Oil India Limited
(A Govt. of India Enterprise)

Notice Inviting "Expression of Interest" (EOI) for Hiring of services for Seismic data acquisition and processing in Arunanchal Pradesh

Oil India Limited (OIL), a premier National Oil Company, is engaged in the business of exploration, production and transportation of crude oil and natural gas. OIL intends to hire the services for acquiring and processing of 2D and 3D seismic data in its existing/anticipated lease areas in Arunanchal Pradesh. It is planned to carry out 2D seismic survey in North Manabhum area (approximately 300 GLKM full fold) whereas 3D survey (approximately 130 Km^2 full fold) is planned in Songking-Namchik area. The tentative block boundaries, line-coordinates and map of both the areas are shown in the Annexure-I. Seismic data acquisition in both the areas is planned to accomplish in two field seasons (2018-19 & 2019-20). Further, processing of the acquired seismic data is planned to be accomplished within six (6) months from the date of completion of data acquisition in the individual areas.

A) Brief Geology of the area & Objective of the Survey

Geologically, both the areas are associated with thrusting and complex sub-surface geology due to severe thrusting and thrust imbricates. The objective of the seismic survey in North-Manabhum area is to obtain geologically conformable subsurface images up to Girujan formation (approximately 5500 m depth), whereas, in Songking-Namchik area is to obtain geologically conformable subsurface images upto Girujan formation (approximately 3600 m depth).

B) Description of the area & Prevailing Logistics

Apart from very complex geological bed settings, both the areas pose extreme surface & near-surface logistics. North-Manabhum area is rocky/hilly terrain with steep slopes & cliffs covered with thick tropical forests. The North-Western part of this area is moderately undulating (elevation difference of 100m-150m), however South-Eastern part is severally undulating with series of hills & valleys (elevation difference of 400m-500m). It is observed that very little accessibility is available in this area, and most of the parts are unapproachable by roads throughout the year. Songking-Namchik area is predominantly a river catchment area and numerous river channels/riverine sands are present. This area mostly contains boulder-beds in the near surface.OIL, during the earlier seismic campaigns, observed that shot hole drilling in these areas necessitates very effective mechanized drilling schemes (rigs, compressor etc). The accessibility and terrain conditions need to be studied thoroughly for the rig movement particularly in the hilly areas. During the earlier campaigns, it is observed that the pattern holes did not provide the desirable results.

Prior to submitting response to EoI, the prospective bidders are advised to have a through reconnaissance of the terrain and get fully acquainted with details not limited to surface topographic features, fair weather window, working culture in the area, socio-political conditions, security aspects and law of the land etc.
The thorough reconnaissance of the area is desired for realistic budgetary estimate and it will also help to judiciously plan inputs for successful execution of the project.

C) Brief Scope of Work/Technical Specifications

The brief Scope of Work/Technical Specifications includes the following:

