in the Midland banks and went to Houston and borrowed from Chambers Energy [Capital]," a Houston-based investment firm, Bryan said. "I did two mezzanine deals, a second lien, and I also did a term loan, which is a second lien." Bryan said his father also specifically warned him against soliciting money from private equity "because they're going to control you."

Parsley then found three private equity groups that were willing to do a minority investment with no negative controls. The firm's initial public offering came in May 2014, which eliminated all of its debt, $930 million, in one fell swoop.

After making more than $1 billion in deals for Permian assets last year, Parsley has kicked off 2017 by spending about $3.5 billion to continue its expansion in the basin. The firm in February agreed to acquire undeveloped acreage and producing properties in the Midland basin from recently formed Double Eagle Energy Permian LLC for $2.8 billion (OGJ Online, Feb. 9, 2017).

After its latest purchase closes, Parsley will have 227,000 net leasehold acres in the Permian with 179,000 in the Midland.

Scott boasted that Pioneer is a $34-billion company with zero debt. He explained that "you never know when prices are going to collapse—you can't predict these downturns." With the countless bankruptcies suffered in the industry over the last couple of years, "I think people are going to run a lot tighter ship over the next several years because of this last downturn," he predicted.

"Everybody should think that there's going to be a downturn around the corner," Scott said. "Always be prepared."

Permian acreage, services costs

Bryan doesn't believe there's a price-per-acre bubble in the Permian as a result of the numerous deals that have taken place in the region over the past year. "What's amazing is, between $40 and $50 oil, we're seeing the same exact price per acre" as at about $100/bbl because "service costs are basically cut in half and we're more efficient."

He said there's "a sand mine frenzy" in West Texas right now that he's content letting play out. "The way I look at services companies right now is they basically raise their prices to finally break even instead of losing money." He thinks that if oil rises above $60/bbl, however, "we're going to have some problems in tight supply for particular items."

Scott noted, "We have 12-16 benches in the Permian. If the services companies can figure out how to drill 6 or 8 at one time and frac them all at once, it'll take the Permian to another level you won't believe. Instead of growing 500,000 b/d/year, you could easily grow 1 million b/d/year."

Bryan is less worried about takeaway capacity, meanwhile, noting there's been drilling in the Permian since the 1940s along with a lot of existing infrastructure.

"We're being approached by private equity-backed midstream companies around the clock in the Delaware and the Midland basin [that are] wanting to build these pipelines," Bryan said. And some of private equity-backed companies are considering more lines connecting the Midland and Delaware basins with the Gulf of Mexico.

Scott anticipates that if basin output reaches 8-10 million b/d, "we're going to need a new pipeline, 100,000 b/d, every year for 10 years. We're going to need NGL lines to [Mont] Belvieu to the fractionators. We're going to need natural gas lines to Mexico. We've got to keep a great relationship with Mexico. We cannot overturn [the North American Free Trade Agreement] too [badly]." OGJ

Shell to divest nearly all of its Canadian oil sands interests for $7.25 billion

Matt Zborowski
Assistant Editor

Royal Dutch Shell PLC has agreed to sell all of its in-situ and undeveloped oil sands interests in Canada and reduce its share in the Athabasca Oil Sands Project (AOSP) to 10% from 60% in exchange for $7.25 billion.

Under the first agreement, Shell will sell its entire 60% interest in AOSP, its 100% interest in the Peace River Complex in-situ assets including Carmon Creek, its 100% working interest in the Cliffdale heavy oil field, and several undeveloped oil sands leases in Alberta to a subsidiary of Canadian Natural Resources Ltd. (CNRL) for $8.5 billion.

The purchase price comprises $5.4 billion in cash plus around 98 million CNRL shares currently valued at $3.1 billion.

The current estimated production capability, before royalties, for the AOSP properties to be acquired by CNRL is 196,000 b/d with February production of 188,000 b/d of mine production and upgrader output of 195,000 boe/d from 70% working interest in AOSP; and 13,800 b/d of heavy oil from the Peace River properties. At yearend 2016, reserves associated with the assets were 2 billion bbl.

In the second agreement, Shell and CNRL will jointly acquire and equally own Marathon Oil Canada Corp., which holds 20% interest in AOSP, from an affiliate of Marathon Oil Corp. for $1.25 billion each to be settled in cash.

Marathon Oil also reported a separate agreement to acquire 70,000 net surface acres in the Permian basin from BC Operating Inc. and other entities for $1.1 billion in cash. That deal includes 51,500 acres in the northern Delaware basin of New Mexico, and current production of 5,000 net boe/d.

Once the oil sands deals close, expected midyear, CNRL will be the operator of the AOSP upstream mining assets, and Shell will continue as operator of the Scotford upgrader and Quest carbon capture and storage (CCS) project, which is next to the 100% Shell affiliate-owned Scotford refinery and chemicals plants.

Shell and CNRL also have agreed that Shell may swap its 50% purchased interest of Marathon Oil Canada for 20% interest in assets of the Scotford upgrader and Quest CCS project. If the swap were to occur, Shell would fully exit AOSP's mining operations and hold 20% interest in the Scotford upgrader and Quest CCS project.

The deals also include intellectual property agreements valued at up to $285 million and a long-term supply agreement for the Scotford refinery. Shell says the moves will potentially allow for additional cost reductions and continued value chain optimization.

For CNRL, the total purchase price of the deals amounts to $12.74 billion as of the effective date.

Shell's ongoing transformation

Shell CEO Ben van Beurden said "the proceeds will accelerate free cash flow and reduce gearing and make a meaningful contribution to Shell's $30-billion divestment program" associated with its acquisition of BG Group PLC, which set in motion Shell's focus on as integrated gas and deep water.

Michael Crothers, Shell Canada president and country chair, said, "Shell has been in Canada for more than 100 years and we plan to continue our presence as one of the country's largest integrated energy companies."

Shell's remaining presence in Canada includes its large Duvernay and Montney shale acreage positions, its proposed LNG Canada project, as well as its chemicals, refining, and marketing businesses.

CNRL Pres. Steve Laut, meanwhile, said the deals will enable the optimization alongside Shell and Chevron Corp. of the Horizon and Albian mine operations as well as the Scotford refinery and upgrader.

"Over time opportunities will be explored to increase the capacity of the upgrader so that more barrels of bitumen which are produced in Alberta will be upgraded in Alberta," Laut said. "Canadian Natural also expects to be able to achieve efficiencies in mine operations, having two mining operations in close proximity at Horizon and Albian to deliver a combined, more effective, and efficient operation that each mine cannot achieve on its own." OGJ

Wood Group to buy Amec Foster Wheeler for $2.7 billion

Matt Zborowski
Assistant Editor

Wood Group PLC has agreed to acquire the entire issued and to be issued share capital of fellow oil field services firm Amec Foster Wheeler PLC in a deal valued at $2.7 billion.

