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Aug. 29, 2016 | Volume 114.8d

7 NEWSLETTER
12 LETTERS / CALENDAR
14 JOURNALLY SPEAKING
15 EDITORIAL
24 ADVERTISERS' INDEX
25 STATISTICS
27 MARKET CONNECTION

GENERAL INTEREST

16 Four Corners methane study finds 10% of sources emit half of emissions
Nick Snow
An extensive airborne survey of a previously identified methane hot spot in the US Four Corners area found that just 10% of the individual observed sources contributed half of the emissions, the National Aeronautics & Space Administration reported.

17 Western governors reiterate concerns over EPA's lower ozone limits
Nick Snow

18 WATCHING GOVERNMENT
Why US, Canada GHG plans differ

18 Western Gulf of Mexico lease sale activity continues to dwindle
Matt Zborowski

19 BLM issues final EIS analyzing Thompson Divide oil, gas leases
Nick Snow

20 BHI: Oil rigs lift overall US rig count
Matt Zborowski

21 WoodMac: Tight gas output triples in Argentina's Neuquen basin

21 Recoverable resources upgraded for SNE oil field offshore Senegal
Rick Wilkinson

22 S-Oil lets contract for Onsan refinery HS-RFCC complex
Robert Brelsford

23 BHP finds gas but no oil in LeClerc well offshore Trinidad and Tobago
Curtis Williams

23 EDITOR'S PERSPECTIVE
Bold enthusiasm usually good—but not in government

COVER

Thai Oil PCL *recently let a contract to Amec Foster Wheeler PLC (AFW) to provide services for a project that will expand crude oil processing capacity and improve fuel production at the 275,000-b/sd Sriracha refinery, near Laem Chabang Port in Chonburi, Thailand. AFW will deliver front-end engineering and design on Thai Oil's proposed Clean Fuel Project (CFP), which alongside increasing crude processing capacity to 410,000 b/sd, will enable the refinery to produce transportation fuels meeting more stringent quality specifications as well as improve its overall energy efficiency. AFW confirmed CFP would involve installation of a number of units, including its own proprietary solvent deasphalting technology. Photo from Thai Oil.*

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Aug. 29, 2016

GENERAL INTEREST QUICK TAKES

PDC enters Delaware basin in $1.5-billion deal

PDC Energy Inc., Denver, has agreed to acquire two privately held units managed by energy-focused privately equity firm Kimmeridge Energy Management Co. LLC, including 57,000 net acres in Reeves and Culberson counties in Texas, with average working interest of 93%, for $1.5 billion.

Current net production from the acreage is 7,000 boe/d from 21 horizontal wells, with two additional wells in the completion and flowback phase. Of the total output, 42% is oil and 65% is liquids.

The total net acreage, of which 41,000 acres are in Reeves County and 16,000 acres are in Culberson County, features more than 700 gross estimated horizontal drilling locations targeting the Wolfcamp A, B, and C zones with upside potential through downspacing and additional intervals, the firm says.

Based on a combined total of 4-12 wells/section, preliminary estimated net reserve potential is 530 million boe.

Expected to close in the fourth quarter, the deal includes scalable owned and operated midstream infrastructure, including gas gathering systems, pipelines, right-of-ways, and five salt water disposal wells.

During the remainder of the year, PDC plans to spud nine horizontal wells, seven of which have 1.5- or 2-mile laterals, and expand certain midstream infrastructure for expected total capital outlay of $55-65 million. The firm also is finishing completion operations on two horizontal wells and plans to operate two drilling rigs by yearend.

"Adding this Delaware position to our Core Wattenberg acreage gives us more than 1 billion net boe of liquid-rich reserve potential in two of the top-tier US onshore basins," commented Lance Lauck, executive vice-president, corporate development and strategy.

PDC in June agreed to a Wattenberg acreage swap with Noble Energy Inc. as the firms sought to consolidate their positions in the Colorado natural gas and condensate field (OGJ Online, June 16, 2016).

Continental to sell North Dakota, Montana acreage

Continental Resources Inc., Oklahoma City, has agreed to sell nonstrategic properties in North Dakota and Montana to an undisclosed buyer for $222 million.

The sale includes 68,000 net acres of leasehold primarily in western Williams County, ND, and 12,000 net acres in Roosevelt County, Mont. It covers net production of 2,800 boe/d.

"This is our third sale of nonstrategic assets this year, with total expected proceeds of more than $600 million," said Harold Hamm, Continental chairman and chief executive officer. In May, the firm reported the sale of 132,000 net acres of leasehold in the Washakie basin of Wyoming for $110 million. On Aug. 3, Continental said it had signed an agreement with an undisclosed buyer to sell 29,500 net acres of nonstrategic leasehold in the eastern SCOOP play in Oklahoma for $281 million.

Meanwhile, Continental has invested $560 million in drilled but uncompleted wells (DUCs), including both operated and nonoperated DUCs. The firm currently has 215 gross operated DUCs in inventory, of which 165 are in the Bakken. Continental expects the total to grow to 240 gross operated DUCs at yearend, with 190 in the Bakken.

The firm says its Bakken DUCs have an average estimated ultimate recovery (EUR) of 850,000 boe/well and can be completed at an average cost of $3-3.5 million/well.

API: US gasoline demand hit 9.7 million b/d in July

Total motor gasoline deliveries, a measure of consumer demand, increased 2.4% from July 2015 to average nearly 9.7 million b/d last month, according to data from the American Petroleum Institute. Compared with June, total motor gasoline deliveries increased 0.3%. For year-to-date, total motor gasoline deliveries increased 2.5% compared with year-to-date 2015 to a record level just above 9.3 million b/d.

"Gasoline deliveries…hit their highest level on record in July," said Erica Bowman, API chief economist. "With this indication of increased demand, it's clear that consumers have continued to benefit from lower gasoline prices at the pump."

Total petroleum deliveries in July moved up 0.8% from July 2015 to average 20.1 million b/d, marking the highest July deliveries in 9 years. Compared with June, total US petroleum deliveries increased slightly by less than 0.1%. For year-to-date, total US petroleum deliveries moved up 1.1% compared with the same period last year.

Crude oil production was down from the prior month, the prior year, and the prior year-to-date as production continued to slow and reached its lowest output level for any month since

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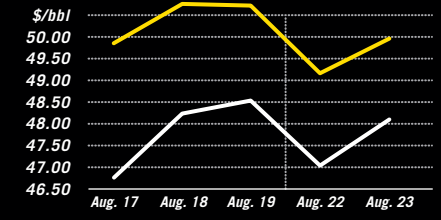

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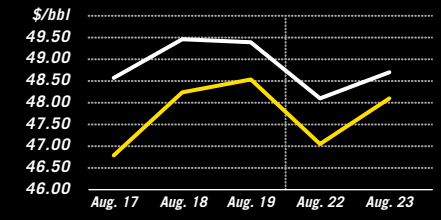
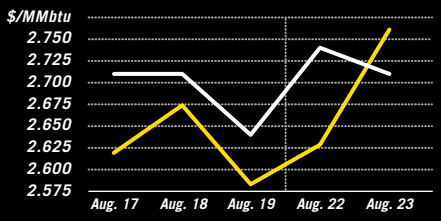


NYMEX NATURAL GAS / SPOT GAS - HENRY HUB



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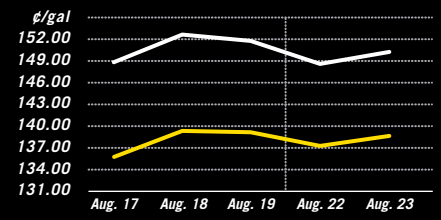
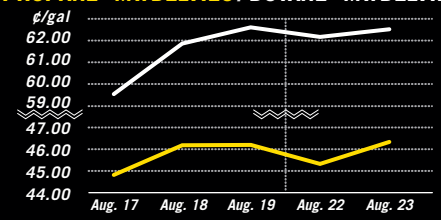
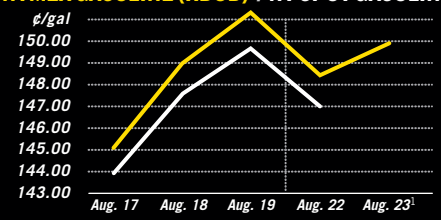


PROPANE - MT. BELVIEU / BUTANE - MT. BELVIEU



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



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

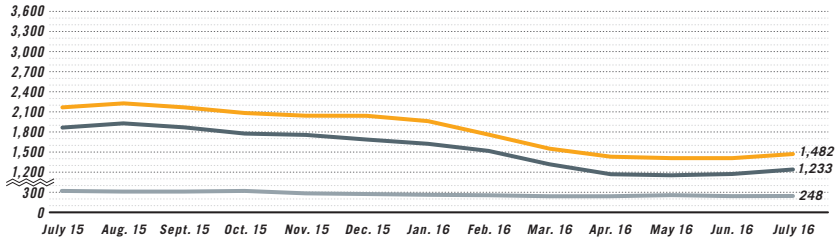
US INDUSTRY SCOREBOARD — 8/29

Latest week 8/12	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	9,770	9,604	1.7	9,450	9,139	3.4
Distillate	3,722	3,712	0.3	3,745	3,954	(5.3)
Jet fuel	1,775	1,675	6.0	1,621	1,564	3.6
Residual	358	237	51.1	297	210	41.4
Other products	5,145	5,262	(2.2)	4,952	4,862	1.9
TOTAL PRODUCT SUPPLIED	20,770	20,490	1.4	20,065	19,729	1.7
Supply, 1,000 b/d						
Crude production	8,504	9,405	(9.6)	8,862	9,402	(5.7)
NGL production[2]	3,549	3,281	8.2	3,433	3,136	9.5
Crude imports	8,443	7,584	11.3	7,917	7,303	8.4
Product imports	2,228	2,263	(1.5)	2,171	2,117	2.6
Other supply[2 3]	2,705	2,399	12.8	2,189	2,332	(6.1)
TOTAL SUPPLY	25,429	24,932	2.0	24,572	24,290	1.2
Net product imports	(1,673)	(1,586)	—	(1,723)	(1,546)	—
Refining, 1,000 b/d						
Crude runs to stills	16,725	17,027	(1.8)	16,231	16,200	0.2
Input to crude stills	17,008	17,086	(0.5)	16,452	16,443	0.1
% utilization	92.9	94.6	—	90.2	91.5	—

Latest week 8/12	Latest week	Previous week[1]	Change	Same week year ago[1]	Change	Change, %
Stocks, 1,000 bbl						
Crude oil	521,093	523,601	(2,508)	456,213	64,880	14.2
Motor gasoline	232,659	235,383	(2,724)	212,774	19,885	9.3
Distillate	153,135	151,196	1,939	148,400	4,735	3.2
Jet fuel–kerosine	41,649	41,611	38	42,321	(672)	(1.6)
Residual	39,050	38,498	552	39,155	(105)	(0.3)
Stock cover (days)[4]			Change, %		Change, %	
Crude	31.2	31.3	(0.3)	27.0	15.6	
Motor gasoline	23.8	24.1	(1.2)	22.2	7.2	
Distillate	41.1	39.5	4.1	40.0	2.8	
Propane	99.9	93.3	7.1	99.3	0.6	
Futures prices[5] **8/19**			**Change**		**Change**	**Change,%**
Light sweet crude ($/bbl)	47.17	43.10	4.07	43.21	3.96	9.2
Natural gas, $/MMbtu	2.62	2.61	0.00	2.84	(0.22)	(7.9)

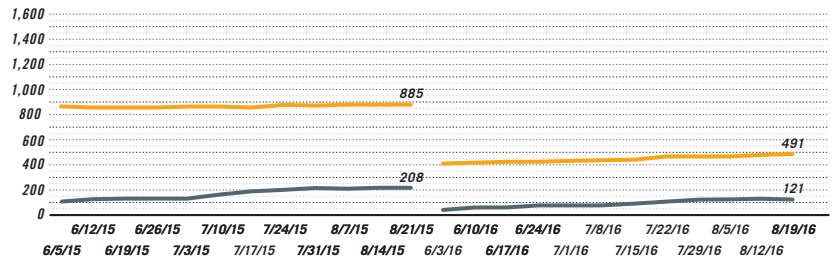
[1]Based on revised figures. [2]OGJ estimates. [3]Includes other liquids, refinery processing gain, and unaccounted for crude oil. [4]Stocks divided by average daily product supplied for the prior 4 weeks. [5]Weekly average of daily closing futures prices.
Source: Energy Information Administration, Wall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

March 2014. Crude oil production fell 1.9% from June, and was down 10% from July 2015 to average 8.5 million b/d in July.