Seismic Data Acquisition

a) The bidder shall plan and execute high quality 2D Seismic Survey (North Manabhum Area) and 3D Seismic survey (Songking-Namchik area) efficiently by using appropriate methodology, equipment and adequate shot hole drilling methodology by deploying experienced personnel with professional competence and to provide industry standards output to OIL.
b) The tentative acquisition parameters for both the surveys are stipulated in Annexure-II.
c) Bidder shall conduct geodetic survey including fixation of reference points and pillars, GPS networking and staking of the source-receiver locations required for seismic recording operation.
d) Bidder shall carry out experimental work prior to the commencement of regular production to optimize the acquisition parameters like charge size, shot hole depth to ensure acquisition of meaningful data.
e) Bidder shall carry out Up-hole/Shallow Refraction survey for near surface modelling to decide optimum depth (OD) of shot holes during the survey work. Up-hole survey and Shallow Refraction survey requires to be done at every 1 Km intervals (1 Km grid for 3D and 1 Km distance for 2D). Te bidder should ensure loading of explosive below OD.
f) Bidder shall deploy adequate shot hole drilling technology (heli-portable rigs, air compressor drilling, mechanized rigs, pneumatic drilling, mechanized water rotary drilling rigs and ancillary equipment) in sufficient numbers to meet the project timelines.
g) Bidder shall make arrangements for procurement, storage, transportation and all statutory clearances pertaining to explosive magazine licenses and usage.
h) Bidder shall deploy latest state-of-art 24-bit telemetry system with Delta-Sigma technology and compatible accessories/ground electronics suitable to acquire the required quality data in the logistics and the terrain condition prevailing in the areas mentioned above.
i) Bidder shall deploy high sensitivity & low distortion geophones, fully compatible with seismic data acquisition system. All the receivers must be compatible to 24-bit recording for high bandwidth signal. The natural frequency of geophones shall be below or equal to 10 Hz. Bunching of 12 geophone units per receiver is required to form a single receiver. Bidder shall ensure proper coupling (tightly planted or buried geophones) to record good quality data.
j) Planning and Quality Control of the seismic data acquisition is primarily the responsibility of the bidder. However, OIL's personnel shall be associated for monitoring and quality assurance through analysis of raw as well as processed data in field. Personnel from OIL shall do overall co-ordination throughout the contract period to ensure quality of data.
k) The bidder shall deploy necessary processing system with adequate and competent personnel in field/base office to monitor and ensure quality of seismic and topographic data and generate output through onsite processing. However, if

any error related to acquisition, bidder shall take corrective measures before the submission of final data.

l) Bidder shall obtain permissions from Government authorities, Custom clearance, licenses for storage, transportation and use of explosives and any other license/clearance. However, necessary recommendatory letters based on appropriateness shall be provided by OIL. Bidder shall adhere to prescribed rules and regulations pertaining to explosive uses.

m) Bidder shall arrange for safe transportation and delivery of three sets of data cartridges along with requisite technical information at OIL's premises.

n) Bidder shall fulfil all the mandatory requirement of HSE specifications and appropriate safe work practices.

Seismic Data Processing

a) The survey areas having complex near-surface and sub-surface geology due to severe thrusting and thrust imbricates and requires specialized processing. The acquired data shall be processed by deploying experienced and professional experts using state of the art processing hardware/software and adopting most optimal processing. The processing flows includes advanced statics solutions, reliable Velocity analysis and Pre-stack Time Migration (Pre-STM) to obtain geologically conformable subsurface images amenable for meaningful interpretation. Pre-stack Depth Migration (Pre-SDM) along with velocity model building is optional as per OIL's requirement.

b) The bidder shall plan and execute high quality seismic data processing by using appropriate state of art methodology, equipment and software by deploying experienced personnel with professional competence and to provide the industry standards output.

c) Bidder shall carry out experimental work prior to the commencement of regular production to optimize the processing parameters to ensure meaningful data.

d) Planning and Quality Control of the seismic data processing and interpretation is primarily the responsibility of the bidder. However, OIL's personnel shall be associated for monitoring and quality assurance through analysis of raw as well as processed data. Personnel from OIL shall do overall co-ordination throughout the contract period to ensure security and quality of data.

e) The bidder shall deploy necessary QC system with adequate and competent personnel into monitor and ensure quality of processed data. If any error is noticed during processing, bidder shall take corrective measures before the submission of final data.

f) Bidder shall obtain permission(s) from Government authorities, Custom clearance, licenses etc. However, necessary recommendatory letters based on appropriateness shall be provided by OIL.

g) Bidder shall arrange adequate work space, hardware and sufficient no. of software licenses during scheduled period for uninterrupted processing.

h) Bidder shall arrange for safe transportation and delivery of three sets of data cartridges along with requisite technical information at OIL's premises.

i) Bidder shall fulfil all the mandatory requirement of HSE specifications and appropriate safe work practice

j) The tentative processing sequence is attached as annexure-III.

