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REGIONAL REPORT: GULF OF MEXICO

Even as oil teeters around \$50/bbl,
Gulf of Mexico is on brink
of a production boom

REGIONAL REPORT

GULF OF MEXICO

Future deepwater GOM projects are less vulnerable to low oil prices. Even as the price of oil teeters around \$50, the Gulf of Mexico is poised on the brink of a production boom. Repercussions of the price collapse in this offshore market depend less on how low prices go, than how long they stay there.

■ MIKE SLATON, Contributing Editor

Much of the current crude oil pricing storm ends at the water's edge—at least in the short term. The Gulf of Mexico (GOM) market is relatively sheltered from price volatility in fundamental ways, from the reservoirs to project size, and operator staying power.

But with a drop from \$107.95/bbl on June 20, 2014, to an early-March 2015 price of \$49.59, everybody's boat is taking on water. Cost-cutting measures in the GOM bloomed overnight, and pressure on service companies is expected to grow, the longer oil prices remain depressed. Some current projects may see delays, and the viability of future projects will be put into question. The recent Central GOM lease sale, where high bids were down 37% from last year's sale, scatters a few dark clouds on the horizon.

The good news is that the GOM is not the Permian basin, or Eagle Ford, Bakken and Marcellus shales. Conventional wis-

dom says that the long-term outlook for deepwater projects is a bulwark against immediate catastrophe. However, while short-term crude price volatility may have minimal impact on big offshore projects, there is no immunity from this marketplace.

MARKET PERSPECTIVES

While U.S. upstream activity has been dominated increasingly by onshore unconventional oil and gas development over the last several years, the GOM continues to be one of the most attractive places to invest. Ernst & Young LLP (EY) points to a raft of positive attributes that include relatively stable and attractive fiscal terms, high proven resources, extensive infrastructure and comparatively high exploration success rates.

Despite the sharp decline in global oil prices, 2014 was a good year for the GOM upstream segment. Crude oil production was up more than 10% over 2013, and exploration activ-

Hess' Tubular Bells field, with spar and supply boats, left. The field is a JV with Chevron. Photo courtesy of Hess Corporation. LLOG Exploration's *Delta House* floating production system, center, has a peak capacity of 100,000 bopd. Photo courtesy of LLOG. Transocean's *Discoverer Clear Leader*, right, is an 835-ft ultra-deepwater drilling rig operating for Chevron in the Gulf of Mexico. Photo credit U.S. Coast Guard via Wikimedia Commons.



ity was relatively robust in terms of the number of exploratory wells completed, and the number of discoveries made during the same period.

Nevertheless, lower oil prices will fuel reductions in 2015, said EY, and cutbacks in the GOM will be more or less in line with those onshore. While the larger projects that are close to completion will continue as planned, there will likely be some slowing in pre-final investment decisions, in an attempt to drive expected project costs down.

With more focus on cost control and capital discipline, collaboration or alliances may increase, said EY—especially among the large, capital-intensive projects that characterize the GOM. Collaboration can help companies conserve capital, control costs and maximize production.

As the year goes on, EY expects a pickup in U.S. upstream transaction activity. While the consensus is that discounted and distressed onshore assets will be most attractive and widely available, some offshore assets could be undervalued and represent good targets, as well.

As a high-cost environment, the deepwater GOM is vulnerable to changes in spending in 2015, as cash flow is significantly reduced, said Gaffney, Cline & Associates (GCA). But onshore shale spending is a better short-term target for capital deferral. Operating flexibility allows any adjustments made there to be reversed in equally quick order—not the case in the deepwater GOM, where tomorrow's expected price is the key driver, and where deferral now may mean missing out on gains later.

For the medium term, there was sufficient incentive at mid-December 2014 prices for ongoing activity without cost reduction initiatives, believes GCA. Longer-term activity will still be affected by where future oil prices are settling, and by the added cost of inflation.

A key factor in reprioritization is the very different mix of companies in onshore unconventional basins and deep water. The onshore blend ranges from small independents to majors, with independents driven by financing needs. In contrast, the deepwater GOM is the domain of large independents and majors, and their issue is capital allocation. Companies with both asset types in their portfolio will be more likely to defer onshore unconventional projects.