Ian Marchant, Wood Group chairman, said the merger will create "a global leader in project, engineering, and technical services delivery across a range of industrial sectors."

Marchant explained that the resulting firm will be "an asset-light, largely reimbursable business of greater scale and enhanced capability, diversified across the oil and gas, chemicals, renewables, environment, and infrastructure and mining segments." The move leverages combined asset life cycle services across project delivery, engineering, modifications, construction, operations, maintenance, and consulting activities, Marchant said.

Wood Group and Amec Foster Wheeler believe the new company will be able to achieve cost synergies of at least £110 million/year, or $134 million/year, on a recurring basis.

Robin Watson and David Kemp, currently Wood Group's chief executive officer and chief financial officer, respectively, will continue in those roles for the combined firm. Marchant will continue as chairman.

The merger has been unanimously recommended by the boards of Wood Group and Amec Foster Wheeler. It will result in Amec Foster Wheeler shareholders owning 44% of the share capital of the combined firm based on the existing ordinary issued share capital of Wood Group and the fully diluted share capital of Amec Foster Wheeler.

Based on a Mar. 10 closing price of £7.52/Wood Group share, the terms of the merger value the issued and to be issued share capital of Amec Foster Wheeler at £2.225 million, or around $2.7 billion.

Amec Foster Wheeler itself is the result of the merger of AMEC PLC and Foster Wheeler AG during 2014 just as crude oil prices were beginning their dive from $100/bbl. Other prominent oil field services combinations since that time include General Electric Co. and Baker Hughes Inc., Schlumberger Ltd. and Cameron International Corp., and Technip SA and FMC Technologies Inc. (OGJ Online, Oct. 31, 2016). OGJ

Eni expects to discover 2-3 billion boe over next 4 years

Eni SPA expects to report discoveries totaling 2-3 billion boe over the next 4 years, almost twice the amount in its previous 4-year plan, by drilling around 120 wells in more than 20 countries.

The drilling will be done despite a 10% reduction in exploration capital expenditures. Overall capex in Eni's 2017-20 strategic plan is expected to total €31.6 billion.

The 4-year plan is an 8% reduction at constant foreign exchange rates compared with the previous 4-year plan, mostly related to its upstream portfolio, project activity rescheduling, and contract renegotiations.

Eni says its portfolio flexibility, the success of its ongoing exploration strategy, synergies with existing assets, and contract renegotiations will enable the average breakeven price of new projects to be $30/bbl.

"We have always considered exploration to be the engine of our upstream business, which is based on conventional and nearfield plays," explained Claudio Descalzi, Eni chief executive officer.

"We operate the majority of our projects through high-equity stakes, which enables us to farm down assets in advance to bring forward cash generation," Descalzi said.

Eni's hydrocarbon production is expected to grow 3%/year across the 2017-20 period, reached primarily by the ramp-up and startup of new projects and production optimization, which are expected to contribute around 850,000 boe/d in 2020.

"After 2 years of lower investment and fragile confidence across the global oil industry, we are forecasting a slow increase in oil prices up to $70/bbl by 2020," said Descalzi.

"Nonetheless, we will remain disciplined, maintaining our capex cash neutrality below $45/bbl on average over the 4-year period," he said. "Financial flexibility will help secure the sustainability of our remuneration policy as oil prices remain lower and enable us to capture upside should the economic environment improve."

Uncommitted capex represents around 55% of the firm's total investments in 2019-20, giving it portfolio flexibility should the oil price scenario turn negative again in the future, Eni says.

The firm's new disposal program, meanwhile, targets €5-7 billion of asset sales primarily through the dilution of exploration assets. OGJ

Iran lets contract for South Pars 12 petrochemical complex

Robert Brelsford
Downstream Technology Editor

Iran's state-owned Ahdaf Management Services Development Co. PLC has let contracts to Hyundai Motor Group of South Korea subsidiaries Hyundai Engineering Co. Ltd. and Hyundai Engineering & Construction Co. Ltd. to jointly build the second phase of Kangan Petro Refining Co.'s (KPRC) South Pars 12 petrochemical project in Pars Special Economic Energy Zone, Tonbak, Boushehr Province, about 1,100 km south of Tehran.

Under the contracts signed in Tehran on Mar. 12, Hyundai Engineering and Hyundai E&C will provide engineering, procurement, construction, and financing services for a proposed grassroots petrochemical complex designed to process gas feedstock from the planned 12th-phase development of Iran's giant South Pars natural gas field in the Persian Gulf, Hyundai said.

Alongside an ethane cracker capable of producing 1 million tonnes/year of ethylene, KPRC's South Pars 12 petrochemical complex also will produce 350,000 tpy of high-density polyethylene, 350,000 tpy of linear low-density polyethylene, and 500,000 tpy of monoethylene glycol, the service provider said.

These latest contracts follow preliminary agreements between the parties for work on the project executed in 2016, as well as an earlier letter of intent from Export-Import Bank of Korea and Korea Trade-Investment Promotion Agency to provide financial support for the proposed development, Hyundai said.

With a combined value of $3.3 billion, the KPRC project contracts have a duration period of 48 months from the start of construction, according to regulatory filings with the Korea Exchange.

Alongside Ahdaf with 99.96%, shareholders of KPRC include Ofogh Zarrin Mohaseb Co. Ltd. 0.01%, Saba Karoon Oil & Gas Development Co. Ltd. 0.01%, Saba Jam-E-Kangan Industrial Complex Ltd. 0.01%, and Navid Saba-E-Jam Oil & Gas Development Co. Ltd. 0.01%.

A two-phase development, the South Pars 12 project aims to deliver 3 bcfd of raw gas from South Pars reservoir to Phase 1 of the project, which includes a recovery and fractionation plant for ethane, propane, butane, and pentanes, according to KPRC's web site.

While propane, butane, and pentanes from Phase 1 will ship directly to market, ethane supplies will be used as feedstock for the Phase 2 cracker. OGJ

IEA: Market deficit of 500,000 b/d could occur in first half

Oil stocks from countries in the Organization for Economic Cooperation and Development rose for the first time in 6 months by a sizable 48 million bbl to reach 3.03 billion bbl at the end of January due to near-record US crude stocks and gains in Europe.

If the Organization of Petroleum Exporting Countries maintains its output cuts and nothing changes elsewhere, demand should overtake supply in this year's first half, generating an implied market deficit of 500,000 b/d, the International Energy Agency said in its latest monthly Oil Market Report (OMR).

"The market needs time for the full impact of the big supply cuts under the output reduction agreements to be felt," IEA said, warning that the volatility that suddenly broke out last week will probably recur. IEA's message for those looking for a rebalancing of the oil market is that they should be patient, and hold their nerve.

IEA also noted that the recovery path of US tight oil is key to rebalancing the market over this year, as is the compliance of the eleven non-OPEC countries that agreed to curb output.

