

## 1.1 Tender document – Appendix 1

*Core drilling of  
Seabed Massive Sulphides  
in the Norwegian Sea*



**NORWEGIAN PETROLEUM  
DIRECTORATE**

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**Scope of work:**

The Norwegian Petroleum Directorate (NPD) intends to carry out a core drilling cruise on the Mohns Ridge in the Norwegian Sea in late summer/early autumn 2020. The purpose of the cruise is to obtain geological information from the subsurface of hydrothermal sulphide deposits at one or two sites in the area. The two sites in question are located at 2600 – 3000 meters water-depth in the north-eastern parts of the ridge as indicated on the map in Figure 1. At each site, the plan is to drill with continuous coring in 5 to 8 holes along a profile across the sulphide deposit. These holes shall be of 15 to 30 meters depth below seafloor (dbsf) at the flanks of the deposit and increase in dbsf towards its central parts. The central hole should be 100 to 200 meters dbsf. Expected total core drilling length at each site would be 300 to 400 meters.

Alternatively, the sites may be covered by a larger number of holes with continuous coring of 10 to 15 meter dbsf distributed over the deposits, 15 to 20 holes at each site. Expected total coring length at each site would be 250 to 300 meters.

High core recovery is an important success criteria for this drilling campaign. But balanced decisions between drilling depth and core recovery shall be made upon consulting the NPD.

The total operation time (including mobilization/demobilization) may be up to six weeks.

