

# **Implementation of a Dynamic Oil Spill Response Regime for the Norwegian Continental Shelf**

**Tharald Brekne, NOFO**  
**Geir Morten Skeie, Alpha**

NOFO, Lervigsveien 32, N-4002 Stavanger, Norway  
tmb@nofo.no

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## **Abstract**

By 1<sup>st</sup> July 2001, the Norwegian Clean Seas Association for Operating Companies (NOFO) will implement a new dynamic oil spill response regime for the Norwegian continental shelf.

Adopting a proactive approach, all information of the planning regime will be made available to all stakeholders and the general public through a web portal.

The regime is based on environmental sensitivity, detailed data sets on reported and predicted activity levels in different regions of the shelf, and on oil drift simulations undertaken for a number of locations. From these, probabilities for defined situations of hazard and accidents are identified, as well as probabilities for contamination of sea, coastal and shoreline areas.

The key components of the web portal are:

- An action plan – to be implemented in the case of an event
- Regional plans – providing an overview of information relevant for each contingency region
- Plan basis – providing in-depth documentation of the analyses applied in the development of the regional plans
- Databases and data sets – on-line access to resource inventories, metocean information etc.
- General background – containing information of general relevance.

The efforts placed in obtaining the regime are extensive, in terms of standardisation, methodology, documentation and presentation. This, combined with the use of state-of-the-art technology, has resulted in a regime that is flexible and dynamic, and well suited to accommodate the oil spill contingency needs of operators on the Norwegian Shelf.

## **Introduction**

On behalf of all operators on the Norwegian Continental Shelf, the Norwegian Clean Seas Association for Operating Companies (NOFO) have been developing and maintaining oil spill response capability on the shelf. Key information and maps showing the location of the main bases are given in figure 1.

By 1<sup>st</sup> July 2001, NOFO will implement a new dynamic oil spill response regime for the Norwegian continental shelf, also including nearshore waters and the shoreline. This new regime is risk based.

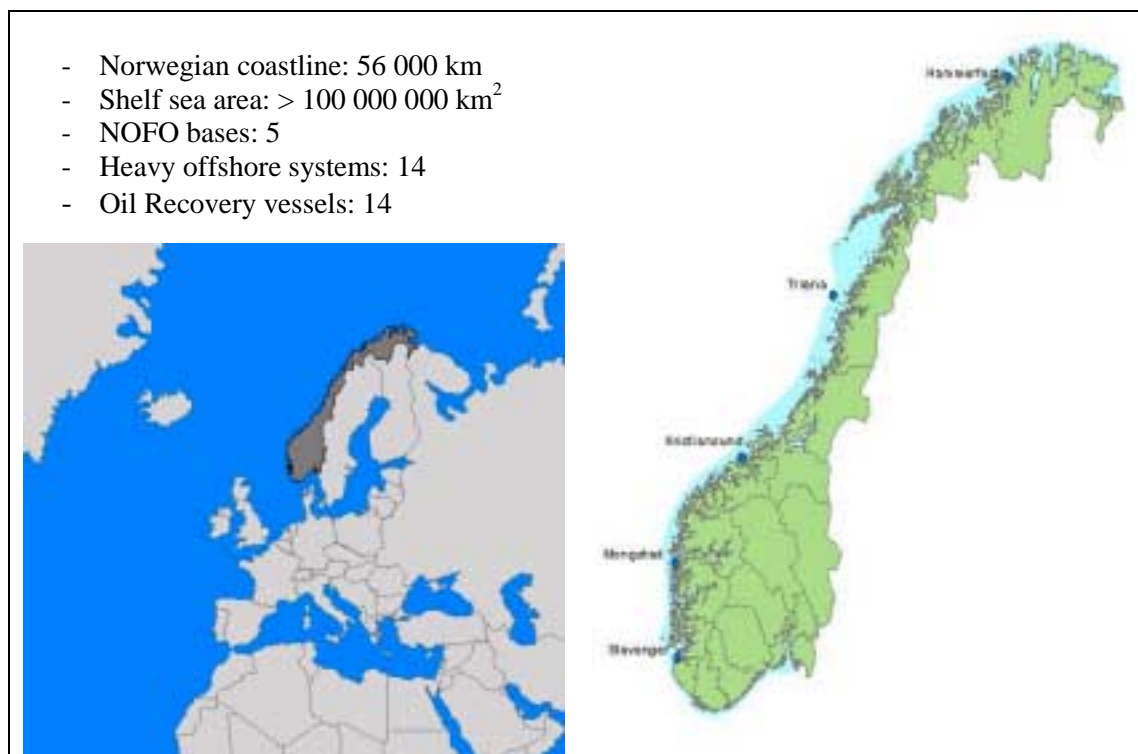


Figure 1. Key information and location of NOFO bases and the area covered by the NOFO oil spill response regime.

