National Petroleum Council

Arctic Potential

Realizing the Promise of U.S. Arctic Oil and Gas Resources

Supplemental Assessment to the March 2015 Report

Interim Report to the Council

December 4, 2018

Study Request

By letter dated August 29, 2018, Secretary of Energy Rick Perry requested the NPC to undertake a supplemental assessment considering recent exploration experience and technological advancements or other new insights related to Arctic offshore oil and gas development that could inform government decision making. In particular, the NPC was asked to provide views on whether the nation's regulatory environment could be enhanced to improve reliability, safety, efficiency, and environmental stewardship.

Key areas to be addressed include:

- Regulatory burdens associated with U.S. OCS development
- Arctic lease terms
- Arctic oil spill response, including recent research conducted in Norway
- Infrastructure associated with offshore Arctic development, including onshore linkages.

Supplemental Assessment – Work Plan

A subset of the original 2015 study groups was reconvened:

- Steering Committee
- Coordinating Subcommittee (CSC)
- Writing Team

To meet a target of supplemental assessment completion in early 2019:

- A technical workshop was held to identify new developments since 2015
- The Coordinating Subcommittee considered the workshop output, developed insights, and updated findings and recommendations
- The Writing Team, Coordinating Subcommittee, and Steering Committee developed this interim report for review by the Council
- A written report will be submitted to the Council membership for approval in February 2019

Supplemental Assessment – Workshop

- **Held October 31 and November 1, 2018, at Rice University, with 45 participants**
- **Four panels corresponding to key interest areas**

Exploration Drilling and Well Control Advances
- ExxonMobil
- Shell
- Cameron Group, Schlumberger
- Trendsetter

Oil Spill Prevention and Response
- Shell, retired
- Chevron, retired
- ExxonMobil
- Arctic Response JIP/IOGP
- Shell
- Alaska Clean Seas

Infrastructure Developments
- Arctic Slope Regional Corp / AEX
- Alyeska
- BP Alaska

Regulatory and Lease Terms
- Schlumberger
- Shell
- Equinor
- ENI
- Resources for the Future
- ExxonMobil

Key Messages

- Since the 2015 Study report, there has been significant, safe, successful Arctic offshore drilling activity, and continued progress in technology for well control and oil spill response (including both demonstrations and continued advancements)
- The 2015 Study key findings and recommendations remain relevant
- The 2015 Study concluded that existing, field-proven technology could support prudent exploration and development of the U.S. Arctic; however, it was not yet accepted for use in the U.S. by regulators and other stakeholders. Further assessment, demonstration, and study was therefore recommended, to improve public confidence
- Based on technology demonstrations and advancements that have occurred since the 2015 report, the 2019 Supplement will include recommendations for regulatory changes that would improve safety, environmental stewardship and economic viability of the U.S. Arctic

