The ITOPF perspective on current challenges in responding to an oil spill in the Arctic
Franck Laruelle & Nicola Beer

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

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PRESENTATION OVERVIEW

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

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
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

ICE & COLD CLIMATE INCIDENTS – ITOPF

- 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

NORTHERN ROUTES

TRAFFIC IN THE ARCTIC (2012)

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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 is reduced 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

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

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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, ILAR, 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

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

• Oil type and weathering
• Containment / slick thickness
• Residuum
• 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

• 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
• 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 EPRR WS publications of guidelines
- Arctic Joint Industry Programme (oil industry)
- National initiatives / Research
- IMO Polar Code

CURRENT PREPAREDNESS & RESPONSE CAPABILITY

<table>
<thead>
<tr>
<th>Country</th>
<th>General</th>
<th>C&amp;R</th>
<th>Dispersants</th>
<th>ISB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>Permit granting by NSRA</td>
<td>CBH equipment on icebreakers</td>
<td>Subject to authorisation on case-by-case basis (NEBA)</td>
<td>No regulations in force on ISB, does not apply</td>
</tr>
<tr>
<td>Canada</td>
<td>2 surveys Arctic (2010) and 6 Arctic (2011)</td>
<td>Certified response agencies system (6)</td>
<td>Subject to authorisation through lead agency and NEBA</td>
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</tr>
<tr>
<td>Alaska, USA</td>
<td>3 polar icebreakers</td>
<td>Arctic Clean Seas provides capability to their members.</td>
<td>Subject to authorisation through lead agency and NEBA</td>
<td>Guidelines, regulations and authorisation requirements (through Unified Command)</td>
</tr>
<tr>
<td>Greenland</td>
<td>Government Stockpiles</td>
<td>Maritime response strategy</td>
<td>Subject to authorisation (NEBA based application)</td>
<td>Considered as an option (NEBA based application)</td>
</tr>
<tr>
<td>Norway</td>
<td>Norwegian Clean Seas Association (NCSA)</td>
<td>Preferred response strategy</td>
<td>Considered as an option (NEBA based application)</td>
<td>Not included in MOU, but in oil industry CP (subject to 10% rule)</td>
</tr>
<tr>
<td>Iceland</td>
<td>Government stockpiles in 5 locations</td>
<td>Maritime response strategy</td>
<td>Secondary strategy</td>
<td>Not considered</td>
</tr>
<tr>
<td>Baltic States</td>
<td>Government stockpiles in 5 locations</td>
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CHALLENGE: WASTE MANAGEMENT

- 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.

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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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