DANMARKS OG GRØNLANDS GEOLOGISKE UNDERSØGELSE RAPPORT 2001/24

Evaluation of raw materials along NorNed cable route in Danish waters

Technical report to Statnett SF
March 2001

Jørgen O. Leth, Dennis Anthony
and Peter Konradi

GEOLOGICAL SURVEY OF DENMARK AND GREENLAND
MINISTRY OF ENVIRONMENT AND ENERGY

GEUS

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G E U S

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1. Introduction

Two power cables, the Viking Cable and the NorNed Cable, are planned connecting Norway and Germany and Norway and the Netherlands. Due to the Danish legislation the raw material potential has to be assessed in the 200 m security zone on both sides along the cable, prior to the establishment of the cable to ensure a sustainable exploitation of the raw materials in the Danish territorial waters.

On the instructions of STATNETT SF The Geological Survey of Denmark and Greenland (GEUS) has carried out raw material investigations along the NorNed Cable route in the Danish Sector. The result of the evaluation presented in this report is a registration of the amount and type of the raw materials.

2. The criteria

The criteria for the definition of raw materials follows the guidelines given by the National Forest and Nature Agency:

- The thickness of the raw materials (sand and gravel) must be at least 1 meter thick.
- The water depth must be at least 15 metres in the near coast area.
- The water depth is less than 40 metres.

The evaluation should describe the geology along the cable tracée, and if possible quantify the volume of raw materials - in the commercial sense – which is expected to be tied up in the cable corridor.

The evaluation is as a rule based on investigations completed in relation to the project combined with the general knowledge on the raw material potential in the region.

3. Database

The database used for the evaluation is based on the report No. 33766.4 "Viking Cable/NorNed Kabel survey of the corridors – Survey Results" made by Fugro-Geoteam for STATNETT in 1996. The report includes the results from the offshore survey of the planned cable corridors for the Viking Cable, the NorNed Kabel and the EuroKabel. The surveys were performed between May 22nd and July 13th 1996.

Data available for the present raw material evaluation has been based on the interpretations from three parallel survey lines. The quality of the interpretations of the data is considered high.

The equipment utilised for the survey is side scan sonar, multibeam echo sounder and deep towed boomer (Sub-bottom profiler). Furthermore, the results from a series of geotechnical samples (PCPT, gravity cores, grab samples and vibrocores) and ROV investigations have been available.

4. Results

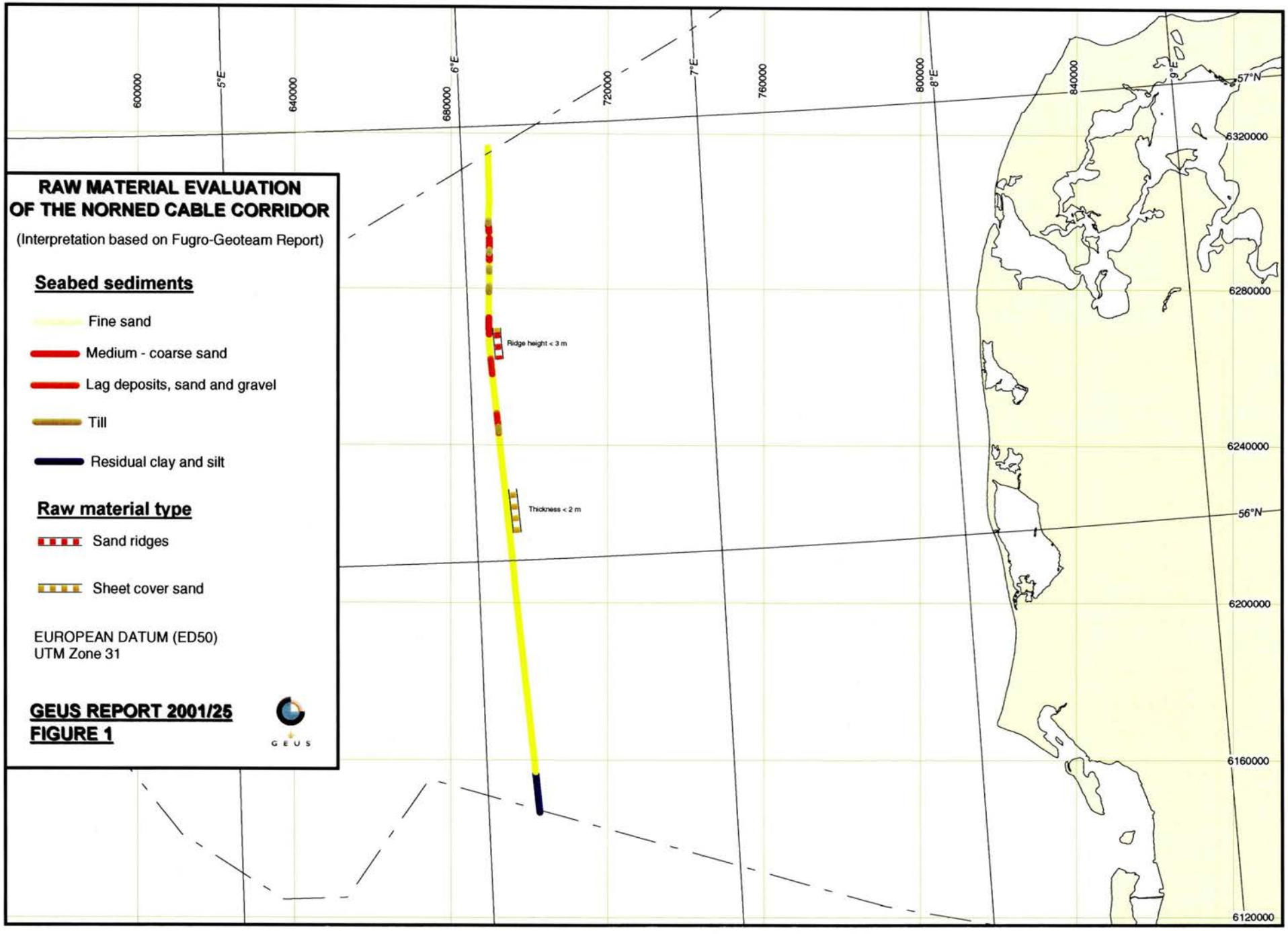
On the basis of the geological interpretations from the Fugro – Geoteam reports presented in the alignment sheets and the text in the above-mentioned reports any information in relation to raw materials has been compiled. It has been possible to define two types of sand units based on the sediment type, the morphology and if possible the internal reflector configuration:

- Sand ridges: Sand unit with maximum thickness in the centre and minimum thickness at the rim. The extend is in the kilometre scale. This type is by volume a major raw material source. The distribution is related to large sandbank accumulation of up to 3 m thickness. The value as a raw material, however, is doubtful due to the dominance of fine sand.

- Sheet cover sand: Uniform layer of sands thicker than 1 m with no internal structures and a wide extend. This resource is in the middle part of the Danish Sector dominated by fine sand.

The areas characterised by the two sand unit types are concluded to be of potential raw material interest. It has not on the actual basis been possible to conclude anything on the distribution, volume and quality of the raw material. To do so further investigations are recommended.

The compiled results are presented in figure 1. The map shows the cable route in different colours, which refer to the seabed sediment type (see legend). Along the cable route signs referring to the two raw material types defined have indicated the areal distribution of potential raw materials.


RAW MATERIAL EVALUATION
OF THE NORNED CABLE CORRIDOR
(Interpretation based on Fugro-Geoteam Report)
Seabed sediments
Fine sand
Medium - coarse sand
Lag deposits, sand and gravel
Till
Residual clay and silt
Raw material type
Sand ridges
Sheet cover sand
EUROPEAN DATUM (ED50)
UTM Zone 31
GEUS REPORT 2001/25
FIGURE 1
GEUS
Ridge height < 3 m
Thickness < 2 m
600000
640000
680000
720000
760000
800000
840000
5°E
6°E
7°E
8°E
9°E
57°N
56°N
6320000
6280000
6240000
6200000
6160000
6120000

5. Conclusion

On the basis of geological interpretations included in the Fugro-Geoteam Reports made for STATNETT in 1996 GEUS has completed an preliminary evaluation of the raw material potential in the NorNed Cable corridor in the Danish Sector. Two different types of resources have been defined and the areal distribution has been mapped together with the seabed sediment type (Figure 1).

Only two specific areas comply with the criteria for raw material. In most cases this is due to water depths below 40 m.

In the northern part of the corridor sand ridges of coarse and fine sand have been recognised. These are due to the presence of large bedforms with lengths of 300-500 m and height of up to 3 m.

In the middle part an area of sheet cover sand have been recognised at water depths around 40 m. The relatively shallow water depth here is due to the updoming structure of the underlying glacial till. However, the thickness of the sheet is less than 2 m.

It can be concluded that both raw material types recognised in this evaluation is of minor interest in the commercial sense due to relatively deep water and thin sand layer thickness.