As a result, 2015 is likely to be driven initially by a combination of caution and capital realities, said GCA. Fundamental economics, and the flexibility of U.S. unconventional development relative to offshore operations, suggest that shale will be the focus of cost reduction, while GOM activity is more influenced by medium-to-long-term oil prices. Changes in activity levels are expected to lag behind unconventional shale and tight oil plays.

THE PRODUCTION WAVE

After falling every year since 2003, GOM production is once again increasing. According to the Energy Information Administration (EIA), it will grow from about 1.4 MMbopd in 2014 to 1.52 MMbopd in 2015 and 1.61 MMbopd in 2016—about 16% and 17% of total U.S. oil output.

The long timelines associated with GOM projects mean that low oil prices will have minimal direct impact on GOM crude production through 2016, says EIA. Still, low oil prices add uncertainty to the timelines of deepwater GOM projects, with the projects in early development stages at greatest risk of delay.

Collaborative projects provide a way to reduce this risk and improve cost-efficiency, shorten time to first production, and spread out development costs. One example is the recently announced Chevron, BP and ConocoPhillips effort to explore

TABLE 1. ANTICIPATED DEEPWATER GOM START-UPS, 2015-2016.

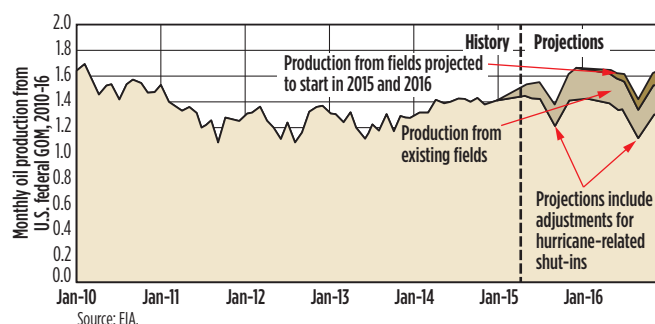
Location	Project	Operator
2015		
Mississippi Canyon	Big Bend	Noble
Mississippi Canyon	Troubadour	Noble
Alaminos Canyon	Silvertip	Shell
Keathley Canyon	Lucius	Anadarko
Walker Ridge	Big Foot	Chevron
Green Canyon	Motormouth	Talos
Keathley Canyon	Hadrian South*	Exxon Mobil
2016		
Mississippi Canyon	Gunflint	Noble
Mississippi Canyon	Dantzler	Noble
Mississippi Canyon	Son of Bluto 2	LLOG
Mississippi Canyon	Malamard	LLOG
Green Canyon	Tahiti 2	Chevron
Walker Ridge	Stones	Shell
Keathley Canyon	Julia**	Exxon Mobil

* Went onstream in March 2015.

** Targeted to go onstream in late 2016 or early 2017.

Sources: EIA, Exxon Mobil and Shell.

Fig. 1. New projects coming online in 2014-2015 are projected to add 265,000 bopd to GOM production.



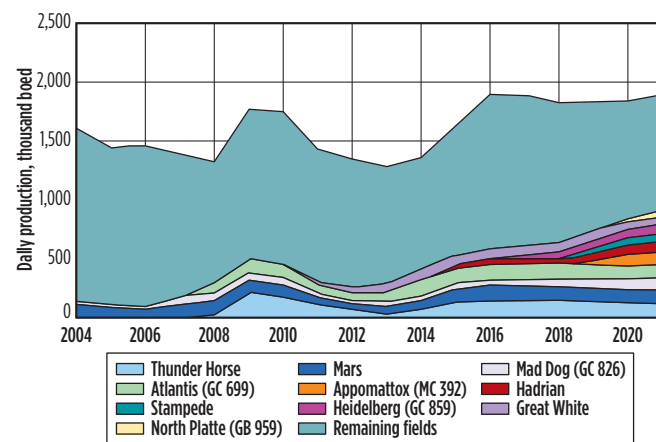
and appraise 24 jointly held offshore leases in the northwestern portion of Keathley Canyon.

Production growth will come from new projects, and the redevelopment and expansion of older producing fields. EIA points to five deepwater projects started in the last quarter of 2014: the Cardamom Deep and Cardona projects operated by Stone Energy; the Chevron-operated Jack/St. Malo fields; Murphy Oil's Dalmatian; and Tubular Bells, operated by Hess.

The redevelopment of Mars (Mars B) and Na Kika (Na Kika Phase 3) also took place at the end of 2014. In addition, Cardamom Deep, Jack/St. Malo and Tubular Bells started up at the end of 2014.

