

Abstract SNAME presentation 21 Dec 2005

Title: Shell Canada Niglintgak Project in the Mackenzie Delta

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Numerous marine transits, structure mobilizations, barging and "sealift" operations involving non-ice class marine vessels have been accomplished over the last few decades around Point Barrow and into the Beaufort Sea. With the ongoing development of offshore fields on the Alaskan Offshore Continental Shelf, in the Canadian Beaufort Sea and Mackenzie Delta, projects are more and more looking to this transit route. Logistic schedules, critical to successful developments, depend on a successful transit within a relatively short ice and weather window permitting open water class vessel transit around Point Barrow.

This planning process is a relatively complex set of engineering and research tasks, that is best first addressed individually and in the end integrated under one "umbrella." The principal tasks that need to be addressed include:

1. Analysis of historical ice data (satellite imagery, studies, visible and microwave data) from public and private sources as accumulated by local operators (such as AOGA, APOA).
2. Estimate of the probabilities of invasion of first-year, 2nd-year, or multi-year ice; of ice-free transportation window due to currents and wind.
3. Ongoing observations on area ice dynamics for near term forecasts.
4. Location of shear boundary separating stable ice from dynamic ice; seabed bathymetry.
5. Probabilistic analysis of a successful transit based on best estimates or Monte Carlo simulation.
6. Quantitative risk analysis of a transit around Point Barrow in specific year.
7. Choice of optimal transit time and route based on all above.
8. Real time observation and continuous reassessment during transit to support any tactical routing changes to accommodate current ice conditions.

A significant amount of work has been done to date by the authors' respective firms in addressing all of the above issues. This presentation will present the general approach for the optimization and real time tactical support for point Barrow shipping transits, and illustrate the principal steps from the authors' experience.