Working Document of the NPC Study:
Arctic Potential: Realizing the Promise of U.S. Arctic Oil and Gas Resources
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Paper #7-1

CURRENT RESEARCH/ACTIVITY CATALOGUE

Prepared for the

Technology & Operations Subgroup

On March 27, 2015, the National Petroleum Council (NPC) in approving its report, *Arctic Potential: Realizing the Promise of U.S. Arctic Oil and Gas Resources*, also approved the making available of certain materials used in the study process, including detailed, specific subject matter papers prepared or used by the study's Technology & Operations Subgroup. These Topic Papers were working documents that were part of the analyses that led to development of the summary results presented in the report's Executive Summary and Chapters.

These Topic Papers represent the views and conclusions of the authors. The National Petroleum Council has not endorsed or approved the statements and conclusions contained in these documents, but approved the publication of these materials as part of the study process.

The NPC believes that these papers will be of interest to the readers of the report and will help them better understand the results. These materials are being made available in the interest of transparency.

The attached paper is one of 46 such working documents used in the study analyses. Appendix D of the final NPC report provides a complete list of the 46 Topic Papers. The full papers can be viewed and downloaded from the report section of the NPC website (www.npc.org).

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Topic Paper

(Prepared for the National Petroleum Council Study on Research to Facilitate Prudent Arctic Development)

7-1	Current Research/Activity Catalogue
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SUMMARY

This paper provides relevant information on technological activity ongoing to support and enhance logistics and infrastructure operations in the Alaskan Arctic.

PURPOSE

Provide information on a Current Catalogue of Technological Activity associated with Outer Continental Shelf (OCS) exploration and development activities in the Alaskan Arctic.

BACKGROUND/ONGOING RESEARCH

OCS exploration is an ongoing effort that easily dates back 30+ years. In some instances, technological capabilities were quickly developed to support the operations in the Arctic environment that proved to be effective in supporting exploration operations. The reinvestment in Arctic OCS operations to prove the existence of suspected hydrocarbon prospects and then determine the best possible means to safely develop the national resources have provided the technology communities to suggest significant performance improvements.

DISCUSSION/POTENTIAL AREAS OF FURTHER RESEARCH

The following list is an example of technologies currently being considered to support logistics and infrastructure during the exploration and development phases of Arctic OCS operations. On the following page is more detail associated with each of these technologies, impacts, benefit, and status.

- Airship. Use of heavy lift airships to ferry material and possibly crews to the area of operations. Airships are an emerging technology that offset some of the logistical challenges of the Arctic such as the lack of deepwater ports, environmental and weather constraints. Several designs from multiple aerospace companies are being explored and considered.

- Floating Port. Also known as a mobile, multi-purpose supply base. Demonstrated capability over the past decades which utilizes Alaskan Super Barges modified with power, crane, berthing, heli-deck, fuel, materials and waste handling, and communications support to create a robust supply and support base in proximity to prospects. With a lack of deepwater ports north of the Bering Strait, this technology basically brings a manmade port to the area of need. Numerous marine companies have experience creating these fit-for-purpose floating ports.
- Hovercraft. Exploring the use of both light and heavy hovercraft to efficiently move crews and materials to the point of need given the lack of deepwater ports. These amphibious craft are attractive and can be used to access very shallow areas. They can be used year round with some specific restrictions. Constraints exist and are well known. Several companies engaged in this area.
- Hover Barge. These amphibious craft combine ship to shore capabilities and materials mobilizaion onshore and offshore. Although it is also an air cushioned vehicle like the hovercraft it, can transport a higher payload. . This type of transport is being explored as a strong possibility.
- Icebreaking Double Acting Ship (DAS) Platform Supply Vessel (PSV) concept has been developed to use for Alaska development. These ice-breaking ships are designed to operate independently in severe ice conditions without icebreaker assistance in the Arctic continental shelf (ABS class A4).
- SWIMS. The Shallows Water Ice Management Ships (ABS class A3) are supply ships designed to mobilize cargo from shallow shore bases up in the north to the leases. Minor dredging would be required as well as complementation with other logistics tools in order to be able to access the theater of operations year round.
- Deepwater Port. Partner with industry, state and federal government for the development of a deepwater port in combination with a satelite port in the vicinity of the operational sites in the Chukchi. ARKTOS. Hi-mobility, ice-capable amphibious support craft that can potentially be used as secondary mode of evacuation from the platforms.
- V-22 Osprey. Commercial use of the proven military V-22 Tilt-rotor aircraft to support operations in the Arctic.

See following page for detail on each of these initiatives.

RECOMMENDATION(S)

None. Provided as information only.

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Emerging Technologies	Collaboration	Development	Opportunity	Benefits	Challenges	Impact
Airship	Industry	Onshore	Emergency Response	Minimal Onshore Footprint	Technology Readiness	Reduced Environmental Impact
	Public	Offshore	Construction	Remote Locations	Weather	
		Nearshore		Year Round Operation		
				Wildlife Interaction		
Floating Port	Military	Offshore	Exploration	Minimal Onshore Footprint	Weather	Improved Uptime
	Public	Nearshore	Construction	Seasonal Sea Ice	Year Round Operation	Reduced Environmental Impact
	Private			Wildlife Interaction		
	International			Subsistence Harvesting		
Hovercraft	Military	Onshore	Emergency Response	Year Round Operation	Technology Readiness	EER Solution
	Public	Offshore	Operations	Wildlife Interaction	Weather	Reduced Environmental Impact
	Private	Nearshore		Subsistence Harvesting	Perception of Technology	
	Industry			Minimal Onshore Footprint		
	International					
Hoverbarge	Public	Onshore	Emergency Response	Year Round Operation	Technology Readiness	Improved Uptime
	Private	Offshore	Operations	Wildlife Interaction	Perception of Technology	Reduced Environmental Impact
	International	Nearshore		Minimal Onshore Footprint	Weather	
Wareship	Industry	Offshore	Operations	Year Round Operation	Technology Readiness	Reduced Environmental Impact
				Wildlife Interaction	Cargo Handling	
				Local Jobs/Revenues		
Icebreaking DAS PSV	International	Offshore	Ice Management	Existing Technology	Environmental Impact	Improved Uptime
	Military		Operations	Local Jobs/Revenues		
	Industry		Emergency Response	Year Round Operation		
SWIMS	International	Nearshore	Ice Management	Existing Technology	Environmental Impact	Improved Uptime
	Industry	Offshore	Operations	Local Jobs/Revenues	Capability	
	Military		Emergency Response		Cargo Handling	
Deep Water Port	Military	Onshore	Construction	Local Jobs/Revenues	Environmental Impact	Improved Uptime
	Industry		Operations		Year Round Operation	
	Federal		Public Port			
Arktos	State	Offshore	Exploration	Existing Technology	Cargo Handling	EER Solution
	Industry	Nearshore	Emergency Response	Seasonal Sea Ice		
			Operations	Remote Locations		
V22 Osprey	Military	Offshore	Public Port	Existing Technology	Weather	EER Solution
	Public	Onshore	Emergency Response	Minimal Onshore Footprint	Wildlife Interaction	Improved Uptime
	Industry		Construction	Seasonal Infrastructure	Subsistence Harvesting	

Table 1. Current Research/Activity Associated with the Arctic