

The Danish Maritime Authority's guidelines of 10 January 2011 on investigation of navigational safety issues in connection with mineral exploitation projects in Greenland as a basis for navigation in the operational phase

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Background

When minerals are exploited in Greenland, the necessary transport normally has the form of navigation in often desolate and inaccessible areas that are environmentally sensitive as well as far from other assistance and sea rescue response and environmental protection services. Furthermore, climatic conditions may pose a special risk to navigation.

In order to be granted an exploitation licence by the Bureau of Minerals and Petroleum under the Government of Greenland for exploiting minerals in Greenland, the licensee must fulfil a number of conditions related to the activities and operation. It has been agreed between the Bureau of Minerals and Petroleum and the Danish Maritime Authority that one of the conditions is that the applicant – prior to being granted an exploitation licence – must have carried out a navigational safety investigation of the conditions in the operational phase in connection with navigation and calls at ports, facilities, anchorages, etc. in the exploitation area. The purpose of the investigation is to illustrate that navigation can be carried out in a safe manner. This investigation is an element of the overall approval procedure by the Bureau of Minerals and Petroleum.

For the purposes of the act on raw materials, minerals mean all mineral raw materials other than hydrocarbons.

Navigational safety in the operational phase in connection with mineral exploitation projects

Pursuant to section 6 of the act on safety at sea, which has been put into force for Greenland by royal decree, the Danish Maritime Authority can lay down regulations, take actions and issue general and specific prohibition or enforcement notices for ensuring safe navigation, observing law and order and preventing danger as well as preventing restrictions on freedom of navigation.

It has been agreed between the Bureau of Minerals and Petroleum and the Danish Maritime Authority that the Bureau of Minerals and Petroleum makes the granting of an exploitation licence conditional upon the applicant – prior to being granted an exploitation licence and starting the extraction in the operational phase – making a navigational safety investigation and acquiring a statement from the Danish Maritime Authority on the

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necessary navigational conditions for the application. The Bureau of Minerals and Petroleum is to enclose the Danish Maritime Authority's statement as a condition for being granted an exploitation licence.

The aim of such an investigation is to ensure that ship voyages to and from mineral exploitation areas can be made in a safe and environmentally reasonable manner. The investigation is to document how the applicant intends to plan and secure the voyage in the best possible way considering the risks at hand. Hereby, it is precluded that the Danish Maritime Authority becomes aware of ship transports that may pose a considerable danger to safety of navigation at a later point in time and, in that connection, orders the voyage stopped. Such orders can cause considerable operational disturbances, especially if issued when a project has been started.

According to the conditions stipulated by the Bureau of Minerals and Petroleum, the cost must be borne by the applicant or licensee for the navigational safety investigation and for conditions of navigation in the exploitation period as given by the Danish Maritime Authority.

Investigation and documentation of navigational safety

For the Danish Maritime Authority's evaluation of the safety of navigation, a number of conditions related to navigational safety are listed in these guidelines to be used when making an investigation. However, when making the investigation, the applicant does not have to limit the investigation to the conditions mentioned in these guidelines since other factors or local conditions may require additional or other aspects to be examined. The applicant must also be aware that there may be conditions that it may not be considered necessary to examine, which will be reasoned in the conclusions of the investigation, if relevant.

In connection with the investigation, the Danish Maritime Authority can offer advice about various available reports. As regards current regulations and recommendations for navigation, they are available from the Danish Maritime Authority's webpage; in case of doubt, the Danish Maritime Authority can also be contacted.

The account given in the investigation report of the possibility of safe navigation

For the use of the investigation, the Danish Maritime Authority has drawn up the below overview of conditions that must form part of the investigation and that must be dealt with in the account to be forwarded to the Danish Maritime Authority. The investigation can include other conditions considered relevant or leave out conditions that are not considered necessary to examine, which must, in that case, be reasoned in the account.

1. Background, project contents and geographic area

The description is intended to provide an overall understanding of the project and the conditions under which the navigation will have to be carried out.

- a) The project background, pre-investigations, the applicant as well as other general information.
- b) The time perspective of the operational period during which ships will navigate the area.
- c) A prognosis of the ship traffic per year, navigational seasons, types of ships, types of cargo, including dangerous and/or polluting goods.
- d) The physical conditions in the exploitation area, landscape and environmental conditions, bathymetry, existing buildings and industries.
- e) Other special conditions.