D) Requirement(s) for Bidder

The broad requirements for a bidder are as follows:

a. Bidder should be an Indian/international company/firm/ joint venture/ consortium/technical collaborator having expertise and experience in seismic data acquisition and processing in logistically difficult and complex geological settings.
b. Bidder should have fully trained personnel capable to undertake the seismic data acquisition & processing jobs in prescribed areas very efficiently and complete the job as per time schedule.
c. Bidder should be capable to deploy appropriate equipment like line telemetry (cable)/cable less/cable free system, ground electronics, adequate shot-hole drilling solutions in the prescribed areas.
d. Bidder should complete mobilization and commence work within 3 months (90 days) from issue of Letter of Award.
e. The major equipment including surveying equipment, recording unit along with accessories, processing system should not be more than three (3) years old on bid opening/closing date. The geophones should not be more than two (2) years old on bid opening/closing date.
f. Bidders should adhere to various applicable rules and regulations in India related to safety, security, confidentiality and other activities of related to seismic data acquisition and processing.

E) Submission of EoI

Interested bidders (Indian/international company/firm/joint venture/ consortium/technical collaborators) having expertise and experience in seismic data acquisition and processing in similar areas are invited to submit their EOI. EOI response should accompany the following information/documents:

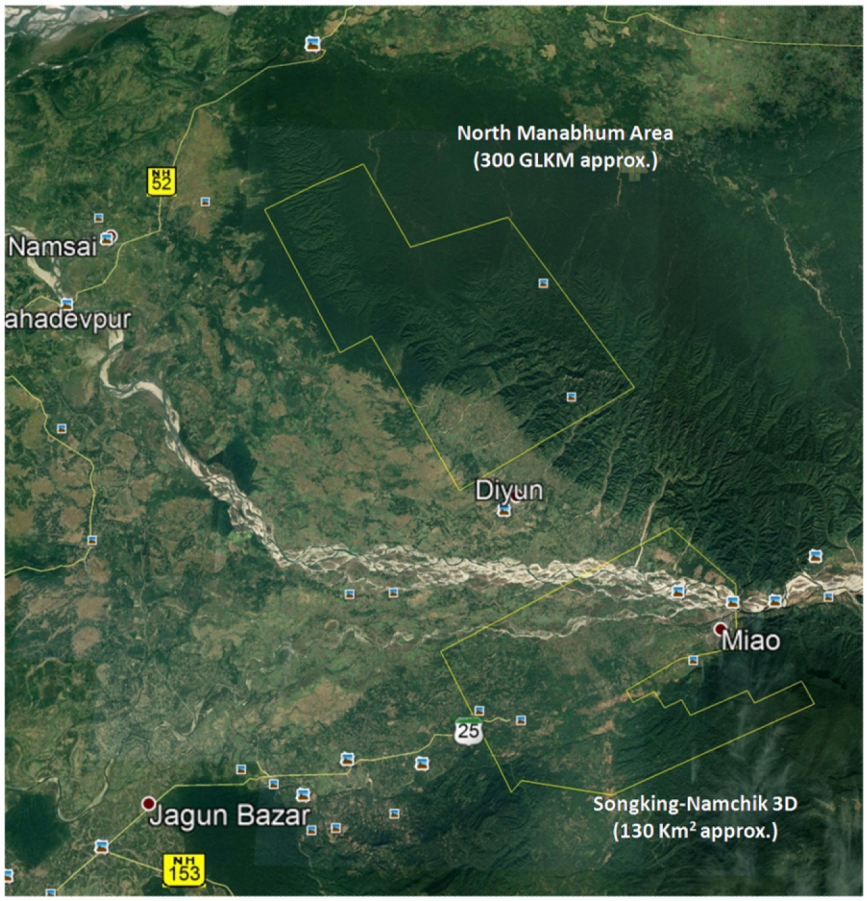
a) Experience details of seismic data acquisition in last 5 years (as per Performa-A).
b) Experience details of seismic data processing in last 5 years (as per Performa-B).
c) Holistic mobilization plan (expected) including vintage (age) & numbers of key equipment viz. Surveying Equipment, Recording Equipment, Geophones, Shot Hole Drilling equipment/types, Field Processing System etc.
d) Expected type(s) and deployment pattern of shot hole drilling equipment (heli-portable rigs, air compressor drilling, mechanized rigs, pneumatic drilling, mechanized water rotary drilling rigs and ancillary equipment) for accomplishing the acquisition within stipulated time frame.
e) Holistic execution plan for the entire project.
f) Details of the experience of key personnel likely to be deployed during data acquisition.
g) Details of processing software and experience of key personnel likely to be deployed during data processing.
h) Details of the Annual Turnover (specify currency)As per Audited balance sheets/profit & loss accounts etc. for the last three years)

