# So You Want To Operate in the U.S. Arctic?

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Arctic water operations present a unique set of challenges that range from environmental to structural to regulatory in nature. This article highlights some of these challenges, and ultimately indicates that IMC's unique surveyor-regulatory compliance team is an ideal resource for operators looking for assistance in accessing and utilizing the U.S.'s northern waters.

The diminution of Arctic ice, both already observed and predicted to occur in the coming years, will open that region up to maritime activities on a never-before-seen scale. As the U.S. Congressional Research Service stated in its January 4, 2018 report entitled "Changes in the Arctic: Background and Issues for Congress [CRS Report],"

> [t]he diminishment of Arctic ice could lead in coming years to increased commercial shipping on two trans-Arctic sea routes—the Northern Sea Route close to Russia, and the Northwest Passage . . . . Changes to the Arctic brought about by warming temperatures will likely allow more exploration for oil, gas, and minerals.

As for Arctic marine tourism, a 2013 study documented that such tourism grew by 500 percent from 1994 to 2009, while the number of Arctic cruise ship passengers doubled from 1.2 million in 2004 to more than 2.4 million in 2007. That trend has continued, as particularly demonstrated by the well-publicized transit of Canada's Northwest Passage (NWP) by the non-ice-strengthened cruise ship Crystal Serenity in 2016.

As alluded to above, such increased access carries with it risks, costs, and challenges not present in more hospitable environs. Many of these are interrelated; for example, the harsh environment enhances the risk of a marine casualty occurring, yet also increases the time necessary to mount a search and rescue operation, which necessitated the adoption of regulations requiring vessels to carry enhanced survival gear to maximize the crew's (or passengers') survival potential until dedicated response assets can arrive on scene. This article will examine these risks, costs, and challenges by first briefly describing the Arctic operating environment. It will then highlight risks associated with Arctic operations. It will conclude with a discussion of some of the operational, regulatory, and legal requirements put in place in Arctic waters, with which vessels operating in these waters must comply.

## The operating environment

Ice presents an obvious challenge and risk to shipping. The ice challenge can take the form of fields of multiyear ice up to 10 feet thick or more that can be problematic even for icebreakers, to one-year ice that is typically 3 feet thick or less that can be more readily broken up by icebreakers or ice-class ships (cargo ships with reinforced hulls and other features for navigating in ice-infested waters). Vessel operators must be aware of the location and solidity of the ice fields, which can pose an impenetrable barrier to vessel movement.

In reality, however, it is the absence, or diminution of the extent and nature, of the ice fields that has vessel operators looking northward in the first place; so this challenge, while real, is by definition less predominant than it once was. However, more open water in the Arctic has resulted in another potential obstacle to shipping: unpredictable ice flows. In the NWP, blocks of multiyear ice from farther north and icebergs from Greenland have been increasingly observed migrating into open sea areas that would serve as sea lanes for transiting vessels. The flow patterns of these ice blocks are very difficult to forecast, which adds a significant degree of unpredictability, and thus risk, to shipping even in the supposedly "accommodating" summer months when the sea lanes will be free of ice fields.

Ice is not the sole impediment to Arctic shipping. Environmental hazards such as hurricane-force winds, subzero temperatures, high seas, shifting sea ice, and long periods of fog and darkness are normal. The fog can pose an especial challenge during the summer months, when the sea lanes would be open.

In and of themselves, these challenges posed by the natural environment impose risk to vessels, e.g. collision with an iceberg, collision due to fog, casualties due to wind and sea state. They also have derivative consequences on support systems, as it were, that enable and support vessel operations. For example, with respect to oil spill cleanup, the National Research Council in a 2014 report concluded that "the lack of infrastructure in the Arctic would be a significant liability in the event of a large oil spill." This is illustrated by the fact that Barrow, Alaska, is the U.S. Coast Guard's 'preferred location' for responding to a spill due to its centralized location along the North Slope. It has no roads, and is only accessible by air for part of the year. There is no permanent Coast Guard presence there; the nearest station, Kodiak, Alaska, is more than 800 nautical miles away. This translates, if weather permits, into a four-hour flight by a C-130, a ten-hour flight via helicopter, or a three-day cutter voyage to reach there from the Bering Sea. Basic Coast Guard telecommunication services such as VHF and HF radio, which are found almost everywhere in the rest of the US, are nonexistent in Barrow. Spill response would be further complicated by the fact that there is limited sunlight for two-thirds of the year, fluids become more viscous, hydraulic hoses and metals become brittle and break more easily, and freezing spray quickly covers everything. Clearly, the inhospitable northern environment poses major operational challenges in conducting a spill response.