US total petroleum imports in July averaged just below 10.5 million b/d, up 6.8% from the prior month and up 9.9% from the prior year, but were the 4th lowest total petroleum imports for the month of July in 19 years, since 1997.

At 10.2 million b/d, gasoline production for the month of July reached its highest level for any month on record. This was up by 1.9% from the prior year, and up 1.3% from the prior month. For year-to-date, gasoline production increased 1.9% compared with the same period last year and was the highest year-to-date on record.

Refinery gross inputs moved down 0.7% from July 2015, but remained the second highest inputs for the month of July, averaging 17.1 million b/d. Compared with June 2016, refinery gross inputs were up 1.9%. OGJ

EXPLORATION & DEVELOPMENT QUICK TAKES

Algerian drilling campaign ends with oil discovery

Algeria's state-owned Sonatrach and its partners completed its drilling campaign in Hassi Bir Rekaiz with the Bou Goufa-2 (BOG-2) well that flowed 2,406 b/d of oil and 2.9 MMcfd of associated gas. BOG-2 was drilled to TD 4,064 m at the end of April. Drillstem tests showed flow rates from the Triassic Argilo Greseux Inferieur (TAGI) formation.

Hassi Bir Rekaiz is onshore in the southeastern part of Algeria. It covers an area of 2,686 sq km and includes Blocks 443a, 424a, 414ext, and 415ext. PTTEP is the operator during the exploration period with 24.5% interest. Its joint venture partners are Sonatrach with 51% interest and CNOOC Ltd. with 24.5% interest. The development proposal is under way and will submitted to the Algerian government in early 2017, PTTEP said.

GeoPark's Jacana 5 well extends Colombian oil field

The GeoPark Ltd.-operated Jacana 5 appraisal well on Llanos 34 block in Colombia reached a TD of 11,467 ft, testing with an electric submersible pump in the Guadalupe formation at 2,500 b/d of 15.5° gravity oil.

Oil flowed through a 41/64-mm choke with wellhead pressure of 90 psi, showing less than 1% water cut. The firm says additional production history is required to determine stabilized flow rates of the well. Surface facilities are in place and the well is already on production.

The Jacana 5 well followed the recent Jacana 4 and Jacana 3 wells, which expanded the size of Jacana field by extending its northwestern limit (OGJ Online, July 8, 2016). Jacana 5 was drilled 780 m north of Jacana 3 further down dip to a bottomhole location below the previous lowest-known oil.

With these results, the test of the Jacana 5 well further extends the limits of the field. GeoPark expects to continue exploring and appraising the Tigana-Jacana oil trend to determine the full extent of the oil accumulation.

Once testing of the Jacana 5 well is completed, the drilling rig will move northeast along the trend to Tigana field, followed by other locations, to continue GeoPark's program of five more wells on Llanos 34 block, of which the firm holds 45% working interest, before yearend.

Energean to develop two fields off Israel

Energean Oil & Gas, Athens, has committed to submit within 6 months a development plan for deepwater Karish and Tanin natural gas and condensate fields offshore Israel, 100% interests in which it agreed to acquire.

The $148-million deal accommodates antitrust stipulations in the Israeli government's natural gas framework allowing development of nearby Leviathan gas field and expansion of Tamar field, both much larger than Karish and Tanin (OGJ Online, Dec. 17, 2015).

Energean will acquire interests of 47.059% from Noble Energy Mediterranean Ltd. and 26.4705% each from Avner Oil Exploration LP and Delek Drilling LP, according to Delek Group.

The fields, about 40 km apart in Israel's exclusive economic zone, will supply the Israeli market.

The agreement is subject to government approvals.

Statoil submits development plan for Byrding strike

Statoil ASA has submitted a plan for development and operation (PDO) for the 2005 Byrding discovery to Norwegian authorities, and said recoverable volumes are estimated at 11 million boe.

Byrding, previously known as Astero, lies in 360 m of water on Block 35/11 about 3.8 km north of Fram field.

The reservoir is about 3,100 m below the ocean surface, according to the Norwegian Petroleum Directorate, which also said the 35/11-13 discovery well was appraised by the 35/11-14 well in 2006.

NPD said development of Byrding "has been considered multiple times" in the past 10 years.

The plan includes a duo-lateral well drilled from the existing Fram H-Nord subsea template. The duo-lateral well is expected to be 7 km long, with the first kilometers shared by the two laterals.

Oil and gas will flow to the Troll C platform for partial processing and then be sent onshore by existing pipelines to Mongstad and Kollsnes.

Capital expenditures are estimated at 1 billion kroner, down from initial estimates of 3.5 billion kroner.

The development is expected to come on stream in third-quarter 2017, with production lasting as long as 10 years. An estimate of peak production in 2017 and 2018 is about 8,000 boe/d.

Byrding is within PL 090 B. Operator Statoil has 45%, Wintershall Norge AS 25%, Idemitsu Petroleum Norge AS 15%, and Engie E&P Norge 15%. OGJ

DRILLING & PRODUCTION QUICK TAKES

Tullow begins oil flow from TEN project off Ghana

Tullow Oil PLC has started oil production from Tweneboa, Enyenra, and Ntomme (TEN) fields offshore Ghana.

Tullow expects oil production to ramp-up gradually towards the Prof. John Evans Atta Mills floating production, storage, and offloading vessel's capacity of 80,000 b/d of oil through the remainder of this year. The firm estimates TEN average annualized output for the year will be 23,000 bo/d gross and 11,000 bo/d net.

The first TEN discovery was made in 2009. The government of Ghana approved the project's plan of development in 2013.

Tullow is operator of the TEN fields with 47.175% interest. Partners are Anadarko Petroleum Corp. with 17%, Kosmos Energy Ltd. 17%, Ghana National Petroleum Corp. 15%, and PetroSA 3.875%. Tullow also is operator of offshore Ghana's Jubilee field, which has been on stream since 2010.

DNO drilling in Tawke field in Iraq's Kurdistan region

DNO ASA, a Norwegian oil and gas operator, said it plans to drill five production wells yet this year in Tawke field in the Kurdistan region of Iraq. The drilling follows an extensive workover program.

Two rigs currently are working, DNO said. The Tawke-31 well, targeting the main Cretaceous reservoir, is the first Tawke production well to be drilled since 2014. It is expected to reach 2,200 m in September.

A third rig will be added to drill an appraisal well in the fourth quarter in Peshkabir field.

DNO said its second-quarter operated production was up 27% to 122,900 boe/d. Tawke production alone was 117,000 b/d.

Statoil's Fram C East starts output to Troll C platform

Statoil ASA said it has started production from the Fram C East well. Technology and improved drilling efficiency helped slash costs for the Norwegian North Sea development designed to maximize production from the Fram area and boost Troll C platform production.

The development originally was estimated to cost $97 million, but expenses were reduced to $72.8 million, Statoil said.

Fram C East is a long production well drilled from the existing Fram subsea template. Production is tied back to Troll C, Statoil reported Aug. 24. Natural gas will be transported to Kollsnes via Troll A. Oil will move by pipeline to Mongstad for processing.

Lars Hoier, Statoil vice-president operations for Troll and Fram, said, "Fram C East is a small development project, but a key element of our plans to capture maximum value in the Fram area." He believes Fram C East could yield a positive cash flow yet this year.

Statoil holds 45% interest in Fram C East. Partners are ExxonMobil Corp. 25%, Engie 15%, and Idemitsu 15%.

Fram C East was discovered in 2007. Oil was found in the Middle Jurassic reservoir rocks (OGJ Online, Jan. 15, 2008).

Yme platform removed in a single lift

The mobile offshore production unit (MOPU) installed in Yme field in the Norwegian North Sea was removed in a single lift on Aug. 22 by the Pioneering Spirit vessel owned by Allseas Group SA.

The 13,500-tonne platform was sea-fastened onboard the installation, decommissioning, and pipelay vessel for eventual dismantling in Lutelandet, Norway.

The Norwegian Petroleum Directorate on Aug. 19 granted consent to Repsol Norge AS for removal of the Yme MOPU in PL 316/316B.

Yme began producing in 1996. In late 2000, licensees decided to shut down production of 16,000 b/d from seven wells due to forecasts for production and oil prices (OGJ Online, Nov. 23, 2000).

In 2007, partners received approval to reactivate the field (OGJ Online, Jan. 11, 2007). In 2012, Talisman Energy Inc. announced a writedown and put production on hold (OGJ Online, Mar. 12, 2013).

The platform had been unmanned since 2012 when cracks were found in platform legs.

Repsol SA became operator after its 2015 acquisition of Talisman Energy Inc. Earlier this year, OKEA AS, Trondheim, agreed to acquire Repsol's 60% stake in Yme. OGJ

PROCESSING QUICK TAKES

Inter Pipeline to buy olefinic NGL business

Inter Pipeline Ltd., Calgary, has agreed to buy the olefinic offgas extraction and fractionation business in Canada of Williams and Williams Partners, Tulsa, for $1.35 billion (Can.) and proposes to expand into propane dehydrogenation (PDH).

The acquisition covers an extraction plant each at the bitumen upgraders of Suncor Energy Inc. and Canadian Natural Resources Ltd. near Fort McMurray, Alta. The plants, with combined capacities of 40,000 b/d, recover NGLs and olefins from coker offgas under long-term supply contracts.

Inter Pipeline also will acquire the 420-km, 43,000-b/d Boreal Pipeline, which carries recovered liquids to Williams's 40,000-b/d olefinic fractionator at Redwater, north of Edmonton, operated by Pembina Pipeline Corp., Calgary.

Nova Chemicals Corp. buys as much as 17,000 b/d of ethane-ethylene mix produced at Redwater under a long-term fee-based agreement. US and Canadian energy marketers and refiners buy remaining NGLs and olefinic liquids under shorter-term, commodity-based agreements.

Inter Pipeline says the purchase price represents a 45% discount to the original cost of the assets.

It envisions the addition of a PDH plant, which it says would be Canada's first, to convert about 22,000 b/d pro-

pane from Redwater and other sources into 525,000-tonnes/year of polymer grade propylene.

Inter Pipeline has invested $250 million so far in the PDH facility, which would be built near the Redwater fractionator. It estimates total capital expenditure of $1.85 billion.

Target service date is in 2020, depending on a final investment decision expected by yearend.

ENOC to expand Dubai condensate refinery

State-owned Emirates National Oil Co. (ENOC) of Dubai plans to expand capacity of its 140,000-b/sd condensate refinery at Jebel Ali to 210,000 b/sd. The expansion is part of a national plan for growth through 2021.

ENOC built the refinery in 1999 and added a reformer and hydrotreater in 2010.

Eni lets contract for Zohr gas processing plant

Belayim Petroleum Co. (Petrobel), a joint venture of wholly owned Eni SPA subsidiary IEOC Production BV and Egyptian General Petroleum Corp., has let a contract to Frames Group BV, Alphen aan den Rijn, the Netherlands, to provide processing equipment for a gas plant connected to the first phase of development of deepwater Zohr natural gas field on the Shorouk block offshore Egypt (OGJ, Sept. 7, 2015, p. 60).

