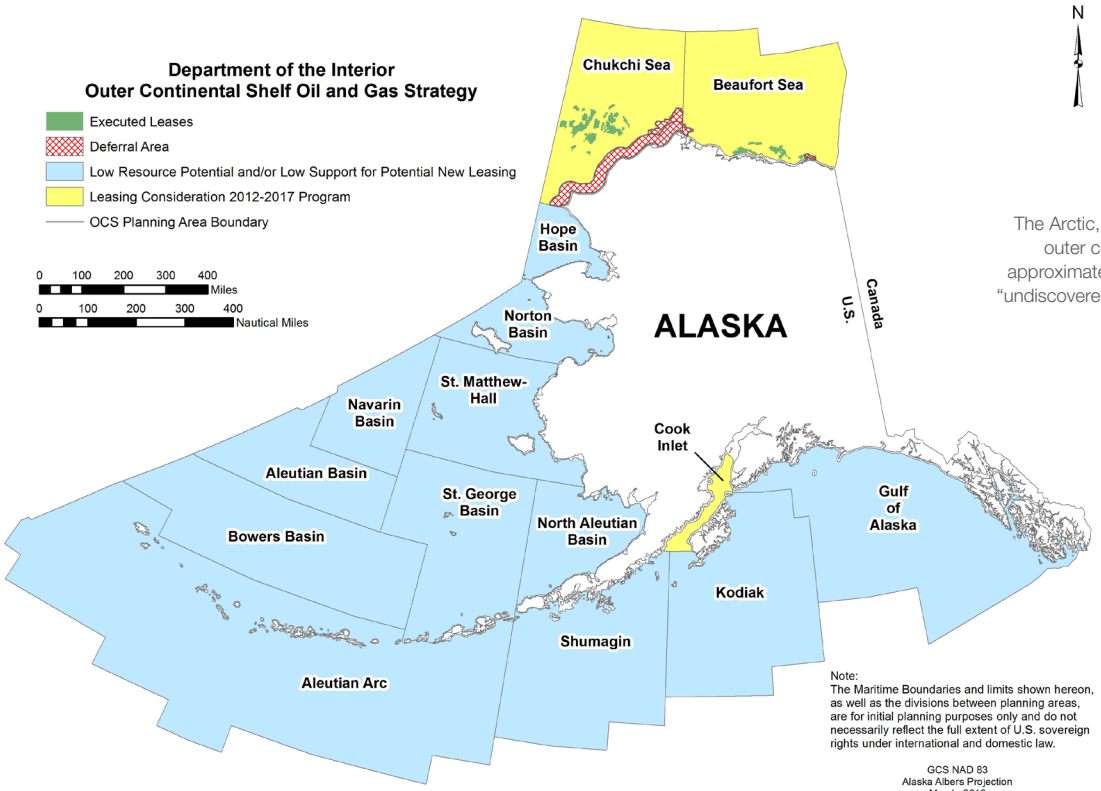

The Arctic, including areas in the outer continental shelf, holds approximately 22% of the world's "undiscovered recoverable" oil and natural gas reserves

MIND THE GAP:
America's lost offshore Arctic experience

With little activity on the US Arctic Outer Continental Shelf in recent decades, one of the big challenges for operators is the offshore Arctic knowledge gap as experienced personnel have left the work force. Joseph White and Victor Schmidt of Houston-based Endeavor Management report

Three decades of relative inactivity in US offshore Arctic oil and gas activity have taken a severe toll on the availability of experienced personnel with oil and gas exploration and production backgrounds to both drill and develop Arctic Outer Continental Shelf (OCS) resources. The skilled and experienced people who developed the fields discovered more than 30 years ago are likely no longer in the work force. A significant offshore Arctic "knowledge and experience" gap exists for design and drilling, just as demand for this expertise is increasing rapidly in the Arctic OCS Regions.

The last great wave of oil and gas activity in the US Arctic occurred with development of the onshore Alaska Prudhoe Bay fields in the 1970s, but new exploration offshore was stymied by declining prices, the *Exxon Valdez* tanker oil spill, environmental opposition, and the challenges of ice-covered waters. Yet, as former Deputy Interior Secretary David Hays put it: "Regardless of what happens in the United States, there is no question there is going to be offshore development in other Arctic nations." Activity today in Russian Arctic waters and Russia's long-term LNG contract commitment with China validates this earlier observation.

With the 2005-2008 sales of Arctic OCS leases, Washington prepared the US to follow suit. Now with Prudhoe Bay fields in decline and the Alaska Pipeline carrying only a fraction of its capacity, the development of additional oilfields in the area has broad national implications.

> A significant offshore Arctic "knowledge and experience" gap exists

On October 19, 2009 USGS published its "Arctic Oil and Natural Gas Potential" report, which laid out the potential "undiscovered recoverable" oil and natural gas reserves in the Arctic region, including areas of the Alaska OCS. That report concluded that the Arctic as a whole holds approximately 22% of the world's undiscovered conventional oil and gas resources. In a world with burgeoning energy demands, particularly in China and India, Arctic energy will undoubtedly play a significant role.

