

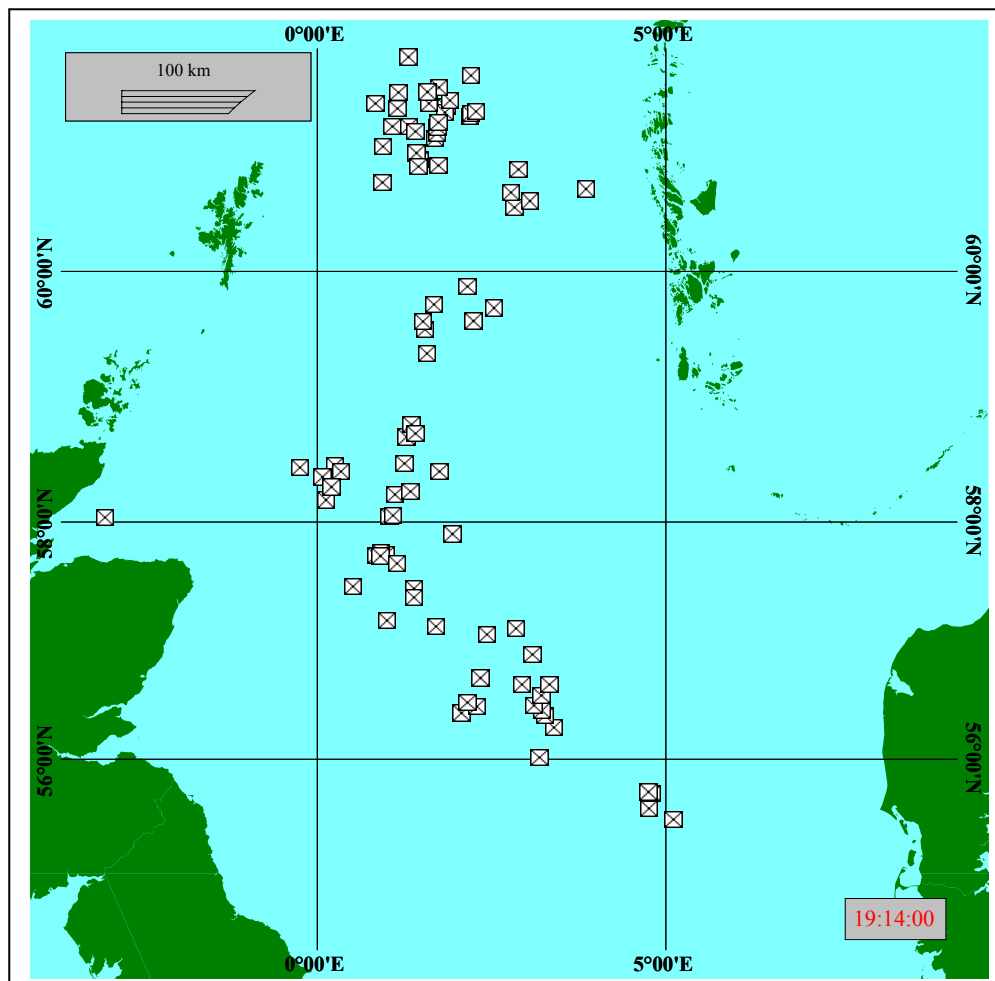
DREAM - Dose related Risk and Effect Assessment Model

DREAM is a Risk Assessment model especially made for evaluating the long-term effects of chronic produced water discharges. It is a tool helping to make the right operational decisions with respect to environmental consequences. Effects of cleaning technology, re-injection, chemical use etc. can be evaluated.

The model is currently in the last development phase, but pre-versions have already been extensively used in the North Sea operators' plans for how to achieve the new goals of 'zero harmful effect discharges'. One of the unique advantages with DREAM is that it can handle complex situations, such as simulation of chemical releases from many platforms simultaneously. This means that it can be used on a regional level (e.g.

Haltenbanken, Ekofisk etc.) where the operation and release from individual platforms can be simulated on a detailed level, then integrated to obtain the contributions of each different platform to the overall environmental risk for the whole oil field.

The overall advantage of such a model as DREAM is that it handles a large complexity of processes and data - discharge amounts, physical, chemical and biological fates of discharged substances, biological uptake and effects. This complexity cannot be handled manually, although the results may look simple as they appear on the computer screen: The figure below shows environmental risk contour map simulated with DREAM for a platform in the North Sea.



The Norwegian pollution control agency (SFT) has stated the importance of model

work connected to the Norwegian Shelf (quoted below)

..."SFT believes that it is important for the operators on the Norwegian Shelf to **maintain** their work on **development of models**... ..that can contribute to increasing understanding of **processes** and the **effects** that may be expected as a consequence of the discharge of various chemicals from offshore installations.

..."It is important to ensure that technological development as regards the risk tools and models does **not** lead to a situation where important elements in the **understanding** of the effects on the environment is **lost**"

....important to remember that a model is only one of **several tools** in a decision process...

SFT pinpoints the importance of understanding environmental effects. DREAM is unique also in its content of low dose, long term effect functions and data based on extensive experiments conducted for the model development. Large parts of the DREAM experiments were conducted at Akvamiljø, making benefit of the laboratory's unique flow-through exposure systems for long term reproductive effects and bio-accumulation testing. One of Akvamiljø's Continuous Flow test Systems is shown in the pictures below.

The four companies TotalFinaElf, Agip, Statoil and Norsk Hydro are the industry partners in the project. They have been taking actively part in the project definition, execution and results utilisation. The project's work contribution from TotalFinaElf was part of the company's research program performed at Akvamiljø in 1998 - 2000. Several tests were also carried out in the Statoil, ENI-Agip and TNO laboratories in Trondheim, Milano and Den Helder.



Continuous Flow test Systems

The DREAM project is an excellent example of a Joint Industry Project with important complementary roles of the collaborating participants. Complementary to Akvamiljø/RF's competence on biological effects, and equally crucial for the project, are Sintef's previous model products and programming skills and TNO's risk modelling competence.



Test chambers