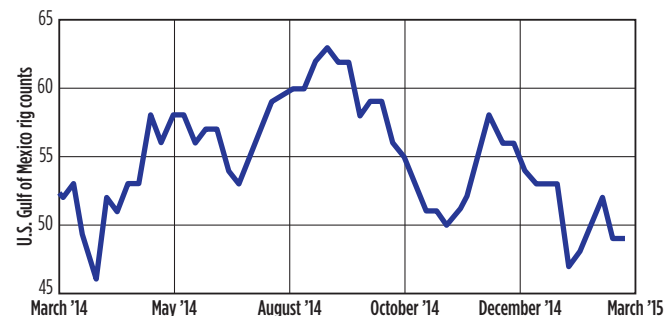
Fourteen fields are expected to start up in the next two years—seven in 2015 and up to seven in 2016, **Table 1**. More than half of the projects will be subsea tie-backs from smaller fields to existing production platforms on larger fields. Combined with continuing production from developments brought

Fig. 2. With aging fields and limited new opportunities, Gulf crude output is expected to plateau after 2016.



Source: Wood Mackenzie

Fig. 3. Offshore, the rig count has been resistant to the effects of low oil prices.



online in late 2014, the new projects are projected to add 265,000 bopd by the end of 2015, according to EIA, **Fig. 1**.

The production increase in 2014 begins a period of significant GOM growth, said consultants WoodMacKenzie (WM). They point to new developments at Delta House, Lucius and Big Foot, and the expansion of older fields, such as Thunder Horse and Mars. These five fields will account for 26% of output in 2016, and production is expected to grow 18% annually over the next two years to a peak of 1.9 MMbopd.

At that point, believes WM, production will plateau for the rest of the decade, due to depletion and the limited number of new fields. By 2021, the 10 largest producing fields will be Thunder Horse, Atlantis, Stampede North Platte, Mars, Appomattox, Heidelberg, Mad Dog, Hadrian and Great White, **Fig. 2**.

At that time, some of the largest fields, such as Mars and Mad Dog, will have been producing for nearly 20 years. It will take almost 55 discoveries to offset their production contribution declines, based on the average deepwater GOM discovery size of 77 MMboe. That might happen, said WM, if recovery can be improved to take advantage of the large resource volumes found in emerging plays. Only eight developments will come online from 2017 through to 2020, compared to 15 developments between 2014 and 2016.

A LOOK AT THE NUMBERS

So far, the GOM **rig count** has held fairly steady in the face of dropping oil prices, **Fig. 3**. A Louisiana Department of Nat-

ural Resources breakout of Baker Hughes figures for March 6 shows 49 rigs running in the GOM—48 in Louisiana and one in Texas.

On Jan. 2, there were 56 total rigs counted. On March 7, 2014, the tally showed 52 rigs. In context, the GOM rig count hit a low of 12 on July 30, 2010, after the Macondo accident, and reached a high of 63 on Sept. 13, 2013.

IHS Petrodata provides another perspective on the rig market. For March 6, it inventoried a total supply of 119 jackups, semisubmersibles and drillships versus 111 rigs last year. The market supply was 77 rigs compared to 85 last year, with 61 contracted rigs versus 79 units. March market utilization was 79.2% compared to 92.9% last year.

Well permits. GOM well permits show steady growth since 2010, particularly in deepwater areas, according to figures from the Bureau of Safety and Environmental Enforcement (BSEE). Shallow-water drilling operations became subject to new rules and information requirements as of June 2010, and deepwater operations were included in October 2010.

Last year, shallow-water permits declined to 434 from 507

TABLE 2. APPROVED PERMITS, BY WATER DEPTH, FOR ALL TYPES.

Year	Shallow (<500 ft)	Deep (>500 ft)	Total
2015 (Jan, Feb)	31	105	136
2014	434	669	1,103
2013	507	554	1,061
2012	446	520	966
2011	418	274	692
2010	229	14 (Oct, Nov, Dec)	243

Source: BSEE

TABLE 3. LEASE SALE SCHEDULE, 2012-2017.

