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
• 34 staff with 15 spill responders
• Attendance at 730 spills worldwide (97 countries)
• Worldwide network of contacts
• Databases, technical library and information services
• Vessel types: tanker, bulker, containership, cargo, passenger and tug

• Causes: grounding, collision, capsize, fire / explosion, operational; weather a factor

• Pollutants: crude and refined oil cargos, bunkers (HFO, IFO, diesel, gas oil)

• Ice and associated challenges may occur at relatively low latitudes
• 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
• 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
• 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.
• Is a response possible?
• Is a response necessary?
• What are the response options?
• What are the operational challenges?
• 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
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

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

PHOTOS: SINTEF
AT SEA RESPONSE: IN SITU BURNING

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

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