i) Budgetary quote as per format given at Performa-C.
j) Any other information that will demonstrate the bidder's competence/capability.

Interested bidders, who fulfil the specifics above, should submit their response by post/courier/email before 20/10/2017. The hard copy in a sealed cover with the superscription "Expression of Interest (EOI) for Hiring of services for seismic data acquisition and processing in Arunanchal Pradesh" along with supporting documents may be sent within the stipulated period at following address:

HEAD GEOPHYSICS
GEOPHYSICS DEPARTMENT
OIL INDIA LIMITED
REGISTERED HEAD QUARTER
DULIAJAN, DIST: DIBRUGARH
ASSAM 786602
FAX NO: 91 374 2804754
PHONE NO: 91 374 2804754
E MAIL ADDRESS: seismic.ningru@gmail.com

Tentative Block Boundary



North Manabhum-2D

Point	Longitude	Latitude
A	95° 57' 15.264" E	27° 41' 09.708" N
B	96° 00' 04.899" E	27° 36' 51.303" N
C	96° 01' 04.080" E	27° 37' 22.188" N
D	96° 04' 10.128" E	27° 32' 54.312" N
E	96° 09' 38.772" E	27° 35' 57.768" N
F	96° 05' 20.075" E	27° 41' 04.905" N
G	96° 02' 09.995" E	27° 40' 05.145" N
H	96° 00' 25.038" E	27° 42' 40.088" N

Songking-Namchik-3D

Point	Longitude	Latitude
A	96° 3' 50.976" E	27° 28' 24.528" N
B	96° 6' 12.486" E	27° 24' 41.730" N
C	96° 6' 29.915" E	27° 25' 0.105" N
D	96° 9' 15.155" E	27° 24' 39.945" N
E	96° 15' 20.195" E	27° 27' 10.065" N
F	96° 14' 58.148" E	27° 27' 46.023" N
G	96° 13' 31.840" E	27° 27' 10.194" N
H	96° 13' 19.198" E	27° 27' 29.853" N
I	96° 11' 35.593" E	27° 26' 48.951" N
J	96° 11' 19.115" E	27° 27' 13.685" N
K	96° 10' 47.863" E	27° 27' 0.257" N
L	96° 10' 28.441" E	27° 27' 26.298" N
M	96° 9' 49.641" E	27° 27' 8.182" N
N	96° 9' 36.717" E	27° 27' 27.134" N
O	96° 11' 14.999" E	27° 28' 20.000" N
P	96° 13' 0.000" E	27° 28' 40.000" N
Q	96° 12' 57.959" E	27° 30' 24.840" N
R	96° 10' 55.108" E	27° 31' 57.221" N

