

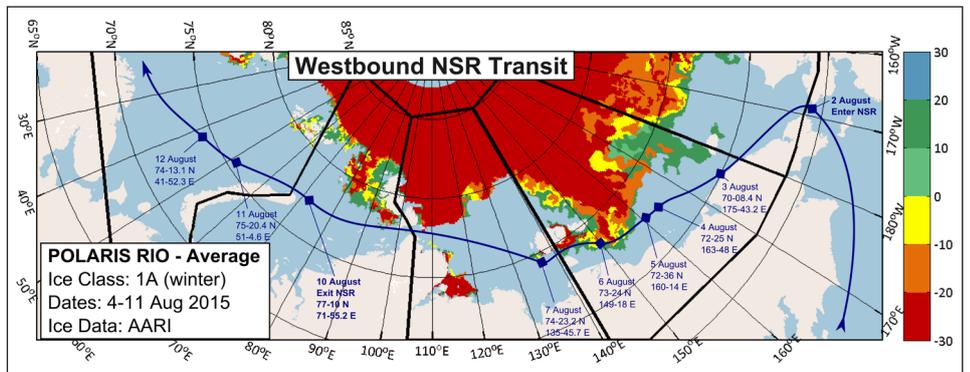
IMO POLAR CODE SUPPORT

In 2015, the International Maritime Organization (IMO) adopted new international regulations for ships operating in Polar Waters by finalizing the IMO Polar Code. ABS was closely involved in the development of the Polar Code through support to both IACS and US delegations during the IMO working group proceedings. The Polar Code introduces a broad spectrum of new binding regulations covering elements of ship design, construction, onboard equipment and machinery, operational procedures, training standards, and pollution prevention. As a recognized organization to flag Administrations, class will be responsible for the implementation of the Polar Code and working with customers to verify compliance with the new regulations which enter into force in 2017.



IMO POLAR CODE ADVISORY

As with any new regulatory requirement, there are challenges. ABS is prepared to provide support, including coordinating with flag Administrations to best understand and clarify any varying interpretations. We recently published the *ABS IMO Polar Code Advisory* to provide an overview and introduction of the Polar Code to all industry stakeholders.



POLAR CODE OPERATIONAL ASSESSMENTS

Under the Polar Code, the owner/operator is required to undertake an operational assessment for all ships entering Polar waters. This operational assessment shall assess the ship and its equipment for the anticipated range of operating and environmental conditions. The outcomes of this assessment will include any limitations to be listed on the Polar Ship Certificate (PSC), a list of procedures for the Polar Water Operational Manual (PWOM), and identified risk control measures for certain ship systems and equipment including lifesaving appliances and survival resources. ABS is prepared

to support customers by facilitating the required operational assessments through a structured hazard identification (HAZID) workshop.

POLARIS FOR ESTABLISHING OPERATIONAL LIMITATIONS IN ICE

While ice class rules provide a clear construction standard, an ice class notation only offers a basic and broad indication of its operational capabilities and limitations in ice. The Polar Code emphasizes having ice operational limitations referenced on the PSC with more detailed procedures in the PWOM.

An approved methodology must be used to determine the operational limitations in ice and the master and navigation officers must be instructed in its use. ABS has developed tools to apply the recently adopted IMO methodology, called the Polar Operational Limitation Assessment Risk Indexing System (POLARIS), to establish the ice operational limitations for ships subject to the Polar Code. Analyses of potential transit routes and operations through various ice covered waters at different time periods can be carried out for early stage planning, to select an appropriate ice class, or during operational phases of a project.

POLAR SERVICE TEMPERATURE

The Polar Code introduces the first formal IMO recognition of design temperatures for ships operating in cold environments. ABS has conducted an extensive analysis of temperature statistics and ice accretion severity risk for Arctic, sub-Arctic and Antarctic Waters. Data from hindcast models and on-shore weather stations has been processed to help customers determine rational Polar Service Temperatures (PST) for the certification of materials and equipment and avoid over specifying at the design stage. The data has also been coupled with seawater temperature, wind speed and salinity information to populate a model for marine icing severity. Continued work is focused on developing testing procedures and criteria for equipment subject to ice accretion and low air temperatures.

GUIDANCE, INTERPRETATION, AND CONTINUED RESEARCH

ABS is prepared to work with customers to provide practical guidance and interpretation of the Polar Code's functional requirements. We also are dedicated to continued research and development efforts to drive the next generation of safety standards and promote innovative solutions for Polar conditions. For example, survival equipment and lifesaving appliances should be fit-for-purpose and functional in the Polar environment. ABS researchers recently participated in a search and rescue (SAR) exercise near Svalbard, Norway to advance the understanding of risks associated with emergency scenarios in Polar Waters.

ADDITIONAL WINTERIZATION GUIDANCE

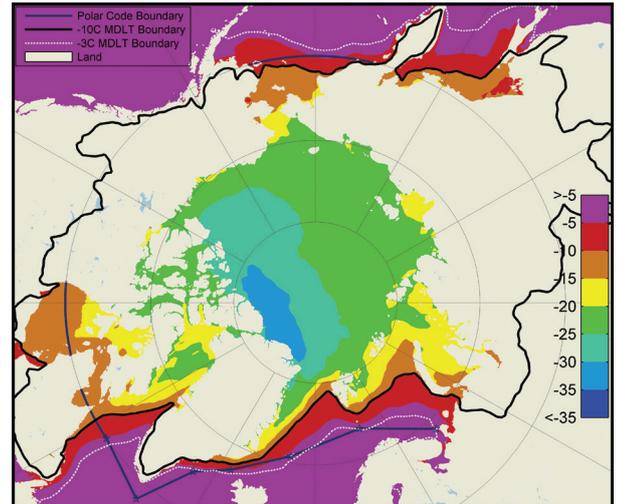
The *ABS Guide for Vessels Operating in Low Temperature Environments (LTE Guide)* contains guidance and requirements addressing materials, welding, coatings, deck equipment,

machinery, safety systems, and crew considerations for ships intended for operations in low temperature environments. ABS has incorporated extensive knowledge and experience into the LTE Guide in order to assist designers and shipbuilders to mitigate the risks of operations in harsh environments. ABS is prepared to work with customers to develop tailored winterization solutions and compliance regimes, include the application of risk-based winterization measures.

ABS HARSH ENVIRONMENT TECHNOLOGY CENTER (HETC)

ABS Harsh Environment Technology Center (HETC) was established on the campus of Memorial University in St. John's, Newfoundland and Labrador in 2009. The primary objective of the HETC is to develop technology for the design and assessment of ships and offshore structures that operate in harsh environments

- particularly the Polar regions and low temperature areas. It is an extension of ABS' robust Polar and harsh environment program located within ABS' Technology department headquartered in Houston, Texas. Newfoundland was considered a prime location to establish an Arctic research center due to its excellent educational program, offshore oil exploration and development activities in the region, and progressive approaches in supporting research activities.



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