TENDER DOCUMENT

Re-processing of 2D seismic data in the Barents Sea

(2017/10)

Open tendering competition cf the Public Procurement Act and the Regulations relating to public procurement part I and III

Submission deadline: 20 February 2017

12:00 noon local time (Norway)

NORWEGIAN PETROLEUM DIRECTORATE

1   Contents

2   General description

2.1   About the Norwegian Petroleum Directorate

The Norwegian Petroleum Directorate (NPD) is a governmental specialist directorate and administrative body established in 1972.

The paramount objective of the NPD is to contribute to creating the greatest possible values for society from the oil and gas activities by means of prudent resource management based on safety, emergency preparedness and safeguarding of the external environment.

For more information about NPD, visit our website www.npd.no.

2.2   Scope of procurement

NPD invites to submit bids for re-processing of 2D seismic data from the Barents Sea North. Please see section 3, especially section 3.1 and 3.4, for further information about the tender.

2.3   Public announcement

The tender competition is announced in the Mercell-database, DOFFIN-database and in the TED-database.

2.4   Financial

The project is subject to funding from the Norwegian Government. NPD therefore reserves the right to stop the bidding process or declare it null and void or reduce the volume of the programme due to budgetary reasons or unforeseen circumstances outside NPD's control.

3   Description of the required services

3.1   2D seismic data re-processing

The Contractor shall process seismic data (volume) as described below in order of priority:

Area:	Barents Sea North
Type:	2D
Volume Phase-I:	Approx. 1.000 Km (three lines)
Volume Phase-II:	4500 km – 5000 km
Data Vintage:	2011 - 2014

The final product of the Phase-I shall be approved by the NPD before the Contractor can initiate Phase-II. The NPD reserves the right to terminate the processing project before Phase-II, based on assessment of processed data quality from phase I, see contract conditions clause 2.2 (Appendix 1B "Processing Sequence and Other requirements", will be worked out by the NPD and the Contractor, before signing the contract).

The following points need special attention:

i.   Shallow & varying water depth
ii.   Hard and varying Seafloor - due to Barents Sea Uplift and subsequent erosion

iii.   Multiple removal because of i and ii, above
iv.   Noise removal
v.   Velocity analysis

3.2 Data Acquisition Parameters

The field parameters for the 2D survey are as follows:

Data Acquisition Parameters (Main Volume)	
Shot point interval	25 m
Source Depth	7 m (nominal)
Active Streamer length	8000 m
Streamer tow depth	8 m, nominal
Number of groups	640
Group interval	12.5 m
Tape format	SEG-D
Tape media	3592
Recording length	8 sec
Sample interval	2 ms

3.3 Basic Processing Sequence (PSTM)

The basic processing price shall be based on the following estimated processing sequence. Algorithms and parameters used at each step in this processing sequence must be agreed with the NPD in writing prior to the production processing. Deviations from the basic sequence must also be in agreement with the NPD. The order of these processes may change depending on testing.

•   Reformat from SEG-D to contractor's own data format. Static shift correction for source/receiver depth. Bad shot and channel edits. Gain recovery.
•   Spherical divergence correction.
•   Merging the seismic traces to the navigation.
•   Resample to 4 ms.
•   Noise attenuation. The data will be searched for spikes, spurious high amplitudes and swell noise.
•   Deterministic signature deconvolution (zero phasing) which shall be applied using an operator designed to transform the modeled far field source signature to its zero phase equivalent. This process shall also take care of source and receiver ghost as well as the air gun bubble pulse.

- Linear noise attenuation in shot and receiver domain, focused on direct arrivals and refractions, contractor to specify methods.
- Inverse Q filter, phase only (place in sequence to be decided).
- Up to 6-passes of de-multiple before migration including (order and methods subject to testing):
- 1st pass de-multiple: 2D Surface Related Multiple Elimination (SRME), as appropriate
- 2nd pass de-multiple: Wave Equation Multiple Attenuation (required in shallow water areas)
- 3rd pass de-multiple: Shallow Water De-multiple (SWD) (required in shallow water areas)
- 4th and 5th pass demultiple: Tau-p De-convolution & Mute in shot and receiver domain. Mute in tau-p domain should be adapted to water depth. Data should be interpolated in shot domain before receiver domain tau-p transform.
- Demultiple pass 1-5 applied either in sequential mode or using multi model least squares adaptive subtraction following testing.
- Tau-p dip filter (shot and receiver domaims if necessary).
- First pass velocity analysis every 2 Km. All velocity picking should be performed in agreement/co-operation with NPD staff. The data shall be muted (& proper pre-conditioned) prior to all velocity analysis.
- FX de-convolution on common offsets
- Common offset linear noise attenuation (FK filter), as appropriate
- 6th pass demultiple: Hi-Resolution Parabolic Radon de-multiple with appropriate shotpoint interpolation.
- Second pass velocity analysis every 1 Km. Input to Pre stack time migration (PSTM).
- Full 2D Kirchhoff Pre stack time migration (PSTM).
- Third pass velocity analysis every 1 km. Final velocities which have to be exported to EssoV2 and diskos98.1 format.
- NMO correction. Pre-stack scaling, inner trace mute and outer trace mute.
- CDP Relevant post stack signal enhancement procedures.
- Post-stack Scaling.
- SEG-Y output.