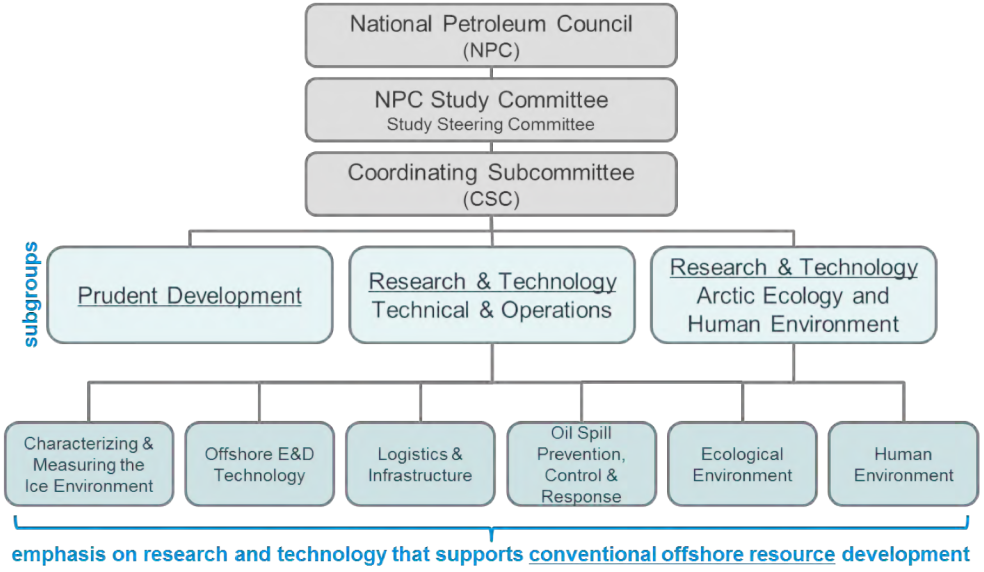
2015 Study Recap

2015 Study Request and Organization

In October 2013, the Secretary of Energy requested the NPC to conduct a study

- "What research should the Department of Energy pursue and what technology constraints must be addressed to ensure prudent development of Arctic oil and gas resources while advancing U.S. energy and economic security and ensuring environmental stewardship?"
- The Secretary also noted that the Council's perspective would be helpful input to the U.S. chairmanship of the Arctic Council, the Quadrennial Energy Review and implementing the U.S. National Strategy for the Arctic Region

The report was approved by the NPC on March 27, 2015



Diverse Team:
266 participants from 105 organizations

2015 Study – Key Findings

1. **Arctic Oil and Gas Resources are Large and Can Contribute Significantly to Meeting Future U.S. and Global Energy Needs**
2. **The Arctic Environment Poses Some Different Challenges Relative to Other Oil and Gas Production Areas, But is Generally Well Understood**
3. **The Oil and Gas Industry Has a Long History of Successful Operations in Arctic Conditions Enabled by Continuing Technology and Operational Advances**
4. **Most of the U.S. Arctic Offshore Conventional Oil & Gas Potential Can Be Developed Using Existing Field-Proven Technology**
5. **The Economic Viability of U.S. Arctic Development is Challenged by Operating Conditions and the Need for Updated Regulations that Reflect Arctic Conditions**
6. **Realizing the Promise of Arctic Oil and Gas Requires Securing Public Confidence**
7. **There Have Been Substantial Recent Technology and Regulatory Advancements to Reduce the Potential for and Consequences of a Spill**

2015 Study – Arctic Development Potential

Most of U.S. Arctic Offshore Conventional Oil and Gas Resources Can Be Developed Using Existing Field-Proven Technology