Global oil supplies rose 260,000 b/d in February as OPEC and non-OPEC producers pumped more. At 96.52 million b/d, world oil production stood 170,000 b/d below year-ago levels. After nearly 2 years of annual output gains, OPEC posted a decline for the second month running.

OPEC kept up robust adherence to its promised 1.2 million-b/d supply cut in February, although the group's crude output rose by 170,000 b/d in February to 32 million b/d, with compliance of the group's supply cut easing to 91% from an upwardly revised 105% in January.

Saudi Arabia raised output in February by 180,000 b/d month-on-month to 9.98 million b/d, still below Riyadh's agreed target of 10.06 million b/d. "Saudi Arabia is shouldering the bulk of OPEC's reduction and tanker tracking data suggest that Riyadh is focusing its cutback on North America," IEA said.

Along with Saudi Arabia, Angola and Qatar also have cut by more than required for 2 months running. Kuwait has carried out its cut in full, holding around 2.71 million b/d since January. Output from the UAE was down 60,000 b/d in February after the start of oil field maintenance. Compliance tightened in Iraq, where exports, including from the Kurdistan Regional Government, fell in February. Gabon and Venezuela are the farthest above their production targets.

"Iran and Nigeria—spared from OPEC cuts—raised supply during February. Preliminary data show a substantial [month-over-month] jump in shipments of crude from Iran, which was granted a slight increase under the 2017 OPEC output pact. Relative calm in Nigeria allowed for a 30,000 b/d rise in production," IEA said.

A recovery in Libya, also exempt from cuts, is proving fragile, due to escalating violence.

Beyond OPEC, oil production rose 90,000 b/d in February, as increasing US output offset declines elsewhere.

"The recovery path of US tight oil is key to rebalancing the oil market over 2017, so is the compliance of the 11 non-OPEC countries that agreed to curb output," IEA said.

US production declines bottomed out in September last year, when output stood close to 1 million b/d below a year earlier, but has since recovered markedly. The total US oil rig count rose from a low of 318 in May last year to 617 rigs in early March.

Alongside OPEC reductions, 11 non-OPEC countries, including Russia, Kazakhstan, Mexico, Azerbaijan, Oman and others agreed to a combined 558,000 b/d cut to speed up the drawdown of excess inventories that accumulated over the past 2 years. According to preliminary IEA estimates, they curbed output by 225,000 b/d from October—the agreed reference month—through January, representing an overall compliance level of 40%.

"Russian supply was largely unchanged. Russian officials have repeatedly announced that the 300,000 b/d cut would be gradual and only met by the end of the 6-month period," IEA said. IEA left its estimate of global demand growth unchanged from its last report at 1.4 million b/d in 2017.

However, preliminary first-quarter estimates depict global demand at 96.7 million b/d, 1.2 million b/d up on the year earlier but 300,000 b/d lower than the estimate carried in last month's OMR. This sharp slowdown arose as renewed declines took hold in Japan and the UK, alongside surprise year-over-year January contractions in South Korea, India, and Germany.

As the recent currency reform negatively impacted demand, Indian oil demand contracted 130,000 b/d year-on-year in January, a dramatic about-face from the previous 6-month trend when demand rose 235,000 b/d. OGJ

US rig count records sixth double-digit rise of past 8 weeks

The US drilling rig count climbed 12 units to 768 during the week ended Mar. 10, according to Baker Hughes Inc. data. The count has now risen in 8 straight weeks, 6 of which have been double-digit increases. Since May 27, 2016, the final week of an extended drilling downturn, the count has added 364 units.

US oil-directed rigs, which represent more than 80% of the rigs to have come online since May 27, gained 8 units this week to 617, an increase of 301 units since May 27. Gas-directed rigs rose 5 units to 151, up 70 since Aug. 26 in their own rally. The country's only unclassified rig stopped operations.

Onshore rigs tallied 9 units to 743 as horizontal drilling rigs increased 6 units to 639, up 325 units since May 27. The offshore slump was somewhat eased by a 2-unit rise to 20. The count of rigs drilling in inland waters rose a unit to 5.

Among the major US operators contributing to the overall drilling rebound, Anadarko Petroleum Corp. this week reported 2017 plans reflecting its sharpened focus on the Permian Delaware and DJ basins after divesting several gas-weighted assets last year.

The firm plans to average 10-14 operated drilling rigs in the Delaware during the year and drill more than 150 operated midlateral-equivalent wells. In the DJ basin, Anadarko plans to average 5-6 operated rigs and drill 290 midlateral-equivalent wells.

The continued ramp up in rig deployment by operators in the Permian and other major oil regions has contributed to upward revisions in forecast US crude oil production. The US Energy Information Administration this week lifted its US crude output forecast for 2017 by 200,000 b/d to 9.2 million b/d. OGJ

THE EDITOR'S PERSPECTIVE

New perils emerge for oil ports and politics in Libya

by **Bob Tippee**, Editor

Fighting has intensified around three Libyan terminals through which oil exports resumed last September after the lifting of a blockade in place nearly 2 years.

Reopening of the Ras Lanuf, Es Sidra, and Zuetina terminals allowed Libyan production to roughly double to 700,000 b/d—still far below pre-civil war output of 1.6 million b/d in 2010.

Although combatants seem to want to protect the facilities, the resurgent militancy bodes ill for stabilization anytime soon of either oil production or fractious politics in Libya.

A group called the Benghazi Defense Brigades on Mar. 3 seized Ras Lanuf and Es Sidra, which had been under control of the Libyan National Army (LNA) since the Petroleum Facilities Guard ended its blockade last year.

The LNA is a group of army and police units, supplemented by local militias, fighting since 2014 to control Benghazi. Its leader is anti-Islamist Field Marshall Khalifa Haftar.

He's allied with the House of Representatives, the internationally recognized parliament based in Tobruk that refuses to accept the United Nations-sanctioned administration in Tripoli—the Presidential Council and Government of National Accord (GNA).

Parliamentary opponents of the GNA support Abdullah al-Thinni, who runs a shadow administration in eastern Libya.

Also on Mar. 3, supporters of an opposition group led by Khalifa Ghwell briefly occupied headquarters of the National Oil Corp. Ghwell was ousted as prime minister by the GNA a year ago.

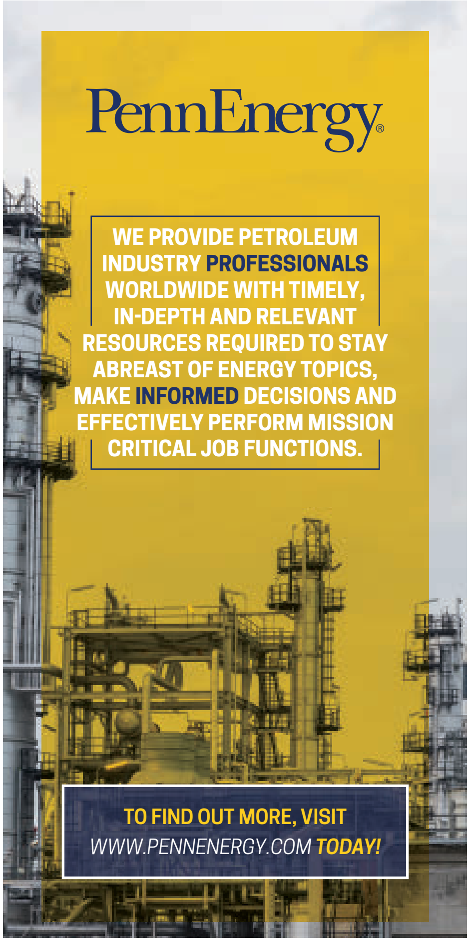
The Benghazi Defense Brigades, the group attacking the terminals, formed last year seeking to return Ghwell to power.

