ARCTIC RESPONSE TECHNOLOGIES

The technologies that currently form the basis of Arctic oil spill response include mechanical recovery, dispersants, remote sensing and in situ burning. The research of the Arctic Oil Spill Response Technology Joint Industry Programme (JIP) is intended to build on existing knowledge of these and other emerging technologies, and their role in an integrated response.

RESEARCH PROJECTS

Over the course of four years, the Arctic Oil Spill Response Technology JIP research programme will be focused on expanding industry knowledge through nine research projects:

- Fate of dispersed oil under ice
- Dispersant testing under realistic conditions
- Environmental impacts from Arctic oil spill and oil spill response technologies
- Oil spill trajectory modelling in ice
- Oil spill detection and mapping in low visibility and ice
- Mechanical recovery of oil in ice
- In situ burning of oil in ice-affected waters:
  - Increase state of knowledge
  - Aerial ignition systems
  - Chemical herders

Remote sensing

- Detecting and confirming where a spill is located, either through remote sensing or direct observation, plays a critical role in guiding response efforts.
- A flexible response strategy combining airborne, satellite, surface and sub-surface-based technologies provides the best data for accurately directing the activities of an oil spill response.
- The following technologies are in use today: airborne remote sensing; satellite systems; ground penetrating radar; forward looking infra-red; marine radar systems; upward looking subsea sonar and sensing with trained dogs.

In situ burning (ISB)

- ISB is a proven response technique in which vapours from a slick are ignited and combusted to convert spilled oil into predominantly CO_2 and water, which then rise and rapidly dissipate in the atmosphere.
- It can be used on most surfaces and in certain conditions can rapidly eliminate more than 90 percent of encountered oil.
- The presence of colder temperatures and calmer sea conditions in ice-covered areas can increase the window of opportunity for ISB because of slower evaporation rates.

Dispersants

- Dispersion of oil using either low toxicity chemical dispersants or mineral additives can be an effective way to enhance natural biodegradation.
- It can also aid the treatment and removal of spilled oil before it has spread and impacted marine wildlife and the environment.
- The use of dispersants during an oil spill response can, in certain scenarios, offer higher encounter rates, greater effectiveness, and increased responder safety than mechanical measures.
- Sub-sea dispersant injection for well-control events provides an additional tool that enhances response capabilities for offshore operations.

Mechanical recovery of oil in ice

- Various types of skimmers, containment booms and vessels have been developed specifically for mechanically recovering oil in ice-covered regions.
- Skimmers are fitted with brush belts, drums, or ropes rotating through the oil slick.
- Enhancements, including heating systems, ice deflection frames, and advanced systems for pumping viscous oil/water/ice mixtures ensure the capability of recovering oil in certain ice conditions.
- Environmental conditions and the oil's physical properties are taken into account when determining the best suited mechanical recovery device for the scenario.

ARCTIC RESPONSE TECHNOLOGY
OIL SPILL PREPAREDNESS

2012
Programme Launch

2013
Research Projects & Interim Findings

2014
Research Projects & Interim Findings

2015
Research Projects & Final Reports

ABOUT THE JIP

Nine oil and gas companies have established the Arctic Oil Spill Response Technology Joint Industry Programme (JIP) to further build on more than 40 years of existing research into technologies and methodologies for Arctic oil spill response. The goal of the JIP is to advance response strategies and equipment and to increase understanding of potential impacts of oil on the Arctic marine environment.

The Arctic Oil Spill Response Technology JIP is sponsored by nine oil and gas companies:

bp · Chevron · ConocoPhillips · eni · ExxonMobil · NCOC · Shell · Statoil · TOTAL

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