Increasing Complexity to Explore & Develop

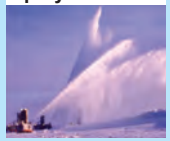
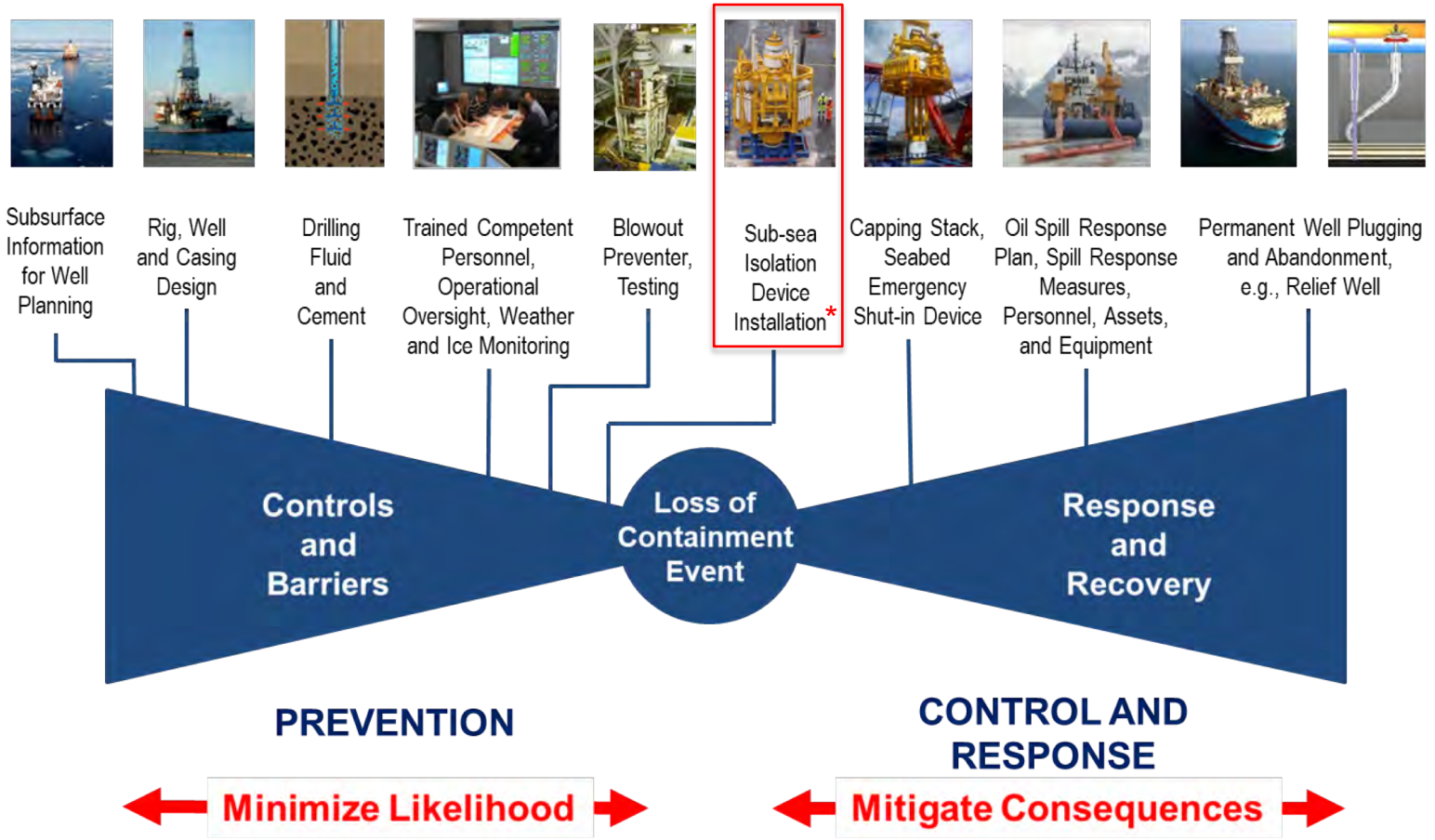
Physical Ice Environment and Water Depth		Technology to Explore & Develop
Description	**Examples**	
Typically ice free, any water depth • Minor first-year ice intrusions, icebergs possible	• South Barents Sea • Newfoundland	**Exploration & development proven** (Various drilling rigs, floating solutions, GBS, subsea tieback) **Snøhvit Subsea**  **Hibernia GBS** 
Any ice conditions, nearshore & shallow water • <~15m water	• Globally, near shore (including U.S. Beaufort and Chukchi Seas)	**Exploration & development proven** (Ice & gravel islands, concrete & steel structures, extended reach drilling from onshore) **Spray Ice Island**  **Northstar** 
Open water >~2 months, any water depth • Mainly first-year ice, potential for combination of multi-year ice, icebergs, and ice islands • Water depth determines development concept (greater or less than ~100m is key)	• Sea of Okhotsk • Pechora Sea • Labrador Sea • U.S. Chukchi & Beaufort Seas • South Kara Sea	**Exploration proven; development proven mainly in <~100m water** Ice management required <~100m development by GBS >~100m development by floating drilling & subsea tieback **Canmar Drillship**  **Sakhalin-2 GBS** 
Open water <~2 months, any water depth • Likely to encounter multi-year ice and/or icebergs, and in some locations ice islands • Water depth determines development concept (greater or less than ~100m is key)	• Deepwater Beaufort Sea • Deepwater Northern Russian Arctic Seas	**Exploration & development possible with technology improvements** Increased ice management capability and possible new technology
Limited to no open water • Frequent multi-year ice with embedded icebergs, and ice islands	• Northeast Greenland • Deepwater Northern Russian Arctic Seas	**Technology extensions or new technology required** Floating, robust ice managed solutions GBS/Subsea technology extensions or new technologies Difficult to mobilize equipment without open water season

Photo sources: Snøhvit Subsea - Statoil (Even Edland); Hibernia GBS - ExxonMobil; Spray Ice Island - BP – Amoco; Northstar - BP p.l.c.; Canmar Drillship - R. Pilkington; Sakhalin-2 GBS - Sakhalin Energy

2015 Study – Oil Spill Prevention and Response

There Have Been Substantial Recent Technology and Regulatory Advancements to Reduce the Risk and Consequences of a Spill