As part of the contract, Frames' separation and heat transfer divisions, respectively, will design and supply eight sour-gas filter coalescers and eight shell and tube heat exchangers, all of which will be installed at the onshore El Gamil plant (OGJ Online, Aug. 22, 2014), the service provider said.

With the Zohr development now on the fast-track to begin production by yearend 2017 (OGJ Online, June 20, 2016), Frames said it plans to complete delivery of the filter coalescers and heat exchangers within a year.

The company did not disclose a value of the contract.

Eni, operating through IEOC Production, holds 100% interest the Shorouk license, with Petrobel acting as operator.

Earlier in the year, the Egyptian Ministry of Petroleum confirmed Eni also has started construction on the first of two new plants in Egypt's Port Said as part of its program to increase processing capacity for Zohr gas production (OGJ Online, Apr. 28, 2016).

Expedited as part of an effort to reduce costs and financial exposure, Zohr's accelerated 1-bcfd startup phase is scheduled to begin production from six subsea wells connecting via a gas pipeline to the onshore plant at Port Said by yearend 2017 (OGJ Online, Feb. 26, 2016).

The project's second phase, or the accelerated ramp-up-to-plateau, will add another 14 wells to boost production to 2.6-2.7 bcfd from 2019.

Second-phase plans also include another gas line as well as an additional onshore processing plant, Eni said.

The gas processing plants will host four processing trains of 350 MMcfd each. OGJ

TRANSPORTATION QUICK TAKES

AOPL releases annual pipeline safety report

The Association of Oil Pipe Lines released the 2016 API-AOPL Annual Liquids Pipeline Safety Excellence Performance Report & Strategic Plan, which it developed jointly with the American Petroleum Institute.

The report, which documents liquids pipeline safety performance and outlining industry-wide efforts to improve pipeline safety in 2016 and beyond, highlights trends since 2011. "Large pipeline incidents, those over 500 bbl, are down 32% over the last 5 years," AOPL Pres. Andrew J. Black said.

During that time, the report said that:

- Incidents per mile larger than 500 bbl decreased by 32%.
- 99.999% of crude oil and petroleum products delivered by pipeline reached their destination safely.
- Pipeline incidents potentially affecting people or the environment outside of operator facilities fell 52% since 1999.
- Corrosion-caused pipeline incidents potentially impacting people or the environment outside operator facilities dropped 68% during that same period.
- In 2015, 65% of pipeline incident releases were fewer than 5 bbl.
- The 16.2 billion bbl of crude oil and petroleum products delivered during 2014—the most recent year for which figures were available—was 20% higher than 2010's total.
- The 207,800 miles of liquids pipelines crossing the US represent a 13% increase in distance during the last 5 years.

AOPL said the Pipeline Safety Performance chapter provides further information analyzing the industry-wide safety record, including where performance is improving and which areas hold challenges. This in-depth examination of safety performance not only allows industry to gauge progress, but also helps prioritize safety efforts, it explained.

The new report also outlines specific industry-wide actions liquids pipeline operators are taking to improve safety and reduce the number of incidents, AOPL said.

PHMSA issues pipeline status advisory bulletin

The US Pipeline & Hazardous Materials Safety Administration issued an advisory bulletin about procedures for changing a pipeline's status from active to abandoned for pipeline owners and operators, and federal and state pipeline safety personnel.

A 2014 pipeline failure which let 1,200 gal of crude oil to seep into a residential neighborhood near Los Angeles raised concerns about the need to remind pipeline operators about the proper way to purge and clean inactive pipelines, the US Department of Transportation agency said.

The Aug. 16 action makes it clear that federal regulations consider pipelines to either be active and fully subject to all parts of the safety regulations or abandoned, it said.

PHMSA said it is working hard to implement the 2016 federal pipeline safety reauthorization law, which Congress passed and US President Barack Obama signed early this summer. OGJ

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

AUGUST 2016

SPE/AAPG/SEG Unconventional Resources Technology Conference (URTeC), San Antonio, web site: www.urtec.org/ **1-3.**

Society of Petroleum Engineers (SPE) Nigeria Annual International Conference & Exhibition, Lagos, web site: connect.spe.org/spenc/naice/naice2016/ **2-4.**

International Conference on Oil Reserves & Estimation Techniques, Seattle, web site: waset.org/conference/2016/08/seattle/ICORET **8-9.**

NAPE Expo, Houston, web site: napeexpo.com/shows/about-the-show/houston/ **10-11.**

EnerCom's The Oil & Gas Conference-2016, Denver, web site: www.theoilandgasconference.com/ **14-18.**

4th International Conference on Petroleum Engineering, London, web site: www.petroleumengineering.conferenceseries.com/ **15-17.**

IADC/SPE Asia Pacific Drilling Technology Conference & Exhibition, Singapore, web site: www.spe.org/events/apdt/2016/ **22-24.**

Rocky Mountain Energy Summit, Denver, web site: rmesummit.org/con/ **22-25.**

GeoBaikal 2016: Expand Horizons, Irkutsk, Russia, web site: www.eage.org/event/index.php?eventid=1433&Opendivs=s3 **22-26.**

SPE Asia Pacific Hydraulic Fracturing Conference, Beijing, web site: www.spe.org/events/aphf/2016/pages/general/call_for_papers.php **24-26.**

International Conference on Energy & Environment, London, web site: www.waset.org/conference/2016/08/london/ICEE **25-26.**

International Conference on Energy Systems Engineering & Technology, London, web site: www.waset.org/conference/2016/08/london/ICESET **25-26.**

2nd International Congress & Expo on Biofuels & Bioenergy, Sao Paulo, web site: biofuels-bioenergy.conferenceseries.com/ **29-31.**

15th European Conference on the Mathematics of Oil Recovery (ECMOR XV), Amsterdam, web site: www.eage.org/event/index.php?eventid=1416&Opendivs=s3 **Aug. 29-Sept. 1.**

Offshore Northern Seas, Stavanger, web site: www.tofairs.com/expo.php?fair=103366 **Aug. 29-Sept. 1.**

2nd International Congress & Expo on Biofuels & Bioenergy, Sao Paulo, web site: biofuels-bioenergy.conferenceseries.com/ **29-31.**

IADC Asset Integrity & Reliability Conference & Exhibition, Houston, web site: www.iadc.org/event/2016-iadc-asset-integrity-reliability-conference-exhibition/ **30-31.**

Ultradeepwater & Onshore Technology Conference, Galveston, Tex., web site: www.rpsea.org/events/503 **30-31.**

SEPTEMBER 2016

Second Applied Shallow Marine Geophysics Conference, Barcelona, web site: www.Eage.org/event/index.php?eventid=1421&Opendivs=s3 **4-8.**

EAGE First Conference on Geophysics for Mineral Exploration and Mining, Barcelona, web site: www.eage.org/event/?eventid=1420 **4-8.**

European Association of Geoscientists & Engineers (EAGE) First Conference on Geophysics for Mineral Exploration & Mining, Barcelona, web site: www.eage.org/event/index.php?eventid=1420&Opendivs=s3 **4-8.**

22nd European Meeting of Environmental and Engineering Geophysics, Barcelona, web site: www.eage.org/event/index.php?eventid=1419&Opendivs=s3 **4-8.**

SPE Offshore Europe, Aberdeen, web site: www.offshore-europe.co.uk/ **5-8.**

SPE Intelligent Energy Conference, Aberdeen, web site: www.intelligentenergyevent.com/ **6-8.**

NACE Egypt Corrosion Conference, Cairo, web site: egyptcorrosion.nace.org/ **6-8.**

AAPG SEG International Conference & Exhibition 2016, Cancun, web site: www.aapg.org/publications/blogs/events/article/articleid/23667/increase-your-exposure-exhibition-and-sponsorship-opportunities-available/ **6-9.**

AAPG SEG 2016 International Conference & Exhibition, Cancun, web site: www.aapg.org/events/conferences/ice/announcement/articleid/20311/aapg-seg-2016-international-conference-exhibition-cancun **6-9.**

23rd Annual India Oil & Gas Review Summit & International Exhibition, Mumbai, web site: www.oilgas-events.com/india-oil-gas **9-10.**

International Conference on Chemical Engineering, Phoenix, web site: chemicalengineering.conferenceseries.com/ **12-14**.

Geomodel 2016, Gelendzhik, Russia, web site: www.eage.org/event/index.php?eventid=1448&Opendivs=s3 **12-15.**

IADC Advanced Rig Technology Conference & Exhibition, Galveston, Tex., web site: www.iadc.org/event/2016-iadc-advanced-rig-technology-conference-exhibition/ **13-14.**

ESOPE International Exhibition & Symposium for the Pressure Equipment Industry, Paris, web site: www.esope-paris.com/ **13-15.**

SPE Deepwater Drilling & Completions Conference, Galveston, Tex., web site: www.spe.org/events/ddc/2016/ **14-15.**

2nd Annual IoT in Oil & Gas, Houston, web site: energyconferencenetwork.com/iot-in-oil-and-gas-2016/**14-15.**

Rio Oil & Gas Expo & Conference, Rio de Janeiro, web site: www.whereinfair.com/rio-oil-gas-expo/rio-de-janeiro/2016-Sep/ **14-16.**

Society of Petroleum Resources Economists Meeting, Houston, web site: www.spreconomists.org/events.htm **15.**

International Conference on Oil & Gas Transportation, Zurich, web site: waset.org/conference/2016/09/zurich/ICOGT **15-16.**

Turbomachinery & Pump Users Symposium, Houston, web site: tps.tamu.edu/event-info **15-17.**

Iran International Petroleum Congress (IIPC), Tehran, web site: www.iranpetroleumcongress.com/ **19-21.**

■ Oil & Gas Anti-Corruption Compliance Exchange, Houston, web site: oilgasanticorruption.com/ **20-21.**

Center for Offshore Safety Forum, Houston, web site: www.centerforoffshoresafety.org/Events/2016%20COS%20Forum **20-21.**

The CWC World LNG & Gas Series: Asia Pacific Summit, Singapore, web site: asiapacific.cwclng.com/ **20-23**.

2016 Deloitte Oil & Gas Conference, Houston, web site: www2.deloitte.com/us/en/pages/energy-and-resources/events/oil-and-gas-conference.html **21**.

IADC Drilling HSE&T Europe Conference & Exhibition, Amsterdam, web site: www.iadc.org/event/euro-hset-2016/ **21-22.**

SPE Liquids-Rich Basins Conference—North America, Midland, Tex., web site: www.spe.org/events/lrbc/2016/ **21-22.**

International Conference on Petroleum Industry & Energy, Los Angeles, web site: www.waset.org/conference/2016/09/los-angeles/ICPIE **22-23**.

Eastern Section, American Association of Petroleum Geologists 2016 Annual Meeting, Lexington, Ky., web site: www.esaapgmtg.org/ **25-27.**

Corrosion Technology Week 2016, Houston, web site: ctw.nace.org/ **25-29**.