## Concept

The concept of the process for implementing this regime includes the following key aspects:

- a) Systematic review of site specific analyses (e.g. oil drift modelling, oil spill contingency analyses)
- b) Identification and compilation of relevant data (e.g. wind and wave distribution, sensitive resources)
- c) Development of data bases of critical information (e.g. depots, equipment, sensitive sites, tidal amplitudes)
- d) Development of a thoroughly documented analytical approach
- e) Use of WWW as a the platform for development and dissemination of results
- g) Application of Geographical Information Systems (GIS) and development of GIS toolkits for spatial analysis, presentation and training

## Development

The development phase started in the third quarter of 1998, and has involved specialists from within NOFO member companies, as well as national expertise on risk analysis, oil spill modelling, environmental sensitivity and decision support systems.

From the start, it was a specific intention that the regime should be risk based, i.e. taking into account both the probability for an event to occur, as well as the potential environmental impact from the event.

Main steps in the process are depicted in Figure 2. Data for the initial steps of the process were reported by operators and analysed in terms of frequencies and release scenarios \1\. Information on environmental sensitivity was provided from a national atlas on areas of particular environmental sensitivity \2\ and from data sets on coastline complexity and wave exposure \3\. Information on oil properties \4\ were used as input in a series of oil drift simulations \5\, providing data on probabilities for contamination, drift time and potential stranding of oil.

All the above data formed input to the oil spill contingency analysis, undertaken according to a standardised approach \6\. The analysis identifies requirements for oil spill combat resources, in terms of response time, equipment type and number of units. Regional plans are prepared from these requirements.

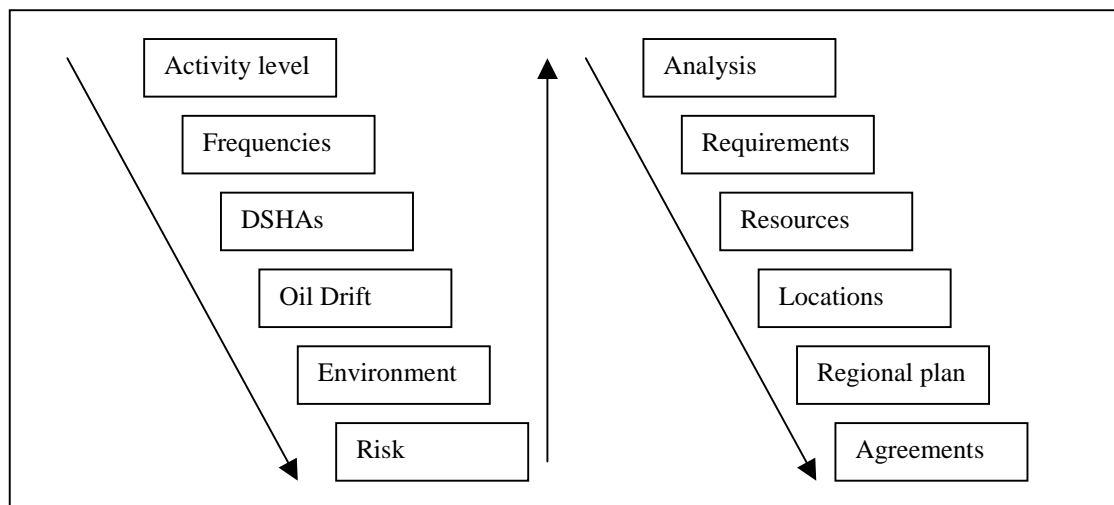


Figure 2. Work process for identifying risk level and establish oil spill response plans.

## Contents

The main elements of the WWW interface to the oil spill response regime are depicted in Figure 3.

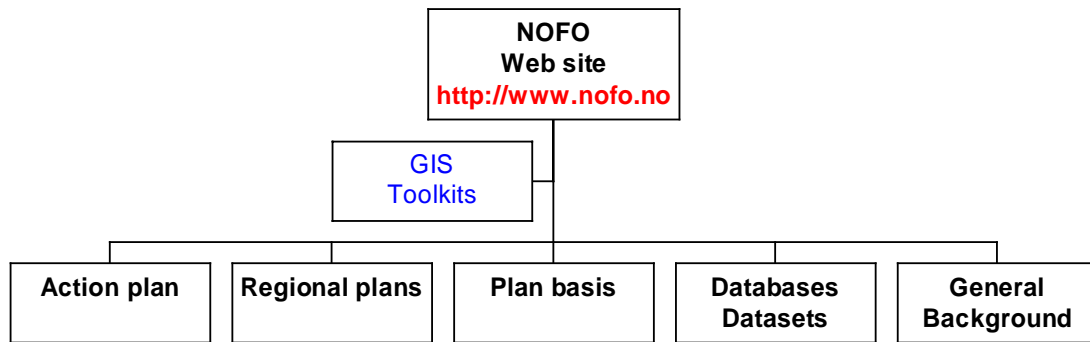


Figure 3. Main elements of the WWW interface to the NOFO oil spill response regime.

For operational use, the action plan will be most relevant. This part of the web provides information on notification and mobilisation of qualified personnel and appropriate resources, including affiliation and contact information. In the initial stage of an emergency, information from other parts of the web are available through links.

In the regional plans, key information is provided on the current oil spill response level in the individual response regions. This includes overview maps with response contours, mobilisation points, equipment types, and location of offshore installations.