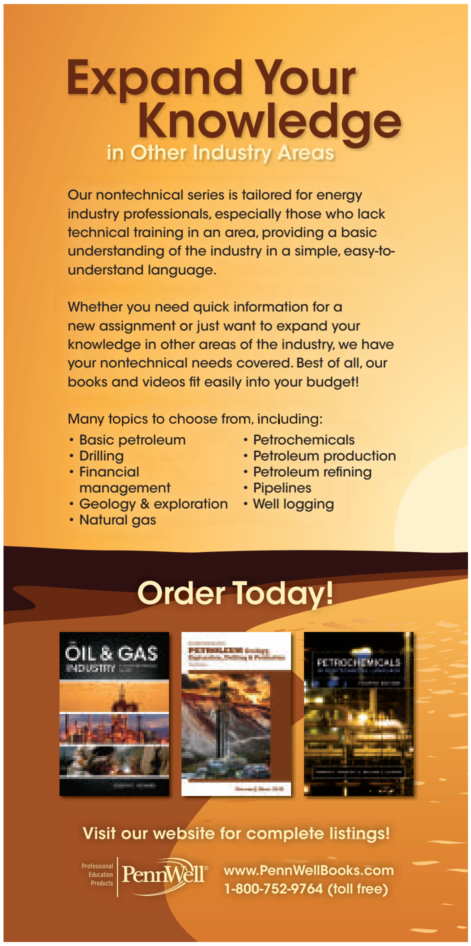
With his fragile government wavering, meanwhile, Prime Minister Faez Serraj has appealed to Russia for help in forging a national consensus. Russia has solid relations with Haftar.

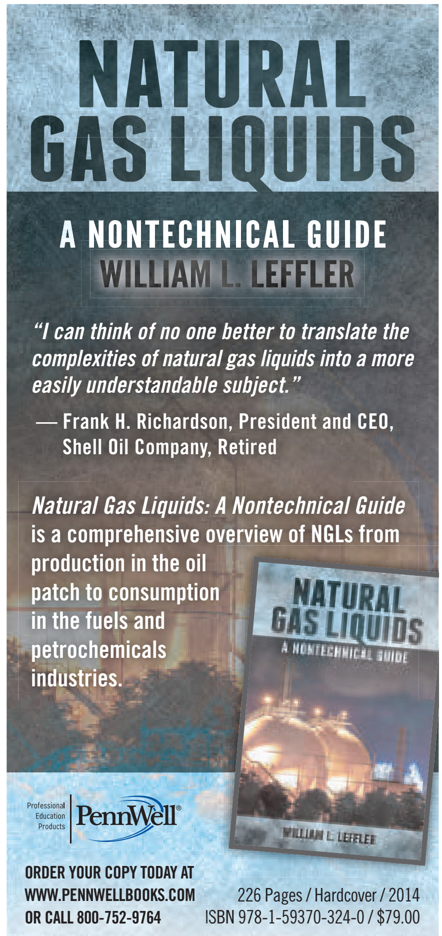
At the time of this writing, whether and how soon Haftar's LNA can retake the terminals—and how much damage and disruption might ensue—were unclear.

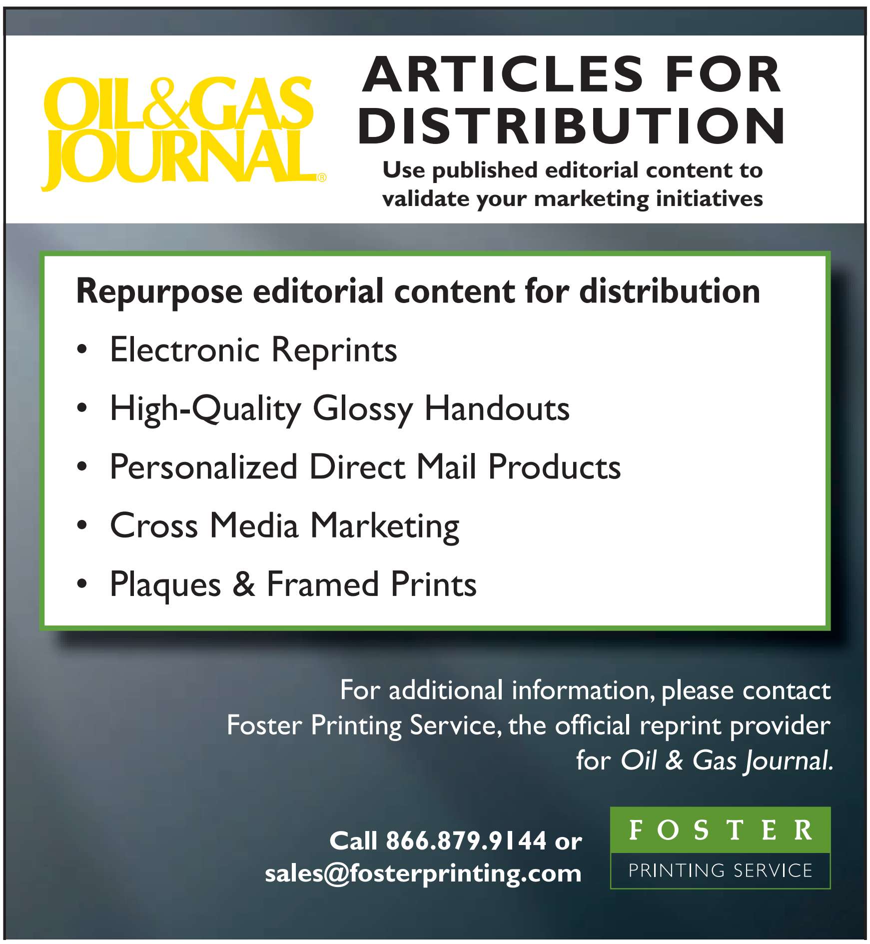
But events this month further erode the GNA's already rickety power base. The House of Representatives said 29 members formerly supporting the Tripoli government joined 44 who oppose it.

(From the subscription area of www.ogj.com, posted Mar. 9, 2017; author's e-mail: bobt@ogjonline.com)









ADVERTISERS INDEX

This index is provided as a service. The publisher does not assume any liability for errors or omission.

