newsletter
ERMS
Environmental Risk Management System
news 1 - 2004

Program participants: - Conoco Phillips - Eni - Exxon Mobil - Hydro - Shell - Statoil - Total

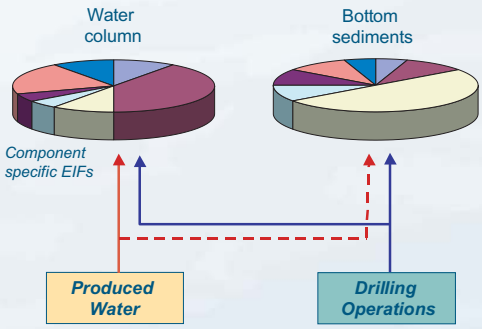
ERMS program objectives

ERMS (Environmental Risk Management System) is a 3-year research program initiated by the oil industry in Norway. The objective of the program is to develop an environmental risk-based decision-supporting tool in order to establish cost-effective mitigation measures for reducing potential harmful discharges to the marine environment.

The offshore operating oil companies are facing the challenge of "zero harmful discharges" within 2005. This challenge, which is based on the Norwegian government's White Paper no. 58, demonstrate the need for a quantitative discharge management tool, enabling the industry to document the strategy and actions to meet this request.

The DREAM (Dose-Related Risk and Effects Assessment Model) model was developed over a 3-year period from 1998 – 2002. This model has been the basis for calculation of EIF (Environmental Impact Factor), which is used for guidance of management decisions for reduction of potential environmental effects associated with produced water discharges. This approach has shown to be very useful in decision making on implementation of produced water treatment techniques and/or the use of offshore E&P chemicals. DREAM and the EIF approach represent the state of the art in marine water column impact assessment tools.

The ERMS program consists of major activities to develop an EIF-based concept for seafloor sediments based on a comprehensive literature study on effects from drilling discharges both in the water column as well as in seafloor sediments. It also includes merging of the DREAM model with the ParTrack model, an existing software tool for simulation of drilling discharges, and further development of the model tool. The concept and model will be validated towards field experiments with discharges from drilling operations.



Contracting partners are: SINTEF, TNO, Akvamiljø, Akvaplan-niva, Battelle and MUST as.

Main activities list:

Main ongoing activities and milestones:

- Finalisation of the literature review to supply additional data on toxicity in the water column and sediments, non-toxic disturbances and characterisation of sediments
- Communications with the Norwegian Pollution Control Authorities and their expert group on offshore environmental matters.
- Cooperation with the University in Oslo on utilisation of the OLF offshore environmental database (MOD) to supply data as input to the model development in ERMS.
- Analyses and reporting from field activities in 2003 and 2004.
- The programming of the basic sediment module is scheduled for completion at the end of June 2004. Subsequent work will focus on integration of the module into DREAM/ParTrack.
- Release of MEMW/DREAM 2.0 will take place in July 2004, to allow time to implement changes in the program after testing of 2.0 Beta.
- A User Group with representatives from the oil companies working with testing verification of model tools and EIFs.
- Next workshop to be held in Rome 15-17 September 2004.

Use of DREAM model for produced water discharges

As part of the work towards Zero harmful discharges in Hydro, EIF calculations, including DREAM modelling was used as a management tool. The results from the EIF calculations were used discussing possible measures to achieve zero harmful discharges.For the Troll B platform, the natural components in the produced water contribute most to the risk for environmental effects (Figure 1). Several possible cleaning technologies for dispersed oil and water-soluble components were evaluated as can be seen from Figure 2.

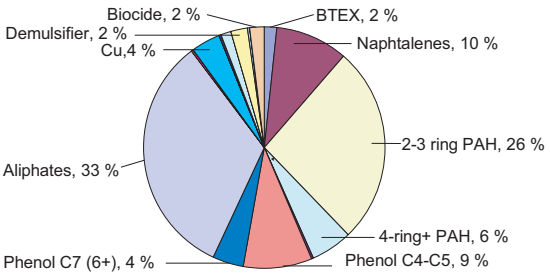


Figure 1 Contribution to environmental risk for produced water from the Troll B platform

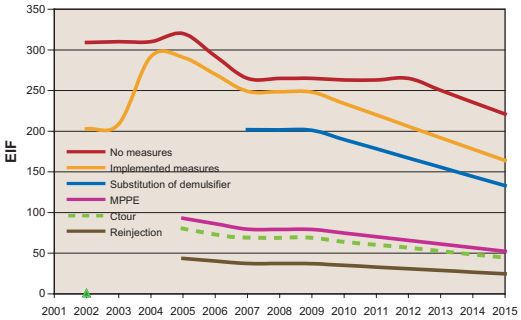


Figure 2 Environmental Impact Factor (EIF) calculated for different cleaning technologies at the Troll B platform

The conclusion for the Troll B platform, based on the EIF calculations, is that MPPE (Microporous polymer extraction) technology probably will be a good solution. However, this technology has never before been implemented on a platform with high discharge volumes (30 000 m3/day), so the technology has to be further tested through a feasibility study. Other aspects that need to be considered are the waste situation and the cost-efficiency.

Potential impact from drilling discharges

Potential impact from drilling discharges includes not only toxicity but also other disturbances, and is a combination of effects of different stressors. It affects different compartments (sediment and water) with different time scale (Figure 3):

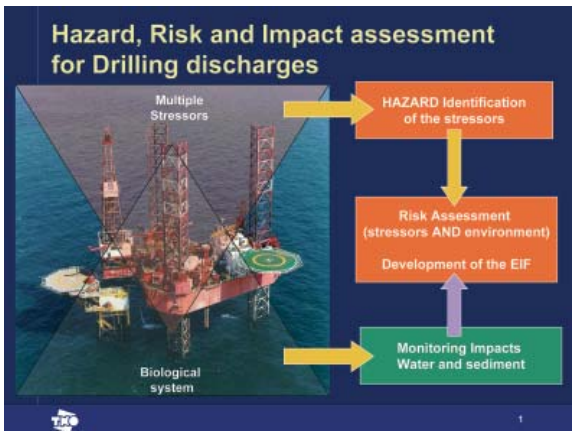


Figure 3 Hazard, risk and impact assessment for drilling discharges.

Water column (timescale: days):

- Toxicity in the water column from dissolved chemicals.
- Toxicity in the water column from chemicals attached to SPM.
- Impact of suspended matter to species in the water column.

Sediment (timescale: years):

- Toxicity in the sediment from chemicals.
- Change in sediment quality:
  - Grain size.
  - Oxygen level, redox potential and related sulphur concentrations.
- Burial of organisms by cuttings.

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