Updating the U.S. SMART Dispersant Efficacy Monitoring Protocol

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ABSTRACT

A review of the SMART dispersant effectiveness monitoring protocol was undertaken in 2007-8, involving three tasks. First, a stakeholders’ workshop was held to recommend revisions to SMART based on practical experience. This concluded that the three-tiered approach in SMART was appropriate, but: a) better guidance must be provided for users; b) the fluorometer historically used for monitoring of dispersed oil poses many operating challenges and should be replaced with a more modern instrument; and c) all U.S. government-sponsored monitoring teams must work with identical instruments and operating protocols. The workshop also developed a list of characteristics for the new oil-analytical instrument and recommended a process for transitioning from the old to new protocol.

Second, oil behaviour monitoring data from recent OHMSETT dispersant effectiveness tests was analysed to verify the reliability of the SMART monitoring methods. Under SMART, instrumental methods involve comparing oil concentrations measured at a single depth under treated and untreated sections of the slick (SMART Ratio). Based on Ohmsett dispersant test data, the ratio of oil concentrations under effectively dispersed and “control” slicks is highly variable and is a poor indicator of effectiveness. On the other hand, assessments based on a combination of oil concentration and oil particle size are strongly correlated with effectiveness. Specifically, when elevated concentrations occur under slicks, the size of drops causing the elevated oil concentration is an unambiguous indicator of effectiveness, with large droplets (VMD >83 µm) indicating low effectiveness and small droplets (VMD< 83 µm) indicating high effectiveness.

Finally, commercially available, field portable instruments for measuring dispersed oil in water were surveyed. The survey identified six potentially suitable submersible and field-portable fluorometers and three particle-size analysers and reported key technical information for each.