This "response gap" and associated challenges would equally impede search and rescue (SAR) operations in the region. The Arctic Council's Arctic Shipping Assessment 2009 Report, a four-year multinational review, had this to say on the current state of Arctic SAR:

> Search and rescue infrastructure in the Arctic is limited. The most significant emerging challenge to existing SAR infrastructure arises from the increase in marine tourism and passenger vessels operating in Arctic waters. As large passenger vessels continue to operate more frequently and farther north in the Arctic, the prospect of having to conduct mass rescue operations with limited SAR resources increases. Recent growth in Arctic marine tourism is outpacing infrastructure investment, development and support through the region.

Little has changed since the Arctic Shipping Assessment was completed, other than an increase in Arctic marine traffic.

The danger this response gap poses in the SAR realm was conclusively demonstrated in 2010, when the 331-foot cruise ship *Clipper Adventurer*, 16 days into a 17-day voyage from Greenland to Nunavut in northern Canada, with 118 passengers aboard, struck and grounded on an uncharted rock 15 feet below the surface in calm seas and clear skies. Though the grounding occurred only 60 miles from the inhabited hamlet of Kugluktuk, Nunavut, it took the Canadian Coast Guard two days to get response assets to the scene. All 118 passengers remained aboard the vessel for the two-day period; and though in this case the vessel did not founder and no lives were lost, the circumstances dramatically illustrate the potentially catastrophic SAR consequences of the "response gap." As further found by the 2009 Arctic Council's 2009 Shipping Assessment,

> [t]he current lack of infrastructure in all but a limited number of areas, coupled with the vastness and harsh environment, makes carrying out a response significantly more difficult in the Arctic. Without further investment in development and infrastructure, only a targeted fraction of the potential risk scenarios can be addressed.

Oil spills and casualties in the Arctic are made more likely due to the fact that only 11% of the Arctic Ocean is surveyed to modern nautical charting standards. According to the CRS Report,

> considerable investment in navigation-related infrastructure would be required if trans-Arctic shipping were to become a reality. Channel marking buoys and other floating visual aids are not possible in Arctic waters because moving ice sheets will continuously shift their positions. Therefore, vessel captains would need to rely on marine surveys and ice charts. For some areas in the Arctic, however, these surveys and charts are out of date or not sufficiently accurate. To remedy this problem, aviation reconnaissance of ice conditions and satellite images would need to become readily available for ship operators. Ship-to-shore communication infrastructure would need to be installed where possible. Refueling stations may be needed, as well as, perhaps, transshipment ports where cargo could be transferred to and from ice-capable vessels at both ends of Arctic routes. Shipping lines would need to develop a larger pool of mariners with ice navigation experience. Marine insurers would need to calculate the proper level of risk premium for polar routes, which would require more detailed information about Arctic accidents and incidents in the past.

Finally, basic economics related to the nature of the operating environment require further cost and risk calculations by vessel operators. Larger vessels that operate freely in other waters would require two icebreakers to break a path wide enough for them to sail through. Beyond the obvious cost of such support, the woeful state of the U.S. government icebreaker fleet – two operational polar icebreakers, one of which has exceeded its 30-year service life, with a new icebreaker not scheduled for delivery until the fourth quarter of fiscal year 2023 – calls into

serious question the very availability of such necessary assets. Ship owners can avoid, or at least minimize, icebreaking costs by operating smaller vessels in the Arctic, but this would raise the cost per container or per ton of freight. Also, smaller ice-class cargo vessels burn more fuel than ships designed for more temperate waters, and would have to sail at slower speeds. The shipping season in the Arctic only lasts for a few months, so icebreakers and other special required equipment would sit idle the remainder of the year. As the CRS Report states, "[n]one of these impediments by themselves may be enough to discourage Arctic passage but they do raise costs, perhaps enough to negate the savings of a shorter route. Thus, from the perspective of a shipper or a ship owner, shorter via the Arctic does not necessarily mean cheaper and faster."

## Operational and Regulatory Responses to the Challenges of Arctic Operations

The risks, costs, and challenges just discussed in relation to Arctic operations have resulted in the imposition of specialized regulatory and operational regimes applicable in the region that impact vessel operations and operators. Some of the more significant of these will be discussed below.

As to routine vessel generated pollution, all vessels operating in or near U.S. waters must comply with the applicable pollution control regime. This regime can be very confusing in its own right, involving as it does a complex interaction of international, U.S., and individual state (i.e. Alaska) laws and regulations. This regime has been recently "modernized" in Arctic waters through the entry into force of the IMO Polar Code [the Code] on January 1, 2017. The Code applies to passenger and cargo ships of 400 gross tons or more engaged in international voyages. As to the waters in which the Code applies, that is overall very complex, but relatively simple in U.S. waters – anything north of the 60$^{th}$ parallel. The waters in which the Polar Code applies are depicted below:

In waters in which the Polar Code applies, and as to vessels to which the Polar Code applies, Part II of the Code contains pollution control measures, of which those in Part II-A are mandatory to MARPOL-signatory States, whereas those in II-B are recommendatory only. Chapter I of Part II-A contains rules relating to prevention of pollution by oil; Chapter 2, on the control of pollution by liquid substances in bulk; Chapter 3, on prevention of pollution by harmful substances carried by sea in packaged form; Chapter 4, on the prevention of pollution by sewage from ships; and Chapter 5, on the prevention of pollution by garbage from ships. Operations in Polar Waters should be incorporated, as appropriate, into the Oil Record Book, Shipboard Oil Pollution Emergency Plan/Shipboard Marine Pollution Emergency Plan, Garbage Record Book garbage placards, and Garbage Management Plan. Particularized changes contained in Part II of the Code include:

- A prohibition on the discharge of garbage in Arctic waters unless food waste is ground or comminuted and the ship is not less than 12 nm from nearest land, nearest ice-shelf, or nearest fast ice, and is as far as practicable from ice concentration greater than 10%;
- Cargo residues may be discharged only under specifically listed conditions;
- The discharge of sewage is prohibited, unless specific requirements are met; and
- With very limited exceptions, the discharge of oil or oily mixtures into the ocean from any ship is prohibited.

Part I of the Code contains a number of mandatory provisions (to vessels covered by the Code) relating to ship construction, ship equipment related to navigation, and crew training and ship operation. Examples of these provisions include:

- a requirement that ships carry fully or partially enclosed lifeboats, and, for passenger vessels, a proper sized immersion suit or a thermal protective aid for each person on board;
- that the crew have training in ice navigation;
- that every ship to which this Code applies shall have on board a valid Polar Ship Certificate and a Polar Water Operational Manual, which incorporates risk-based procedures for such things as voyage planning to avoid ice and/or temperatures that exceed the ship's design capabilities or limitations; and
- that in creating the Operational Manual, an assessment of the ship and its equipment be conducted, taking into consideration such factors as the anticipated range of operating and environmental conditions.

Other responses to the risks and challenges posed by increasing vessel traffic in the U.S. Arctic include spatial measures that derive from IMO's Particularly Sensitive Sea Areas (PSSA) regime. One example of this is the IMO's adoption of five Areas to be Avoided (ATBAs) "in the region of the Aleutian Island Archipelago" (see depiction below) that came into effect on January 1, 2016. Vessels to which the ATBAs apply – those 400 gross tons or larger solely in transit through the Bering Sea and North Pacific Ocean – "should" avoid the designated waters, which extend 50 nautical miles from the shoreline of the islands. This 50 NM buffer zone keeps transiting vessels far enough offshore so that if they suffer a marine casualty, they have time to

repair it, or there is time to launch an emergency response effort before the impacted vessel runs aground and damages the fragile ecosystem.


In addition to the ATBAs, the United States and Russian Federation have proposed voluntary two-way routing measures in the Bering Strait and Bering Sea in response to an anticipated increase in transits through the Strait. The nations jointly developed and submitted the routing measures to the International Maritime Organization to formalize the two-way routes and precautionary areas. Located in U.S. and Russian Federation territorial waters off the coasts of Alaska and the Chukotskiy Peninsula, the recommended routes help ships avoid the numerous shoals, reefs and islands outside the routes, reduce the potential for marine casualties and environmental disasters, and avoid areas that would adversely impact subsistence hunting and gathering of the indigenous people in the region.

## Conclusion

This article focused on the risks, costs, and challenges of operating in Arctic waters generally, with a particular emphasis on the U.S. Arctic. The article also discussed some recent regulatory and operational changes that have recently occurred, or that have been proposed, in response to the anticipated increase in vessel operations in these waters. IMC's regulatory consultants Tim Close, Barry Compagnoni, and Andrew Norris recently completed an exhaustive study on vessel generated waste in the U.S. Arctic that was commissioned by The Pew Charitable Trusts, and are extraordinarily equipped and capable to assist vessel operators either prospectively in planning for and achieving compliance with the complicated regulatory regime applicable to vessels in these waters, or in response to casualties or other incidents that may have already occurred. In addition, IMC's hull inspectors and surveyors are available to assess vessels designated for

Arctic operations to ensure that the Polar Code's requirements, including the creation of a Polar Water Operational Manual, are satisfied in an efficient and cost-effective manner.

Sources:

U.S. Congressional Research Service stated in its January 4, 2018 report entitled "Changes in the Arctic: Background and Issues for Congress

Arctic Council's Arctic Shipping Assessment 2009 Report

Norris, Compagnoni, and Close, "Technical Analysis of Vessel Discharges in the Northern Bering Sea and Bering Straits Region," commissioned by The Pew Charitable Trusts, 2017

Norris and McKinley, "The Central Arctic Ocean - Preventing Another Tragedy of the Commons," 53 *Polar Record,* No. 1, January 2017