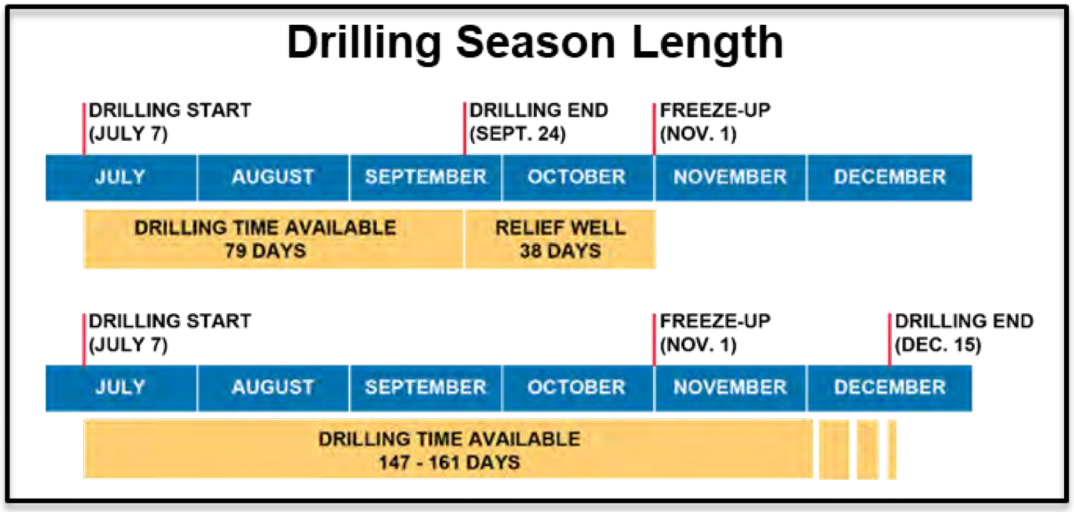
- The greatest reduction of environmental risk comes from preventing a spill



* Added based on developments since 2015

2015 Study – Key Recommendations

- Industry and regulators should work together to perform the analysis, investigations, and any necessary demonstrations to validate technologies for improved well control
- Industry, government, and regulators should perform the analysis, investigations, and necessary demonstrations to validate technologies/ capabilities to safely extend the drilling season



2015 Study – Key Recommendations, cont.

- The Department of Energy and the Department of the Interior should assess the timelines to progress an offshore exploration program, compared with current U.S. lease durations

Lease Length

Country	Lease/License System	Typical Well Count to Retain Lease/License	Lease/License Duration
Canada	Exploration Based	1 to 2	9 years
Greenland	Exploration Based	1 to 2	Up to 16 years
Norway	Exploration Based	1 to 2	Up to 30 years
Russia	Exploration Based	1 to 2	10 years
United States	Development Based	6 to 7	10 years

- Government agencies should participate in ongoing and future industry collaborative research programs for oil spill response in ice, such as the Arctic Response Technology Joint Industry Programme, and evaluate and pre-approve all oil spill response technologies

What's Changed

Arctic Exploration / Drilling Experience

- Since 2014, 47 offshore exploration wells safely and successfully drilled in the Arctic, in a variety of ice conditions
  - Globally, 45 wells drilled in Norway, Canada, and Russia, using conventional floating drilling technology adapted for Arctic Conditions
  - In the U.S. Arctic, 2 wells drilled, one using conventional floating drilling technology (Shell) and one using extended reach drilling (Caelus)
- ENI progressing Nikaichuq – directional drilling from a gravel island in state waters to the federal OCS

Enabling, Field-Proven Technology

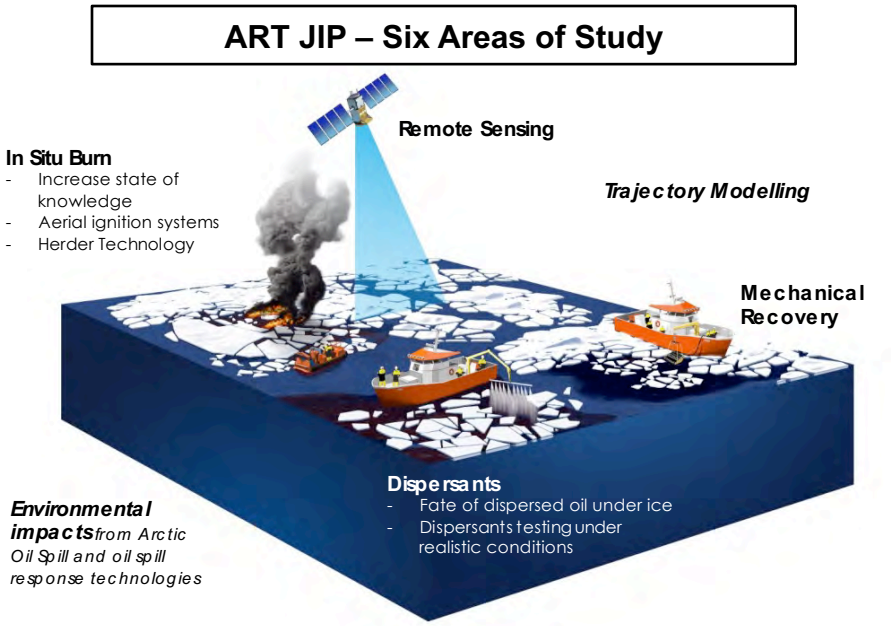
- Well design and execution planning, including comprehensive risk/contingency planning and simulations
- Rig and vessel upgrades for Arctic conditions
- Integrated ice defense and management system
- Well control technology - advanced blowout preventer (BOP) capability and controls, sub-sea isolation devices (SSID), and capping stacks