Sale number*	Area	Year
229	Western Gulf of Mexico ²	2012
227	Central Gulf of Mexico ²	2013
233	Western Gulf of Mexico ²	2013
225	Eastern Gulf of Mexico ²	2014
231	Central Gulf of Mexico ²	2014
238	Western Gulf of Mexico ²	2014
235	Central Gulf of Mexico ²	2015
246	Western Gulf of Mexico ²	2015
226	Eastern Gulf of Mexico ²	2016
241	Central Gulf of Mexico ²	2016
237	Chukchi Sea ¹	2016
248	Western Gulf of Mexico ²	2016
244	Cook Inlet ¹	2016
247	Central Gulf of Mexico ²	2017
242	Beaufort Sea ¹	2017

¹ Alaska lease sales

² Gulf of Mexico lease sales

in 2013, while deepwater approvals climbed to 669 from 554, **Table 2**. Total permits last year were 1,103 vs. 1,061 the prior year. For the first two months of 2015, permits were keeping pace with 31 shallow and 105 deepwater permits approved for a total 136 permits.

Lease sales. High bids in the March 18 Central GOM Lease Sale 235 were down about 35% compared to the last Central GOM sale (231) in March 2014, and nearly 57% lower than high bids two years ago in the March 2013, Central GOM sale 227. While lease terms, prior sales and other factors weigh on this, the reduction and its timing suggests uncertainty.

Sale 235 had \$538.8 million in high bids, and the total for all bids was \$583.2 million. There were 42 companies that submitted 195 bids on 169 tracts, and 7,788 blocks offered. Last year, Central Gulf sale 231 had a high bid of \$850.8 million, with all bids totaling \$1.085 billion. Fifty companies submitted 380 bids on 326 blocks, and there were 7,511 blocks offered.

The top 10 high-bid companies this year were: Shell, Statoil, Venari, Chevron, Exxon Mobil, Houston Energy, BHP Billiton, Apache, Red Willow Offshore and Anadarko. Last year, the top 10 Central Gulf bidders were: Total, LLOG, BP, GulfSlope, EPL, Houston Energy, Apache, Freeport-McMoRan and Murphy.

Secretary of the Interior Sally Jewell said, "While this sale reflects today's market conditions and industry's current development strategy, it underscores a steady, continued interest in developing these federal offshore oil and gas resources." Prior to the sale, the National Ocean Industries Association (NOIA) observed that roller coaster prices were unlikely to affect interest in long-term GOM projects. But shorter time frames for active exploration within the lease terms were factors that could impact bidding in the sale, particularly for capital-tight companies.

The last GOM sale (238) offered western region leases. The August 2014 sale attracted \$109.9 million in high bids for 81 tracts. A total of 14 companies submitted 93 bids. The sale offered 4,026 tracts.

The next lease sale is 246, scheduled for August 2015. It will offer approximately 4,000 blocks in the Western GOM planning area. The current five-year leasing program runs from 2012 to 2017, **Table 3**. A new leasing program is being developed to cover 2017-2022. A January 2015 draft (**Table 4**) includes eight planning areas—three in the Gulf of Mexico, two in the Atlantic, and three in Alaska. Of the 14 lease sales proposed in those areas, 10 are in the GOM.

GOM PROJECTS

Despite current oil price volatility, activity in the GOM is far from idle. Following are snapshots of some of the key operators and projects in the mix.

LLOG Exploration. The Delta House floating production system (FPS) was installed in Mississippi Canyon 254 by LLOG Bluewater, a JV between LLOG Exploration, and Blackstone Energy Partners and its affiliates. The FPS, located 130 mi southeast of New Orleans in 4,500 ft of water, is designed for peak capacity of 100,000 bopd and 240 MMcf/d. In fourth-quarter 2014, most of the infield and export lines, and subsea equipment (trees, manifolds, and umbilical termination assemblies), had been installed.

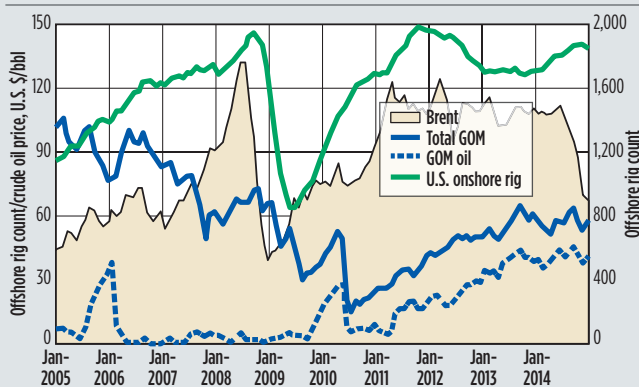
First production from the facility, which will host a series

TABLE 4. COMBINED LEASING REPORT, AS OF JANUARY 2015.