IMPORTS OF CRUDE AND PRODUCTS

	Districts 1-4		District 5		Total US		
	3-3 2017	2-24 2017	3-3 2017	2-24 2017	3-3 2017	2-24 2017	3-4* 2016
	1,000 b/d						
Total motor gasoline	225	442	16	16	241	458	566
Mo. gas. blending comp.	221	412	16	16	237	428	516
Distillate	262	209	3	0	265	209	133
Residual	206	374	60	43	266	417	259
Jet fuel-kerosine	22	96	117	60	139	156	183
Propane-propylene	133	207	46	41	179	248	113
Other	1,056	695	151	140	1,206	834	687
Total products	**1,904**	**2,023**	**393**	**300**	**2,296**	**2,322**	**1,941**
Total crude	**6,975**	**6,823**	**1,174**	**767**	**8,149**	**7,590**	**8,047**
Total imports	**8,879**	**8,846**	**1,567**	**1,067**	**10,446**	**9,913**	**9,988**

*Revised.
Source: US Energy Information Administration
Data available at PennEnergy Research Center.

EXPORTS OF CRUDE AND PRODUCTS

	Total US		
	3-3-17	2-24-17	*3-4-16
	1,000 b/d		
Finished motor gasoline	741	891	398
Jet fuel-kerosine	155	116	162
Distillate	1,330	1,284	1,331
Residual	321	296	364
Propane/propylene	1,022	755	632
Other oils	1,758	1,272	1,498
Total products	**5,327**	**4,614**	**4,385**
Total crude	**897**	**721**	**387**
Total exports	**6,224**	**5,335**	**4,772**
NET IMPORTS			
Total	4,222	4,576	5,217
Products	(3,031)	(2,292)	(2,444)
Crude	7,253	6,868	7,661

*Revised.
Source: Oil & Gas Journal
Data available at PennEnergy Research Center.

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

OIL&GAS JOURNAL online research center. PennEnergy research

OGJ CRACK SPREAD

	3-10-17*	3-11-16*	Change	Change, %
	$/bbl			
SPOT PRICES				
Product value	62.93	48.26	14.67	30.39
Brent crude	52.78	39.30	13.49	34.32
Crack spread	10.15	8.97	1.18	13.16
FUTURES MARKET PRICES				
One month				
Product value	67.71	56.42	11.29	20.02
Light sweet crude	50.88	37.81	13.07	34.56
Crack spread	16.83	18.61	(1.78)	(9.56)
Six month				
Product value	68.37	57.75	10.63	18.40
Light sweet crude	52.51	42.47	10.04	23.64
Crack spread	15.86	15.28	0.59	3.84

*Average for week ending.
Source: Oil & Gas Journal
Data available at PennEnergy Research Center.

CRUDE AND PRODUCT STOCKS

District	Crude oil	Motor gasoline Total	Motor gasoline Blending comp.	Jet fuel, kerosine	Fuel oils Distillate	Fuel oils Residual	Propane-propylene
	1,000 bbl						
PADD 1	17,823	71,217	65,991	10,571	61,724	10,037	3,761
PADD 2	152,761	60,006	54,080	8,069	35,074	1,134	12,535
PADD 3	278,599	79,307	68,123	15,356	46,501	22,900	27,585
PADD 4	24,493	8,134	6,306	640	3,828	298	[1] 1,345
PADD 5	54,718	30,670	28,659	9,544	14,404	5,143	—
Mar. 3, 2017	**528,394**	**249,334**	**223,159**	**44,180**	**161,531**	**39,512**	**45,226**
Feb. 24, 2017	**520,184**	**255,889**	**228,587**	**44,561**	**164,208**	**38,278**	**49,306**
Mar. 4, 2016[2]	**490,843**	**250,463**	**224,098**	**42,546**	**162,478**	**45,755**	**62,320**

[1]Includes PADD 5. [2]Revised.
Source: US Energy Information Administration
Data available at PennEnergy Research Center.

REFINERY REPORT—MAR. 3, 2017

District	REFINERY OPERATIONS Gross inputs	REFINERY OPERATIONS Crude oil inputs	REFINERY OUTPUT Total motor gasoline	Jet fuel, kerosine	Fuel oils Distillate	Fuel oils Residual	Propane-propylene
	1,000 b/d		1,000 b/d				
PADD 1	859	859	3,018	67	294	37	153
PADD 2	3,515	3,512	2,364	248	1,047	53	443
PADD 3	8,547	8,383	2,225	839	2,673	223	950
PADD 4	575	576	286	26	196	12	[1] 186
PADD 5	2,365	2,162	1,574	392	564	130	—
Mar. 3, 2017	**15,861**	**15,492**	**9,467**	**1,572**	**4,774**	**455**	**1,732**
Feb. 24, 2017	**15,885**	**15,663**	**9,540**	**1,563**	**4,754**	**477**	**1,711**
Mar. 4, 2016[2]	**16,192**	**15,912**	**9,671**	**1,578**	**4,744**	**420**	**1,654**
	18,474 Operable capacity		**85.9 utilization rate**				

[1]Includes PADD 5. [2]Revised.
Source: US Energy Information Administration
Data available at PennEnergy Research Center.

OGJ GASOLINE PRICES

	Price ex tax 3-8-17	Pump price* 3-8-17	Pump price 3-9-16
	¢/gal		
(Approx. prices for self-service unleaded gasoline)			
Atlanta	162.6	212.0	159.3
Baltimore	171.8	222.8	169.3
Boston	173.3	218.2	164.3
Buffalo	168.6	229.7	177.4
Miami	163.1	218.1	169.4
Newark	186.7	219.6	146.4
New York	182.2	243.3	199.3
Norfolk	200.1	240.8	200.4
Philadelphia	160.8	229.6	172.3
Pittsburgh	172.8	241.6	188.3
Wash., DC	197.3	239.2	181.3
PAD I avg	176.3	228.6	175.3
Chicago	220.2	268.7	214.0
Cleveland	182.0	228.4	181.2
Des Moines	172.5	222.9	187.3
Detroit	175.0	223.9	181.9
Indianapolis	173.9	222.2	184.8
Kansas City	173.5	209.2	158.2
Louisville	173.2	217.6	179.4
Memphis	179.1	218.9	175.2
Milwaukee	162.9	214.2	172.5
Minn.-St. Paul	175.2	222.2	179.1
Oklahoma City	172.5	207.9	161.4
Omaha	175.4	221.5	172.5
St. Louis	174.9	210.6	161.2
Tulsa	173.0	208.4	152.5
Wichita	172.8	215.2	163.4
PAD II avg	177.1	220.8	175.0
Albuquerque	169.6	206.8	162.2
Birmingham	172.3	211.6	156.9
Dallas-Fort Worth	171.3	209.7	153.4
Houston	167.0	205.4	156.5
Little Rock	164.4	204.6	161.9
New Orleans	168.8	207.2	159.8
San Antonio	168.1	206.5	158.7
PAD III avg	168.8	207.4	158.5
Cheyenne	179.5	221.9	171.7
Denver	186.5	226.9	165.9
Salt Lake City	179.0	226.9	191.3
PAD IV avg	181.7	225.2	176.3
Los Angeles	256.3	315.3	262.6
Phoenix	213.7	251.1	179.9
Portland	189.8	239.3	190.3
San Diego	234.3	293.3	244.6
San Francisco	237.8	296.8	249.9
Seattle	210.5	273.4	221.1
PAD V avg	223.7	278.2	224.7
Week's avg.	**182.5**	**229.1**	**179.5**
Feb. avg.	**181.4**	**228.0**	**174.9**
Jan. avg.	**186.9**	**233.5**	**192.5**
2017 to date	**183.7**	**230.3**	—
2016 to date	**135.4**	**182.3**	—

