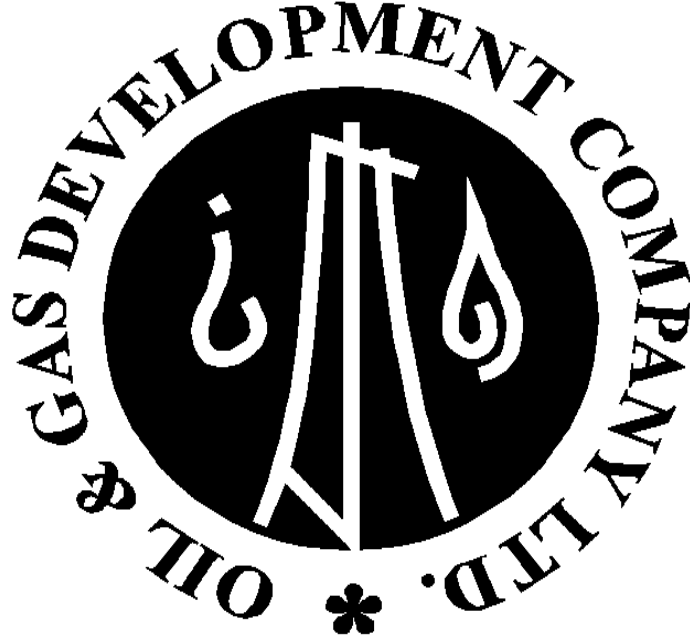


OIL & GAS DEVELOPMENT COMPANY LIMITED



TENDER ENQUIRY NO. PROC-SERVICES/CB/EXPL-4822/2020

**HIRING OF 2D SEISMIC DATA PROCESSING SERVICES FOR
PALANTAK AND SHAHANA E.L 's UPTO PRE-STACK TIME MIGRATION
PALANTAK AND SHAHANA E. L's**

Note:

Bid bond of **USD 2,500/- (US Dollar Two Thousand Five Hundred Only)** to be submitted with the technical bid.

The master set of tender documents (services) uploaded on OGDCL website (www.ogdcl.com) is the integral part of this TOR.

HIRING OF 2D SEISMIC DATA PROCESSING
SERVICES FOR PALANTAK AND SHAHANA E.L 's
UPTO PRE-STACK TIME MIGRATION



PALANTAK AND SHAHANA E. L's

1.0 Introduction:

Oil and Gas Development Company Limited (hereafter referred as Company), a Government of Pakistan Enterprise, is a premier E & P Company engaged in exploration and production of crude oil and natural gas in different parts of Pakistan. The company intends to hire 2D seismic data processing services from an internationally reputed seismic data processing company (hereafter referred as Contractor) for Palantak and Shahana E.Ls in Makran Fold & Thrust Belt area of Baluchistan Basin, Pakistan. Base map with 2D surveys and boundaries of Palantak and Shahana E.Ls are provided in **Annexure-I**.

1.1 Palantak and Shahana E.L's:

1.1.1 PALANTAK AND SHAHANA E.Ls are located in Washuk and Panjgur Districts, Baluchistan Province of Pakistan, falling between latitudes 27° 00' 00" and 27° 32' 00" and longitudes 62° 58' 00" and 64° 48' 00".

Tectonically these blocks lie in Northern Makran Zone. The Makran Fold & Thrust Belt is a mainly east-west trending structurally defined basin and is composed of an accretionary wedge (Northern Makran) and the Panjgur Wrench Zone (Southern Makran). The accretionary complex consists of a low taper wedge of deformed late Eocene to Pliocene sediments, exposed in arcuate zone of highly folded and densely faulted coast parallel mountain belt and ridges.

OGDCL as operator of the block acquired 2D seismic survey in PALANTAK AND SHAHANA E.Ls in 2016. The intended 2D seismic data processing campaign comprises surface coverage of approximately **502 L.Kms** (PALANTAK 345 L.Kms & SHAHANA 157 L.Kms). Details of the 2D seismic acquisition survey is provided in **Annexure-II**.

1.1.2 There is no well control over the project area as no VSP/Check shot data is available for Well-to-Seismic calibration.

1.1.3 The contractor is required to make sufficient arrangements to perform the stipulated task within agreed time frame to meet the targets of the company.