Operational Excellence in Refining & Petrochemicals, Houston, web site: www.opexinrefiningandpetrochem.com **26-28.**

SPE Annual Technical Conference & Exhibition (ATCE), Dubai, web site: www.spe.org/atce/2016/ **26-28.**

SPE Annual Technical Conference & Exhibition, Dubai, web site: www.spe.org/events/calendar/ **26-28.**

US-China Oil & Gas Industry Forum (OGIF), Tysons Corner, Va., web site: www.cvent.com/d/hfqw6c **27-29.**

Flexible & Cost Effective Well Site Facilities Onshore 2016, Houston, web site: www.facilities-design-onshore.com **28-29.**

3rd Annual Unconventional Production & Well Site Facilities Design, Onshore 2016, Houston, web site: www.facilities-design-onshore.com/program/ **28-29.**

Global Oil & Gas South East Europe & Mediterranean Conference, Athens, web site: www.oilgas-events.com/Global-Oil-Gas-Black-Sea-Mediterranean-Conference/ **28-29.**

International Conference on Petroleum & Petrochemical Engineering, London, web site: www.waset.org/conference/2016/09/london/ICPPE **29-30.**

International Conference on Geophysics, Vancouver, web site: geophysics.conferenceseries.com/ **29-30.**

OCTOBER 2016

ICOGPE 2016: 18th International Conference on Oil, Gas & Petrochemical Engineering, Barcelona, web site: www.waset.org/conference/2016/10/barcelona/ICOGPE **3-4.**

SPE African Health, Safety, Security, Environment & Social Responsibility Conference & Exhibition, Accra, Ghana, web site: www.spe.org/events/en/2016/conference/16hsea/homepage.html **4-6.**

Kazakhstan International Oil & Gas Conference (KIOGE) 2016, Almaty, Kazakhstan, web site: kioge.kz/en/conference/about-conference **5-6.**

USEA 9th Annual Energy Supply Forum, Washington, DC, web site: https://www.usea.org/event/usea-9th-annual-energy-supply-forum **6.**

International Conference on Geosciences, Orlando, web site: geosciences.conferenceseries.com/ **6-7.**

Cyber Security for Critical Assets LATAM, Rio de Janeiro, web site: www.criticalcybersecurity.com/latam/ **6-7.**

23rd World Energy Conference, Istanbul, web site: www.wec2016istanbul.org.tr/ **9-13.**

International Conference on Oil Reserves & Energy Management, New York, web Site: www.waset.org/conference/2016/10/new-york/ICOREM **10-11.**

The 2016 API Tank, Valves, & Piping Conference & Expo, Las Vegas, web site: www.api.org/events-and-training/calendar-of-events/2016/tvp **10-13.**

■ Natural Gas for High Horsepower Summit, Chicago, web site: www.hhpsummit.com/ **11-13.**

■ OilComm Conference & Exposition, Houston, web site: www.oilcomm.com/ **11-13.**

SEG International Exhibition and 86th Annual Meeting, Dallas, web site: www.seg.org/web/annual-meeting-2016/ **16-21.**

International Conference on Oil Reserves & Production, London, web site: www.waset.org/conference/2016/10/london/ICORP **17-18.**

The 8th Saudi Arabia International Oil & Gas Exhibition (SAOGE), Dammam, web site: www.saoge.org/ **17-19.**

SPE Well Construction Fluids 2025 Forum: Meeting the Challenges, Dubai, web site: www.spe.org/events/16fmel/ **17-19.**

2016 Fall Committee on Petroleum Measurement Standards Meeting, Los Angeles, web site: www.api.org/Events-and-Training/Calendar-of-Events/2016/fallcopm **17-21.**

Permian Basin International Oil Show, Odessa, Tex., web site: www.pboilshow.org **18-20.**

The 37th Oil & Money Conference, London, web site: www.oilandmoney.com/ **18-19.**

Society of Petroleum Engineers (SPE) African Health, Safety, Security, Environment & Social Responsibility Conference & Exhibition, Accra, Ghana, web site: www.spe.org/events/hsea/2016/ **18-20.**

IADC Well Control Europe Conference & Exhibition, Copenhagen, web site: www.iadc.org/event/2016-well-control-europe/ **19-20.**

SPE Latin America & Caribbean Heavy Oil & Extra Heavy Oil Conference, Lima, web site: www.spe.org/events/laho/2016/ **19-20.**

Arctic Technology Conference (ATC), St. John's, Newfoundland & Labrador, web site: www.arctictechnologyconference.org/ **24-26.**

SPE Russian Petroleum Technology Conference & Exhibition, Moscow, web site: www.spe.org/events/rpc/2016/ **24-26.**

SPE North America Artificial Lift Conference & Exhibition, The Woodlands, Tex., web site: www.spe.org/events/alce/2016/ **25-27.**

SPE Asia Pacific Oil & Gas Conference & Exhibition (APOGCE), Perth, web site: www.spe.org/events/apogce/2016/ **25-27.**

The 10th Element Oilfield Engineering with Polymers Conference, London, web site: oilfieldpolymers.nace.org/ **25-27.**

Produced Water Quality Recycling & Reuse, Denver, web site: www.produced-water-quality-recycling-reuse-rockies.com/ **26-27.**

Bottom of the Barrel Technology Conference (BBTC) Middle East & Africa 2016, Manama, web site: www.bbtc-mena.biz **26-27.**

International Conference & Expo on Oil & Gas, Rome, web site: oil-gas.conferenceseries.com/ **27-28.**

Gulf Safety Forum (GSF) 2016, Doha, web site: www.gulfsafetyforum.com/ **30-31.**

23rd Africa Oil Week Africa Upstream Conference 2016, Cape Town, web site: www.oilgas-events.com/Find-an-Event/Africa-Oil-Week/ **Oct 31-Nov 04.**

NOVEMBER 2016

SPE Annual Caspian Technical Conference & Exhibition, Astana, Kazakhstan, web site: www.spe.org/events/en/2016/conference/16ctce/homepage.html **1-3.**

4th Iran Europe Oil & Gas Summit, Berlin, web site: www.iran-summit.com/**1-3.**

2nd International Conference & Expo on Oil & Gas, Istanbul, web site: oil-gas.omics-group.com/ **2-3.**

7th Annual Summit Operational Excellence in Oil & Gas, Houston, web site: www.opex-inoilandgas.com 7**-9.**

The Abu Dhabi International Petroleum Exhibition & Conference, (ADIPEC), Abu Dhabi, web site: www.adipec.com/ **7-10.**

RefComm Mumbai 2016, Mumbai, web site: refiningcommunity.com/refcomm-mumbai-2016/ **7-11.**

International Petroleum Technology Conference (IPTC), Bangkok, web site: www.iptcnet.org/pages/about/future-dates.php **14-16.**

4th East Africa Oil & Gas Summit & Exhibition, Nairobi, web site: eaogs.com/**15-17.**

■ International Conference on Oil, Gas & Petrochemistry, Dubai, web site: www.waset.org/conference/2016/11/dubai/ICOGP **16-17.**

21st Annual Oil & Gas of Turkmenistan (OGT) Conference 2016, Ashgabat, web site: ogt.theenergyexchange.co.uk/ **16-17.**

Project Financing in Oil & Gas, London, web site: www.smi-online.co.uk/energy/uk/conference/Project-Financing-in-Oil-and-Gas **21-22.**

International Conference on Shale Oil & Gas Engineering, London, web site: www.waset.org/conference/2016/11/london/ICSOGE **24-25.**

Powering the people

STEVEN PORUBAN
Managing Editor-News

If you're a US voter still stymied by the choice of which candidate will receive your coveted vote on Nov. 8 for the nation's highest office, you might take comfort in knowing that the presidential election field has just increased by one. That is, of course, if you first accept as fact the announcement made earlier this month that "Fracking," running as an independent, has thrown her hat into the ring.

Touted as an "attractive alternative for Americans dissatisfied with [their] current choices," Fracking's platform includes "jobs, pocketbook savings, energy security, environmental benefits, and funding for local services."

The "Fracking for President" campaign—as fervent as it sounds—is a project being supported by North Texans for Natural Gas (NTNG) and FrackFeed and, as it states on the campaign's web site at www.frackingforpresident.com, is "intended for educational purposes only," although NTNG "can't help it if people laugh, too."

The movement to elect Fracking for president was launched Aug. 1 by a slickly produced 60-sec commercial posted to social media. The images displayed are typical of such American campaign spots—a morning cup of coffee being poured, sweeping views of Washington, DC, and its monuments, and blue-collar workers welding sheet metal.

What is never shown, however, is the candidate herself. Rather, while the images and some factual text flash across the screen, a voice-over announcer dramatically recites the following: "What if I told you that a new candidate is running for president, that politicians on the right and left praise her, that she almost single-handedly saved the American economy, that no one has ever met her, yet you see her handiwork every day.

"What if I told you that this candidate is both feared and respected in the Middle East, that she helped bring American carbon emissions to a 25-year low, that the savings on your electricity bill and at the gas pump are her work.

"What if I told you that the best candidate is not the one who talks about powering people, but the one who already does."

Meet Fracking

Fracking, states her campaign's web site, was born in 1947 near Hugoton, Kan., but "she quickly traveled to oil and natural gas fields in Oklahoma, Texas, and other energy-producing states." The site says, "By the early 2000s, her work had impacted more than 1 million wells, and she had begun to lead an energy revolution in America. With the help of other important technologies, like horizontal drilling and advanced 3D seismic, Fracking reversed declines in domestic energy production that experts believed were inescapable."

The candidate's campaign theme, "Powering the People," embodies her "proven record—and future agenda—of creating jobs, lowering consumer prices, strengthening energy security, reducing air pollution, and providing funding for critical public services," the site says.

Fracking herself is quoted as saying, "In 2016, America doesn't just need a leader who can reenergize our country, but one who has a record of actually doing so. For nearly 70 years, I have been giving power to the people in states all across the country, from Pennsylvania and Ohio to Texas, Colorado, and California."

Weeks after announcing her campaign, Fracking even launched a virtual bus tour that, in the coming months, will take her across the US "and culminate with the selection of a vice-presidential candidate." She says that she is looking forward to the fall debates where she can "compare her record of improving the economy against the rhetoric of her opponents."

Your vote counts

Fracking's site goes on to say that she has put America "in the driver's seat in the global energy market" after more than 30 years of control by the Organization of Petroleum Exporting Countries. Thanks to her work, it states, "oil imports fell to their lowest level in 2 decades, and experts predict America could soon become a net energy exporter."

In short, Fracking has "transformed America into an energy powerhouse" and has "done more than anyone else to secure American energy security by decreasing our dependence on foreign oil."

So, with one of the more contentious US presidential elections in recent memory winding its way down to the finish line, you should be reminded that every vote counts.

And, if Fracking somehow ends up losing this important race, there's always cabinet positions available. OGJ

Midterm market moves

Market change threatens to undermine important work starting in the US on vehicle fuel economy and greenhouse-gas (GHG) emissions. The gasoline market has defied expectations in place when Congress created corporate average fuel economy (CAFE) standards a generation ago. It probably will defy expectations underlying decisions made now.

Last month, the Environmental Protection Agency and National Highway Traffic Safety Administration (NHTSA) published technical documents launching a midterm evaluation of standards for model-year 2022-25 light-duty vehicles. A crucial question, raised in an OGJ article earlier this year, is the extent to which the agencies account for gasoline-market changes that have occurred since CAFE regulation began (OGJ, Apr. 4, 2016, p. 24). Just as important, however speculative, is whether they will acknowledge further changes likely in the next few years.

Assessing progress

CAFE standards, established in 1975 in response to the Arab oil embargo of 1973-74, have been combined with control of GHG emissions for regulation under a combined metric expressed as miles per gallon. Regulation born out of concern for fuel supply thus has evolved to accommodate concern about climate change. With gasoline lately abundant and priced low enough to revive demand growth, GHG control is the dominant concern—certainly of agencies in the Obama administration.

EPA committed to the midterm evaluation of progress toward MY 2022-25 goals when it issued the final rule for light-duty vehicles in 2012. It, NHTSA, and the California Air Resource Board are coordinating the work and prepared the technical assessment of progress toward a fleet average of 54.5 mpg in 2025, the mileage EPA determined would be necessary to meet emission goals wholly through fuel-economy improvements.

In comments for the midterm evaluation, the Alliance of Automobile Manufacturers put the challenge in useful perspective. Government targets, the group said, soon might outrun recent gains in vehicle fuel economy. Meeting the MY 2025 target requires the average vehicle to be more efficient than some current hybrids. "Real-world, holistic modeling predicts up to 47% of the US car fleet will need to be as efficient as modern hybrids," the group asserted. Among its suggestions are recognition of "the higher level of electrified vehicles needed to meet future standards" and consideration of "how lower fuel prices impact consumer buying decisions and the standards' achievability."