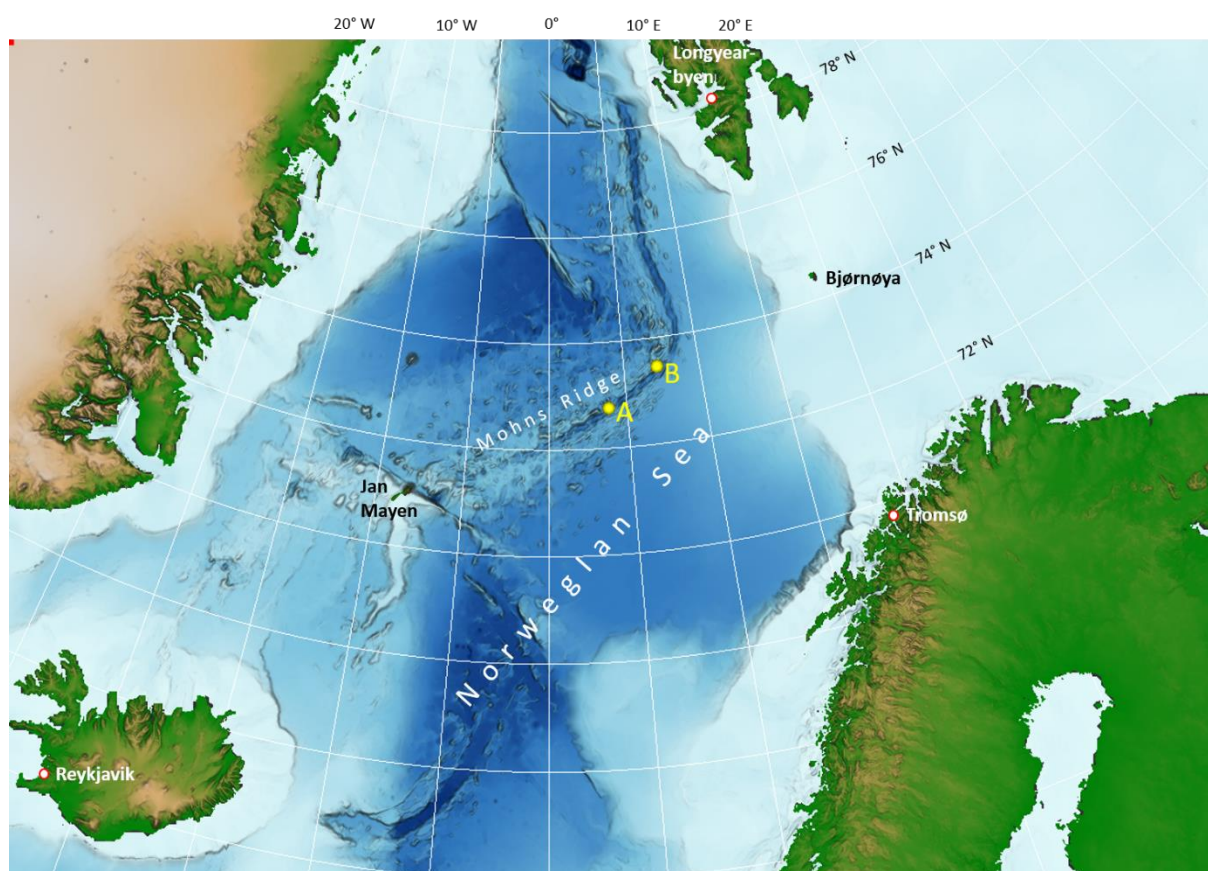


Figure 1. Regional map indicating the general location of the two drilling sites A and B ( shown by yellow spheres).

## **1 Description of the assignment**

### **1.1 Background**

The drilling campaign described here is part of NPD's program for mapping the deep-sea mineral resources of the Norwegian continental shelf. The data acquisition program will be administered by the NPD, funded through the Ministry of Petroleum and Energy.

### **1.2 Technical overview**

NPD expects that in the first case mentioned above, i.e. the drilling of 5 to 8 holes of 15 to 200 meters dbfs along profiles, the operation will be done by a surface drilling ship or by coiled tubing drilling, or by any other suitable technology. In the alternative case, i.e. the drilling of a larger number of distributed holes of 10 – 15 meters dbfs, the operations are foreseen to be performed by submersed drilling rig or any other suitable equipment located on the seafloor.

For ships other than surface drilling ships, the ship has to carry at least one ROV to assist the drilling operations as appropriate. The ROV must be equipped to take rock samples by itself from the seafloor, preferably with equipment that can cut or drill rocks. Rock sampling by ROV shall take place at any time suitable in general, and during any downtime of the main drilling operations in particular. The ROV should be equipped with high definition colour camera for video and still images.

NPD requires 24 hours operation, and crews should be available accordingly.

The sites are generally characterised by uneven topography with varying degrees of sloping terrain (Figure 2), and variable loose and consolidated sulphides and volcanic rocks. Jamming of coring equipment may therefore be a frequent problem. The bidders are asked to provide information on how they will handle such conditions, e.g. the drilling of top layers of unconsolidated sulphide and rock rubble, downhole brecciated loose zones, and at what maximum seafloor slopes the drilling operations may take place. The bidder is asked to submit a summary description of the operations and procedures to be followed for drilling and coring, for bringing the cores from the seafloor to the ship, and for handling the cores on deck.

The bidder shall provide a contingency plan for alternative coring methods or procedures to be implemented to mitigate severe recovery failure during sections of the core drilling, e.g. by retrieving intermittent sections with motor driven core barrel technology.

The bidder is asked to describe the operation's sensitivity to weather conditions. Maximum tolerable sea-state (waves and wind force) should be included.

The NPD will make available to the contractor existing high-resolution Multibeam Echosounder (MBES) and Sub-bottom Profiler (SBP) data that may be relevant as support for the detailed planning of the drilling locations.