SSID used for Kara Sea

Well Control Devices – Global Staging/Deployment

OSR Technology Improvements

- The Arctic Oil Spill Response (OSR) JIP concluded in 2017, confirming and advancing prior research demonstrating OSR techniques in Arctic conditions
  - 40 years of research, backed up by field testing in Arctic conditions
  - Mechanical recovery effective for small spills but ineffective for large spills
  - Dispersants, including sub-sea, and in-situ burning most effective for larger spills

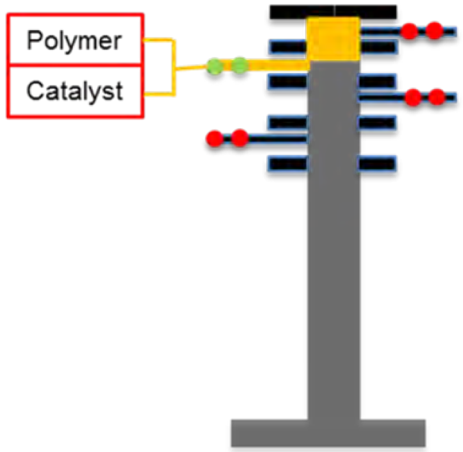


OSR Technology Improvements, continued

- Two Arctic-relevant demonstration spill response exercises in Norwegian open waters since 2015
- Research continues in promising areas in advanced well control (new JIP forming for polymers and sea water dynamic kill)

Field Exercise

Advanced Well Control



Infrastructure and Logistics

U.S. Arctic

- TAPS technology improvements and increased throughput extend life
- NOAA released the most comprehensive bathymetric update since 2002
- The Corps of Engineers terminated their deep-draft Arctic port study and began a feasibility study of Port of Nome improvements, February 2018

Globally

- Growing fleet of icebreakers
- IMO approved joint (U.S. / Russia) Bering Strait shipping routes, May 2018
- First Arctic LNG cargo from Yamal via Northern Sea Route, July 2018

Each Country's Icebreaker Fleet

	▲ Current	▲ Building	△ Planned
Russia	▲▲▲▲▲ ▲▲▲▲▲ ▲▲▲▲▲ ▲▲▲▲▲ ▲▲▲▲▲ ▲▲▲▲▲ ▲▲▲▲▲ ▲▲▲▲▲ ▲	▲▲▲▲▲	△△△△△ △
Finland	▲▲▲▲▲ ▲▲		△
Canada	▲▲▲▲▲ ▲		△
Sweden	▲▲▲▲▲ ▲		
United States	▲▲▲▲▲		△△△*
Denmark	▲▲▲▲		△
Estonia	▲▲		△
China	▲		△
Germany	▲		△
Norway	▲		△
Japan	▲		
South Korea	▲		
United Kingdom			△

Source: U.S. Coast Guard.
* U.S. has three icebreakers planned, but only one currently funded.