In 2009, the same USGS Report cited the following factors as slowing or preventing Arctic offshore development:

- Harsh winter weather requires equipment be "specially designed" for temperature extremes.
- In Arctic seas, the icepack can damage offshore facilities, while hindering the movement of personnel, materials, and equipment.
- Long supply lines from the world's manufacturing centers require equipment redundancy and a large inventory of spare parts and materials to insure reliability.
- Limited transportation access and long supply lines reduce transportation options and increase costs.

Map: USGS

These factors can be overcome with the application of appropriate technology and adequate resources. However, it is the lost "hands on" experience and expertise of Arctic OCS personnel that is now a concern.

The major difference between the onshore Arctic and the Arctic OCS is floating ice, which must be controlled for safe offshore operations. Dealing with the ever-changing ice in Arctic waters is one of the most challenging issues. Whether the task is moving vessels through the ice or keeping ice clear of drilling vessels and production facilities, ice management requires the right resources, sufficient expertise, and the right plan.

An effective ice management program must have a clearly defined purpose with specific goals. The location or region to be serviced must be identified based on the activity to be protected, whether it's a stationary drilling operation, production facility, or maintaining access for support vessels.

Ice management vessels protecting a location must have the specific capabilities to deal with the likely ice conditions. The vessels must have the ability to detect ice by radar and visual observation, operate safely in close proximity to identify ice concentration and thickness, and to break up large floes that threaten operations.

By all measures, the Arctic OCS Region will be more challenging than other OCS regions such as the Gulf of Mexico for well blowouts, oil spill containment, and oil recovery due to the remote and unforgiving environment, lack of infrastructure, logistical difficulties, ice, harsh weather, and high sea states. Limited visibility, whether caused by fog, haze, or darkness, reduces the amount of information that crews can gain from direct observation. Navigation by dead-reckoning becomes problematic, so sophisticated global positioning equipment and vessel and oil tracking tools are needed to coordinate any clean-up activity.

More challenging is the recent change in the US regulatory environment, resulting from the Deepwater Horizon incident in the Gulf of Mexico, that operators may be seeking to apply in other Arctic OCS Regions to enhance safety precautions. The Macondo well blow-out and subsequent clean-up brought intense scrutiny to offshore drilling activity by the popular press and among environmental groups. It also prompted the division of the former Minerals Management Service (MMS), creating the Bureau of Ocean Energy Management (BOEM) and Bureau of Safety and Environmental Enforcement (BSEE).

As a new US regulatory agency focused on industry regulation and enforcement, BSEE issued a comprehensive new policy on August 17, 2012 that clearly extended regulations for the offshore oil and gas industry to contractors and their subcontractors. This new paradigm means that contractors must be concerned about legal liability and the risk that they and their insurers now incur when their services or equipment are to be utilized in US OCS waters.

The roll call of obstacles – scarce and fragmented expertise, environmental and operational challenges, and intensive regulatory requirements predicated on a recent mishap – appears daunting. Though the potential rewards for oil and gas development in the US Arctic OCS and other Arctic regions are huge, they come with high risks, high costs, and lengthy lead times – and they could easily become catastrophic.

Both operators and contractors need to be aware of the additional responsibility now required by US authorities. They need to develop appropriate approaches to Arctic OCS operations and identify, assemble, and access those individuals having "hands on" Arctic OCS experience to meet the challenges head on successfully and safely. FE

Authors

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The retirement of skilled workers means there's now a significant knowledge gap

Photo: Shell

Time Line of Arctic Oil and Gas Discovery

1962	Tazovskoye Field, Russia, discovered
1967	Prudhoe Bay Field, Alaska, discovered
1978	Panarctic Oils Ltd. Drake F-76 well (Canada) was completed as the world's first Arctic subsea gas well in 181ft of water, one-half mile offshore
Early 1990s	61 large oil fields discovered within the Arctic Circle 43 in Russia: 35 in the West Siberian Basin, 5 in Timan-Pechora Basin, 2 in South Barents Basin, 1 in Ludlov Saddle. 11 in Canada's Northwest Territories 6 in Alaska 1 in Norway
2005	US offshore Beaufort Sea lease sales issue 117 leases for US$47 million
2007	US offshore Beaufort Sea lease sales issue 90 leases for US$42 million
2009	USGS issues updated estimates for Arctic oil and gas resources US offshore Chukchi Sea lease sales issue 487 leases for US$2.7 billion Pioneer Natural Resources brings Oooguruk field online (5 miles offshore Beaufort Sea).
2012	46 of the 61 large fields discovered in early 1990s are in production: 41 in Russia, 4 in Alaska, 1 in Norway 15 remaining large fields have yet to go into production: 2 in Arctic Alaska, 11 in Canada's Northwest Territories, 2 in Russia Shell Oil begins exploratory drilling in the Beaufort and Chukchi Seas.