



Ulloq/Dato/Date : 16 May 2006
Jnr.: 69.04.15+00001

Guidelines for preparing an Environmental Impact Assessment (EIA) for exploration, development, production, decommissioning and transport of hydrocarbons offshore Greenland

This paper is meant as a guide to license holding companies when preparing an Environmental Impact Assessment (an EIA) for activities related to the exploration, development, production, decommissioning and transport of hydrocarbons offshore Greenland.

Hydrocarbon exploration has taken place since the mid 1970ies off Southwest Greenland, six wells have been drilled, but so far no commercial discoveries have been made. The immediate plans for the year 2006 is to open a more northern region – the Disko-Nuussuaq offshore region – to hydrocarbon exploration. This region contains ecosystems and species, which are more sensitive to disturbances and pollution than the areas, which have recently been open to hydrocarbon exploration. The occurrence of icebergs and of drifting sea ice increases the overall risk of operating in the area due to e.g. accidents with potential large impacts such as oil pollution from a leaking tanker. High international standards related to environmental protection - as practiced in e.g. the Barents Sea - will be implemented in this region.

In connection with the opening of this new region to hydrocarbon exploration, the Bureau of Minerals & Petroleum (BMP) is developing a Regional Strategic Impact Assessment for the area that – in a worst case scenario - could be affected. In addition a number of baseline studies are being conducted in 2006-2008, funded by the authorities. However, it will be the responsibility of the license holding companies to prepare EIAs for their specific activities. This guideline sets the general requirements to the EIA by the BMP. For legal requirements, application procedures and the approval process, reference is made to the HSE regulations by the BMP.

This company initiated EIA must cover the entire region that might be affected, including land facilities. It also must cover trans-boundary aspects, including the impacts of oil pollution on neighbouring countries. The EIA shall include the full lifecycle of activities: Exploration, field development, production, transport and decommissioning. The EIA must be updated and further developed when needed, e.g. when going from exploration to production phase, or if there is a change in the plans presented in the EIA. The initial EIA related primarily to exploratory drilling shall focus on this activity, but must include assessment of scenarios of possible activities related to production, transport and decommissioning.



The EIA will be made available as a public document.

In order to secure that data necessary to update the EIA in connection with further hydrocarbon activities are available when needed, and in order to secure baseline data for assessing the impact of accidents, a plan for acquiring supplementary data must be prepared and kept updated. This plan should be developed in cooperation with the BMP. The National Environmental Research Institute (NERI) - which acts as BMP's scientific advisor - will keep and update a database of all environmental data collected in connection with hydrocarbon activities, both from the authorities and the license holding companies. Data must be submitted to NERI in formats agreed to by the license holding companies and BMP, and will be available to both parties.

In Appendix 1 a proposed structure and content of the EIA is outlined. Where relevant the BMP has elaborated on issues to be included and on the environmental standards, which must be met. Since the Offshore West Greenland region is a frontier area with technologically challenging conditions, standards have to be adjusted in accordance to technological advances and solutions. The present standards are based on present knowledge of impacts that could be expected. However, new environmental knowledge and new technology may change standards to be met, and at any time during all phases of exploration, production and decommissioning the Best Available Technology (BAT) must be used in order to minimize environmental impacts.

An important source of information to the license holding companies - when preparing their EIAs - will be the Regional Strategic Impact Assessment (SIA) for the Disko-Nuussuaq region. Additionally important will be a number of environmental GIS (Geographic Information System) layers prepared by NERI as part of Regional SIA; the layers are planned to be updated as new data becomes available as a result of the extensive background studies being carried out in 2006-2008. Another important source of information is the "Environmental Oil Spill Sensitivity Atlas for the West Greenland (68°-72° N) Coastal Zone" facilitated by NERI (<http://environmental-atlas.dmu.dk>). Further inspiration for preparing an EIA may also be found in EIAs prepared for similar operations in other regions (see for example the EA report of "Husky Energy Jeanne d'Arc Basin Exploratory/Delineation Drilling Program" on www.cnlopb.nl.ca).

In developing this guideline, information on the requirements to EIAs related to hydrocarbon exploration, development, production, decommissioning and transport in other Arctic countries has been studied. Valuable information was found from Alaska (www.mms.gov/eppd/compliance/nepa/policy/eis/index.htm), Canada (www.cnlopb.nl.ca/) and Norway (www.lovddata.no/for/sf/as/xs-20010903-1157.html). Appendix 1



is based on above EIAs, on the “Arctic Offshore Oil & Gas Guidelines” issued by the Arctic Council and on the “OSPAR Guidelines for Monitoring the Environmental Impacts of Offshore Oil and Gas Activities” (http://www.ospar.org/documents/dbase/decrecs/agreements/04-11e_OSPAR%20offshore%20guidelines%20monitoring.doc).

Appendix 1.

