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**Review of MMS and WWF reports on oil spill response in ice
for consideration at WGWAP-9**
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Brian Dicks, August 2010

At WGWAP8, WWF noted that the US Minerals Management Service (MMS) had produced a report on oil spill response in ice titled *Arctic Oil Spill Research and Development Program. A Decade of Achievement* and that subsequently WWF had produced a response entitled *Not So Fast: Some Progress in Spill Response, but US Still Ill-Prepared for Arctic Offshore Development*. WWF provided us with a copy of their report and set out below are my reactions to both the MMS and WWF documents. Please note that the MMS has recently been renamed as the US Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE) and that the MMS report can be found at <http://www.boemre.gov/tarprojectcategories/arcticoilspillresponseresearch.htm>. I have not made a blow-by-blow critique of the MMS report because the WWF report has done just that and I deal with their main points below. However, I have set out a brief overview of the MMS document as an introduction to the WWF report.

Arctic Oil Spill Research and Development Program. A Decade of Achievement.

The MMS report is self-congratulatory in tone, but looking beyond this it does provide a useful update on progress with various projects on oil spill response in ice which the MMS have been overseeing. The main projects reported on are:

- The development of sensors for remotely detecting oil under ice (Ground Penetrating Radar - GPR) and for measuring oil thickness (a thermal imaging sensor using infra-red).
- Development of new skimmers for use in ice and improvements to existing skimmers.
- Development of in-situ burning techniques.
- Use of dispersant in ice.
- Development of chemical herders which act in similar fashion to booms and increase oil thickness.

Unsurprisingly perhaps, there have been no quantum leaps ahead with response techniques in ice and it is a fair criticism that many of the research projects that the report reviews are not yet complete and equipment being tested simply isn't yet available. Some of the projects have been conducted under pretty favourable weather and ice conditions rather than 'worst case' conditions in which real spills often occur. Progress that is reported has been relatively limited, mainly taking the form of improvements to skimmer efficiency. The report makes reference to the many limitations that ice and winter conditions pose for responders, but it doesn't take a position on whether the existing equipment available in the North American Arctic and the resources which are under review in this report are actually adequate to meet the risks. Overall, and disappointingly, the report gives the reader the impression that clean-up in ice is being steadily improved and is feasible/straightforward rather than difficult (sometimes impossible), slow and extremely costly.

Not So Fast: Some Progress in Spill Response, but US Still Ill-Prepared for Arctic Offshore Development.

WWF have made a detailed assessment of the MMS report and many of their criticisms of the various research projects are technically sound. They have tried to put into context the rather limited progress that has been made with clean-up of oil in ice and have offered opinions about whether the improvements which have occurred are likely to have made any difference to response capabilities in the North American Arctic.

WWF have picked up on the following main issues from the MMS study:

- WWF accept that some progress has been made in development of GPR units for remotely detecting oil under ice and thermal imaging sensors for measuring oil thickness, but they correctly highlight the limitations of the instrumentation. For example, the GPR units can penetrate ice up to only 7 feet thick if deployed on foot, and only 3 feet thick if deployed in a helicopter at low altitude. They also note the lack of commercial availability of the units.
- WWF note improvements to existing skimmers and also that a couple of new skimmers are under development, but they also note that most of these improved units are still not commercially available. A very important and oft repeated criticism that WWF make is that in spite of the reported improvements to equipment, the lack of available response vessels that can work in ice in the Alaskan Arctic (I haven't been able to verify this point) makes any progress with equipment and response techniques pointless.
- In-situ burning is critically considered by WWF and they disagree with the MMS's conclusion that this is a viable technique in ice. Their main arguments include that (1) increased oil viscosity at low temperatures and the formation of water-in-oil emulsions make ignition difficult or (for some oils) impossible, (2) it is difficult to work safely on and amongst ice when trying to arrange a burn and (3) even if a burn can be made, the resulting atmospheric pollution is always unacceptable. WWF conclude that in most situations in-situ burning is neither feasible nor acceptable. I have some sympathy with the WWF position but feel their criticism goes too far. In the right conditions and with amenable types of oil, in-situ burning does have some potentially beneficial applications, but I agree with WWF that it is less likely to be successful than the MMS report suggests.
- Regarding dispersant use, WWF highlight the limitations of application in ice and note that due to the damping effects of ice on wave and wind conditions, in many situations there would be too little physical mixing energy for successful dispersion. They also point out that once the oil has been treated with dispersant, it is not actually cleaned up but is simply transferred into the water phase where it may affect marine organisms. WWF adopt a general position against the use of dispersants. This is a position with which I personally disagree. Dispersants have their uses provided that application is restricted to appropriate conditions with adequate mixing energy and sufficient dilution capacity.
- WWF are similarly against the use of chemical herders. They rightly point out that herders are not available commercially and have not been adequately tested for toxicity and effectiveness over a wide enough range of conditions.

In summary it is clear that WWF do not consider the MMS report to have been correctly titled as 'A Decade of Achievement' and for some good reasons. At best, the reported progress with clean-up of oil spilled in ice has been marginal and incremental. The WWF critique rightly states, "In any spill response scenario, the weakest link in the response chain limits response capability," but then it overstates the likely limitations on response by stating, "Despite some technological advances,

most oil spilled in the arctic would not be able to be cleaned up.” This is unlikely to be the case, even though clean-up might be prolonged, difficult and costly and would certainly benefit from ice-class response vessels which allegedly are not available in Alaska. The WWF document ends with a call for a moratorium on further oil leases in the Arctic “until the government, in cooperation with stakeholders, determines acceptable thresholds for response gaps and implements operational limits that acknowledge these thresholds.”

Overall, there is nothing in either report which causes me to change my views on ice response or to suggest additional recommendations to Sakhalin Energy concerning equipment or plans. As reported to the Panel, Sakhalin Energy’s OSR plans and ice response equipment are of good quality and the company holds some of the best equipment that is commercially available. They also have ice-class vessels capable of deploying personnel and resources. The light and non-persistent nature of Vityaz crude is also a bonus in that problems associated with increased oil viscosity at low temperatures are unlikely to arise. Vityaz crude should be easy to ignite and it should maintain a sustained burn in conditions where burning is viable. Hence Sakhalin Energy are in a better position than many other operators for mounting an effective response to a spill in ice. That is not to say, however, that a spill would not pose a host of problems, as we have noted on many occasions.

The Panel was already aware of the limitations for spill clean-up in ice, so neither report presents anything particularly new or surprising. Part of our remit is to try to keep abreast of new developments, which the MMS report has done to some extent. It would be helpful to hear Sakhalin Energy’s interpretation and opinion of the MMS and WWF reports and for them to apprise the Panel of their own progress in upgrading plans and equipment related to ice response.

Brian Dicks, 31st August 2010