2. Conclusions and account

A summary of the investigations carried out should be described following the background information.

On the basis of the investigations and the conclusions drawn, an account is to be drawn up of the conditions and measures related to navigational safety.

3. Description of other investigations

In connection with large-scale projects, a number of sub-investigations will be carried out that may contribute to a broader picture of the activities planned. An overview of these sub-investigations should be given so that it is possible to request the reports unless they are covered by confidentiality.

4. Choice of route, hydrographic survey and charts

Depending on the location, it will be possible to approach an area by one or more routes. If there is more than one possibility, alternative routes must be included in the considerations. If a primary route is, for example, blocked due to the ice conditions, any alternative routes will have to be used.

In parts of Greenland, the data basis of existing charts is incomplete, which means that depth data can be of a rather old date, from the time before it was possible to make up-to-date hydrographic surveys. Other areas can consist of undocumented sounding lines or be entirely unsurveyed. Another issue to be taken into consideration is the fact that the reference point of old charts does not follow current standards and that it cannot be expected that the coast lines are placed correctly in the charts.

Consequently, it cannot be expected that satisfactory charts will be available for the project area and, therefore, it may be necessary for the licensee to produce new charts for the navigation in the exploitation period. Ships for the mineral extraction area as well as ships that are, for example, to assist or rescue another ship must have the necessary charts available in order to navigate safely.

- a) Route investigation. Practical shipping routes from open sea to the destination as well as any possible alternatives considering the necessity of being able to circumnavigate shifting ice and/or weather conditions.
- b) New hydrographic survey. Due to incomplete surveys of many areas, unknown bottom conditions in some areas, coast lines that are not lying correctly in existing charts as well as other uncertainties in the existing charts, it could be necessary to carry out new hydrographic surveys. The Danish Maritime Safety Administration and the National Survey and Cadastre, which are the responsible authorities, must be consulted before hydrographic surveys are made with a view to later chart production.
- c) Charts. It must be possible to approach a port, a place of call, an anchorage, etc. for a mineral exploitation project in a safe manner. Calls and safe navigation require, among other things, official paper charts or official electronic navigational charts (ENC). If official ENCs are used, it will normally be possible to use satellite navigation in ships' electronic chart and display information systems (ECDIS). This equipment ensures enhanced navigational safety at constant, real-time and correct electronic display of the ship's position. This depends on the production of ENCs that meet official international standards, which necessitates new coast line data as well as data from new hydrographic surveys. The production of any new charts must be arranged with the National Survey and Cadastre.

5. Ice conditions

In Greenland, ice and temperature have great influence on navigational conditions and, consequently, the shipowner and the master must take special precautions both when planning and carrying out a voyage. In this connection, it would be relevant for the applicant to provide compiled information about the ice conditions of navigation from open sea to the exploitation area. For this purpose, it could be relevant to examine the following:

- a) The ice conditions in general, ice transport, icebergs, types of ice and special circumstances, such as the field ice (drifting sea ice from the Northern Cap) off especially the east and southern Greenland coasts. It deserves to be mentioned that in Denmark there are consultants with great experience within this field.
- b) Statistics on ice conditions from official sources.

6. Meteorological and oceanographic conditions

As in other Arctic regions, the weather conditions in Greenland can be rough and severe. Locally, strong currents and/or tides can be seen. Therefore, it will be necessary to examine and describe this using official data. In case of lack of this information, it could be necessary for the applicant to arrange for hydraulic investigations. Furthermore, it must be assessed whether circumstances are to be expected where the possibility of calls and voyages must be considered in more detail on the basis of, for example, a time window.

- a) Meteorological conditions in the area, including extreme values, based on official source material.
- b) Fog can prevail in some areas. Data on sight conditions.
- c) Data on water level, current, tide and the density of the water (salt content).

7. Ship and crew

The construction, equipment and manning of ships is regulated both nationally and internationally. However, these regulations often do not take account of the special conditions that may apply in Arctic regions. In inner Greenland waters, navigation in ice must be included in the ships' voyage planning only if the ship is structurally intended for navigation in the ice types that are found in the area to be called at.