The problem is consumer preference for light trucks, which becomes especially strong when gasoline prices are low. So an economic dilemma looms. Meeting CAFE and GHG emission targets requires accelerated electric-vehicles sales, which will boost growth in demand for electricity, the cost of which will be increasing as requirements expand for power from renewable sources. Electric cars will be expensive to buy and costly to operate.

At the same time, if current trends persist, the price of gasoline will be quite low by comparison. Part of the reason is obvious: a swing by the oil market from scarcity to abundance with the emergence of supply from unconventional reservoirs. Less noticed is a surge of gasoline feedstock accompanying growth in production of natural gas.

A liquids surge

As has been noted here before, the supply of natural gas liquids from gas plants is set to surge—perhaps by 5.7 million b/d during 2014-21, according to the late Al Troner of Asia Pacific Energy Consulting (OGJ, June 13, 2016, p. 17). One effect will be chronically plentiful naphtha, which will moderate the price of gasoline. This will happen partly because mandated increases in electricity from solar and wind will lift demand for natural gas in backup generators.

Regulation and buying patterns sales thus indicate the need for electric-vehicle sales above current expectations even as regulation raises the costs of electricity while helping to suppress gasoline prices. Contradictory forces such as these are not the ingredients of regulatory success. A midterm evaluation of progress toward vehicle-efficiency and emission goals should be an opportunity to align regulation with realities of a market that seldom behaves as regulators wish it would. OGJ

Four Corners methane study finds 10% of sources emit half of emissions

Nick Snow
Washington Editor

An extensive airborne survey of a previously identified methane hot spot in the US Four Corners area found that just 10% of the individual observed sources contributed half of the emissions, the National Aeronautics & Space Administration reported.

Five trade associations representing the upstream oil and gas industry responded that the study was a good first step, but is narrow in scope compared with others now under way and expected to be more comprehensive.

Scientists from NASA's Jet Propulsion Laboratory and the California Institute of Technology, both in Pasadena, Calif.; the National Oceanic and Atmospheric Administration (NOAA) in Boulder, Colo.; and the University of Michigan at Ann Arbor used two JPL airborne spectrometers to identify and measure more than 250 individual methane sources, JPL said.

Methane emissions in the area where Arizona, Colorado, New Mexico, and Utah meet are associated primarily with coalbed methane (CBM) production and transportation, NASA said. The sources emitted the gas at rates from a few to 11,000 lb/hr, JPL added. Results were published in a paper, "Airborne methane remote measurements reveal heavy-tail flux distribution in Four Corners region," in the Proceedings of the National Academy of Sciences.

The experiment proved that an airborne methane detection concept works, according to lead author Christian Frankenberg of JPL and Cal Tech. "That we could observe this distribution in a widespread geographical area and collect enough plumes to perform a statistical analysis was a pleasant surprise," he said.

A 2015 investigation

Frankenburg and other researchers originally detected the Four Corners methane hot spot using past observations from a European satellite, JPL said. Last year, he and JPL colleagues joined a campaign, led and funded by NOAA, to investigate the hot spot, called Twin Otter Projects Defining Oil/Gas Well Emissions (Topdown). The campaign also included researchers from the University of Michigan. Each participating institution deployed its own suite of instruments.

The study's observed emissions sources included gas processing facilities, storage tanks, pipeline leaks, and well pads, as well as a coal mine venting shaft. "With the observed confirmation of a lognormal emission distribution, this airborne observing strategy and its ability to locate previously unknown point sources in real time provide an efficient and effective method to identify and mitigate major emissions contributors over a wide geographic area," it said.

It said that the US Environmental Protection Agency uses a process-based approach that assumes a normal distribution of emissions for each process used in extraction, processing, and distribution. In reality, the flux distribution can be heavily skewed, resulting in a heavy-tailed distribution.

This suggests that a relatively small percent of the sources in a given field may dominate the overall total, the study said. "Although the heavy-tailed distribution makes it more difficult to estimate emissions using a process-based, or bottom up, approach, it suggests that mitigation of field-wide emissions such as those estimated for [the Four Corners area] will be less costly because it only requires identifying and fixing a few emitters," it said.

"However, evaluating the distribution and role of point sources in large geographical areas with limited road access is too time-consuming without prior knowledge of suspected locations," the study continued. Researchers conducted an intensive airborne campaign in April 2015 to overcome this shortcoming and directly measure the source distribution, identify strong emitters, and provide real-time feedback to ground teams.

Strong emitters dominant

"Our analysis shows that strong emitters dominate the regional budget, with presumably lower marginal cost for emissions reductions. We have also demonstrated the ability to quantify and identify both small and large point source emissions widely spread over inaccessible geographic areas," the study concluded. "Airborne remote measurements, combined with in-situ sensing, could thus provide a path forward toward effective methane emission (monitoring) mitigation strategies."

But the oil and gas trade associations in Colorado and New Mexico said that several other studies under way by NOAA, the University of Colorado, and the University of Michigan in conjunction with NASA will include on-the-ground measurements of all Four Corners area sources of methane, including coal mines, landfills, and natural seeps.

"The study represents a snapshot in time that can provide valuable information, but is not suitable for extrapolation to monthly, annual, or other longer-term emissions estimates," said Christi Zeller, executive director of the La Plata County Energy Council.

"Certain operational events, such as scheduled maintenance downtime, are temporary and can skew results," she said. "For example, one gas plant was measured five times, with one outlier measurement that occurred during a scheduled maintenance event. We look forward to the results from NOAA and the universities to provide a more complete picture of methane in the area."

New Mexico Oil & Gas Association Pres. Steve Henke said, "The first of several studies, NASA's assessment begins the process of better understanding methane levels in the region, but it addressed a limited set of methane sources. It has been known by the states and tribes in the Four Corners that natural methane seeps occur throughout the area from the Fruitland Formation outcrop. Also, the topography of the area traps air and causes methane to build up over time, whether from human or natural sources."

Small methane amounts offset

Kathleen Sgamma, vice-president of government and public affairs at the Western Energy Alliance in Denver, noted, "There is a built-in economic incentive for producers to minimize emissions and capture as much methane as possible, since it's the very product they sell." Small amounts of methane emitted at the well site are offset many times over by the huge greenhouse gas reductions natural gas delivers when used to generate electricity, she said.

Colorado Oil & Gas Association Pres. Dan Haley said, "Oil and gas operators in Colorado strive to protect the health and safety of our communities and environment every day; after all, these are the communities where we are raising our families. Colorado and the nation have seen a significant decrease in greenhouse gas emissions due to an increase in the electricity powered by gas."

The US Energy Information Administration projects that carbon emissions will be lower in 2040, largely because of gas-fired power generation, according to Colorado Petroleum Council Executive Director Tracee Bentley. "Put simply, increased use of gas has been at the heart of America's climate progress and will continue to play a major role in emissions reductions well into the future," she said.

Oil and gas production has taken place in the Four Corners area's San Juan basin since the 1940s, the five associations jointly said. In its northwest New Mexico portion, where there are nearly are nearly 20,000 active gas wells and fewer than 2,000 oil wells, about 140 operators produced 646 bcf of gas in 2015.

In the San Juan basin's southwestern Colorado portion, where about 34 operators produced 337 bcf of gas the same year, there are about 3,400 active wells, about two thirds of which are CBM and one-third conventional gas, the groups said. OGJ

Western governors reiterate concerns over EPA's lower ozone limits

Nick Snow
Washington Editor

The Western Governors Association reiterated concerns that the US Environmental Protection Agency's plan to reduce ground-level ozone limits under the National Ambient Air Quality Standard (NAAQS) will likely push parts of the West into nonattainment based on high levels of uncontrollable background ozone.

Oil and gas trade associations and other business organizations have raised concerns about background ozone problems under EPA's new ozone limits.

"Tightening ozone standards could increase costs to the American public, reduce America's ability to compete internationally, and threaten American jobs," according to American Petroleum Institute's web site. "The recent study by NERA Economic Consulting found that a stricter ozone regulation could reduce US [gross domestic product] by $270 billion/year and $3.4 trillion from 2017 to 2040 and result in 2.9 million fewer jobs or job equivalents/year on average through 2040."

In an Aug. 11 letter to EPA and White House officials, WGA's chairman, Gov. Steve Bullock (D-Mont.), and vice-chairman, Dennis Daugaard (R-SD), said, "We strongly urge EPA to adjust criteria to properly account for events that contribute to background ozone concentrations, which are impossible for states to control."

EPA's October 2015 plan to invoke the Exceptional Events Rule and reduce allowable ground level ozone limits from 75 ppb to 70 ppb is undergoing White House review. The US House approved a bill by 234 to 177 votes in early June, largely along party lines, which Republicans said would give the states more time to implement new federal limits, and Democrats said would gut the Clean Air Act (OGJ Online, June 9, 2016).

The CAA obligates all states to develop state implementation plans (SIP) to attain and maintain the NAAQS, the letter

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

Why US, Canada GHG plans differ

Canada and the US face different greenhouse gas (GHG) emission challenges and are taking different approaches despite their close economic, social, and cultural ties, a recent IHS Markit report said.

The two countries' governments may have chosen similar GHG reduction goals, but their climate policies reflect differences in the nature of their economies and emissions sources, it said. US policies primarily focus on specific businesses, while Canada's concentrate more on putting a price on carbon, the report said.

"How to address climate change has become a defining question of the 21st century and there has been increased policy momentum in both Canada and the United States over the past year," Kevin Birn, director for IHS Energy and head of the IHS Oil Sands Dialogue, said on Aug. 23 as the critical information, analytics, and solutions firm released the report.

"While the two countries maintain similar policy approaches in several areas, the reality is that each country is also starting to develop its own distinct climate policy portfolio based on the specific attributes of its economies and GHG emissions profiles. There is not a one-size-fits-all approach to reducing emissions," Birn said.

Differences in the makeup of the countries' respective power businesses are a primary example of where their approaches differ, said the report, "The State of Canada and US Climate Policy."

It said US electric power generation, particularly coal-fired, is the country's single biggest GHG emissions source, accounting for about 30% of the country's total. Access to abundant and affordable shale gas, which emits half the amount of GHGs vs. coal, and the declining cost of renewables provide the US with a relatively low-cost opportunity to reduce power generation—and thus national—emissions, the report stated.

A different main source

On the other hand, hydroelectric generation's large share—about 80%—in Canada's total power capacity makes it largely zero-emitting already, it said. Industry is the country's single largest emitter, representing 44% of total emissions. It includes oil and gas and refining, which account for about 25% of Canada's total emissions, the report said.

Canadian oil sands, which have been the subject of heightened interest due to their relatively higher GHG intensity compared with some other crude oil types, represent 9% of the country's emissions, it noted. Alberta's government has instituted a cap on emissions, however, limiting future GHG emissions growth from the operations in and around Fort McMurray, it said.

While the national government has said it plans to implement a harmonized pan-Canadian carbon price by yearend, provinces' various pricing regimes could cover up to two thirds of Canada's total emissions in 2017, it suggested. OGJ

noted. SIPs are intended to reduce pollution from sources over which states can exert control, but not natural or international sources that can increase background ozone levels, it said.

"Such events and conditions include wildfire, lightning, biogenic emissions, stratospheric ozone intrusion, and transported ozone from international and interstate sources," the letter said. "These events may be discrete (such as a wildfire or stratospheric intrusion) or may present as a periodic or ongoing condition (such as transported ozone). All result in emissions over which states have no control."

The letter said that Western governors believe the states—and, in turn, EPA—would benefit from a more holistic approach under which states could aggregate multiple ozone-contributing factors to prove a single exceptional event exceedance demonstration.