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

BAKER HUGHES RIG COUNT

	3-10-17	3-11-16
Alabama	2	0
Alaska	3	12
Arkansas	1	0
California	7	7
Land	7	6
Offshore	0	1
Colorado	28	17
Florida	0	0
Illinois	1	0
Indiana	0	0
Kansas	0	9
Kentucky	0	1
Louisiana	56	49
N. Land	30	17
S. Inland waters	5	3
S. Land	3	5
Offshore	18	24
Maryland	0	0
Michigan	0	0
Mississippi	4	2
Montana	1	0
Nebraska	0	2
New Mexico	46	15
New York	0	0
North Dakota	37	32
Ohio	21	11
Oklahoma	101	67
Pennsylvania	32	19
South Dakota	0	0
Texas	392	216
Offshore	2	2
Inland waters	0	0
Dist. 1	37	14
Dist. 2	32	23
Dist. 3	12	7
Dist. 4	9	10
Dist. 5	2	2
Dist. 6	21	9
Dist. 7B	7	2
Dist. 7C	29	23
Dist. 8	213	104
Dist. 8A	19	11
Dist. 9	1	2
Dist. 10	8	7
Utah	7	1
West Virginia	10	12
Wyoming	19	9
Others	0	0
Total US	**768**	**480**
Total Canada	**315**	**98**
Grand total	**1,083**	**578**
US oil rigs	617	386
US gas rigs	151	94
Total US offshore	20	27
Total US cum. avg. YTD	**723**	**579**

Rotary rigs from spudding in to total depth.
Definitions, see OGJ Sept. 18, 2006, p. 46.
Source: Baker Hughes Inc.
Data available at PennEnergy Research Center.

OGJ PRODUCTION REPORT

	[1]3-10-17	[2]3-11-16
	1,000 b/d	
(Crude oil and lease condensate)		
Alabama	25	22
Alaska	526	507
California	540	549
Colorado	329	320
Florida	6	6
Illinois	26	24
Kansas	101	114
Louisiana	1,484	1,438
Michigan	16	16
Mississippi	59	59
Montana	67	69
New Mexico	428	407
North Dakota	1,043	1,109
Ohio	50	74
Oklahoma	435	436
Pennsylvania	17	19
Texas	3,563	3,626
Utah	85	83
West Virginia	25	21
Wyoming	199	209
Other states	51	37
Total	**9,075**	**9,145**

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

US CRUDE PRICES

	3-10-17 $/bbl*
Alaska-North Slope 27°	46.15
Light Louisiana Sweet	43.86
California-Midway Sunset 13°	41.90
California Buena Vista Hills 26°	50.20
Wyoming Sweet	44.74
East Texas Sweet	42.50
West Texas Sour 34°	40.00
West Texas Intermediate	45.00
Oklahoma Sweet	45.00
Texas Upper Gulf Coast	38.75
Michigan Sour	37.00
Kansas Common	44.00
North Dakota Sweet	37.00

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

WORLD CRUDE PRICES

		$/bbl
OPEC reference basket Wkly. avg. 3-10-17		52.00
	Mo. avg., $/bbl	
	Jan.-17	Feb.-17
OPEC reference basket	52.40	53.37
Arab light-Saudi Arabia	52.29	53.63
Basrah light-Iraq	51.66	52.66
Bonny light 37°-Nigeria	54.98	55.24
Es Sider-Libya	53.08	53.46
Girassol-Angola	54.41	55.21
Iran heavy-Iran	51.90	53.16
Kuwait export-Kuwait	51.48	52.85
Marine-Qatar	53.44	54.14
Merey-Venezuela	46.81	47.03
Minas 34°-Indonesia	50.63	51.19
Murban-UAE	55.97	56.31
Oriente-Ecuador	48.64	50.08
Saharan blend 44°-Algeria	54.84	55.06
Other crudes		
Fateh 32°-Dubai	53.71	54.41
Isthmus 33°-Mexico	54.98	56.09
Brent 38°-UK	54.58	55.06
Urals-Russia	53.42	53.67
Differentials		
WTI/Brent	(2.08)	(1.66)
Brent/Dubai	0.87	0.65

Source: OPEC Monthly Oil Market Report.
Data available at PennEnergy Research Center.

REFINED PRODUCT PRICES

Spot market product prices

	3-3-17 ¢/gal
Motor gasoline (Conventional-regular)	
New York Harbor	145.00
Gulf Coast	148.70
Motor gasoline (RBOB-regular)	
New York Harbor	182.50
No. 2 heating oil	
New York Harbor	154.60

	3-3-17 ¢/gal
No. 2 Distillate	
Low sulfur diesel fuel	
New York Harbor	157.90
Gulf Coast	155.60
Los Angeles	159.60
Kerosine jet fuel	
Gulf Coast	149.90
Propane	
Mont Belvieu	61.30

Source: EIA Weekly Petroleum Status Report.
Data available at PennEnergy Research Center.

IHS PETRODATA RIG COUNT

MAR. 10, 2017

	Total supply of rigs	Marketed supply of rigs	Marketed contracted	Marketed utilization rate (%)
US Gulf of Mexico	97	45	32	71.1
South America	50	44	38	86.4
Northwest Europe	107	80	57	71.3
West Africa	68	46	26	56.5
Middle East	174	161	116	72.1
Southeast Asia	89	75	40	53.3
Worldwide	822	663	463	69.8

Source: IHS Petrodata
Data available in PennEnergy Research Center

US NATURAL GAS STORAGE[1]

	3-3-17	2-24-17	3-3-16	Change, %
	bcf			
East	404	422	468	(13.7)
Midwest	579	608	592	(2.2)
Mountain	139	146	146	(4.8)
Pacific	201	205	258	(22.1)
South Central	972	982	1,023	(5.0)
Salt	326	333	290	12.4
Nonsalt	646	649	733	(11.9)
Total US	**2,295**	**2,363**	**2,487**	**(7.7)**
	Dec.-16	**Dec.-15**	**Change, %**	
Total US[2]	**3,306**	**3,675**	**(10.0)**	

