


The ITOPF perspective on current challenges in responding to an oil spill in the Arctic

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PRESENTATION OVERVIEW




- Introduction to ITOPF
- The Arctic and Northern routes
- Operational challenges and response options
- Preparedness and capabilities
- Conclusions





INTRODUCTION TO ITOPF



- Not-for-profit organisation established in 1968
- Primarily funded by the shipping industry (via P&I Clubs)
- Main role: objective advice on effective response to marine spills of oil & HNS
- Based in London but provide a global service



ITOPF RESOURCES

- 34 staff with 15 spill responders
- Attendance at 730 spills worldwide (97 countries)
- Worldwide network of contacts
- Databases, technical library and information services

ICE & COLD CLIMATE INCIDENTS – ITOPF

NORTHERN ROUTES

- Summer ice cover receding makes transiting the Northern routes accessible to more ships
- Transit distances reduced (NSR: up to 12,000 km – NWP: up to 7,000 km)
- Fuel savings and reduced emissions
- No canal constraints → more cargo carried
- Uncertainty on weather and ice movement → voyage less predictable

TRAFFIC IN THE ARCTIC (2012)

- Remoteness
- Harsh climate
- Dynamic ice conditions
- Daylight variability
- Unique environment (high profile species)
- General lack of infrastructures (Ports, airstrips, roads...)
- General lack of oil spill response equipment / stockpiles

WWF ArkGIS - Data Source Norwegian Coastal Administration

OIL FATE & BEHAVIOUR IN ICE

- Spreading dependent on ice type and ice coverage. **Increasing oil film thickness with increasing ice coverage.**
- Drift: Ice coverage < 30%, drifting of oil is independent of ice. Ice coverage > 60-70%, the oil will mainly drift with the ice.
- Evaporation: **Increasing oil film thickness** due to confinement in ice **reduces both the rate and degree of evaporation.** Diffusion barrier of precipitated wax at low temperature.
- Natural dispersion: decreases with increasing ice coverage. Could be very low due to reduced energy conditions in the ice.
- Emulsification: usually **decrease with increasing ice coverage** due to reduced wave activity.
- **Window of opportunity** for response techniques can be **widened**

KEY QUESTIONS



- Is a response possible?
- Is a response necessary?
- What are the response options?
- What are the operational challenges?

CHALLENGE: WORKING CONDITIONS



- Working hours restricted by temperature and day length
- Presence of ice, mobility and stability
- Logistics of access, transport, accommodation, etc
- Health and safety (darkness, exposure, wildlife, snow and ice)

RESPONSE: DETECTING & TRACKING OIL IN ICE



- Usual set of technologies (FLIR, SLAR, Satellite SAR) can detect oil on the surface of water or ice.
- Ground Penetrating Radar (GPR) for oil >2.5 cm thickness, under snow or ice
- Sniffer dogs on solid ice / shorelines can reliably detect small amounts of oil
- Gas detectors (ethane)
- Ongoing R&D

AT SEA RESPONSE: MECHANICAL RECOVERY



- Oil type and weathering / presence of ice
- Containment vs. ice; abrasion of boom
- Skimmer, pump and power pack winterisation
- Storage, transport and disposal of recovered oil and oily ice/water
- Availability of vessels / access to site

AT SEA RESPONSE: CHEMICAL DISPERSION



PHOTOS: SINTEF

- Oil type and weathering
- Window of opportunity
- Application in ice – targeting fragmented oil slicks; mixing energy
- Regulatory pre-approval is key

AT SEA RESPONSE: IN SITU BURNING



PHOTO: SINTEF

PHOTO: SINTEF

- Oil type and weathering
- Containment / slick thickness
- Residue
- Smoke plume
- Regulatory pre-approval is key

SHORELINE PROTECTION



- Success will depend on oil type / weathering & environmental conditions
- Logistics of access & sourcing equipment, vessels, etc
- Shoreline booming may not be practical due to presence of ice (abrasion, pressure) or extreme cold
- Ice can act as a natural protection