"Under such an approach, there would be no onerous requirement to differentiate and quantify contributions of various background sources or to utilize multiple CAA provisions to account for various background ozone contributors," the letter said. "The focus would be on showing that these sources, rather than controllable man-made emissions, are the principal contributing factor in a monitored NAAQS exceedance." OGJ

Western Gulf of Mexico lease sale activity continues to dwindle

Matt Zborowski
Staff Writer

Results published by the US Bureau of Ocean Energy Management (BOEM) indicate a new low in industry interest for western Gulf of Mexico lease sales. Just three firms submitted 24 bids on 24 blocks in Lease Sale 248 on Aug. 24,

COMPANIES SUBMITTING TOP 10 SINGLE HIGHEST BIDS

Company	Block	Water depth, m	High bid amount, $
1. ExxonMobil Corp.*	East Breaks 590	800-1,600	1,124,000
2. BHP Billiton Petroleum (Deepwater) Inc.*	Alaminos Canyon 127	800-1,600	1,077,480
3. BHP Billiton Petroleum (Deepwater) Inc.*	East Breaks 870	800-1,600	937,480
4. BHP Billiton Petroleum (Deepwater) Inc.*	East Breaks 871	800-1,600	937,480
5. BHP Billiton Petroleum (Deepwater) Inc.*	East Breaks 915	800-1,600	937,480
6. BHP Billiton Petroleum (Deepwater) Inc.*	East Breaks 786	800-1,600	887,480
7. BHP Billiton Petroleum (Deepwater) Inc.*	East Breaks 830	800-1,600	887,480
8. BHP Billiton Petroleum (Deepwater) Inc.*	Alaminos Canyon 170	800-1,600	887,480
9. BHP Billiton Petroleum (Deepwater) Inc.*	East Breaks 872	800-1,600	827,480
10. BHP Billiton Petroleum (Deepwater) Inc.*	Alaminos Canyon 39	800-1,600	737,480

*Denotes the submitter.
Source: US Bureau of Ocean Energy Management

BOEM reported from the event in New Orleans. Bids totaled $18 million.

As with last year's western gulf sale, Australia's BHP Billiton Petroleum (Deepwater) Inc., a BHP Billiton Ltd. company, was the most active firm, submitting 12 bids totaling just fewer than $10 million. Its highest bid was $1.1 million on Alaminos Canyon Block 127, but most of its bids were in the East Breaks area.

BP PLC subsidiary BP Exploration & Production Inc., the most active firm in the western gulf sale of 2 years ago, accounted for 10 bids in this year's sale totaling $6.3 million. All of its bids were in the Garden Banks area.

The single highest bid came from ExxonMobil Corp., which targeted East Breaks Block 590 at $1.12 million. The sole US firm to participate in the sale, ExxonMobil placed just 2 bids overall, both in the East Breaks area, totaling $1.8 million.

Fourteen bids sought 7-year lease terms while the remaining 10 sought 5-year terms. Fourteen bids targeted blocks in 400-800 m of water while the rest targeted those in 800-1,600 m of water.

Drawing the fewest bids and lowest sum of high bids for a western sale since regional sales began in 1983, Lease Sale 248 offered 4,399 tracts covering 23.8 million acres located 9-250 nautical miles offshore in up to 3,340 m of water.

BOEM Director Abigail Ross Hopper attributed the light activity in the Aug. 24 sale to "today's market conditions and industry's current development strategy." Randall Luthi, president of the National Ocean Industries Association (NOIA), reiterated the results "are indicative of the current market conditions and regulatory environment."

In a separate statement released on Aug. 23, Luthi noted Mexico's possible role in the sale. "With the recent changes in Mexican law, our neighbor to the south is eager to attract US companies into their portion of the Gulf of Mexico," he said. "The continuing onslaught of ever-changing US regulatory policies may tilt companies towards investing more in Mexican waters and thus dampen interest in this sale."

Last year's western gulf Lease Sale 246, the previous low point in activity, ended with 5 firms submitting 33 bids on 33 tracts, totaling $22.7 million in high bids (OGJ Online, Aug. 19, 2015). It offered about 4,000 tracts on 22 million acres.

Held during a month in which the Brent crude oil spot price averaged more than $100/bbl, western gulf Lease Sale 238 in 2014 saw 14 firms place 93 bids on 81 tracts, with a sum of high bids at $110 million (OGJ Online, Aug. 20, 2014). It offered about 4,000 tracts covering 21.6 million acres.

Lease Sale 248 is the 11th gulf sale and the final one for the western planning area under the Obama administration's outer continental shelf oil and gas leasing program for 2012-2017. The first 10 sales offered more than 60 million acres and netted nearly $3 billion. OGJ

BLM issues final EIS analyzing Thompson Divide oil, gas leases

Nick Snow
Washington Editor

The US Bureau of Land Management released a final environmental impact statement analyzing 65 oil and gas leases that were issued in the White River National Forest in Colorado from 1995 to 2012. The agency's preferred alternative in the final EIS would cancel the 25 undeveloped leases, apply new stipulations to the remaining leases that are not currently producing, and make no or only minor adjustments for leases that are producing.

Comments will be accepted for 30 days following the proposed action's Aug. 5 publication in the Federal Register. It respects the US Forest Service's 2015 decision to maintain the White River forest's character while facilitating oil and gas development, BLM Colorado State Director Ruth Welch said on July 29 as the final EIS was released. "We appreciate all the work that the local community has put into this process," she added.

BLM initiated the EIS in 2014 after the US Department

of the Interior's Board of Land Appeals identified deficiencies in the leases, which are entirely on lands managed by the White River National Forest (OGJ Online, Apr. 2, 2014).

The Western Energy Alliance, West Slope Colorado Oil & Gas Association, and Public Lands Advocacy together formally objected in early 2015 to White River Forest Supervisor Scott Fitzwilliams's December 2014 draft decision that would have administratively closed nearly 1.3 million acres to leasing, 61,000 of which were in the still high-potential Four Mile-Thompson Divide area where the first well was drilled in 1947 (OGJ Online, Feb. 12, 2015). Acting Deputy Regional Forester James Bedwell rejected most of their objections a few months later.

Fitzwilliams issued a final record of decision on Dec. 3, 2015, which emphasized conserving the White River Forest's roadless and existing natural character while providing oil and gas development opportunities on lands that have proven to be productive in the past 15-20 years. Emphasizing that Congress would have to make any withdrawal permanent, he said that 1.2 million acres would be administratively closed, while 194,100 acres would remain available for oil and gas leasing with certain stipulations.

BLM said the preferred alternative in its draft EIS is consistent with the one the USFS developed that led up to Fitzwilliams's ROD, and incorporates much of its information and analysis. It expects to issue its own ROD early this fall, the agency indicated. OGJ

BHI: Oil rigs lift overall US rig count

Matt Zborowski
Staff Writer

Entirely comprising oil-directed units, the US drilling rig count increased by 10 during the week ended Aug. 19, according to data from Baker Hughes Inc.

Now at 491 rigs working, the overall count has risen in 10 of the last 12 weeks, adding 87 units during that time. Compared with Dec. 5, 2014, the week prior to the drilling freefall, the count is down 1,429 units.

Largely bolstered by increased oil-directed drilling activity in the Permian basin, last week's overall 17-unit rise in the US was the country's largest since July 24, 2015 (OGJ Online, Aug. 12, 2016). The basin has represented more than two thirds of the total US gain during the recent rally.

Meanwhile, US crude oil production during the week ended Aug. 12 jumped 152,000 b/d to 8.597 million b/d, down 751,000 b/d year-over-year, according to data from the US Energy Information Administration. The Lower 48 accounted for 100,000 b/d while Alaska contributed the remaining 52,000 b/d.

EIA also this week forecast a 3,000-b/d increase in output from the Permian during September after several months of declines (OGJ Online, Aug. 15, 2016). Overall US shale oil output, however, is expected to fall 85,000 b/d during the month.

The projected rise in the Permian comes as firms have been snatching up acreage and adding rigs in the Midland and Delaware basins (OGJ Online, Aug. 5, 2016). Over the past 3 months, Callon Petroleum Co., Pioneer Natural Resources Co., QEP Resources Inc., Laredo Petroleum Inc., SM Energy Co. Concho Resources Inc., and Parsley Energy Inc. have all moved to expand their positions in the Midland basin alone.

Among those planning to maintain higher rig counts during the second half in the Midland basin are Pioneer, QEP, Concho, and Apache Corp. Doing the same in the Delaware basin are Concho, Devon Energy Corp., WPX Energy Inc., and Anadarko Petroleum Corp.

West Texas horizontal wells

With another double-digit increase this week, US oil-directed rigs have added 90 units since May 27 to reach 406, which is down 1,203 units since their peak in BHI data on Oct. 10, 2014.

All but 1 of the 10 oil-directed units began operations on land, bringing that tally to 470. Rigs engaged in horizontal drilling counted 7 more units to 382, up 68 units since May 27. Directional drilling rigs edged up 1 unit to 45. One unit started work offshore Louisiana, lifting the overall US count to 18.

Texas paced the major oil- and gas-producing states, gaining 8 units this week to 238, up 64 units since May 27. As with last week's 13-unit jump, all but 1 of the units to begin work this week were in the Permian. At 196 rigs working, the basin is up 59 units since May 27.

The last time the Permian recorded an increase as big as last week's was Mar. 7, 2014. The basin peaked at 568 rigs working during October-November 2014 before plunging to a bottom of 134 in this past April-May.

A 1-unit increase in the Barnett to 5 was offset by a 1-unit decline in the Granite Wash to 9.

Pennsylvania posted the only other double-digit increase, rising 2 units to 17. The Marcellus jumped 3 units to 24. Oklahoma, Louisiana, and West Virginia each edged up 1 unit to 62, 43, and 8, respectively. The Cana Woodford rose 3 units to 32, while the Mississippian dropped a unit to 3.

New Mexico dropped a unit to 30, ending its recent warm streak at 6 weeks. Down 2 units to 27, North Dakota led the way in losses, mirroring the same tallies of the Williston.

Canada recorded its first rig-count decline in 11 weeks, relinquishing 5 units during the week to settle at 121, still up 85 compared with the week ended May 6. Oil-directed rigs, however, remained flat at 65. Gas-directed rigs lost 4 to 56 while the country's only unclassified rig went offline. OGJ

WoodMac: Tight gas output triples in Argentina's Neuquen basin

A large shift to tight gas production in Argentina's Neuquen basin is being driven by pricing incentives and lower costs vs. shale gas wells. However, at current costs, only the best tight gas wells break even at the incentivized $7.50/MMbtu gas price, according to analysis from research and consultancy firm Wood Mackenzie Ltd.

Tight gas production from the basin almost tripled over a 2-year period to 565 MMcfd during the first quarter, representing one quarter of the basin's overall output, WoodMac notes, but well performance has been variable across all formations. Of the six tight gas formations studied, the median well in the Neuquen basin has a 90-day initial production (IP) rate of 2 MMcfd, with top quartile wells performing about five times higher than the bottom quartile.

Horizontal wells targeting the Mulichinco formation show the highest estimated ultimate recovery (EUR) at more than 5 bcf. The best wells in Punta Rosada are expected to achieve similar results with a vertical construction. Representative wells in the Lajas formation, meanwhile, are expected to recover a third of that volume.

"The large variability indicates that tight gas in Neuquen will continue to require a statistical development approach," said Horacio Cuenca, WoodMac director of Latin America upstream research. "This means that large, multiwell development programs will be used to spread the productivity risk among a large number of wells. This approach is more similar to shale than to conventional developments."

High costs, high output

WoodMac notes that longer laterals, more fracture stages, and increased water and propant usage are all factors that have been shown to enhance production but also increase well cost. Different sections of the same play also require unique considerations given variance in rock quality and thickness, pressure, and temperature.

"What is critically important is the relationship between the cost of these wells and the productivity they can achieve," said Cuenca. "Our analysis shows that the tight gas wells with the highest costs also have the highest EURs and IP rates."

