U.S. Arctic Outer Continental Shelf
Energy Exploration, Development, & Production

6th Symposium
on the
Impacts of an Ice-Diminishing Arctic
on Naval and Maritime Operations
July 14-16, 2015
Washington, D. C.

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Department of the Interior
Bureau of Ocean Energy Management
Meeting Global Demand

Potential polar marine routes could support efforts to construct new Arctic infrastructure.

*The Organization for Economic Co-operation and Development (OECD)*

...to meeting rising global demand for petroleum products.

**EIA Reference Case for World Consumption of Oil and Other Liquids**

- Non-OECD
- OECD

Source: Energy Information Administration Annual Energy Outlook 2012

- Small Ports
- Major Ports
- Northern Sea Route
- Arctic Bridge
- Northwest Passage
- Each red bar represents one icebreaker, including federal and privately owned, light to heavy.
OCS Oil and Gas Resources
2011 Assessment of Undiscovered Technically Recoverable Oil & Gas Resources

USGS Circum-Arctic Assessment – Undiscovered Oil Potential by Assessment Unit

South Barents
~9.4 BBO

S. Danmarkshavn ~4.3 BBO
N. Danmarkshavn ~3.3 BBO

Yenisey-Khatanga
~5.3 BBO

Canning-Mackenzie
~6.4 BBO

NW Greenland
~4.9 BBO

Alaska Platform
~28 BBO

UNDISCOVERED OIL
(billion barrels)

- >10
- 1–10
- 0.1–1
- <0.1
- Area not quantitatively assessed
- Area of low petroleum potential

USGS Fact Sheet FS2008-3049; pers. comm. D. Houseknecht

09/16/14
Historic OCS Lease Sales

Legend
- Planning Area where NO sales have been held
- Planning Area where lease sales have been held

Note: Some planning area boundaries have changed since they were originally created. This map shows the current boundaries only.
86 Exploration Wells and 14 Deep Stratigraphic Test Wells have been drilled on the Alaska OCS

<table>
<thead>
<tr>
<th>Region</th>
<th>Wells Drilled</th>
<th>Region</th>
<th>Wells Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beaufort Sea</td>
<td>31</td>
<td>St. George Basin</td>
<td>10</td>
</tr>
<tr>
<td>Chukchi Sea</td>
<td>6</td>
<td>Cook Inlet</td>
<td>13</td>
</tr>
<tr>
<td>Norton Sound</td>
<td>6</td>
<td>Gulf of Alaska</td>
<td>12</td>
</tr>
<tr>
<td>Navarin Basin</td>
<td>8</td>
<td></td>
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</tr>
</tbody>
</table>

Alaska OCS Exploration Wells 1975 - 2012

Two shallow top holes in 2012 – one in the Beaufort Sea and one in the Chukchi Sea.
Current OCS Leases and Exploration Prospects, Development, and Production
Over 50 on-going Environmental Studies researching (~$70 million):

- Physical, Biological, & Chemical Oceanography
- Fates and Effects
- Biological Resources
- Protected Species
- Traditional Knowledge
- Atmospheric/Air Quality
- INTEGRATED & INTERDISCIPLINARY!

BOEM’s Environmental Studies Program (ESP) develops, conducts and oversees world-class scientific research specifically to inform decisions regarding development of OCS energy & mineral resources.

BOEM has invested OVER $450 million studying the OCS environment offshore Alaska, and developed more than 1,000 reports & peer reviewed publications.
BOEM actively seeks TK / TEK to complement its use of Western science to make better decisions.

Special Issue on Traditional Knowledge

Science in Transformation

Traditional Knowledge and Sociocultural Studies

Integrating Traditional Knowledge into Biological Resource Studies

Cultural Landscapes: Traditional Knowledge Across the Pacific Rim

Fenton Rexford (Interview), Tribal Administrator of the Native Village of Kaktovik

Where Do We Go From Here?
An Adaptive, Integrated, Ecosystem-based Approach to Science-informed Decision-making

Potential OCS Activity → Environmental Studies Program → Environmental Analysis → Decision Support Actions → Program Decisions

- Biological Sciences
- Physical Sciences
- Social Sciences
- Traditional Knowledge
- Existing information [NOAA, USGS, NSF, ONR, State of Alaska]

- Highlights need for further scientific research
- Informs need for more scientific research
- Process may require multiple environmental reviews

- Consultations (Legal Requirements)
- NEPA
Challenges of Arctic Resources Management

