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Responding to Oil Spills Under Ice: Alaska Clean Seas' Cold Regions Research and Engineering Laboratory (CRREL) Training Course

Christopher J. Hall, Planning & Development Manager
Ken Linderman, Operations Manager
Alaska Clean Seas
Prudhoe Bay, AK 99734-0022

Leonard Zabilansky, Research Civil Engineer
U.S. Army Engineer Research and Development Center (ERDC) –
Cold Regions Research and Engineering Laboratory (CRREL)
Hanover, NH 03755

Abstract:

The Alaska North Slope region is a demanding operating environment for oil exploration, production and transportation operations. The Arctic Ocean remains frozen for an average of nine months of the year, with only a limited open-water season in the summer. There are long periods of darkness, extremely harsh weather conditions, remote installations and limited infrastructure. As Arctic oil exploration, production and transportation activities expand, there is growing concern about the ability of public and private sector response organizations to effectively clean up oil spills under ice.

Alaska Clean Seas (ACS) is the Alaska North Slope oil spill response cooperative based in Prudhoe Bay, AK. ACS oversees the training and coordination of the North Slope Spill Response Team (NSSRT), a volunteer-based organization consisting of personnel from the workforce of ACS' Member Companies and their support contractors. Beginning in January 2012, ACS partnered with the U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL) in Hanover, NH, to develop an Advanced Oil Spill Response in Ice Course. Now in its third year, this partnership has combined the unique facilities, capabilities and ice research history of CRREL with the Arctic response expertise and experience of Alaska Clean Seas to deliver realistic, one-of-a-kind training for recovering oil spilled under ice. Participants have included members of the NSSRT, several federal regulatory agencies and representatives from the Global Response Network. ACS provides response equipment from the North Slope and several vendors have demonstrated additional skimming and pumping systems specifically designed for recovery in ice.

Central to the course is CRREL's outdoor saline test basin, a 60' x 25' x 7' refrigerated in-ground tank equipped to grow and maintain a two-foot cover of sea ice. Approximately 600 gallons of Alaska North Slope crude oil are injected under the ice to provide a realistic field scenario to practice response tactics. These tactics include assessment and profiling techniques for safely working on the ice; employing underwater lights and ground penetrating radar for detection of oil under ice; use of augers and chainsaw sleds to cut holes and slots in the ice; deployment of recovery and storage systems to remove oil from an ice environment; and in-situ burning operations in slush and broken ice.

This presentation highlights the development of the CRREL Training Course and provides guidelines for course content, length, and special considerations for similar advanced field training courses.

Freshwater Pond

Saline Test Basin

Field training areas used during 2014 CRREL Training Course

Ice Safety and Profiling

Delineation with Ground Penetrating Radar

Delineation with Underwater Lights and Cameras

Cutting Ice Slots for Recovery

Techniques for Ice Removal

Recovery of Oil Under Ice

In Situ Burning of Oil in Broken Ice