SHORELINE CLEAN-UP



PHOTO: ENTROPISAS

- Natural recovery or clean-up. Respond immediately or wait for thaw?
- Consider waste generation, including ice and snow - *in situ* techniques preferable
- Accessibility / availability of manpower and equipment
- Techniques using water limited by ambient temperature
- Minimise damage to substrate / permafrost / intertidal organisms / vegetation

CHALLENGE: WASTE MANAGEMENT



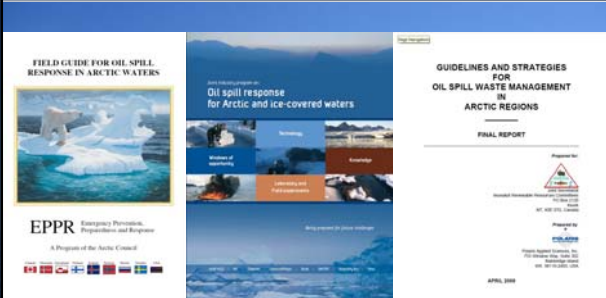
- Likely to be a costly part of any response, especially in a remote location
- Waste hierarchy: reduce, re-use, recycle. Segregate waste streams
- Storage, transport and disposal options likely to be limited and involve transport over large distances
- Contingency plans

CHALLENGE: SOURCING EQUIPMENT & MANPOWER



- High level of locally-relevant knowledge needed
- First aid / survival skills for remote locations
- Use of local populations ?
- Support and subsistence of workers
- Set up of a shore base or vessel deployment to provide accommodation to workers

GUIDELINES AND RESEARCH



- Arctic Council EPPR WG publications of guidelines
- Arctic Joint Industry Programme (oil industry)
- National initiatives / Research
- IMO Polar Code

CURRENT PREPAREDNESS & RESPONSE CAPABILITY



Country	General	C&R	Dispersants	ISB
Russia	Permit granting by NSRA Icebreaker assistance SAR Centres capabilities and numbers to be expanded	C&R equipment on icebreakers Dual purpose oblique icebreaker ordered from Aker Arctic (OSRV)	Subject to authorisation on a case-by-case basis (NEBA)	No regulations in force on ISB. Used on land spills
Canada	2 heavy Arctic icebreakers and 4 Arctic icebreakers Certified response agencies system (4)	Preferred response strategy No equipment stockpiled	Subject to authorisation through lead agency and REET	Subject to authorisation through lead agency and REET
Alaska, USA	3 polar icebreakers OSROs system Alaska Clean Seas provides capability to their members.	OSROs stockpiles and capabilities	Zonation of Alaska waters into pre-approval / case-by-case approval / no-use zones	Guidelines, regulations and authorisation requirements (through Unified Command)
Greenland	Greenland Oil Spill Response: capabilities for members.	Preferred response strategy	Subject to authorisation (NEBA based application)	Not included in NCP, but in oil industry CP (subject to approval)
Norway	Norwegian Coastal Administration (NCA) Norwegian Clean Seas Association (NOFO)	Preferred response strategy. NCA and NOFO capabilities	Considered as an option. Subject to authorisation (NEBA based application)	Not a response option in open water. Increased focus in relation to oil in ice
Iceland	Government stockpiles in 5 locations	Preferred response strategy	Secondary strategy	Not considered
Baltic States	National arrangements and cooperation through HELCOM	Preferred response strategy	Last resort response option (permits)	Not considered

CONCLUSIONS



- Ongoing R&D vs. commercially available technology
- Modelling: fate & behaviour, oil spill trajectory
- Little research on fate and behaviour of non-crude oils
- General lack of infrastructure (ports and transport links)
- Relative lack of non-industry owned stockpiled equipment, vessels and aircraft
- Relative lack of trained personnel other than industry
- 'Response gap' in time and space
- Importance of dispersant and ISB pre-approval regimes when relevant
- Need for international cooperation



THANK YOU
Any questions?

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