In general, it will be necessary for ships to be especially fitted for navigation in Arctic regions and for the crews to be specially trained. Pack ice or especially hard types of ice (black ice and glass ice) that are found around Greenland could penetrate an ordinary ship hull. Great amounts of icing could make a ship capsize.

It will be assessed whether there will be a need to consider special conditions for ships with which a navigation agreement is concluded. These special conditions include, for example:

- a) Ships' stability when navigating in ice, including conditions with icing that may considerably impair the stability of a ship.
- b) Ships' stability in damaged condition – leak stability.
- c) Special design requirements for ships, such as ice class/polar class, double hull, ice cutters around the propeller, sound stability conditions in order to withstand the risk of icing.
- d) Requirements for special Arctic equipment, including ice search-lights and Arctic life-saving appliances.
- e) Engine power.
- f) Ability to function in cold conditions.
- g) Manoeuvrability in relation to the extension of the place of call.
- h) The necessity of tug boat assistance.

- i) Ships must have at least one navigator available on board with the necessary local knowledge about the waters to be navigated. It will be assessed whether there is a need for local “ice navigators/an unqualified pilot” if they are available.
- j) General crew qualification requirements as regards knowledge about navigation in Arctic areas.
- k) The applicability of electronic navigational aids to navigation. Common instruments such as compasses can be unreliable in the extreme north. Certain areas can have difficult reception conditions for radio communication and satellite navigation, especially in fjords surrounded by mountains.

8. Ports, places of call, anchorages, etc.

The applicability of a place of call.

- a) Investigation of the applicability of the port area or the place of call in relation to the size of calling ships.
- b) The extension of the maneuvering area in relation to the influence of wind, sight, ice, current, water level, the density of the water and waves, etc.
- c) Investigation of the consequences of any sediment transport in the port area or the place of call in the light of the chosen design or location. This may be especially relevant in cases where the port facility is located at a delta area with sediment transport.
- d) Protection of cables and pipelines.

9. Emergency preparedness and risk-reducing measures

It may be expedient to establish navigation guidance and information services. Since the possibility of calling for assistance from others is often very limited, it can be necessary to have local emergency preparedness. The following should be considered:

- a) Marking by means of lights, beacons, racons (equipment giving an identifiable signal on a radar installation). In some cases, a local automatic identification system (AIS) could assist navigation. The Danish Maritime Safety Administration is the responsible authority.
- b) Local port service that could inform calling and departing ships about wind, weather, sight and ice conditions, etc. In this connection, for example a weather station and maritime radio equipment are necessary.
- c) Tug boat assistance for use in connection with ordinary calls or as assistance in adverse weather and ice conditions if a ship encounters engine failure or damage.
- d) Drawing up of nautical information material for use by ships intending to call. Information about material available for navigation in Greenland.

- e) Local emergency preparedness for (emergency) assistance of ships as well as environmental preparedness. In case a ship is lost, it could be necessary to be able to rescue those on board by means of a vessel, especially in ice conditions.
- f) Local ice reconnaissance that could inform a calling ship of the ice conditions.

10. Assessment of possible environmental effects

In case of an accident in connection with navigation, there will be a risk of effecting the environment, including especially the marine environment. The investigation should assess these conditions.

- a) Possible environmental effects of the navigation.
- b) Environmental effects in case of navigational accidents.

Practical information

In some cases, the Danish Maritime Authority may have a need for further investigations to be carried out by the applicant or licensee.

The statement of the Danish Maritime Authority will be forwarded to both the applicant or licensee and the Bureau of Minerals and Petroleum, which will, when informing an applicant about the granting of an exploitation licence, refer to any conditions or the like that have been laid down by the Danish Maritime Authority. Furthermore, the statement will be forwarded to the Climate and Infrastructure Agency.

Geographic coordinates (positions) must be given in degrees, minutes and decimals of minutes, in system WGS 84 datum, for example – 63°10′.92 N, 060°34′.86 W.

The investigation report is to be forwarded to:

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Centre for Maritime Regulation
Vermundsgade 38 C
DK-2100 Copenhagen Ø
Denmark

with a copy to:

The Bureau of Minerals and Petroleum
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3900 Nuuk
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Ministry of Housing, Infrastructure and Transport
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