Using type-well EURs and WoodMac's current well-cost estimates, Mulichinco horizontal wells and Punta Rosada vertical wells, the most expensive in the basin on average, are profitable at or below the government's $7.50/MMbtu incentivized gas price. These costs reflect a 15% reduction versus 2015 levels driven by the strong peso devaluation at the beginning of 2016. However, considerable additional reductions are still needed for type wells in these and other formations to be economic at the $5.20/MMbtu average gas price without incentives.

"Beyond discovering and focusing on the best producing sweet spots in each formation, enhancing EURs through more expensive wells—i.e. horizontal sections or targeting deep, thick formations with a high number of frac stages—seems a more plausible path for improving tight gas well economics in the short term rather than the drastic cost reductions needed with current EURs," said Cuenca.

Capital efficiencies on IP rates in the Neuquen basin ranged $9,340-20,000/boe/d while EUR capital efficiencies ranged $13.70-29/boe. In comparison, WoodMac's recently estimated capital efficiencies for unconventional wells within the Karnes Trough and Edwards Condensate subplays of the south Texas Eagle Ford shale showed capital efficiencies on IP rates ranging $8,000-15,000/boe/d and EUR capital efficiencies ranging $16-31/boe. OGJ

Recoverable resources upgraded for SNE oil field offshore Senegal

Rick Wilkinson
OGJ Correspondent

FAR Ltd., Perth, has released the results of an independent report that shows a 14% increase from calculations made in April in the contingent resources of SNE oil field offshore Senegal. The report, completed by Perth consultancy RISC Operations Pty. Ltd., has upgraded the 2C contingent recoverable resources for SNE field to 641 million bbl.

The 1C resources, meanwhile, have increased to 348 million bbl, up 26% on the April figure, while 3C resources have risen 5% to 1,128 million bbl.

The upgrade includes results from the BEL-1 and SNE-4 wells (OGJ Online, May 19, 2016; Apr. 11, 2016).

FAR says the material increase in SNE's resources is a result of improved understanding of SNE field parameters as a result of the appraisal drilling and associated wireline logging, flow testing, core data, and high-quality reprocessed 3D seismic data.

The SNE-1 discovery was made in November 2014. The four appraisal wells since then cover a distance of 9 km in a north-south direction and 5 km across. All the wells confirmed a gross oil column in excess of 100 m thickness containing 32° gravity oil.

The structure has an estimated aerial extent of more than

350 sq km and provides the basis for declaring it a significant oil field.

Test flow rates from the SNE-2 and SNE-3 wells indicate the potential for commercial production rates. Further drilling, testing, and other studies are continuing to define a development project.

ConocoPhillips deal

Relatedly, SNE joint venture participant ConocoPhillips has confirmed that FAR has a right of preemption over the proposed sale of ConocoPhillips interests in Senegal to Perth-based Woodside Petroleum Ltd., Perth. Woodside agreed a binding purchase and sale agreement with ConocoPhillips last month to acquire 100% of ConocoPhillips's interests in Senegal for $350 million plus a completion adjustment of $80 million (OGJ Online, July 14, 2016).

The purchase covers 35% of three production-sharing contract exploration blocks offshore Senegal—Rufisque Offshore, Sangomar Offshore, and Sangomar Deep Offshore. The stake includes 35% interest in the SNE discovery as well as the nearby FAN oil discovery.

Woodside also took the option to operate the future development of the resource from current operator Cairn Energy.

After taking legal advice, FAR now says that ConocoPhillips failed to comply with the terms of the joint operating agreement in relation to the proposed sale of its interests in Senegal. As a consequence FAR believes that the preemption period has not yet commenced.

FAR has stopped short of saying that it will preempt the sale to Woodside, but has said it will participate in prompt efforts to reach an amicable solution to the matter.

At this stage Cairn has 40% of the permits, ConocoPhillips 35%, FAR 15%, and Senegal national company Petrosen 10%. OGJ

S-Oil lets contract for Onsan refinery HS-RFCC complex

Robert Brelsford
Downstream Technology Editor

S-Oil Corp., Seoul, has let a contract to General Atomics Electromagnetic Systems (GA-EMS), San Diego, to provide electrostatic separation technology and equipment to be installed at a residue upgrading complex (RUC) now under construction at S-Oil's 669,000-b/d Onsan refinery complex in Ulsan, South Korea (OGJ Online, July 16, 2015).

As part of the contract, GA-EMS will supply its proprietary 16-module Gulftronic electrostatic separator system for the RUC's new high-severity residue fluid catalytic cracker (HS-RFCC), the service provider said.

Selected as a solution to challenges S-Oil previously experienced with mechanical filtration systems failure to achieve complete solids removal from slurry-decant oil, Gulftronic separators use an electrostatic process to polarize, capture, and remove all solids from the process stream to result in higher-value clarified products, less downstream contamination, and reduced maintenance requirements, according to GA-EMS.

The company disclosed neither a value of the contract nor a timeframe for its delivery of the Gulftronic system to the refinery.

Ongoing modernization

This latest contract follows a series of contract awards by S-Oil for the 76,000-b/d HS-RFCC, one of many projects under the South Korean operator's overall program to modernize and expand its integrated refining and petrochemical operations at Ulsan (OGJ Online, July 16, 2016).

The program, which includes construction of the RUC and olefin downstream complex (ODC), is designed to improve profitability as well as secure long-term competitiveness of the Onsan complex by enabling it to increase conversion of low-cost heavier hydrocarbons into high-value olefins and fuels.

Scheduled for startup during first-half 2018, the RUC will add a 63,000-b/d residue hydrodesulfurization (Hyvahl) unit as well as the 76,000-b/d HS-FCC to produce 21,000 b/d of gasoline, 14,000 b/d of alkylate, and 370,000 tonnes/year of methyl tertiary butyl ether.

The ODC project, also due for commissioning during first-half 2018, will add a 405,000-tpy polypropylene (PP) plant and 300,000-tpy propylene oxide (PO) plant based on PP and PO technologies licensed by Sumitomo Chemical Co. Ltd., Tokyo.

The South Korean refiner also continues to progress on its separate S-Oil Upgrading Program of Existing Refinery (SUPER) project, which entails a three-phased revamp of processing units at the integrated complex.

Completed during 2015, SUPER's first phase included upgrades to an existing hydrocracking plant that increased production volumes of diesel, kerosine, and lube base oils, as well as completion of the first-stage revamp of Onsan's aromatic complex to boost output of paraxylene.

SUPER's second phase, which will include revamps of

S-Oil Corp.'s Onsan refinery complex in Ulsan, South Korea, will be undergoing upgrades. Photo from S-Oil.

existing lube base oil, RFCC, and ultralow-sulfur diesel production complexes, is scheduled to be completed by yearend.

The company plans to complete Phase 3 of SUPER, which is to include a second-stage revamp of the aromatic complex, sometime in 2017. OGJ

BHP finds gas but no oil in LeClerc well offshore Trinidad and Tobago

Curtis Williams
OGJ Correspondent

BHP Billiton has plugged its LeClerc 1 ST01 deepwater well, drilled 135 miles offshore eastern Trinidad and Tobago, after it encountered natural gas in multiple zones but failed to find oil. The well reached a total depth of 22,876 ft.

Steve Pastor, BHP Billiton president operations, petroleum, said, "While the focus of our program is a commercial oil discovery, we are encouraged by the results of the first well in our Trinidad and Tobago exploration campaign, LeClerc."

This is the first well to be drilled in BHP's much-anticipated deepwater campaign offshore Trinidad and Tobago in what is virgin territory since no exploration has ever taken place in the deep water off the Caribbean twin-island nation.

On May 28, the Australian outfit begun to drill LeClerc with a target depth of 20,000 ft in which the operator was looking for three different sands. Two gas-bearing and one with black oil. It was expected that the black oil would be below the gas and condensate and would have been seen at about 17,000 ft.

However OGJ learned that at about 15,000 ft, the first gas sand was found and the second at about 16,000 ft. No oil sands were found, and when the drilling reached 18,000 ft, a request was made of the island's Ministry of Energy and Energy Resources to drill beyond the original target depth.

The request for deeper drilling was in fact granted by the ministry, however when the drilling continued BHP and its partner Royal Dutch Shell PLC encountered pressure control problems, a decision was made to do a sidetrack of the well.

The well was sidetracked but did not access any nearby productive zones.

A closer look

At this year's Trinidad & Tobago Energy Conference, David Rainey, BHP president, exploration, showed a cross-section of the seismic survey of LeClerc, saying that the prospect was 20 km long and 5 km wide.

"We call this prospect LeClerc. With our new seismic we are now able to dissect it in great detail. This is a 3D look at one of several potential target horizons. That red patch at the top of the structure likely indicates the presence of hydrocarbons. It doesn't say anything about the type of hydrocarbon, or the thickness or quality of the reservoir, but it is certainly an encouraging observation," Rainey said.

Rainey added, "We have heard from others in the industry that they believe this is a gas play, it may be; but we do have some encouraging evidence to suggest otherwise. This is a surface core that was taken not very far from this structure. I am well past my use-by date as a petroleum systems person, but even I can tell that that is not gas—that is black oil."

The next well in the campaign will be drilled to the northeast of the islands in a completely different trend. BHP will partner with BP PLC in that well. They are expected to go after the Angostura trend, which BHP has already successfully explored off the northeast of Trinidad and Tobago, but on the continental shelf.

The companies will be hoping that the trend extends off the shelf and into the deep water.

BHP said its exploration program will test several additional plays over the next 3 years, focusing on large, tier-1 oil potential in the Gulf of Mexico, Trinidad and Tobago, and potentially Western Australia. OGJ

THE EDITOR'S PERSPECTIVE

Bold enthusiasm usually good—but not in government

by **Bob Tippee**, Editor

Governance does not count among the many human activities improved by bold enthusiasm. Governance works best in measured doses, guardedly administered.

Testimony to this observation abounds, recently in the unraveling of two enthusiastically implemented programs the US would be better off without.

One is the Affordable Care Act—Obamacare.

Because federal manipulations haven't worked as planned, insurance companies are hemorrhaging money and abandoning the effort.

Latest to go is Aetna, which will withdraw from program exchanges in 11 states, citing losses.

Supporters of the system produced a letter purportedly showing Aetna officials threatened withdrawal to win antitrust clearance of a merger.

In fact, Aetna's letter responded to a Justice Department inquiry about how rejection of the merger might affect its Obamacare participation. It wasn't a threat.

Like all initiatives predicated on the ability of politicians to outwit markets, Obamacare—infamously passed by lawmakers trumpeting the need to pass the legislation before they knew what it contained—is failing….

Quite like the other program the US should discard, the Renewable Fuel Standard.

Requiring more grain ethanol than the market can use and more cellulosic ethanol than can be made, the RFS has become a cost trap for refiners. That's reason enough to kill it.

Beyond that, assumptions on which the program is based no longer apply.

Lawmakers thought a country destined forever to struggle with gasoline shortage needed a supply extender. They didn't foresee the surplus now depressing gasoline prices and likely to become a standard feature of the products market unless cataclysm strikes crude supply.

Lawmakers also assumed renewable substitutes for gasoline and diesel would help the environment. Experience suggests otherwise.

The Environmental Protection Agency is supposed to assess environmental effects of the RFS every 3 years and report to Congress. According to an Aug. 18 Inspector General report, it has done so once—in 2011.

Obamacare and the RFS are errors their sponsors wish not to confront. So they've assumed lives of their own. And they both need killing.

