Effects of Arctic Change on Energy Exploration and Production

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Impact of an Ice-Diminishing Arctic on Naval and Maritime Operations
July 10-12, 2007
Topics

• Arctic Activity
  – Present
  – Future
• Research
  – Environmental
  – Technical
  – Spill response
• Thoughts
MMS: An Ocean, Energy, & Mineral Agency

- The Outer Continental Shelf
  - off the coast beyond 3 miles
- Oil and Gas Leasing, Regulation, Monitoring, Inspections
- Sand, gravel, gold, and other minerals,
- *New* > Energy from wind, currents, waves
- Royalty Collection and Disbursement
- Environmental & Technical Research
Current and Future Activities

- **Currently producing Arctic areas**
  - Russia’s Timan-Pechora and NW Siberia areas
  - Alaska’s North Slope and Beaufort Sea.
  - Norwegian Sea

- **Possible future exploration and production**
  - Alaska’s North Slope and Beaufort and Chukchi seas
  - Pechora and Kara Sea
  - Russia and Norway’s Barents Seas
  - Canadian Beaufort Sea, Mackenzie Delta, and Mackenzie Valley.
  - Possible Exploration offshore Greenland
  - Possible Exploration offshore Faroe Islands

Law of the Sea Implications
State of Alaska
• 3.6 million acres under lease
• Over 3500 wells active on the North Slope
• Production offshore islands; ERD

U.S. Arctic Oil and Gas
Arctic Ocean and Bering Sea

MMS Arctic offshore
• 600 million acres
• Only 59 exploration wells
• Northstar only federal production.

BLM onshore
• NPR-A 23.5 million acres
• 16 exploration wells in recent years
Alaska 2007-12 OCS Program
Chukchi Sea

Map is for illustration only, showing past leases; no current leases; it does not reflect Sale 193 decisions.
## Alaska Oil and Gas Estimates

**Undiscovered Technically Recoverable**

<table>
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<tr>
<th>OCS Planning Area</th>
<th>Oil and Gas Estimates</th>
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<td><strong>Beaufort Sea</strong></td>
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MMS 2006 National Assessment
Trans-Alaska Pipeline
Daily Throughput
1977-2006

2006: 759,081 barrels of oil per day
What are oil and gas activities?

- **Exploration**
  - field work
  - seismic surveys
  - drilling
- **Development**
  - platforms/rigs construction
  - drilling
  - infrastructure (including housing, roads, airstrips, storage, waste disposal facilities)
  - transportation (ships and pipelines).
- **Decommissioning**

In the event of climate change, all of these are likely to be affected.
Alaska Exploration

- **Seismic surveys**
  - 2006 & 2007 summer
  - Chukchi/Beaufort
  - Ice hinders surveys

- **Exploration drilling**
  - Shell – Sivulliq, Beaufort Sea
    - “open water”
  - Floating vessels
  - Past: ice or gravel islands
    - winter
  - Floaters
  - Ice management
Alaska Offshore Development/Production

Past
Northstar (BF) producing
(State/federal)
Buried pipeline
Nearshore in State waters
barrier/gravel islands
extended reach drilling

Near Future
Liberty (BF) – Development
Plan - ultra extended reach

State – nearshore islands
ICE PROTECTION — Northstar's production island is protected from the moving ice by a special design. Diagram above shows how the design causes ice to grind on the gravel berm and then break up. Storm action has caused some changes in the shape of the berm, which is being monitored by BH.

Buried pipeline for ice protection
Technology Changes

- Platforms
- Pollution Prevention
- Safety Systems
- Human Factors
- Pipelines
Norway’s Barents Sea