3.3.1   Special seismic processing challenges

The major part of the seismic data is acquired in area with shallow water with partially hard seafloor, and in some areas (due to sub crop of even older strata) – extremely hard. The water depth in time varies from approx. 80ms to 500ms. To meet these processing challenges the Contractor should suggest de-multiple methods / processing flows, which will focus on this issue.

Contractor will demonstrate relevant experience of techniques.

3.3.2   Optional processing sequence

Contractor proposed processing processes, which are not included in the basic processing sequence - shall be quoted separately.

3.3.3   Testing

The NPD see it as necessary that processing parameters shall be tested on two or three parts from different lines and confirmed on two more lines before being applied in production. The test data should be available via FTP-server in SEG-Y format and as PowerPoint presentations.

3.4   Re-processing for «shallow» target and Data Analysis of 2D seismic data in Barents Sea North-East

Area: Barents Sea North-East

Type: 2D

Volume Phase-I: Approx. 2.500 Km including initial Data Analysis/test lines

Data Vintage: 2011 - 2014

The basic Data Acquisition parameters are identical with 3.2, above. However, with this dataset we would like to conduct a series of initial data-analysis with a possible "shallow" target in mind. Hereafter, the aim is to 'develop' a smart data processing strategy – to be applied to a 2D data volume of approx. 2.500 km.

We envisage the following contends: (But not limited to)

- Maintain 1 ms sample rate, all through the re-processing
- Data window, 4 sec. / alternatively 5 Sec., please quote accordingly
- Swell noise attenuation
- De-ghosting
- Bubble pulse suppression
- Conversion to zero-phase
- Eventual Shot-channel scaling
- Water column statics (if applicable)
- Several iterations of de-multiple including a Short Offset Multiple Elimination run
- Pre-stack imaging
- 'Post'-processing
- Stack

3.5   Other requirements

The contractor shall at no extra cost establish a secure online client monitoring and supervision site where test results, project status, meeting summaries and other required data will be available to the NPD throughout the processing.

3.6   Products to be delivered after processing

Item	Format	Media
Final processing report	MS Word or PDF format	CD / DVD
Raw field data as received from client	SEG-D	3592
Final stacking & migration velocities	EssoV2xy or diskos98.1	CD / DVD
Raw CDP gather before PSTM	SEG-Y	Hard disk
Raw common image gather (CIG) after PSTM	SEG-Y	Hard disk

Raw migration full-offset stack volume and sub stack volum (near,- mid- and far- angle)	SEG-Y	Hard disk
Final PSTM (unscaled true amplitudes full offset volume)	SEG-Y	Hard disk
Final PSTM (TVS full offset volume)	SEG-Y	Hard disk

3.7   Timing

Data processing shall commence as soon as the field tapes are delivered to the chosen processing centre.

Delivery of finalized product:

•   Phase I should be completed 8 to 10 weeks after field tapes are received.

•   Phase II should be targeted for delivery within 12 weeks from completion of phase I

•   Work scope as stated in section 3.4 above: 15 weeks after field tapes are received.

3.8   Costs

Prices shall be quoted in NOK and shall comprise the specified basic processing sequence in accordance with Section 3, above. Test processing shall be included as part of the basic processing sequence.

Seismic data processing cost shall be stated as:

•   Rate per kilometre based on the estimated processing sequence in Section 3.
•   Rate per kilometre for optional extra processing

NPD intends to allocate up to NOK 3 800 000,- to the project.

4   Competition rules

4.1   Procedure

Open tendering competition, cf. the Public Procurement Act of 16 July 1999 No. 69 as amended, see also the Regulations relating to public procurement, laid down by Royal Decree on 7 April 2006 No 402. **This type of procedure does not allow for contract negotiations.** Only bidders that fulfil the qualification requirements will have their tenders evaluated. Bidders are not allowed to change the tender after the submission deadline.

4.2   Reservations and non-conformity

If the supplier has reservations regarding parts of the tender documentation, required specifications, contract or other tender documents, it shall be clearly stated in the bid. Any reservations must be specified, including consequences for performance, prices or other conditions.