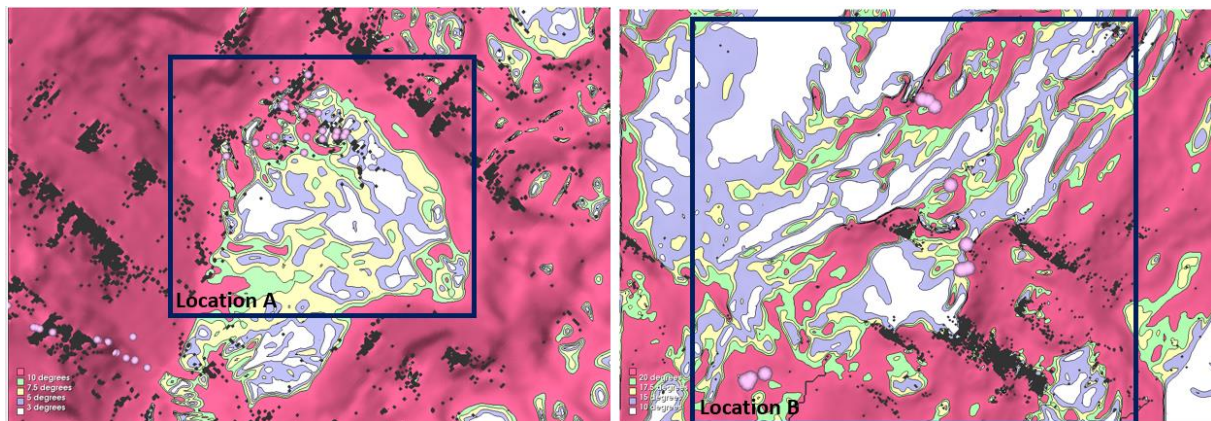


Figure 2. Batymetric map showing the slope gradient on the location A and B respectively. Purple spheres are identified sulphide deposits.

### 1.3 Timing

The drilling campaign shall be completed within late September 2020, preferably within early to mid September.

Bidder is requested to provide vessel availability meeting this survey period.

### 1.4 Project time schedule

The bidder is required to specify a table with a realistic project time schedule based on the scope and technical overview described above.

### 1.5 Crew change

If possible, it should be a continuous survey without crew change. To achieve this, the date when the survey vessel is leaving harbor starting the project operations is expected to be the start-date for a leg (crew-change period).

The bidder is required to comment on the need for crew-change during the project period.

### 1.6 Client's representative

NPD will have representative(s) on board for quality control, operational decisions and daily reporting to NPD.

### 1.7 Navigation specifications

The survey vessel must have onboard navigation equipment necessary for its movement and ability to stay on location during drilling operation and rock sampling, as well as recording the locations of the cores and rock samples (DP). The technical solutions available onboard will be evaluated.

Bidder is required to detail all onboard navigation equipment and planned procedures during operations.

## **1.8 Communication**

There is need for continuous communication to shore. Phone and email communication will always have to be available at all times to assure that necessary information is delivered to the NPD and that decisions are taken without unnecessary delay. This information shall include all relevant results and evaluations. A unique high velocity line for this communication is preferred. In this regard the quality of the onboard communication will be evaluated.

Bidder is required to detail all onboard communication equipment, including capacity for delivery and receipt of information.

## **1.9 Data delivery and final products**

Work regarding interpretation and analysis of the recovered core material shall include onboard core descriptions and geological interpretation of the wellsite data , as well as preparation of the cores for storage.

Bidder is required to provide planned procedures for the onboard core handling and preparation. Please also include plans for description and interpretation of the cores and other geological wellsite information.

Comprehensive digital reports shall be delivered to the NPD within one month after the finalization of the assignment. Reports shall as a minimum include:

- Reports on each drilling operations including onboard core descriptions
- Reports on each ROV dive including onboard sample descriptions and video material
- Cruise report with time break down and any operation failure report
- Daily operation report with 24 hours forecast

Preliminary data shall be made available to the NPD representative(s) on board if requested.

The contractor shall deliver all cores and rock samples to a storage facility or any other institution determined by NPD immediately after the finalization of the assignment. Packing and shipping material for samples shall be available at the vessel during operations.

## **2 Costs**

### **2.1 General conditions**

The total cost with all included shall not exceed NOK 60 000 000 ex .VAT.