2.0 Scope of Work:

2.1 The 2D processing services shall include processing up to PSTM level of 2D seismic data. The Contractor shall process the data as per sequence of **Annexure III**, along with other advance processing modules offered by the contractor. Any step in the Time processing workflow may be modified with mutual consent without affecting the cost of the project. The processing sequence may be modified by

addition or deletion or reordering of any module as and when required to achieve the optimum results without any additional cost and subject to approval of the Company.

- 2.2 The data is required to be processed at 2ms sampling interval with full record length of 6 seconds along with true amplitude recovery and zero phase output.
- 2.3 The contractor shall use the state-of-art computer system with internationally used software capable of carrying out 2D time processing by deploying professionals having seismic data processing experience as per **Annexure-VI**. The contractor shall provide digital data of all the outputs, parameter testing, intermediate and final processing, in acceptable format loadable on workstation for QC & interpretation. The contractor shall provide final deliverables, as mentioned in **Annexure-V**. The contractor would provide weekly progress report along with Gantt chart in a timely manner.
- 2.4 Contractor will execute the complete project within turnaround time given in the TOR.

3.0 Objectives:

- 3.1 The primary objective of seismic data processing is to have best quality in Time.
- 3.2 Obtain high quality 2D seismic data free of multiples, enhanced S/N Ratio and improved frequency band width.
- 3.3 Define accurate Reflector Character in terms of vertical and horizontal resolution & continuity.
- 3.4 To improve the overall resolution and continuity of seismic data and properly image the subsurface configuration.
- 3.5 Identify and map major and minor faults with respect to shallow and deep Exploration/Development targets. Fault definition is extremely critical in the project area.
- 3.6 To have a data set in terms of broadband preserved amplitude, phase, frequency and statics to be used for structural interpretation.
- 3.7 The target horizons lie at the TWT as interpreted on the 2D seismic data set as under: The shallow reservoir targets lie at 1000-2500 ms (Kharan Limestone Formation of Eocene age and SRD at 1800m AMSL) with compressional tectonic involved in subsurface structuration. The deepest target lies at 2500-3000 ms (Rakhshani Formation of Paleocene age and SRD at 1800m AMSL) with a similar trend as for shallow targets.

4.0 Seismic Data Processing Sequence:

The processing steps would be required to be applied in a manner so that amplitude, frequencies and phase of the data remain preserved and output yield is of enhanced S/N ratio, improved broadband spectrum and high resolution. However, a proposed standard processing sequence for PSTM is provided in the **Annexure-III** and can be modified according to the requirement with no cost effect. However, the actual sequence will be determined at each step of processing in consultation with the company representatives.

5.0 Parameters Testing/QC:

The contractor shall submit the data in the form of power point presentation(s) and/or SEG Y for comparison of qualitative results and decision making. The contractor would be required to submit its recommendations regarding processing sequence/parameter selection. The final decision, however, would be of the Company. The Company's professionals' will participate in the project for QC purpose at the stages as proposed in the **Annexure-VI (keeping in view COVID-19 situation at that time)**. The contractor would be required to provide the QC display of each processing step after extensive testing in order to select the optimum parameters if there is some additional information obtained from testing then that will also be included, the company can ask for the provision of data in SEG Y/PPT/TIFF/CGM etc. as and when required without any additional cost.

6.0 Rates of Processing

The contractor shall specify Lump sum rates in US \$ per L. Km for 2D up to Pre-stack Time Migration as per **Annexure-IV**. The processing rate should be inclusive of all taxes, duties, courier charges, levy etc. and deliverables as per **Annexure V** except Provisional Sales Tax/ICT Tax on Services in Pakistan. Any additional processing module may be applied in processing flow for improvement of data quality with mutual consent of the company and contractor without affecting the cost of the project.