Regulatory and Leasing Developments

Alaska

- The two sales in the 5-year OCS 2017-2022 lease plan were canceled
  - Three Beaufort leases are proposed in the 2019-2024 draft Proposed Program
  - Only one small Alaska lease sale is scheduled in the next 4 years – Cook Inlet
- The Arctic Rule was issued in 2015
- The Shell Beaufort Sea leases were transferred to AEX LLC
  - BOEM recently issued a Suspension Of Operations for 5 years
- BOEM granted Conditional Approval of Liberty, the first production facility in Alaska OCS waters
- The Alaska 1002 area has been opened up for potential lease sale in the future

Global

- Russian regulator approved use of SSID as a superior solution to a same-season relief well for the Kara Sea
- Canadians/Norwegians approved drilling without relief well requirement
- Norwegian support for oil spill response exercises

New Findings

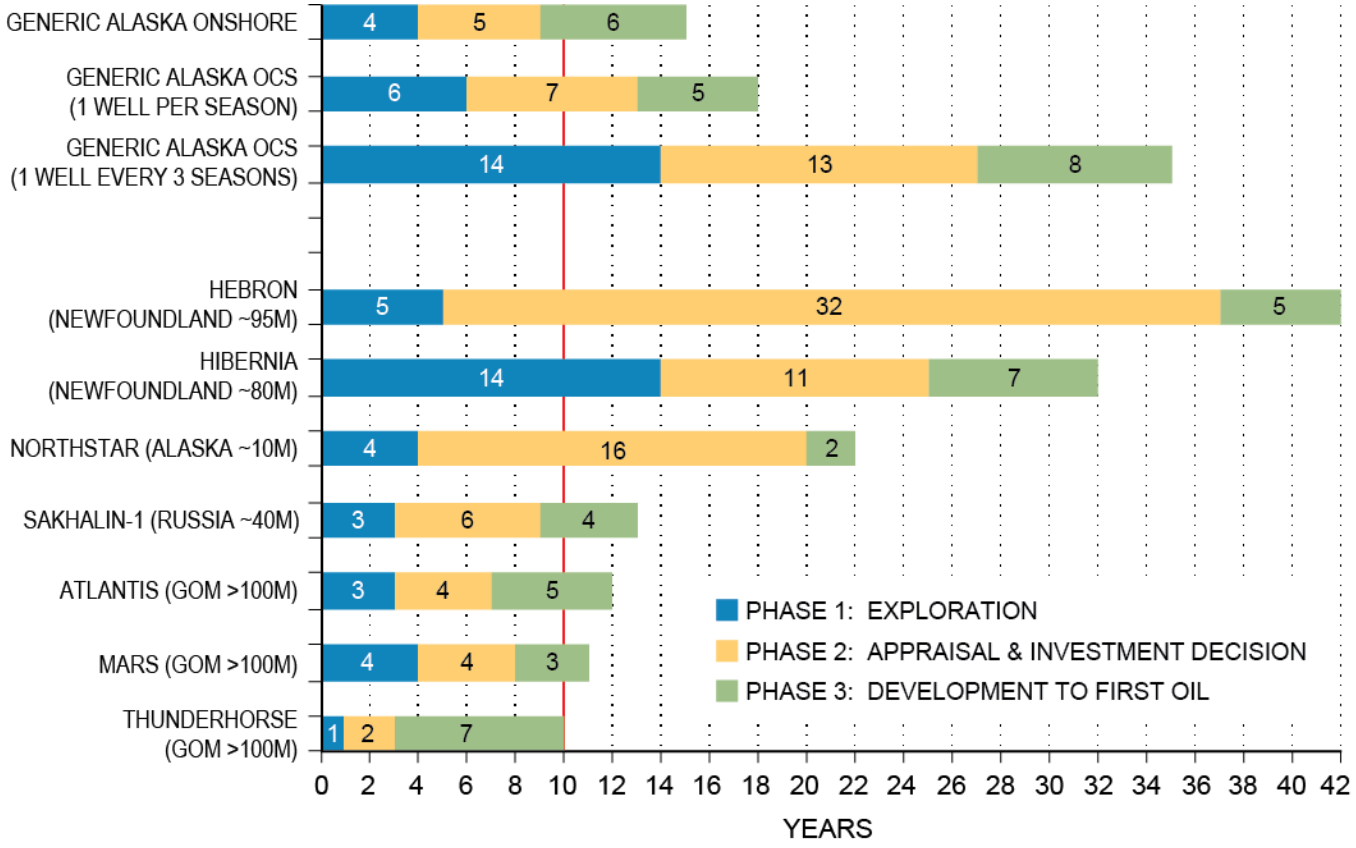
2018 Findings

Current Arctic OCS regulations and their implementation could be improved to enhance safety and environmental stewardship

- Requiring specific solutions leads to compliance rather than risk management, and decreases the incentive for technology improvement
- Multiple layers of “protection” and requirements may increase overall risk
- Multiple agencies with conflicting mandates and overlapping requirements hinder effective risk management