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

BAKER HUGHES INTERNATIONAL RIG COUNT

Region	Feb. 2017 Land	Feb. 2017 Off.	Feb. 2017 Total	Feb. 2016 Total
WESTERN HEMISPHERE				
Argentina	54	0	54	65
Bolivia	4	0	4	5
Brazil	3	11	14	35
Canada	340	2	342	211
Chile	2	0	2	3
Colombia	21	1	22	7
Ecuador	7	0	7	4
Mexico	3	13	16	39
Peru	1	0	1	1
Trinidad	2	3	5	7
US	724	20	744	532
Venezuela	50	4	54	69
Other	0		0	2
Subtotal	**1,211**	**54**	**1,265**	**980**
ASIA-PACIFIC				
Australia	12	2	14	9
Brunei	1	1	2	2
China-offshore	0	18	18	25
India	80	35	115	99
Indonesia	21	2	23	18
Japan	0	0	0	0
Malaysia	0	3	3	5
Myanmar	0	1	1	1
New Zealand	0	0	0	0
Papua New Guinea	2	0	2	2
Philippines	1	0	1	3
Taiwan	0	0	0	0
Thailand	3	10	13	16
Vietnam	0	3	3	1
Other	0	1	1	1
Subtotal	**120**	**76**	**196**	**182**
AFRICA				
Algeria	50	0	50	52
Angola	0	3	3	8
Congo	0	1	1	2
Gabon	0	0	0	1
Kenya	11	0	11	11
Libya	0	1	1	1
Nigeria	5	2	7	6
South Africa	0	0	0	1
Tunisia	1	0	1	0
Other	1	2	3	6
Subtotal	**68**	**9**	**77**	**88**
MIDDLE EAST				
Abu Dhabi	33	14	47	48
Dubai	0	2	2	2
Egypt	18	5	23	35
Iran	0	0	0	0
Iraq	40	0	40	49
Jordan	0	0	0	0
Kuwait	59	0	59	43
Oman	56	1	57	71
Pakistan	21	0	21	21
Qatar	5	6	11	6
Saudi Arabia	103	17	120	128
Sudan	0	0	0	0
Syria	0	0	0	0
Yemen	0	0	0	0
Other	2	0	2	1
Subtotal	**337**	**45**	**382**	**404**
EUROPE				
Croatia	1	0	1	1
Denmark	0	1	1	2
France	1	0	1	1
Germany	3	0	3	7
Hungary	1	0	1	2
Italy	4	0	4	4
Netherlands	0	2	2	2
Norway	0	16	16	18
Poland	10	0	10	7
Romania	7	0	7	7
Turkey	29	0	29	29
UK	0	11	11	8
Other	13	8	21	19
Subtotal	**69**	**38**	**107**	**107**
Total	**1,805**	**222**	**2,027**	**1,761**

Definitions, see OGJ Sept. 18, 2006, p. 42.
Source: Baker Hughes Inc.
Data available at PennEnergy Research Center.

PRODUCTION BY REGION

	Oil production Mar.-17	Oil production Apr.-17		Gas production Mar.-17	Gas production Apr.-17	
	b/d		change	Mcf/d		change
Bakken	974	964	(10)	1,579	1,583	4
Eagle Ford	1,116	1,144	28	5,714	5,757	43
Haynesville	43	43	—	6,139	6,247	108
Marcellus	37	38	1	19,020	19,187	167
Niobrara	433	444	11	4,576	4,628	52
Permian	2,207	2,286	79	7,791	7,945	154
Utica	43	43	—	4,236	4,270	34
Total	**4,853**	**4,962**	**109**	**49,055**	**49,135**	**80**

Source: US Energy Information Administration
Data available in PennEnergy Research Center.

DRILLING PRODUCTIVITY REPORT

	New-well oil production per rig* Mar.-17	New-well oil production per rig* Apr.-17		New-well gas production per rig* Mar.-17	New-well gas production per rig* Apr.-17	
	b/d		change	Mcf/d		change
Bakken	994	1,001	7	1,427	1,447	20
Eagle Ford	1,440	1,442	2	4,527	4,542	15
Haynesville	32	32	—	7,159	7,215	56
Marcellus	69	70	1	13,049	13,233	184
Niobrara	1,294	1,300	6	4,285	4,406	121
Permian	660	662	2	1,111	1,113	2
Utica	192	207	15	10,373	10,473	100
Rig-weighted avg.	**711**	**720**	**9**	**3,513**	**3,516**	**3**

*Drilling data through March, projected production through April.
Source: US Energy Information Administration. Data available in PennEnergy Research Center.

PROPANE PRICES

	Dec. 2016	Jan. 2017	Dec. 2015	Jan. 2016
	¢/gal			
Mont Belvieu	63.70	74.70	38.70	33.60

Source: EIA Weekly Petroleum Status Report
Data available at PennEnergy Research Center.

MUSE, STANCIL & CO. REFINING MARGINS

	US Gulf Coast	US East Coast	US Mid-west	US West Coast	North-west Europe	South-east Asia
	$/bbl					
Feb. 2017						
Product revenues	66.67	64.72	64.88	75.85	65.52	63.71
Feedstock costs	(54.69)	(58.06)	(53.27)	(53.92)	(56.43)	(54.98)
Gross margin	11.98	6.66	11.61	21.93	9.09	8.73
Fixed costs	(2.49)	(3.46)	(2.80)	(3.26)	(2.80)	(2.18)
Variable costs	(1.04)	(0.99)	(0.92)	(1.35)	(1.34)	(1.71)
Cash operating margin	**8.45**	**2.21**	**7.89**	**17.32**	**4.95**	**4.84**
Jan. 2017	9.14	3.42	8.95	15.03	4.02	4.53
YTD avg.	8.80	2.82	8.42	16.18	4.49	4.69
2016 avg.	9.25	3.73	11.14	14.18	3.33	1.73
2015 avg.	11.27	5.52	17.58	22.42	5.99	4.35
2014 avg.	8.50	3.99	19.43	15.04	3.05	2.17

Source: Muse, Stancil & Co. See OGJ, Jan. 15, 2001, p. 46
Data available at PennEnergy Research Center.

MUSE, STANCIL & CO. GASOLINE MARKETING MARGINS

Jan. 2017	Chicago*	Houston	Los Angeles	New York
	¢/gal			
Retail price	243.39	217.53	280.23	262.00
Taxes	52.93	38.40	58.09	49.68
Wholesale price	172.63	164.91	191.47	171.65
Spot price	158.57	157.00	166.56	159.72
Retail margin	17.83	14.22	30.67	40.67
Wholesale margin	14.06	7.91	24.91	11.93
Gross marketing margin	**31.89**	**22.13**	**55.58**	**52.60**
Dec. 2016	31.74	8.10	54.02	40.04
YTD avg.	31.89	22.13	55.58	52.60
2016 avg.	33.98	18.26	67.31	38.46
2015 avg.	36.40	20.71	66.66	39.71
2014 avg.	33.12	25.36	45.25	39.64

*Effective December, 2013 retail margins for Chicago no longer include conventional grades.
Source: Muse, Stancil & Co. See OGJ, Oct. 15, 2001, p. 46.
Data available at PennEnergy Research Center.
Note: Margins include ethanol blending in all markets.

