

OIL SPILLS IN THE ARCTIC: A REVIEW OF THREE DECADES OF RESEARCH AT ENVIRONMENT CANADA

B. HOLLEBONE[†] & M.F. FINGAS
*Emergencies Science and Technology Division,
Science and Technology Branch, Environment Canada,
Environmental Technology Centre, 335 River Rd.,
Ottawa, ON, Canada*

Abstract*. Since 1970, Environment Canada has had the responsibility to coordinate response for environmental emergencies in Canada, to develop new understandings of how emergencies happen, their effects on Canada's environment, and to develop and test new techniques to protect the environment from their adverse repercussions. The Arctic and Marine Oil spill Program (AMOP) was initiated by Environment Canada in conjunction with many partners to improve capabilities to detect oil in the Arctic, to understand the fate and behaviour of oil in ice and to counteract and limit the impacts of oil spills in the Arctic and marine environments. For the past thirty years, AMOP has sponsored and participated in hundreds of individual research projects in each of these three fields of research. Finding oil in Arctic waters is made difficult both by the presence of ice and by the long darkness of winters. Environment Canada has developed a second-generation airborne laser fluorosensor (SLEAF), autonomous oil sensor buoys, and new techniques to assess oiled Arctic shorelines (SCAT). The second major focus of AMOP has been to develop understanding of the fate and behaviour of oil in the Arctic. These efforts have included large-scale field projects such as the Baffin Island Oil Spill (BIOS) and the Newfoundland Offshore Burn Experiment (NOBE), laboratory studies of oil in ice (for example, the effects of oil on ice growth, the degradation of oil in ice, and the sinking of oil in cold water), the development of new analytical environmental forensic techniques to identify, quantify, and understand the behaviour of oil, and the creation of one of

[†] To whom correspondence should be addressed. E-mail: bruce.hollebone@ec.gc.ca

* Full presentation available in PDF format on CD insert.

the largest catalogues of oil properties at cold temperatures. Environment Canada has also been working to improve spill countermeasures in the Arctic. This has included the development and testing of new equipment including ice skimmers, conventional booms, water jet barriers, fire-resistant booms and slick igniters. Other countermeasures are also actively researched including the burning of oil and bitumens in ice, and the use of dispersants and other spill-treating agents. Finally, to communicate with and to bring together oil researchers from around the world, AMOP conducts an annual seminar (with peer-reviewed proceedings) now in its 29th year, which has developed into one of the major technical conferences focusing on oil spill detection, behaviour and countermeasures.

Keywords: arctic, oil spill response, environment, oil in ice, AMOP