Planning areas by region	Total blocks	Total acres	Number of active leases	Acreage of active leases	Number of producing leases	Acreage of producing leases	Number of non-producing leases	Acreage of non-producing leases
Gulf of Mexico								
Western	5,240	28,576,813	1,184	6,715,673	105	582,979	1,079	6,132,694
Central	12,409	66,446,351	4,050	21,483,528	875	4,227,581	3,175	17,255,947
Eastern	11,526	64,563,679	106	567,104	0	0	106	567,104
Region sub-total	29,175	159,586,843	5,340	28,766,305	980	4,810,560	4,360	23,955,745
Pacific								
Southern California	16,164	89,028,609	43	217,669	43	217,669	0	0
Region sub-total	16,164	89,028,609	43	217,669	43	217,669	0	0
Alaska								
Beaufort Sea	11,876	65,075,663	147	760,129	3	10,424	144	749,705
Chukchi Sea	11,472	62,594,455	460	2,604,658	0	0	460	2,604,658
Cook Inlet	1,093	5,336,420	0	0	0	0	0	0
Region sub-total	24,441	133,026,538	607	3,364,787	3	10,424	604	3,354,3636
Totals	69,780	381,641,990	5,990	32,348,761	1,026	5,038,653	4,964	27,310,108

THE LAG

Industry activity is driven by a combination of factors: fundamental economics, cash flow and availability of funding, internal project resourcing (people), and commitments already undertaken, explains Gaffney, Cline & Associates. On the upturn, there is a lag, sometimes years in duration, as the industry adjusts to higher oil prices. But when prices crash, as in 2008 and in the current downturn, it may take only a few months before the rig count responds. **WO**



of LLOG-operated fields in the region, is expected in first-half 2015. A likely tie-back to the FPS is LLOG's Mississippi Canyon Otis prospect. A successful exploration test last year encountered more than 70 ft of net hydrocarbons.

First production from the fifth well in LLOG's Who Dat Mississippi Canyon field was initiated in April last year, bringing total production to 28,000 bopd and 58 MMcf/d. The

Fig. 4. Mars B output has been underway for just over a year from Shell's *Olympus* facility, the firm's seventh and largest floating deepwater platform in the GOM. Courtesy of Shell.



field's development plan calls for eight additional wells.

The Son of Bluto 2 and Marmalard fields in Mississippi Canyon also will tie back to the FPS. The Son of Bluto 2 field discovery well was drilled in 2012 to 18,500 ft, TD. Marmalard was drilled in 2012 to 18,100 ft, TD.

Murphy Oil. Production from both of Murphy Oil's high-rate Dalmatian wells began in second-quarter 2014. The two wells can deliver a combined rate in excess of 20,000 boed. A third well is planned in Dalmatian South, in Desoto Canyon, by early 2016. Murphy also will add a fourth Dalmatian devel-

opment well in Desoto Canyon. Expansion plans continue at the Medusa project in Mississippi Canyon. At the end of 2014, the company had drilled one well, and was drilling the second planned hole. First production from the new wells, via a subsea tie-back to the Medusa facility, is expected by mid-year.

Chevron. Crude oil and natural gas production from Chevron's Jack/St. Malo project began in late 2014. In the lower Tertiary trend, deepwater fields are among the largest in the GOM. Production from the first development stage is expected to ramp up over the next several years, to a total rate of 94,000 bopd and 21 MMcfd. With an expected production life of more than 30 years, recovery in this initial phase may exceed 500 MMboe.

Jack and St. Malo fields are about 25 mi from each other in the Walker Ridge area, in approximately 7,000 ft of water—roughly 280 mi south of New Orleans. The fields were co-developed with subsea completions flowing back to a semisubmersible floating production unit located between the fields. The facility is the largest of its kind in the GOM, and has a production capacity of 170,000 bopd and 42 MMcfd, with the potential for future expansion.

Crude oil from the facility is pumped 140 mi to the Green Canyon 19 Platform via the Jack/St. Malo Oil Export Pipeline, and then to refineries along the Gulf Coast. The pipeline is the first large-diameter, ultra-deepwater pipeline in the Walker Ridge area of the Lower Tertiary trend.