In the plan basis, the analytical methodology is presented in detail, as well as the latest oil spill contingency analysis for each individual region. This section also provides details on the activity level, and a comprehensive presentation of the results from oil drift simulations.

In the databases and data sets section, a series of databases and resource inventories are provided, including metocean data, location and characteristics of sensitive areas, location and description of oil spill combat equipment. This section also contains a library on site-specific analyses and studies, providing NOFO members information on recent studies of relevance for planning of new activities.

As a supplement to the system, a suite of GIS tools and data sets have been developed and compiled, enabling users to visualise and analyse response strategies, results from oil drift modelling, distribution of sensitive environmental resources and priority sites for oil spill combat. To ensure transparency of the decision process, these tools are made available to the authorities as well as NOFO members.

## Operation

As of 1<sup>st</sup> July, 2001, the WWW portal to the oil spill response regime will be available through the NOFO web site. The system is dynamic, and will be updated and revised according to changes in the activity level on the shelf as well as results from R & D efforts. Key aspects are presented in figure 4.

In the top row, the main users are listed, comprising operators (analysis, review, training and planning), NGOs and authorities (review of applications for consent to operations) and the general public (information on various aspects of oil spill response planning). Through the use of response forms and discussions groups, comments and

input from all user groups are actively collected and compiled. In addition to information on changes in the environment, activity level, oil drift and risk level (bottom row), feedback from users and results from R & D work provides input to the development of the oil spill response regime by NOFO and associated specialists.

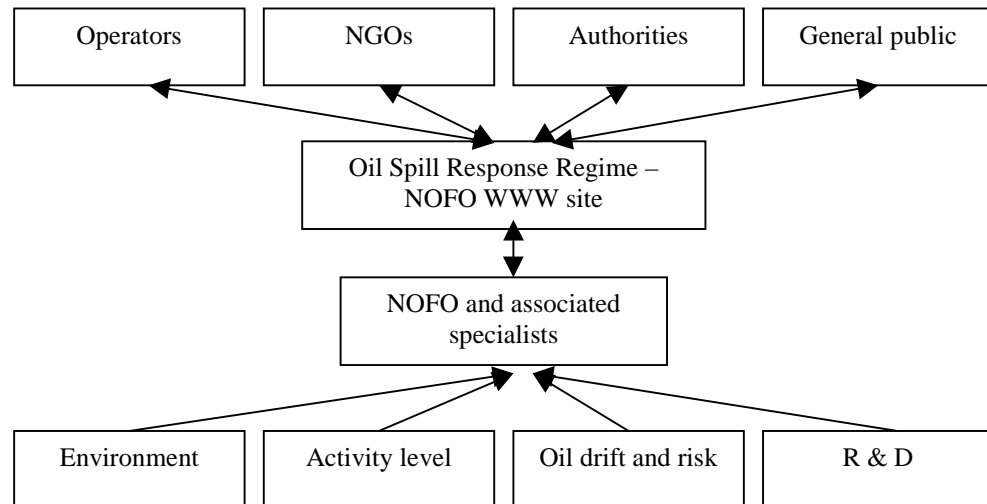


Figure 4. Operation of the oil spill response regime. Note the direction of the arrows.

### Areas of application

The main area of application is in maintaining a dynamic oil spill response level on the Norwegian continental shelf that reflects the risk level. In this context, NOFO member companies are the primary users, in areas like training, tabletop exercises and review of company specific issues.

An important area of application is in consent applications. For the major part of the activity, including exploration drilling, applications may be prepared in simple format, with reference to the established oil spill response regime. In the case of drilling in sensitive and/or nearshore areas, gaps in the response level may be easily identified, and temporary increases in response levels facilitated through standard agreements.

The authorities will audit individual operators on emergency preparedness, including oil spill response planning, and will review NOFO's plans through this process. NGOs are including in the hearing process on applications for consent, and may access to web site to verify information.

### Achievements

Key achievements of the process include:

- From a situation where different approaches were applied, to some extent poorly document, a standardised methodology, including input and output formats, is now established. For the first time, this provides us with the opportunity to systematically compare different activities and regions, including the effects of different oil properties.

- A fully documented methodology is developed, and is openly available to all stakeholders and to the general public. All are invited to critical review our work and to provide feedback on how improvements may be made.
- All data of relevance for analysis and evaluation is compiled in appropriate formats, and are shared with all interested parties.
- By using a web interface, all information and user interface is location-, platform- and software independent

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## Author biographies

Tharald M. Brekne is the Managing Director of the Norwegian Clean Seas Association for Operating Companies (NOFO). Mr. Brekne has 25 years experience within the offshore industry. His last assignment before joining NOFO was as Director within the Norwegian Oil Industry Association (OLF) with responsibility for all activities related to Project Development, Platform operations and Health, Environment and Safety.

Geir Morten Skeie is Senior Environmental Advisor and partner in Alpha Environmental Consultants. Mr. Skeie has 14 years experience as a consultant on marine environmental and contingency issues, on assignments in Norway, Southeast Asia and FSU countries. Mr. Skeie has been involved in the design, development and implementation of the new oil spill response regime. Contact information: [gmskeie@alphaenv.com](mailto:gmskeie@alphaenv.com).