CLIMATE CHANGE

INCREASED STORM SEVERITY
- Increased Coastal Erosion
- Loss of Coastal Infrastructure
- Encroachment on Coastal Communities

THAWING PERMAFROST
- Release of Greenhouse Gases
- Infrastructure Instability
- Home Destabilization

SEA ICE REDUCTION
- Opening of Polar Shipping Routes
- Habitat Loss for Ice-Dependent Species
- Changes in Subsistence Food Resources
Applying Principles of IAM to Decisions:

• A whole-of-government approach in coordinating development and conservation strategies in the U.S. Arctic to improve efficiency, operational certainty, and sustainability:
  – Information about marine and terrestrial ecosystems, resources, and U.S. Arctic communities is available and widely shared;
  – Direct and meaningful engagement with partners and stakeholders;
  – Scientific information and traditional knowledge to ensure management decisions promote productive and sustainable ecosystems;
  – Landscape-scale strategies to inform development, conservation, restoration, and mitigation planning;
  – The cumulative impacts of human activities and management decisions in the U.S. Arctic; and
  – Climate change impacts upon the natural and human environment in the U.S. Arctic

• Increasing international coordination with other Arctic nations, as appropriate.
Shell Chukchi Sea Exploration Plan


Operational Period
- July 1 to Oct. 31 each year until complete

Six Lease Blocks
- Six Well Locations

Two Floating Drilling Units
- Noble Discoverer
- Transocean Polar Pioneer

Support Vessels
- Aircraft - 7
- Marine Vessels - 29
Late Season Exploratory Drilling Hiatus

- BOEM limited drilling into hydrocarbon zones 30+ days prior to ice encroachment at Chukchi Sea drill site.

- Each year, BOEM estimates ice encroachment using hindcasting techniques, and establishes a "trigger date" for the drilling hiatus.

- Consistent with adaptive management, BOEM may refine the "trigger date" in light of real time sea ice forecasting.

Sea Ice data files interpreted by the National Ice Center (NIC)
2008–2013 U.S. Arctic Activity

<table>
<thead>
<tr>
<th>Transits</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bering Strait</td>
<td>220</td>
<td>280</td>
<td>430</td>
<td>410</td>
<td>480</td>
<td>440</td>
</tr>
<tr>
<td>Vessels in U.S. Arctic</td>
<td>120</td>
<td>130</td>
<td>160</td>
<td>190</td>
<td>250</td>
<td>240</td>
</tr>
</tbody>
</table>

Source: USCG District 17, Sector Anchorage Overview Presentation; February 10, 2014.

BOEM lease operations require on-site monitoring and mitigation measures for marine mammals.

2012 Total Estimated U.S. Arctic Vessel Traffic

- Energy Related: 10%
- Non-energy Related: 90%

2013 Total Estimated U.S. Arctic Vessel Traffic

- Energy Related: 2%
- Non-energy Related: 98%

Source: Photographer: Brenda Rose, NOAA NMFS AFSC NMML. NMFS Permit No. 14245, Funded by BOEM.
2025 Scenarios Bering Strait Vessels and Transits for the U.S. Arctic

Low Scenario: O&G Vessels, 6.5 to 8.1% of the total
Medium Scenario: O&G Vessels, 4.7 to 6.6% of the total
High Scenario: O&G Vessels, 4.9 to 7.3% of the total
Proposed U.S. Arctic Development Activity

Under Regulatory Review:

➢ 2014 Hilcorp Development and Production Plan (DPP)
  • Artificial Gravel Island in the Beaufort Sea, 5.6 miles offshore
  • Under completeness review by BOEM
  • Once “Deemed Submitted” Public Process
  • EIS preparation (pending DPP is “Deemed Submitted”)  
  • Island construction proposed to start in Winter 2017-2018
  • Proposed buried pipeline
  • Proposed production to begin in 2019-2020.
Comparable Beaufort Sea Projects

**Nikaitchuq Island**
- Drillsite
- Constructed: 2011
- Work Area Acres: 10
- Water Depth: 8’

**Oooguruk Island**
- Drilling & Production
- Constructed: 2007
- Work Area Acres: 6
- Water Depth: 4’

**Northstar Island**
- Drilling & Production
- 65,000 BOPD
- Constructed: 2000
- Work Area Acres: 6
- Water Depth: 40’

**Liberty Island**
- Drilling & Production
- 65,000 BOPD
- Constructed: 2017
- Water Depth: 19’
- Subsea Pipe Distance: 5.6 miles
- Onshore Pipe Distance: 1.5 miles
Thank You!