As full compensation to Bidder for satisfactory performance of the Services, NPD shall reimburse Bidder in accordance with the rates and prices hereunder. Such rates and prices are in full and final settlement of all remuneration due to the Bidder for performance of the services, meaning:

- Prices stated by Bidder shall include all costs necessary to carry out the whole project.
- Costs shall be stated in NOK. Prices shall exclude VAT and shall remain fixed until completion of the work.
- All navigation costs shall be included in the day rates.



- All costs for communication to shore shall be included in the day rates.
- Costs and delivery of the samples and material to the NPD shall be included in the rates quoted for mob/demob, day rates and reporting.
- Costs related to equipment performance and acceptance tests shall be covered by the bidder.
- Food and lodging for the client's representatives shall be included.
- Fuel costs shall be included.

The breakdown of timing regarding production and standby shall on daily basis be agreed between the Party Chief and the NPD. The bidder's breakdown standards on this issue must be part of the tender documentation.

All downtime due to technical breakdown must be covered by the Bidder.

Bidder is required to state prices for all items in section 2.2-2.7.

## **2.2 Mobilization and demobilization**

Mobilization and demobilization will take place in a port conveniently located with respect to suitable facilities and airline connections for the oncoming crew and representatives from the client. In this case, the port should be within reasonable transit time e.g. Tromsø or Bergen. In conjunction with the mobilization, a start-up meeting will be held with representatives from the NPD to provide hands-on information regarding the project to the crew and potentially to do a short vessel inspection.

Bidder shall specify the total cost for mobilization and demobilization related to the port in their bid. Mobilization and demobilization cost shall cover vessel, equipment and personnel costs associated with the mobilization and demobilization of this survey.

The costs shall be stated as lump sums.

The mobilization period will be regarded as finished when the vessel(s) and all equipment, personnel, infrastructure, spare parts and consumables of the Bidder departs from the port of mobilization and starts transiting to the first survey location.

The demobilization is regarded as finalized when the vessel has transited to and arrived at the agreed port after finalization of the survey.

## **2.3 Transit rate**

The bidder is asked to quote a transit rate (pr day – 24 hours) related to the transit time from port of mobilization to the area where work is planned to commence, and to the specify expected time for such transit.

The transit rate will relate also to movement of vessel between drilling locations, and to the transit from the working area back to port for demobilization.

## 2.4 Operational rate

Operational rates will apply when the Bidder's equipment and personnel are actually conducting the drilling-services to be rendered by the Bidder and shall be quoted per day (24 hours).

Operational time is classified as time spent on:

- Preparation for drilling at location
- Handling of drillstring and other drilling related equipment
- Drilling
- Coring
- Recovery of equipment on the drilling location

The following costs shall be included in operational day rates stated:

- Costs for logistical coring and drilling planning.
- time spent on handling of drillstring and other drilling related equipment, drilling, coring, recovery of equipment on the drilling location and other drilling related operations

Use of other optional equipment proposed by contractor may be quoted as "other equipment and services offered by contractor" and quoted as lump sum and daily rental (applies when equipment is in use).

## 2.5 Standby rate

Standby rate shall be stated as rate per day (24 hours).

Standby time is classified as time spent on:

- Waiting on weather.
- Waiting due to circumstances beyond Bidder's control.

Downtime due to technical failure shall be covered by the bidder.

Lost time due to waiting on weather will be covered by the NPD.

## 2.6 Cost associated with crew-change

Reference is made to pt. 1.5. In case of need for crew change during the project period, the Bidder shall specify the associated cost. This can be done either by specifying a total sum associated with crew-change during the project, or by a day-rate and associated time expected for the crew-change.

## 2.7 Cost for optional equipment

Cost for any optional services shall be detailed for the relevant tools or packages of tools. This cost shall include personnel, equipment, operation cost, reporting etc.