DEVELOPMENT OF A STRATEGY FOR OFFSHORE USE OF DISPERSANTS IN NORWEGIAN WATERS

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Abstract[*]. Oil spill contingency planning consists of evaluating potential discharge scenarios for the location in question and developing response strategies. The main objective for a response strategy is to minimize the environmental consequences of an oil spill on ecological, comer-cial and/or human used resources. The weighting of relative advantages and disadvantages and the study of consequences with use of different oil spill countermeasures is often referred to as Net Environmental Benefit Analysis. Modelling tools have been developed to give support for such analyses. SINTEF has performed oil spill contingency and NEBA analyses for the oil industry over a period of 10–15 years. The OSCAR (Oil Spill Contingency And Response) model was developed in the early 1990s to support such analyses and has been continuously strengthened since then by, e.g., improving the simulations of water soluble oil components and dispersed oil droplets in the water column. Recently the model has been further developed from a scenario-based model to also allowing for stochastic simulations. OSCAR is a multi-component three-dimensional modelling tool used for analysing alternate response strategies. Key components in the system are: a data-based oil weathering model; a near zone model; a three-dimensional oil drift model; a strategic response model; Exposure models for fish and plan-ktonic organisms, birds and marine mammals; and, tools for evaluation of exposure within GIS polygons. The model analyses alternate response strategies (e.g., mechanical recovery vs. use of dispersants) as a basis for a quantitative evaluation of environmental risk in the marine environment. The model has been used as a basis for evaluation and development of strategies for use of dispersants in Norwegian waters, both offshore and for oil terminals and refineries. Dispersants can be used as a supplement to mechanical recovery or as an alternative in certain

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scenarios. The decision model for use of dispersants is based on the following criteria: Is natural dispersion already a dominating process?; Which biological resources are threatened by the oil spill and how will use of dispersants influence upon these?; Will the dispersed oil be effectively diluted in the water column?; Will the effectiveness be reduced due to oil type and/or weathering degree?; Will the effecttiveness be reduced due to low salinity (brackish water)?; Will the effectiveness be reduced due to bad weather (wind/fog)?; How to apply the dispersant in a correct manner?; Is there sufficiently short response time and treatment capacity?; How to monitor the effectiveness of the dispersant action?; and, Criteria for when and how to terminate the dispersant application. A strategy for use of dispersants has been developed for several Norwegian offshore oil fields based on this methodology. Restricted by the amount of dispersant available, dispersants can be used as an alternative to mechanical recovery for smaller oil spills (typically less than 500 – 1000 m^3) contributing a supplement for larger oil spills.

Keywords: oil spill response, dispersants, SINTEF, Norway, model