Guidelines for Preparing an Environmental Impact Assessment Report for Exploration, Development, Production, Decommissioning and Transport of Hydrocarbons Offshore Greenland

1. Introduction

- a description of the company/companies
- the location of the license area
- the purpose of the proposal
- a time schedule of all activities covered in the EIA

2. Environmental setting

- Climate:
Air temperature, wind, waves, visibility, extreme wind and waves
- Bathymetry
- Ice conditions:
Sea ice and icebergs, concentrations, thickness/draft/mass, drift speed, iceberg scour
- Oceanography:
Water temperature, salinity, currents, water masses
- The biological environment and the ecosystem
 - a) The benthic and pelagic communities to be described. Site-specific studies of the benthic community should be conducted at drill and production sites. We refer to the "OSPAR Guidelines for Monitoring the Environmental Impacts of Offshore Oil and Gas Activities". These guidelines should be used as a basis for designing a specific Baseline and Monitoring Program to be approved by the BMP.
 - b) Commercially important fish and invertebrate species to be described on a species by species basis (occurrence, spawning). An evaluation of the importance of the area for each species on a seasonal basis.
 - c) Marine birds to be described on a species by species basis (seasonal abundance, breeding, and concentration areas). An evaluation of the importance of the area to each species on a seasonal basis.
 - d) Marine mammals to be described on a species by species basis (seasonal abundance, breeding, concentration areas). An evaluation of the importance of the area to each species on a seasonal basis.

- A summary description of threatened species and species of concern
- A summary description of important habitats and/or areas of particular ecological importance, e.g. upwelling areas, ice edge communities and polynias
- A summary description of Valued Ecosystem Components (VECs, see the Regional Strategic Impact Assessment of the Disko-Nuussuaq region for a definition).
- Baseline chemistry (hydrocarbons, heavy metals a.o.). For site-specific studies at drill and production sites we refer to the "OSPAR Guidelines for Monitoring the Environmental Impacts of Offshore Oil and Gas Activities". These guidelines should be used as a basis for designing a specific Baseline and Monitoring Program to be approved by the BMP.
- Existing resource use (fishing, hunting, tourism)

3. Physical characteristics of the proposed activity

- A description of proposed activities, including its purpose, location, duration and intensity, including drilling platforms, ships, pipelines, loading facilities, port facilities etc.
- Energy requirements
- Use of chemicals:

All chemicals used or released must have been tested for their eco-toxicological properties according to OSPAR Harmonized Offshore Chemical Notification Format (HOCNF). The operator must select those chemicals that will pose the lowest risk of environmental impact, in particular those on OSPARs PLONOR list. Reference is made to OSPARs homepage (www.ospar.org/eng/html/welcome.html).

- Waste handling (solids, chemicals a.o.):
Drill cuttings associated with the use of water based drilling mud may only be released to the sea if they do not contain oil from the geological formation and if the impact is assessed to be minimal. The amount of produced water to be disposed should be minimized (e.g. by re-injection). All water containing oil must be treated to reduce its oil concentration to a minimum level. This level must be approved by the BMP. All other waste must be brought to shore for disposal or further treatment. A plan for this must be presented.
- Residual emissions to air (types, amounts):
The emission of CO₂, NO_x, nmVOC, CH₄, SO₂ must be measured/estimated and reported. A program for measuring emissions must be presented. Emissions should be minimized. A plan for this using the Best Available Technology should be included.
- Residual emissions to water (types, amounts):

The emissions to water of produced water, oil, heavy metals and other possible contaminants must be measured/estimated and reported. A program for measuring emissions must be presented. Emissions should be minimized. A plan for this using the Best Available Technology should be included.

- A decommissioning plan
- Other development options. This should include an evaluation of different alternatives and the reason for choosing the selected scenario.

4. Impact analysis

- Risk and impacts of oil spills, including trajectory modelling
- Evaluation of effects of emissions of other pollutants to water and air
- Impacts of noise, in particular underwater noise on marine mammals
- Effects on seabirds and marine mammals from disturbances (e.g. helicopters)
- Effects of lights and flaring, in particular attraction of birds
- Impacts on fishing and hunting
- Cumulative impacts:

An evaluation of the impacts caused by the activities of all operators in the region and in combination with the development in other human activities in the area (fishing, hunting a.o.)

- The risk of introducing invasive species
- A description of the forecasting methods used to assess effects on the environment and a discussion of limitations in this assessment due to lack of data

5. Environmental mitigation and monitoring

- A summary of mitigative measures to be taken
- A plan for monitoring residual emissions
- A plan for monitoring environmental impacts of routine operations and of accidents

6. Further studies

- In order to secure that data necessary to update the EIA in connection with further hydrocarbon activities are available, and in order to secure baseline data for assessing the impact of accidents, a plan for acquiring supplementary data must be prepared and kept updated. This plan should be developed in cooperation with the BMP.

7. Environmental Assessment Flowchart

Phase	Procedure	Activity	Responsible
Opening of new area for petroleum activities	SEIA ↓ Hearing ↓ Opening	Environmental survey Strategic impact assessment Regulations	Authorities
Exploration	EIA in Particularly Sensitive Areas Risk assessment Contingency planning and emergency response	Seismic Drilling	Operator/Authorities
Development	EIA ↓ Permission for discharge ↓ Baseline survey Risk assessment Contingency planning and emergency response	Construction activities Transportation Drilling	Operator/Authorities
Production	Monitoring Risk assessment Contingency planning and emergency response	Drilling Discharges to water Transportation	Operator/Authorities/ Third Party
Decommissioning	EIA	Monitoring	Operator/Authorities