MUSE, STANCIL & CO. ETHYLENE MARGINS

	Ethane	Propane	Naphtha
	¢/lb ethylene		
Feb. 2017			
Product revenues	40.16	70.97	92.33
Feedstock costs	(10.18)	(45.89)	(72.68)
Gross margin	29.98	25.08	19.65
Fixed costs	(6.83)	(8.07)	(9.13)
Variable costs	(2.82)	(3.21)	(4.09)
Cash operating margin	**20.33**	**13.80**	**6.43**
Jan. 2017	16.92	12.21	(1.87)
YTD avg.	18.63	13.00	2.28
2016 avg.	12.46	13.10	(5.85)
2015 avg.	14.85	20.53	(7.40)
2014 avg.	41.38	31.42	(8.91)

Source: Muse, Stancil & Co. See OGJ, Sept. 16, 2002, p. 46.
Data available at PennEnergy Research Center.

MUSE, STANCIL & CO. US GAS PROCESSING MARGINS

Feb. 2017	Gulf Coast	Mid-continent
	$/Mcf	
Gross revenue		
Gas	2.72	2.34
Liquids	0.75	2.07
Gas purchase cost	3.03	3.14
Operating costs	0.07	0.15
Cash operating margin	**0.37**	**1.12**
Jan. 2017	0.26	0.97
YTD avg.	0.32	1.05
2016 avg.	0.18	0.54
2015 avg.	0.17	0.44
2014 avg.	0.46	1.28
Breakeven producer payment, % of liquids	46%	43%

Source: Muse, Stancil & Co. See OGJ, May 21, 2001, p. 54.
Data available at PennEnergy Research Center.

MARKET CONNECTION
WHERE THE INDUSTRY GOES TO CLASSIFY

- Employment? **HIRE**
- Services Offered? **ACQUIRE**
- Equipment/Products/Land? **SELL**

SEE RESULTS—Ask me how!
GRACE JORDAN
713-963-6291
GraceJ@PennWell.com
Twitter: @ogjmarket

The Oil & Gas Journal has a circulation of over 100,000 readers and has been the world's most widely read petroleum publication for over 100 years

EMPLOYMENT | PRODUCTS & EQUIPMENT

Optimizing Careers
for Oil & Gas Leaders

Through Professional Short Courses at Colorado School of Mines

Upcoming Continuing Education Courses in 2017:

Economic Evaluation & Investment Decision Methods
May 15-19, June 19-21, July 24-28, Sept. 11-15, Nov. 13-17

Petroleum SuperSchool
July 10-28

Natural Gas Processing
July 31-August 3

Petroleum Refining Economics
August 16-18

Register Today!
www.csmspace.com
303-279-5563 / space@mines.edu

COLORADOSCHOOLOFMINES
EARTH • ENERGY • ENVIRONMENT

Offshore Catering Jobs Available

Offshore Experience Required
Executive Steward/Campboss
Cooks
UTs (Housekeeper/Janitorial)
Lead Stewards
Bakers (Pastry Chefs)

How to Apply:
Online: www.essgulf.com
Email: Patricia.hebert@compass-usa.com

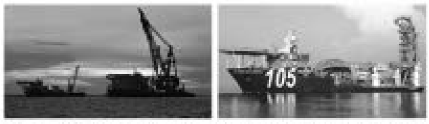
VALID TWIC CARD IS REQUIRED TO APPLY

ESS
Support Services Worldwide

MARKET CONNECTION
WHERE THE INDUSTRY GOES TO CLASSIFY
www.ogj.com/market-connection.html

McDERMOTT
A Flexible Marine fleet that covers every aspect of facility installation

NOW HIRING!
Licensed Marine & Experienced Offshore Construction Crew
for The US Gulf of Mexico



We help bring offshore exploration into production

Please apply at website
www.mcdermott.com/careers

SURPLUS GAS PROCESSING/ REFINING EQUIPMENT

25 MMCFD x 1100 PSIG PROPAK REFRIGERATION PLANT
28 TPD SELECTOX SULFUR RECOVERY UNIT
1100 BPD LPG CONTACTOR x 7.5 GPM CAUSTIC REGEN
NGL/LPG PLANTS:10 - 600 MMCFD
AMINE PLANTS:60 - 3300 GPM
SULFUR PLANTS:10 - 180 TPD
FRACTIONATION:1000 – 25,000 BPD
HELIUM RECOVERY: 75 & 80 MMCFD
NITROGEN REJECTION: 25 – 100 MMCFD
MANY OTHER REFINING/GAS PROCESSING UNITS
We offer engineered surplus equipment solutions.

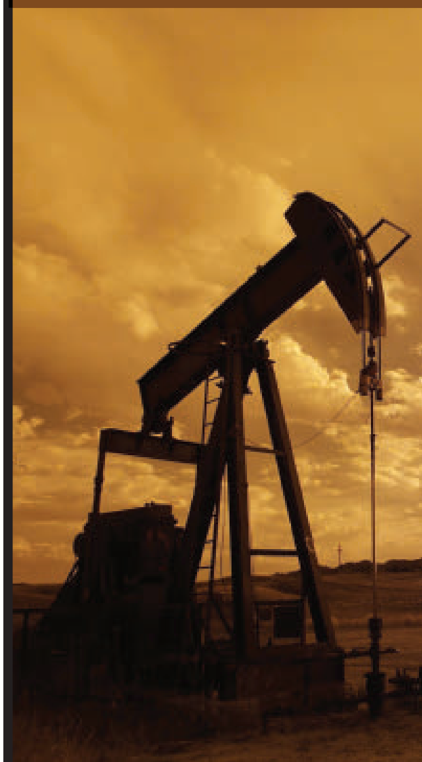
Bexar Energy Holdings, Inc.
Phone 210 342-7106/ Fax 210 223-0018
www.bexarenergy.com
Email: info@bexarenergy.com

FOR IMMEDIATE SALE

(6) 95K GAL 275 PSI TANKS
AMINE PLANTS 80 & 700 GPM
REFRIGERATION PLANTS: 5MM-25MM

Gas Corporation of America
We Buy, Sell & Rent Natural Gas Plants
gascorp@wf.net * www.gas-corp.com * 800-762-6015
GAS PLANT EQUIPMENT

Let's make a deal...



Are you selling equipment, land, or other assets?

List your business opportunity in ***Oil & Gas Journal's*** Market Connection, and reach +100,000 potential buyers.

To learn more, contact:
GraceJ@PennWell.com • 713-963-6291