2018 Findings

Lease availability, lease terms, and a burdensome regulatory framework reduce the competitiveness of the Alaska OCS, compared with other opportunities worldwide



Recommendations

Perspective

- The view of the 2015 study was that the technology and knowledge currently exists to prudently explore for and develop the U.S. Arctic while protecting people and the environment.
- The 2015 study recommended further assessment and demonstration to gain acceptance by regulators and other stakeholders of key technologies and operating practices that would improve environmental stewardship, economic viability, and overall competitiveness of the U.S. Arctic.
- Since 2015, these technologies have been further demonstrated in other jurisdictions. These demonstrations now provide the basis for the recommended regulatory improvements to improve U.S. Arctic competitiveness, safety, and environmental stewardship.

Enhanced Safety and Environmental Stewardship

- A coordinating body for federal oil and gas regulations, permitting, and environmental reviews should be established, similar to the Alaska Office of Project Management and Permitting and the Canadian National Energy Board, with authority to prioritize objectives and troubleshoot across multiple agencies
- Arctic OCS drilling regulations and their implementation should emphasize spill prevention and use of the most effective technologies to enhance safety and reduce environmental risk
  - Use of demonstrated sub-sea isolation devices should be accepted in place of the same-season relief well requirement to improve safety and environmental performance
  - Preapproval should be provided to facilitate rapid response for dispersants and in-situ burning
  - Regulations should emphasize desired outcomes rather than specific technologies, to promote implementation of improved technologies. Where authority exists to approve use of new technology, that authority should be used.

Regulatory Effectiveness and Certainty

- The coordinating body for federal oil and gas regulations and permitting, noted on the prior page, should include a senior coordinating officer empowered with authority to resolve disputes among regulatory and permitting agencies, to address conflicting regulatory requirements, and improve timeliness in resolving issues
- Conflicting regulatory requirements should be harmonized
- Timely, integrated review and decision making across multiple agencies for permits should be required
- The time and scope of Requests For Information should be limited, and the time between receipt and response mandated
- The Arctic OCS regulations should be updated to reflect alternative drilling options, including extended reach drilling from land-based rigs
- Regulatory authorities should participate in Joint Industry Projects and oil spill response exercises, including those in other jurisdictions, as independent observers and to promote public confidence

Season Length

- Use of demonstrated sub-sea isolation devices should be accepted in place of the same-season relief well requirement, to improve safety and environmental performance, extend the drilling season, and improve competitiveness

- Drilling season length should be determined by actual ice conditions and capability of the drilling rig, not a fixed date, to facilitate single-season exploration drilling

Lease Term Competitiveness

- The 10 year primary lease term should be adjusted based on the Arctic working season and extended timelines for operating in an ice environment:
  - The production phase should be separated from the exploration and appraisal phases and additional time allowed to evaluate a discovery
  - Suspensions of primary lease terms to address Arctic operations and permit conditions should be stipulated in all newly issued federal Arctic OCS leases. These suspensions should be granted automatically for non-working time: weather, litigation, permitting, wildlife management, etc.
- The DOI should use its existing authority to allow for Arctic OCS leasing of "economically productive units" greater in size than the current 5760 acre lease tract limitation
- The DOI should consider royalty structures to improve economics for exploration and production activity
- Unilateral changes should not be made to lease terms after issue
- Arctic OCS lease sales should be included in all 5 Year Leasing Programs and held at regular intervals, to promote certainty and effective exploration and development planning

Enabling Infrastructure

- Local, state, and federal agencies should coordinate infrastructure planning by carrying out joint scenario planning to identify mutual needs such as airfields, ports, roads, and communications, and opportunities for investment synergies.
  - The oil and gas industry and local stakeholders should be included
  - The process should be initiated by the Department of the Interior coordinating a workshop with the relevant parties
  - An Alaska deep draft port study is needed
- The U.S. Coast Guard icebreaker fleet and presence should be expanded
- All stakeholders should work with FAA to support use of unmanned aircraft in the Arctic

Discussion and Path Forward

Path Forward

- Invite feedback from Council members now, or by December 14 via e-mail
  - Marshall Nichols, mnichols@npc.org
- The Arctic Potential team will prepare a draft report for Council review in February 2019
- Publication will follow resolution of any comments received on the report, and approval from the Council