The same applies to non-conformity. Reservations and non-conformities shall be stated precisely and unambiguously. They shall be stated in the bid letter in such a manner that the contractor can evaluate them without it being necessary to contact the supplier, cf. Section 20-3 of the Public Procurement Act. Substantial reservations, and reservations or non-conformities that can result in uncertainty regarding evaluation of the bid compared to other bids, will result in the bid being disallowed, cf. Section 20-13(1) of The Public Procurement Act.

If the supplier's reference to standardized terms of delivery, or something similar, deviates from existing tender or contract provisions, it will be regarded as a reservation.

The supplier can not make any reservation against the contract section 18, Wage and Working Conditions – Prohibition against Social Dumping. This is a statutory requirement that OD must include in their contracts.

4.3   Abidance

The bidder must abide by his/her tender until three months after the submission deadline.

4.4   Communication during the tender process

All communication during the process shall be routed via the Mercell-portal, www.mercell.no. This is to assure that all communication will be logged. When you are logged on to the competition, chose the flag marked "Communication", click on the symbol [image] "New message". Enter the information to the authority and then click [image]. The authority will then receive your message. If the question regards all bidders, the authority will answer the inquiry anonymously by giving the answer as additional information. Additional information is available under the flag "Enquiry", then the flag "Additional information". You will also receive an e-mail with a link to the additional information.

5   Qualification requirements

5.1   General requirements

Requirement	Documents required
Circumstances regarding the bidder's tax remittances shall be in order (this only applies to Norwegian companies).	• Tax certificate • VAT certificate More information: http://www.skatteetaten.no/no/Alt-om/Skatteattest/

5.2   Company registration

Requirement	Documents required
The bidder shall be registered in the	• Copy of company registration Certificate or similar.

"The Register of Business Enterprises" in Brønnøysund or registration in a trade register or the like as set out in the laws of the country of registration of the bidder.	

5.3   Experience

Requirement	Documents required
The bidder must have considerable experience with similar assignments.	Description of the company`s most relevant previous assignments. The description must include an overall description of the assignment, value, timing and contact information of the client. (CVs are not acceptable documentation in this context)

6   Award criteria

Only tenders that is submitted by qualified bidders and that meet the requirements and specifications given in the tender document will be considered.

The NPD will choose the most economically advantageous tender, based on the following criteria:

Criteria	Weight	Documents required
5.1.Price	25%	A quotation of prices in accordance with section 3.8, "Costs".
5.2. Quality, including offered technology and competence	45%	A brief description of your offered technology in accordance with section 3.3 "Basic Processing Sequence (PSTM)"
5.3 The key persons experience with processing of similar seismic data	30%	Manpower for this assignment (organization plan) with names and CV`s for the key persons who shall carry out the services.

7   Submission and disposition of tender

7.1   Submission of tender

All tenders shall be submitted electronically via the Mercell portal, www.mercell.no by the tender deadline. Tenders delivered after the deadline will not be accepted. (The system does not permit tenders to be sent electronically via Mercell after the tender deadline.)

If you are not a Mercell customer, or you have questions regarding how the application functions, e.g how to submit a tender, please contact Mercell Support at tel +47 21 01 88 60, or by e-mail to support@mercell.com. It is recommended to submit the tender in adequate time before the deadline. A minimum of two hours before the deadline is suggested.

If the authority should provide additional information that results in you wanting to change your tender before the deadline, you can access your offer, open it, make the necessary changes and send it again right up to the deadline. The last submitted tender will be regarded as the final one.

The tender requires an electronic signature when it is submitted. When sending the tender electronically, an electronic signature will be requested to confirm that you are the actual bidder who has submitted the tender. An electronic signature can be obtained at www.commfides.com, www.buypass.no or www.bankid.no.

We would like to remind you that it can take some days to acquire an electronic signature, and therefore recommend that this process be initiated as soon as possible.

7.2   Disposition of tender

The tender shall be enunciated in English and as in this disposition:

File name	Contents
Qualification requirements	**Documents are to be enclosed in the step Kvalifikasjonskrav/Qualification requirements when you submit the tender in Mercell.**
Q01 – Tax certificate	Ref 5.1
Q02 - Company registration	Ref 5.2
Q03 – Description of previous assignments	Ref 5.3
Documents required	**Documents are to be enclosed under the tab Dokumenter/Documents when you submit the tender in Mercell.**
DOC01 – Cover page	Signed by a responsible/liable representative for the bidder. Confirmation that NPD's contract terms are accepted. Minor reservations with reference to specific contract clauses must be quoted with alternative proposals, as this type of procedure does not allow for negotiations. Name and contact information of the bidder.
DOC02 – Price	Ref.5.1.
DOC03 – Description of technology	Ref.5.2
DOC04 CV`s of key persons	Ref 5.3

8   Appendices

- Appendix 1 – Contract terms
- Appendix 2 – Final Report