Deepwater Gulf of Mexico

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Regional Director
Gulf of Mexico Region

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Outline

• Brief overview of Bureau of Ocean Energy Management
  – Enabling legislation/mission
  – Agency responsibilities
  – GOM Region status

• Deepwater Gulf of Mexico
  – Production
  – Drilling
  – Fields
  – Technology challenges
  – Progression into deepwater

• Summary
“(T)he outer Continental Shelf is a vital national resource reserve held by the Federal Government for the public, which should be made available for expeditious and orderly development, subject to environmental safeguards, in a manner which is consistent with the maintenance of competition and other national needs”
## Offshore Energy Regulatory Agencies

<table>
<thead>
<tr>
<th><strong>BOEM</strong></th>
<th><strong>BSEE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Role:</strong> Resource science and management</td>
<td><strong>Role:</strong> Regulatory enforcement</td>
</tr>
<tr>
<td><strong>Mission:</strong> To manage development of the U.S. Outer Continental Shelf energy and mineral resources in an environmentally and economically responsible way.</td>
<td><strong>Mission:</strong> Enforce safety, environment, and conservation compliance on the Nation’s offshore resources</td>
</tr>
</tbody>
</table>
| **Key functions:**  
- Leasing & Plans  
- Environment studies  
- NEPA analysis  
- Economic and reserves analysis  
- Geologic risk analysis  
- Renewables development  
- Financial Risk Analysis | **Key functions:**  
- Permitting  
- Environmental compliance  
- Conservation compliance  
- Engineering standards and regulations  
- Oil spill response planning  
- Inspections  
- Enforcement and investigations |
Gulf of Mexico Active Leases

BOEM Gulf of Mexico OCS Region
Blocks and Active Leases by Planning Area
October 2, 2017

<table>
<thead>
<tr>
<th>Planning Areas</th>
<th>Total Blocks</th>
<th>Total Acres</th>
<th>Number of Leases</th>
<th>Acres Leased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western</td>
<td>5,240</td>
<td>28,576,813</td>
<td>437</td>
<td>2,467,602</td>
</tr>
<tr>
<td>Central</td>
<td>12,409</td>
<td>66,446,351</td>
<td>2,359</td>
<td>12,329,712</td>
</tr>
<tr>
<td>Eastern</td>
<td>11,537</td>
<td>64,357,859</td>
<td>37</td>
<td>200,670</td>
</tr>
<tr>
<td>Sub-Totals</td>
<td>29,186</td>
<td>159,381,023</td>
<td>2,833</td>
<td>14,997,984</td>
</tr>
<tr>
<td>CPA/EPA Shared Blocks*</td>
<td>(66)</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>29,100</td>
<td>159,381,023</td>
<td>2,830</td>
<td>14,997,984</td>
</tr>
</tbody>
</table>

* CPA and EPA contain 88 shared blocks of which 3 are leased. These blocks are given both a CPA and EPA designation in the data which accounts for a higher block total.
## Gulf of Mexico Highlights