7.0 Technical Evaluation Criteria:

- 7.1 The Technical evaluation will be based on the technical evaluation table **Annexure-VI**. The potential bidders are required to strictly follow the sequence of Technical Evaluation Criteria and submit their proposals accordingly.
- 7.2 **For final bid evaluation, 80% weightage would be given to Technical Evaluation Annexure VI and 20% weightage would be given to Financial Evaluation Annexure IV.** The lowest bidder will attain the maximum points in financial evaluation and others would be ranked on sliding scale. The points

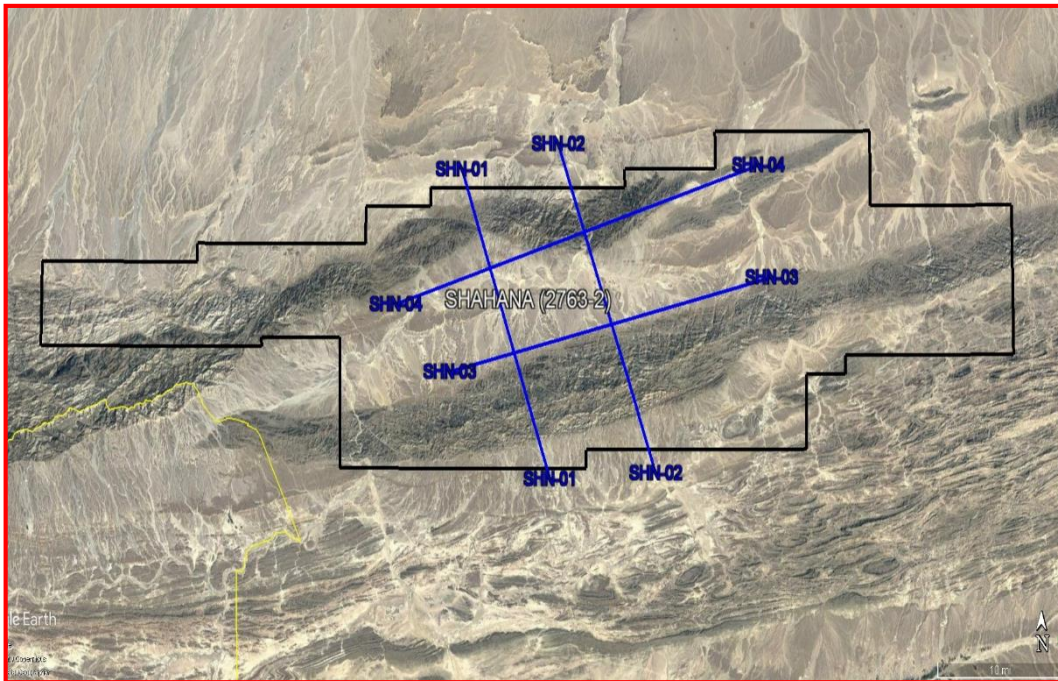
obtained in technical evaluation, and financial evaluation will then be combined and the contract will be awarded to the bidder obtaining maximum points.

- 7.3 The contractor must have adequate experience in 2D seismic data processing. The bidders will provide the details of project execution center and experience of professionals undertaking PALANTAK AND SHAHANA 2D project in detail vide **Annexure VI**.
- 7.4 The contractor must have workable project schedule and turnaround time for 2D Project. The bidders should submit project schedule in the form of Gantt chart.
- 7.5 The contractor must provide schedule for the participation of OGDCL professionals for the QC of the processing steps. Contractor shall provide a phase wise work program for the participation of the OGDCL professionals in line with **Annexure-VI**, Contractor will be bound to take all necessary measures to facilitate the OGDCL participation process. Any delay due to visa, air tickets etc. will be accommodated by the contractor, however cost of traveling and lodging will be borne by the OGDCL.