(From the subscription area of www.ogj.com, posted Aug. 19, 2016; author's e-mail: bobt@ogjonline.com)

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IMPORTS OF CRUDE AND PRODUCTS

	Districts 1-4		District 5		Total US		
	8-12 2016	8-5 2016	8-12 2016	8-5 2016	8-12 2016	8-5 2016	8-14* 2015
	1,000 b/d						
Total motor gasoline	550	907	60	23	610	930	868
Mo. gas. blending comp.	405	817	60	22	465	839	846
Distillate	67	171	25	14	92	185	200
Residual	110	209	58	7	168	216	217
Jet fuel-kerosine	44	46	138	32	182	78	144
Propane-propylene	146	67	18	16	164	83	90
Other	885	617	71	95	955	711	1,095
Total products	**1,802**	**2,017**	**370**	**187**	**2,171**	**2,203**	**2,614**
Total crude	**7,296**	**6,891**	**898**	**1,514**	**8,194**	**8,405**	**8,038**
Total imports	**9,098**	**8,908**	**1,268**	**1,701**	**10,366**	**10,609**	**10,652**

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

OGJ CRACK SPREAD

	8-19-16*	8-21-15*	Change	Change, %
	$/bbl			
SPOT PRICES				
Product value	60.20	63.30	(3.10)	(4.90)
Brent crude	48.60	46.00	2.60	5.66
Crack spread	11.59	17.30	(5.71)	(32.99)
FUTURES MARKET PRICES				
One month				
Product value	61.60	65.52	(3.92)	(5.98)
Light sweet crude	47.11	41.38	5.73	13.85
Crack spread	14.49	24.14	(9.65)	(39.99)
Six month				
Product value	61.41	60.63	0.78	1.29
Light sweet crude	50.25	45.09	5.16	11.44
Crack spread	11.16	15.53	(4.38)	(28.18)

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

EXPORTS OF CRUDE AND PRODUCTS

	Total US		
	8-12-16	8-5-16	*8-14-15
	1,000 b/d		
Finished motor gasoline	454	454	444
Jet fuel-kerosine	156	156	149
Distillate	1,266	1,266	1,293
Residual	362	362	398
Propane/propylene	668	668	547
Other oils	995	995	1,053
Total products	**3,901**	**3,901**	**3,884**
Total crude	**677**	**677**	**576**
Total exports	**4,578**	**4,578**	**4,460**
NET IMPORTS			
Total	5,786	6,029	6,192
Products	(1,730)	(1,698)	(1,270)
Crude	7,516	7,727	7,462

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

CRUDE AND PRODUCT STOCKS

District	Crude oil	Motor gasoline		Jet fuel, kerosine	Fuel oils		Propane-propylene
		Total	Blending comp.		Distillate	Residual	
	1,000 bbl						
PADD 1	17,063	70,125	64,211	8,589	61,919	10,283	6,572
PADD 2	153,005	48,618	42,481	6,648	29,641	1,106	28,846
PADD 3	272,124	76,595	67,134	16,009	44,527	23,170	54,959
PADD 4	26,384	7,105	5,233	687	3,342	212	[1] 3,367
PADD 5	52,517	30,215	27,854	9,715	13,707	4,277	—
Aug. 12, 2016	**521,093**	**232,658**	**206,913**	**41,648**	**153,136**	**39,048**	**93,744**
Aug. 5, 2016	**523,601**	**235,383**	**211,098**	**41,612**	**151,196**	**38,498**	**91,903**
Aug. 14, 2015[2]	**456,212**	**212,775**	**187,702**	**42,322**	**148,400**	**39,155**	**93,866**

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

REFINERY REPORT—AUG. 12, 2016

District	REFINERY OPERATIONS		REFINERY OUTPUT				
	Gross inputs	Crude oil inputs	Total motor gasoline	Jet fuel, kerosine	Fuel oils		Propane-propylene
					Distillate	Residual	
	1,000 b/d				1,000 b/d		
PADD 1	1,076	1,037	3,361	89	348	43	157
PADD 2	3,734	3,734	2,686	281	987	32	392
PADD 3	9,014	8,956	2,301	922	2,841	198	992
PADD 4	589	588	341	41	173	13	[1] 181
PADD 5	2,714	2,550	1,704	516	590	118	—
Aug. 12, 2016	**17,127**	**16,865**	**10,393**	**1,849**	**4,939**	**404**	**1,722**
Aug. 5, 2016	**16,883**	**16,598**	**10,261**	**1,842**	**4,739**	**454**	**1,730**
Aug. 14, 2015[2]	**17,084**	**16,775**	**10,062**	**1,639**	**5,072**	**409**	**1,620**
	18,320	**Operable capacity**	**93.5**	**utilization rate**			

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

STATISTICS

OGJ GASOLINE PRICES

	Price ex tax 8-17-16	Pump price* 8-17-16	Pump price 8-19-15
	¢/gal		
(Approx. prices for self-service unleaded gasoline)			
Atlanta	149.6	199.0	244.7
Baltimore	156.0	207.0	247.7
Boston	153.1	198.0	250.7
Buffalo	147.0	208.0	261.7
Miami	142.1	197.0	254.7
Newark	162.1	195.0	241.7
New York	170.0	231.0	273.7
Norfolk	187.3	228.0	228.2
Philadelphia	137.2	206.0	269.7
Pittsburgh	155.2	224.0	266.7
Wash., DC	179.1	221.0	256.7
PAD I avg	158.1	210.4	254.2
Chicago	211.5	260.1	334.3
Cleveland	162.2	208.6	258.2
Des Moines	158.2	208.6	252.2
Detroit	158.6	207.6	257.8
Indianapolis	161.8	210.1	260.7
Kansas City	153.0	188.7	246.0
Louisville	160.7	205.1	270.9
Memphis	167.3	207.1	257.3
Milwaukee	146.8	198.1	275.0
Minn.-St. Paul	154.1	201.1	263.7
Oklahoma City	145.7	181.1	224.6
Omaha	151.5	197.6	243.9
St. Louis	155.4	191.1	262.3
Tulsa	154.6	190.0	223.4
Wichita	153.6	196.1	251.6
PAD II avg	159.6	203.4	258.8
Albuquerque	153.6	190.9	243.6
Birmingham	165.6	204.9	235.5
Dallas-Fort Worth	160.5	198.9	225.7
Houston	161.5	199.9	226.7
Little Rock	160.7	200.9	236.6
New Orleans	161.5	199.9	237.6
San Antonio	160.5	198.9	238.6
PAD III avg	160.6	199.2	234.9
Cheyenne	175.0	217.4	267.2
Denver	187.5	227.9	281.5
Salt Lake City	181.5	229.4	286.4
PAD IV avg	181.3	224.9	278.4
Los Angeles	245.3	304.3	381.6
Phoenix	181.9	219.3	274.6
Portland	178.8	228.3	302.4
San Diego	219.3	278.3	374.7
San Francisco	225.3	284.3	344.4
Seattle	198.4	261.3	313.2
PAD V avg	208.1	262.6	331.8
Week's avg.	**167.9**	**214.5**	**265.4**
July avg.	**178.7**	**225.4**	**278.7**
June avg.	**188.3**	**234.9**	**276.9**
2016 to date	**161.1**	**207.8**	—
2015 to date	**203.8**	**251.2**	—

*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

	8-19-16	8-21-15
Alabama	3	2
Alaska	4	13
Arkansas	—	4
California	5	13
Land	5	13
Offshore	—	—
Colorado	21	37
Florida	—	—
Illinois	2	2
Indiana	—	—
Kansas	—	13
Kentucky	1	2
Louisiana	43	77
N. Land	15	28
S. Inland waters	3	6
S. Land	8	12
Offshore	17	31
Maryland	—	—
Michigan	—	—
Mississippi	3	3
Montana	—	1
Nebraska	—	3
New Mexico	30	52
New York	—	—
North Dakota	27	72
Ohio	14	19
Oklahoma	62	106
Pennsylvania	17	36
South Dakota	—	—
Texas	238	383
Offshore	1	—
Inland waters	—	—
Dist. 1	19	47
Dist. 2	13	47
Dist. 3	7	19
Dist. 4	10	15
Dist. 5	2	5
Dist. 6	8	22
Dist. 7B	4	4
Dist. 7C	24	33
Dist. 8	132	153
Dist. 8A	9	16
Dist. 9	2	5
Dist. 10	7	17
Utah	3	4
West Virginia	8	17
Wyoming	8	25
Others ID-1, NV-1	2	1
Total US	**491**	**885**
Total Canada	**121**	**208**
Grand total	**612**	**1,093**
US oil rigs	406	674
US gas rigs	83	211
Total US offshore	18	32
Total US cum. avg. YTD	**484**	**1,089**

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]8-19-16	[2]8-21-15
	1,000 b/d	
(Crude oil and lease condensate)		
Alabama	18	26
Alaska	475	416
California	550	569
Colorado	306	341
Florida	6	6
Illinois	21	26
Kansas	96	121
Louisiana	1,294	1,472
Michigan	16	18
Mississippi	52	67
Montana	60	76
New Mexico	361	420
North Dakota	1,066	1,184
Ohio	64	76
Oklahoma	257	421
Pennsylvania	16	19
Texas	3,559	3,750
Utah	81	99
West Virginia	21	20
Wyoming	189	236
Other states	51	46
Total	**8,559**	**9,409**

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

US CRUDE PRICES

	8-19-16 $/bbl*
Alaska-North Slope 27°	30.62
Light Louisiana Sweet	43.89
California-Midway Sunset 13°	39.50
California Buena Vista Hills 26°	49.48
Wyoming Sweet	44.77
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	37.25

*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

OPEC reference basket	Wkly. avg.	8-19-16	$/bbl 46.82
		— Mo. avg., $/bbl — June-16	July-16
OPEC reference basket		45.84	42.68
Arab light-Saudi Arabia		46.28	43.14
Basrah light-Iraq		44.63	41.37
Bonny light 37°-Nigeria		48.48	45.30
Es Sider-Libya		47.28	44.00
Girassol-Angola		48.30	45.09
Iran heavy-Iran		44.68	41.59
Kuwait export-Kuwait		44.50	41.37
Marine-Qatar		46.37	43.53
Merey-Venezuela		38.22	36.71
Minas 34°-Indonesia		51.56	41.84
Murban-UAE		49.28	46.54
Oriente-Ecuador		44.03	40.72
Saharan blend 44°-Algeria		48.98	45.30
Other crudes			
Fateh 32°-Dubai		46.25	42.64
Isthmus 33°-Mexico		47.51	45.07
Brent 38°-UK		48.28	45.00
Urals-Russia		46.60	43.76
Differentials			
WTI/Brent		0.46	(0.10)
Brent/Dubai		2.03	2.36

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

REFINED PRODUCT PRICES

	8-12-16 ¢/gal		8-12-16 ¢/gal
Spot market product prices			
Motor gasoline (Conventional-regular)		No. 2 Distillate Low sulfur diesel fuel	
New York Harbor	135.80	New York Harbor	139.00
Gulf Coast	137.30	Gulf Coast	137.40
		Los Angeles	136.80
Motor gasoline (RBOB-regular)		Kerosine jet fuel	
New York Harbor	130.80	Gulf Coast	128.30
No. 2 heating oil		Propane	
New York Harbor	129.80	Mont Belvieu	44.60

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

IHS PETRODATA RIG COUNT

AUG. 19, 2016

	Total supply of rigs	Marketed supply of rigs	Marketed contracted	Marketed utilization rate (%)
US Gulf of Mexico	104	52	39	75.0
South America	52	48	40	83.3
Northwest Europe	108	86	65	75.6
West Africa	70	52	29	55.8
Middle East	168	157	122	77.7
Southeast Asia	96	80	41	51.3
Worldwide	831	684	491	71.8

Source: IHS Petrodata
Data available in PennEnergy Research Center

US NATURAL GAS STORAGE[1]

	8-12-16	8-5-16	8-12-15	Change, %
	bcf			
East	763	746	697	9.5
Midwest	861	845	732	17.6
Mountain	217	215	178	21.9
Pacific	313	314	345	(9.3)
South Central	1,185	1,197	1,060	11.8
Salt	305	313	287	6.3
Nonsalt	881	884	772	14.1
Total US	**3,339**	**3,317**	**3,012**	**10.9**
	May-16	**May-15**	**Change, %**	
Total US[2]	**2,976**	**2,296**	**29.6**	

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

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