<table>
<thead>
<tr>
<th>Lease Sale</th>
<th>Date of Sale</th>
<th>No. of Tracts Offered</th>
<th>No. of Tracts Bid On</th>
<th>No. Of Bids Received</th>
<th>Total Bonus High Bid ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>249 Gulfwide</td>
<td>8/16/2017</td>
<td>14220</td>
<td>90</td>
<td>99</td>
<td>121.1 M</td>
</tr>
<tr>
<td>247 CGOM</td>
<td>3/22/2017</td>
<td>9118</td>
<td>163</td>
<td>189</td>
<td>274.8 M</td>
</tr>
<tr>
<td>248 WGOM</td>
<td>8/24/2016</td>
<td>4399</td>
<td>24</td>
<td>24</td>
<td>18.1 M</td>
</tr>
<tr>
<td>226 EGOM</td>
<td>3/23/2016</td>
<td>162</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>241 CGOM</td>
<td>3/23/2016</td>
<td>8349</td>
<td>128</td>
<td>148</td>
<td>156.4 M</td>
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<tr>
<td>246 WGOM</td>
<td>8/19/2015</td>
<td>4083</td>
<td>33</td>
<td>33</td>
<td>22.7 M</td>
</tr>
<tr>
<td>235 CGOM</td>
<td>3/18/2015</td>
<td>7788</td>
<td>169</td>
<td>195</td>
<td>538.8 M</td>
</tr>
<tr>
<td>238 WGOM</td>
<td>8/20/2014</td>
<td>4026</td>
<td>81</td>
<td>93</td>
<td>110 M</td>
</tr>
<tr>
<td>225 EGOM</td>
<td>3/19/2014</td>
<td>134</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>231 CGOM</td>
<td>3/19/2014</td>
<td>7511</td>
<td>326</td>
<td>380</td>
<td>850.8 M</td>
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<tr>
<td>233 WGOM</td>
<td>8/28/2013</td>
<td>4036</td>
<td>56</td>
<td>64</td>
<td>123.7 M</td>
</tr>
<tr>
<td>227 CGOM</td>
<td>3/20/2013</td>
<td>7299</td>
<td>320</td>
<td>407</td>
<td>1.2 B</td>
</tr>
</tbody>
</table>
The Gulf of Mexico
is a proven petroleum basin that still offers significant opportunities for exploration and development.
Deepwater Leasing

Deepwater Lease Blocks

Effective 1982 to 1987 (789)
Comparison of Annual Production Volumes from Deep and Shallow Water

Deep surpassed shallow

OIL

GAS
Monthly oil production from U.S. Federal Gulf of Mexico
million barrels per day

Source: U.S. Energy Information Administration, Short-Term Energy Outlook April 2017
Number of Wells Drilled Per Year
Number of BOEM-Designated Fields in Deepwater by Year

Total of 279 BOEM-designated deepwater fields
Industry Technical Challenges - Drilling

- Very Deep Water
- Remote location from infrastructure
- Thick overlying salt of complex shapes
- Deep subsea drilling
- High well costs
- Low porosity and permeability
- Low gas-to-oil ratio
Deepwater Wells Drilled in the Deepest Water

Year

Water Depth (ft)

10,141 ft
Deepest Wells Drilled in Deepwater Each Year

Year
- 1975
- 1977
- 1979
- 1981
- 1983
- 1985
- 1987
- 1989
- 1991
- 1993
- 1995
- 1997
- 1999
- 2001
- 2003
- 2005
- 2007
- 2009
- 2011
- 2013
- 2015
- 2017

Total Well Depth (TVDSS, ft)
- 0
- 5,000
- 10,000
- 15,000
- 20,000
- 25,000
- 30,000
- 35,000
- 40,000
- 45,000

Sediment
Water Column

35,935 ft TVDSS
Shallow Water vs. Deepwater

<table>
<thead>
<tr>
<th></th>
<th>UTRR</th>
<th>Grown Reserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shallow Water</td>
<td>14.684</td>
<td>49.700</td>
</tr>
<tr>
<td>Deepwater</td>
<td>59.005</td>
<td>29.682</td>
</tr>
</tbody>
</table>
The Lower Tertiary and Jurassic Norphlet trends in deepwater continue to be excellent exploration targets.

The deepwater Lower Tertiary trend has spurred the acquisition of numerous, nonexclusive wide-azimuth (WAZ) and full-azimuth (FAZ) seismic surveys.

For the entire Gulf of Mexico, the deepwater portion is assessed to contain 80 percent of the remaining undiscovered resources.

The Gulf of Mexico is one of the world’s prolific hydrocarbon basins, with a production history of more than 100 years.

It is the primary offshore source of hydrocarbons for the United States, generating approximately 97 percent of all offshore oil and natural gas production.

Of this Gulf production, wells in deepwater produced 82 percent of the oil and 54 percent of the natural gas.
BOEM manages the responsible exploration and development of offshore energy and marine mineral resources on the OCS. The bureau promotes energy independence, environmental protection and economic development through responsible management of these offshore resources based on the best available science.