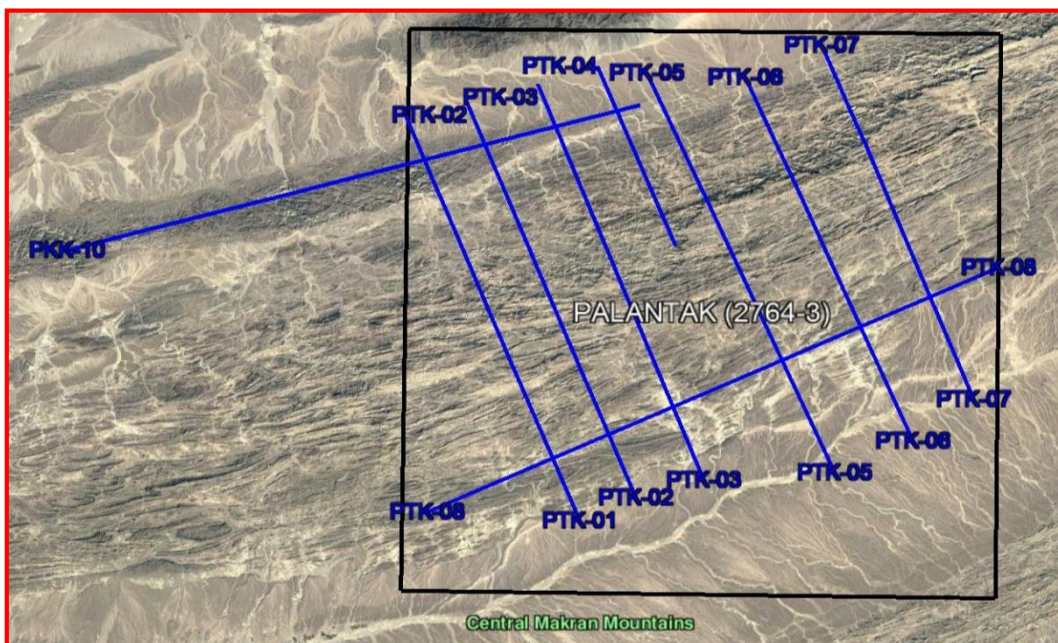
8.0 Data Confidentiality / liability

The contractor shall be solely responsible for secrecy, loss or damage of data due to any reason including fire, theft etc. of any documents/cartridges/soft copies and other important documents /CDs etc. pertaining to the contract while in their custody or control. Neither contractor is liable to reproduce the same data for any other business reasons other than specified by the OGDCL.

Base Map Showing 2D Seismic Lines in Shahana EL



Base Map Showing 2D Seismic Lines in Palantak EL



Seismic Acquisition Parameters of the PALANTAK AND SHAHANA 2D

2D L.Km to be processed	502 L.Km
Vintage	2016
Acquired by	BGP
Source	Vibroseis and Dynamite
No. of Channels	480
Spread	Symmetric Split
Station Interval	25 m
Source Interval	50 m
No of Geophones/ station	24* 2 string
Geophone Array	Linear
Array Length	23.95m
Fold	120
Record Length	6 sec
Sampling Rate	2 ms
Near Offset	37.5 m

For Dynamite

No. of Holes: Single Deep hole
 Depth of hole: 18/21 m
 Charge Size: 10/8 Kg * 2 pcs Detonator

For POP Shot

Pattern holes each with 1.8m deep
 No.of holes : 10
 Charge size for Pop shot: 0.5 kg/hole
 Source Interval (SPI): 50 m (B/w the picket)

For Vibroseis

Vibrator array : 04 vibrators inline (1.5 meter pad to pad)
 Sweep Length: 14 Sec, No. of Sweeps : 10 Sweep per VP,
 Sweep Frequency: 10-80 HZ

Supporting documentation:

Observer reports, Survey listings (Co-ordinates / elevation lists), SPS files, W-Z data/Up-hole data, etc.

Basic/Standard Processing Sequence for PSTM Processing

The main basic processing steps to be taken into account: The contractor will process the land 2D seismic data through following basic processing sequence which also forms the basis for price quotation. The proposed basic processing steps to be performed are listed below:

Sr. No.	Time Processing Sequence
1.	Reformat
2.	Geometry application and QC attributes
3.	Geometry update & QC
4.	True Amplitude Recovery
5.	Minimum phase conversion and match filter
6.	Manual and Automatic Trace Editing
7.	Despike /Wild Noise Removal
8.	Coherent/Non Uniform Coherent noise removal in different domains
9.	Scattered/dispersive, random and high frequency noise attenuation, preserving amplitude
10.	Multiple Attenuation
11.	Refraction Static computation and application (Refraction tomography and Diving Wave tomography etc.)
12.	Inverse Q Filtering (Q compensation)
13.	Surface consistent amplitude compensation (SCAC)
14.	Surface consistent Deconvolution/Robust Deconvolution
15.	1st Velocity analysis every at 1.0 Km x 1.0 Km
16.	1st pass of Surface Consistent Residual Static Correction
17.	2nd Velocity Analysis at 0.5 Km x 0.5 Km
18.	2 nd pass of Surface Consistent Residual Static Correction
19.	3rd Velocity analysis if required and more passes of residual static
20.	Pre-stack Random noise attenuation in different modes
21.	Pre stack signal enhancement/ CRS or equivalent subject to testing results
22.	Final Stack, Filtering and Scaling
23.	Post stack Signal Enhancement
24.	Spectral enhancement
25.	Post Stack Time Migration
26.	Noise attenuation before PSTM
27.	Final gather conditioning and velocity preparation for initial Pre-Stack Time Migration
28.	Initial PSTM (Ist Pass/PSTM 1 st Run) (with different velocity percentage)
29.	First PSTM Velocity analysis at 0.5 Km x 0.5 Km
30.	2 nd pass PSTM (PSTM 2 nd Run)
31.	2 nd PSTM Velocity analysis at 0.5 Km x 0.5 Km (Velocity analysis with higher order NMO
32.	If required, more passes of Pre-stack Time Migration (Anisotropic Turning-Wave Kirchhoff) and Velocity analysis with higher order NMO correction in order to have adequate results.
33.	Final PSTM (Anisotropic Turning-Wave Kirchhoff) & Final PSTM Stack
34.	Foot print removal (FKxKy), and Filtering and Scaling on Final PSTM Stack

NOTE:

- All final output will have to be in zero phase and SEG standard normal polarity.
- Any advance processing module suggested by bidder to be used in place of above mention module gives best results will be free of cost.
- Processing sequence may be changed if required for better results.

Financial Bid Format

Rates for land 2D seismic data Time Processing (PSTM) shall be provided as per given table.

S. No	Processing Sequence Description	COST in US \$ per L. km (2D)
1	Time Processing Sequence as per Annexure-III (Lump Sum)	

NOTE:

- i. Financial bids will be evaluated on the basis of total cost Sr. No.1 above in the **Annexure-IV**, on the basis of lump sum turnkey rate (LSTK) basis.
- ii. The contractors should provide the list of all advance processing modules and should use these modules for improvement of data free of cost if needed during processing.
- iii. Invoices need to be generated for Sr. No.1 of **Annexure-IV**. Payments will be made at actual after successful completion of the project against the verified invoices.
- iv. Total Line kilometers for charged rates will be calculated on the basis of subsurface coverage
- v. Prices must be quoted inclusive of all Taxes, duties, courier charges and levy etc. except provisional sales tax / ICT Tax on services where applicable will be borne by OGDCL at actual.

Time Processing Deliverables for 2D Project

Sr. No.	Description	Format	Recommended Media	No. of Copies
a)	a) First Break Picks b) Refraction Statics	ASCII	DVD	03 sets
b)	a) Final Stacks (Unmigrated) with Post Stack Processing Sequence b) Final Stacks (Unmigrated) without Post Stack processing Sequence	SEGY	HD & LTO	Three sets on HD and three sets on LTO
c)	a) Final POSTM Stacks with Post Stack Processing Sequence b) Final POSTM Stacks without Post Stack processing Sequence	SEGY		
d)	a) Final PSTM Stacks with Post Stack Processing Sequence b) Final PSTM Stacks without Post Stack processing Sequence	SEGY		
e)	a) Final PSTM stacking Velocity (ASCII) b) Final PSTM stacking Velocity (SEG-Y)	SEG-Y & ASCII		
f)	a) Final PSTM CMP gather with NMO Correction Without Post Processing Sequence b) Final PSTM CMP gather without NMO Correction Without Post Processing Sequence	SEGY		
g)	a) Final Un-migrated CMP gather with NMO Correction Without Post Processing Sequence b) Final Un-migrated CMP gather without NMO Correction Without Post Processing Sequence	SEGY		
h)	a) PSTM Processing Report	MS Word/ PDF		

Technical Evaluation:

Ca t No .	Description of Technical Information	Qualifying Criteria	Max. Marks
1	Company History & Profile (mention the list of projects executed in the mentioned time span)		30
	No. of Years in PSTM Processing of land 2D Seismic Data belonging to Fold and thrust Belt (compressional regime) area	More than 10 years = 12 marks 05 to 10 years = 08 marks Less than 05 years = 00 marks	12
	No. of land 2D projects for PSTM in the last 5 years in the fold and thrust Belt (compressional regime) area (Please provide Client list as per Annexure VIII)	More than 10 projects = 15 marks 07 to 10 projects = 08 marks 03 to 06 projects = 03 marks Less than 03 years = 00 marks	15
	Number of processing centers worldwide (Detailed Locations Must Provide as per Annexure IX)	03 or more Processing center = 03 marks Less than 03 Processing center = 01 marks	03
2	Processing Facilities Software and Work Flows		30
	Software Name and version as per Annexure-X		10
	Provide name of softwares used for proposed processing sequence as per Annexure-III		7
	At least five Advance/Optional processing modules other than proposed processing sequence		3
	Details of PSTM processing sequence for mentioned project including optional steps as per Annexure-III	Cover 100% of proposed processing flow for PSTM with optional steps=10 marks Cover 90%-100% of proposed processing flow for PSTM with optional steps=6 marks Cover less than 90% of proposed processing flow for PSTM with optional steps=00 marks	10
3	Hardware		08
	Provide List of hardware / machines / equipment in operating condition owned by the company, available with contractors used in land 2D seismic data PSTM processing as per Annexure-XI	Hardware/equipment version not older than 03 years=08 marks Hardware/equipment version not older than 05 years=04 marks Hardware/equipment version not older than 08 years=02 marks	08

		Hardware/equipment version older than 10 years=00 marks	
	Manpower (Qualification of 16 Years Degree in Geophysics/ Geology) and having experience in 2D PSTM Processing		12
4	Attach the resume of the contractor permanently employed manpower for land 2D PSTM processing projects (Give complete detail experience belonging to Fold and thrust Belt as per Annexure IX).	At least 05 professionals with experience of more than 10 years = 12 marks At least 05 professionals with minimum experience of 5-10 years = 08 marks At least 05 professionals with experience of less than 05 years = 0 marks	12
	Work Plan/Project Schedule		08
5	Maximum Turn Around Time for Full Project from the date of handing over the data to the successful bidder		
	Total Turn Around Time 04 Months Processing time + 01 months for Deliverable	Processing time 4 Months = 08 marks Processing time 5 Months = 06 marks Processing time more than 5 Months = 00 marks	8
6	TOR Compliance	<u>Bid Prepared as per TOR Format</u> 100 % Compliance = 02 marks Below 100% = 00 Marks	02
	OGDCL professional participation in the 2D seismic data processing PSTM project.		10
7	Submit workable QC schedule for OGDCL professionals.	1. Noise Attenuation, Refraction Statics, 1st Vel Analysis. (Two professionals for 01 weeks) 2. During Final Pass of Velocity Analysis and PSTM for 2D processing (Two professionals for 01 weeks)	10
	TOTAL MARKS (Qualifying Marks 70%)		100

MANDATORY REQUIREMENTS:

1. Contractor/ bidder shall not be eligible If the Contractor / bidder including any of its shareholders, directors, employees, partners, associated company or affiliated company is involved or has been involved in the past in litigation with OGDCL.
2. If the Contractor / bidder including any of its shareholders, directors, employees, partners, associated company or affiliated company is or has been blacklisted. A sworn affidavit confirming that the Contractor/bidder is not ineligible as per the above shall be furnished to OGDCL.
3. Seismic data processing companies and team leaders must have an experience of on-shore projects as per **Annexure VI**
4. Filling of Questionnaire as per **Annexure-VII**.
5. Compliance to HSE policy is mandatory.

NOTE:

1. Contractor shall be declared as disqualified for Non Compliance against mandatory requirements.
2. Contractor should allocate dedicated team for OGDCL projects. At the time of award of contract contractor shall ensure to provide professionals of same level on which they have been awarded the contract
3. In case of JV, the JV leader should be professionally a Processing Company.
4. For the execution of the project, contractor should provide the processing team from the list of professionals mentioned at Annexure-VI, category 4.
5. The bidders must submit soft copy of bid document in pdf/ word along with hardcopy.