Shell. The last year or so has been a busy period for Shell, as regards deepwater projects. In February 2014, first oil flowed from the company's Mars B development (West Boreas and South Deimos fields) through the Olympus platform (Fig. 4), Shell's seventh, and largest, floating deepwater platform in the GOM. Combined output from Olympus and the firm's original Mars platform is expected to deliver an estimated resource base of 1 Bboe.

Also, last September, Shell's Cardamom field achieved first oil, ahead of schedule. Oil from Cardamom is piped through the existing Auger platform, Shell's first deepwater TLP, installed 20 years ago. The 50,000-boed output from Cardamom makes Auger the largest net producing platform in the GOM.

Meanwhile, construction is underway for Stones field, an ultra-deepwater oil and gas development that Shell says will host the world's deepest production facility in 9,500 ft of water, at a reservoir depth of 26,500 ft below sea level. Production from the field's first phase in the lower Tertiary trend is targeted for 2016, with two subsea production wells tied back to an FPSO. This will be followed later by six additional wells with multiphase pumping. Output will be 50,000 boed from more than 250 MMboe of recoverable resources, with an upside potential of more than 2 Bboe of oil-in-place.

Stone Energy. The Cardona deepwater development project was tested at year's end, and Stone Energy was ramping up production from its two wells. The wells were flowing to Stone's Pompano facility at a gross rate of approximately 10,000 boed. The Cardona subsea facility allows for the tie-in of two additional wells, Cardona 6 and 7, planned for 2015.

Stone's 2015 capital expenditure budget of \$450 million is allocated about 75% to deepwater and Gulf Coast activity. The deepwater money is focused on development and exploration drilling, facility installations for development work, completion operations, and seismic and lease acquisition. In addition

to Cardona field, Stone will participate in drilling two non-operated exploration wells in first-quarter 2015. It also will complete its Amethyst discovery well and install a flowline back to the Pompano platform. Installation of a platform rig on the Pompano platform in the fourth quarter sets up a 2016 drilling program at that location.

Hess. Production from Tubular Bells field began in November 2014. The Hess (57.14%) and Chevron (42.86%) venture in Mississippi Canyon was expected to deliver gross production of approximately 50,000 boed from three producing wells by the beginning of 2015. The field has an estimated production life of 25 years. Tubular Bells lies in about 4,300 ft of water, 135 mi southeast of New Orleans. The Miocene field, discovered in 2003, produces to a spar hull floating production facility.

In October last year, Hess and its partners, including Chevron, announced that they would proceed with the Stampede oil and gas project. First production is expected in 2018. Located in Green Canyon, it was discovered during 2005 in approximately 3,500 ft of water and has a reservoir depth of 30,000 ft. The plan calls for six subsea production wells and four water injection wells from two subsea drill centers tied back to a TLP. A two-rig drilling program was planned, with the first rig commencing operations in fourth-quarter 2015. Gross processing capacity for the project is approximately 80,000 bopd and 100,000 bwpd, injection capacity. Total estimated recoverable resources are estimated in the range of 300–350 MMboe.

Exxon Mobil. The company will invest more than \$4 billion in deepwater GOM exploration and development through 2016. Significant among projects included in this spending is the Hadrian South gas development, which started production in March 2015. Exxon Mobil says that it drilled the deepest well in the Gulf at this location, in more than 7,600 ft of water. The discovery well, Hadrian-2, was drilled in 2008, and the appraisal well, the Hadrian-4 sidetrack, was completed in 2009. Gross production, from two wells, is expected to reach 300 MMcfd and 3,000 bopd. At 230 mi offshore, the Hadrian South development employs a subsea production system with flowlines to the Anadarko-operated Lucius platform.

In addition, Exxon Mobil's development of the Julia ultra-deepwater oil field in the Walker Ridge area continues. The plan calls for six wells with subsea tie-backs to Chevron's Jack/St. Malo production facility with initial output of 34,000 bopd. Latest target date for first oil is now late 2016 or early 2017.

Noble Energy. The company has two deepwater fields that should go onstream in the next couple of years. Dantzler is an oil development that is planned as a two-well tie-back, utilizing infrastructure at the firm's Big Bend field. Initial startup is expected in 2016. Meanwhile, Gunflint is planned to be a two-well tie-back that also will go online in mid-2016. Combined, these fields are expected to double the company's deepwater GOM production over the next four to five years. **WO**