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Impact assessment on exploration drilling in the Wadden Sea, the Netherlands

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Abstract

The decision-making process on the approval for exploration drilling in the Wadden Sea is a balance between the economic interest of gas exploitation and the interests of nature and environment. Imperative to the decision is an environmental impact assessment with public consultation.

Keywords: Exploration drilling; Wadden Sea; Impact assessment

1. Background

The Wadden Sea is a shallow coastal sea stretching from Den Helder in the northwest of the Netherlands through the German Bight to Esbjerg in Denmark. It is an area of extreme biological importance and serves many ecological, economic and societal functions. Since the 1960s NAM holds two concessions for the production of oil and gas in the eastern part of the Wadden Sea and the adjacent North Sea coastal zone. In 1993 seismic activities revealed the probable presence of important new gas reservoirs. The expected presence of gas initiated a discussion between the Dutch government and the mining companies concerned on the conditions for exploration drilling in the Wadden Sea. In a jointly produced report, the 'Go-ahead Plan' (the Environmental Impact Assessment), the conditions for drilling such as the phasing of drillings in time and space, monitoring of potential environmental effects, are established. After a consultation process with all authorities involved this plan was finally concluded in 1995.

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2. Nature and environment of the Wadden Sea

This tidal area is the result of mainly natural erosion and sedimentation processes. Together with the North Sea coastal zone, the Wadden Sea is part of a unique system with channels, sand bars, tidal flats, beaches, coastal dunes, deltas and islands. Tidal driven transportation of water and sediments determine the natural dynamics of the system. Due to these processes and because of a constant input from the main rivers Rhine and Elbe, nutrient availability is high. As a result of the large variation in chemical and physical processes the tidal flats in Wadden Sea maintain a high production of flora and fauna.

It is regarded as an area of international and national importance with high natural values, shown by its special landscapes, atmosphere, and unique hydrology and geomorphology. Characteristics are the many channels and tidal flats which continuously change in form and location. Its richness in benthic fauna, algae and fish species makes the Wadden Sea into an important area for birds to breed, to rest and to forage. Birds are found in large numbers and many species from eastern Canada to the Lena delta in eastern Siberia travel through this area during autumn and spring migration. Also for seals the Wadden Sea is an important breeding and foraging area. In summer, the relative shallow and warm waters provide excellent conditions for fish to grow.

The Wadden Sea also serves an important function for fisheries and recreation.

The many, high natural values of the Wadden Sea have been recognised in its special planological status as a protected nature reserve. In this status the sustainable protection and development of the Wadden Sea as a nature reserve has been established.

3. Environmental impact assessment

For the exploration drilling in the Wadden Sea an environmental impact assessment process has been made obligatory by the authorities, according to national and EU legislation. According to legislation descriptions of the planned activities, the existing situation of the environment, alternative options for the activities; potential environmental effects and the most environmentally friendly option are part of the assessment. Also the environmental impact statement has to be published prior to public consultation. An independent scientific commission lays down both the standards for, and the acceptance of, the final report.

NAM carried out this environmental impact assessment focusing on finding the most environmentally friendly and technical practicable answer to the question ‘where’, ‘when’ an ‘how’ exploration drilling could take place.

3.1. How?

An adapted conventional rig will be used for exploration drilling because the environmental effects compared to those from other options such as drilling from a pontoon are smaller and of a more short-term nature.

Normal drilling techniques will be applied despite alternative techniques such as coiled tubing and slimhole drilling. These latter techniques are attractive from the environment point of view but technically less advanced to guarantee a successful drilling process in this area. Small ships will transport material and personnel, because helicopters have a larger area of disturbance.

Mitigation measures have been planned to reduce the potential for environmental effects. By choosing a rig location in deeper channel waters no dredging is required and hence, the footprint effect will be minimum. The derrick of the rig will be fully enclosed in order to reduce noise levels to a minimum; also new flaring technology will be applied to reduce disturbance. Moreover, flaring will be restricted to daylight periods to prevent disorientation of birds. All waste streams will be removed in a controlled manner, including rainwater from working decks and walkways.

3.2. When?

Combining the field observations, judgement from independent outside experts and an ecological risk analysis, the conclusion is that the most environmentally friendly period for drilling in the Wadden Sea area is in the period October–February. Although there remains a low level of ecological risk in this period, especially for birds, planning the start of the drilling activities in October results in the lowest level of interference possible.

3.3. Where?

For each of the prospect areas the potential environmental effects have been assessed using the field observation data, ecological risk analysis and expert judgement from outside (third party) independent scientists, the most environmentally friendly location has been identified. For each of the locations selected the potential effects on nature, recreation, fisheries and on the ecology of the local environment have been described and mitigation plans for still remaining aspects put in place.

4. Monitoring during and after drilling

The authorities are legally obliged to evaluate the effect predictions made in the Environmental Impact Assessment (EIA). This evaluation will be based both on short term monitoring and on long term investigations as part of the permit conditions.

Within 3 months after each well will be drilled, short term monitoring will deliver answers with respect to real and potential effects. It has to be demonstrated that the assumptions made in the EIA are correct. The analyses will focus on (disturbance) effects on seals and birds.

For some more complex aspects long term research is initiated. By drilling the wells in the most sensitive location as the last ones, optimum use can be made of the results of the monitoring program and the long-term research.

5. Scientific data set using GIS

In order to asses the ecological window has been developed based on the specific occurrence of natural (species of fish, birds, seals, etc.) and human (recreation, fisheries, etc.) components, as well as on their sensitivity to different forms of disturbance. This method makes use of a geographic information system with its electronic atlas comprising information per indicator species (geographic and temporal distribution), and an agreed set of mostly quantified disturbance criteria. The assessment gives, within margins of error, the optimum location and period for a potential disturbing activity and shows in a logical and reproducible manner where the minimum level of potential effects from exploration drilling in the Wadden Sea occur.

6. Partnership

The EIA process required a description and analysis of the Wadden Sea ecosystem as complete as possible. This was achieved by involving those independent scientific institutes in the process which are well known for their expertise on various aspects of the Wadden Sea and the North Sea coastal zone (e.g. NIOZ, IBN, TNO, WL, Staringcentrum). Their expertise was also used in the 'expert-judgement' step. The effort of NAM and scientific institutes to jointly arrive at agreed conclusions and recommendations (instead of delivering a report to the customer) was a unique and positive experience for both parties. One of the products of this co-operation is a data set of all Wadden Sea environmental aspects as complete as possible.

7. The consultation process

During the whole process intensive consultation has taken place with politicians, national, regional and local authorities, environmental movements, etc. Actually the process started already in 1992 when publicity was given to the fact on the one hand gas expectations were high and on the other hand new techniques enable NAM to carry at the operations without major impact to the environment. This resulted in the agreement between authorities and companies concerned at the end of 1993. Based on this agreement the permit procedures started with the EIA. The permits will be formulated and granted based on the EIA. An optimistic scenario assumes the first well to be drilled in winter 1997. During both the EIA and other permit procedures formal and informal hearings where organised with the general public. Although a full acceptance/agreement by everyone could (of course) not be met during these public hearings, there was a general positive reaction to the openness by which facts; figures, problems and solutions were presented.

In 1996 and in 1997 the permits were challenged before court on formal grounds and suspended. The base case will rule in May 1998.