Questionnaire

Sr#	Questions	Answers
1	Registered Name of the Firm/Company.	
2	Permanent Address of Head Office and Branch Offices (if any) with telephone no(s)/fax no(s).	
3	Date and place of establishment of Company. (Please attach appropriate proof)	
4	Name and address of Foreign Associates (if any)	
5	Name, Designation and Qualifications of the person(s) authorized to represent the firm in Contractual Matters. (Authorization letter from Chief Executive of the Firm to be attached).	
6	a. Financial status of the Company with supporting documents.	
	b. Last 3 years audited financial statements of the Company. (Please attach Audit Reports with the Balance Sheets).	
	c. NTN Certificate and statement/proof of income tax deduction for last 3 years. (Please attach copies)	
7	Name and address of the Bankers	
8	Performance of the firm on at-least 5 recently completed jobs / contracts of similar nature (Certificates of satisfactory performance from organizations/owners to be attached)	
9	Average turnaround time for about 502.lkm 2D PSTM project. Mention turnaround time for last 05 similar projects along with project volume.	
10	Availability of Innovational processing flow for any processing project	
11	Do you have a facility for remote/interactive data QC?	
12	Do you have a facility for Video Conferencing?	
13	Do you have 2D seismic data visualization facilities?	
14	Do you have an FTP site for transfer of data from processing centers to clients office for QC	
15	Details of any litigations/cases in which the Firm/Company has been involved.	
16	Any other information.	
Note:	1 List of Facilities, ownership of contractor's machineries/equipment, availability of technical and skilled personnel, support capabilities and experience of the contractor may be checked and verified physically through technical audit.	
	2 Mis-statement by the contractor will lead to subsequent disqualification at any stage.	

List of Projects/Contracts During the Last Ten Years

(Mention complete detail of 2D PSTM processing projects belonging to Fold and thrust Belt)

S.NO.	CLIENT NAME With address , email & Contact Number	SATISFACTORY REPORT OF THE CLIENT	DESCRIPTION OF WORK	AMOUNT (Million US \$)	CURRENT STATUS OF THE CONTRACT	VALIDITY	
						FROM	TO
1.							
2.							
3.							
4.							
5.							

List / Resume of Manpower Permanently Employed by the Contractor

Center -1. Location and List of Resume of Staff						
(Mention complete detail experience of 2D PSTM processing belonging to Fold and thrust Belt)						
S.NO	NAME OF PROFESSIONAL	DESIGNATION	ACADMIC QUALIFICATION (YEARS)		PROFESSIONAL EXPERIENCE	MENTION PROJECTS DETAIL
			DEGRE	OTHER		
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Center -2. Location and List of Resume of Staff						
(Mention complete detail experience of 2D PSTM processing belonging to Fold and thrust Belt)						
S.NO	NAME OF PROFESSIONAL	DESIGNATION	ACADMIC QUALIFICATION (YEARS)		PROFESSIONAL EXPERIENCE	MENTION PROJECTS DETAIL
			DEGRE	OTHER		
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Center -3. Location and List of Resume of Staff

(Mention complete detail experience of 2D PSTM processing belonging to Fold and thrust Belt

S.NO	NAME OF PROFESSIONAL	DESIGNATION	ACADMIC QUALIFICATION (YEARS)		PROFESSIONAL EXPERIENCE	MENTION PROJECTS DETAIL
			DEGRE	OTHER		
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Details of Software used by the contractor for 2D land Seismic Processing

S.NO.	SOFTWARE NAME	ACQUIRED BY THE COMPANY ON	QUANTITY	VERSION YEAR	REMARKS
1.					
2.					
3.					
4.					
5.					
6.					

Details of hardware used by the contractor for 2D land Seismic Processing

S.NO.	HARDWARE NAME	ACQUIRED BY THE COMPANY ON	QUANTITY	CONDITION	REMARKS
1.					
2.					
3.					
4.					
5.					
6.					

Note:

- Bid bond of **USD 2,500/- (US Dollar Two Thousand Five Hundred Only)** to be submitted with the technical bid.
- The master set of tender documents (services) uploaded on OGDCL website (www.ogdcl.com) is the integral part of this TOR.
- All Annexures to be attached with the bid. Kindly see master set of tender documents services for further detail.