Tentative Coordinates of the Planned 2D Lines in North Manabhum Area

EAST-WEST LINES					
LINE	GLKM (Approx.)	Longitude_S	Latitude_S	Longitude_E	Latitude_E
M-1P	5.97	96° 0' 40.392" E	27° 42' 17.429" N	95° 57' 17.995" E	27° 41' 5.551" N
M-3P	5.98	96° 1' 5.713" E	27° 41' 40.405" N	95° 57' 42.703" E	27° 40' 28.314" N
M-5P	6.01	96° 1' 34.261" E	27° 40' 57.914" N	95° 58' 10.526" E	27° 39' 45.570" N
M-7P	6.03	96° 2' 3.044" E	27° 40' 15.410" N	95° 58' 38.595" E	27° 39' 2.817" N
M-9P	11.63	96° 5' 41.101" E	27° 40' 39.964" N	95° 59' 6.685" E	27° 38' 20.024" N
M-11P	11.81	96° 6' 15.653" E	27° 39' 59.392" N	95° 59' 34.869" E	27° 37' 37.205" N
M-13P	11.99	96° 6' 49.887" E	27° 39' 18.343" N	96° 0' 3.138" E	27° 36' 54.053" N
M-15P	12.24	96° 7' 24.283" E	27° 38' 36.511" N	96° 0' 29.302" E	27° 36' 9.311" N
M-17P	12.61	96° 7' 59.789" E	27° 37' 55.355" N	96° 0' 51.984" E	27° 35' 23.676" N
M-19P	13.11	96° 8' 33.675" E	27° 37' 14.878" N	96° 1' 8.985" E	27° 34' 37.220" N
M-21P	16.12	96° 9' 8.304" E	27° 36' 34.126" N	96° 0' 1.753" E	27° 33' 20.306" N
M-23P	18.75	96° 9' 14.415" E	27° 35' 44.184" N	95° 58' 38.869" E	27° 31' 58.712" N
	132.25				
NORTH-SOUTH LINES					
M-2P	24.47	95° 57' 45.443" E	27° 44' 42.346" N	96° 3' 43.625" E	27° 32' 33.271" N
M-4P	24.39	96° 4' 11.964" E	27° 32' 42.915" N	95° 58' 24.730" E	27° 44' 53.049" N
M-6P	21.1	95° 59' 51.231" E	27° 43' 17.016" N	96° 4' 46.534" E	27° 32' 43.414" N
M-8P	14.65	96° 1' 42.199" E	27° 40' 46.192" N	96° 5' 7.167" E	27° 33' 26.179" N
M-10P	12.98	96° 2' 37.591" E	27° 40' 13.826" N	96° 5' 39.119" E	27° 33' 44.025" N
M-12P	12.76	96° 3' 13.673" E	27° 40' 25.174" N	96° 6' 11.572" E	27° 34' 2.148" N
M-14P	12.52	96° 3' 48.110" E	27° 40' 36.003" N	96° 6' 43.235" E	27° 34' 19.826" N
M-16P	12.3	96° 4' 23.213" E	27° 40' 47.037" N	96° 7' 15.152" E	27° 34' 37.642" N
M-18P	12.08	96° 4' 58.150" E	27° 40' 58.193" N	96° 7' 47.019" E	27° 34' 55.333" N
M-20P	10.41	96° 5' 53.133" E	27° 40' 25.690" N	96° 8' 18.593" E	27° 35' 13.044" N
M-22P	6.25	96° 7' 23.242" E	27° 38' 38.750" N	96° 8' 50.598" E	27° 35' 30.899" N
	163.91				

Annexure-II

Tentative Acquisition Parameters

Songking-Namchik 3D	
Live receiver lines / Template	10
Group Interval	40 m
SP Interval	80 m
Bin Size	20 m x 40 m
Receiver line Interval	320 m
Live receiver lines / Template	10
Live channels per receiver line	192
Total No. of live channels per SP	1,920
Source line interval	320 m
Nominal Fold	60
Symmetrical Split Spread	Yes
Orthogonal Geometry	Yes
Swath Roll	Half Salvo Roll(20 SP per Salvo)
Expected No. of SP's	7000 (Approx.)

North Manabhum 2D	
Group Interval	20 m
SP Interval	60 m
Live channels	600 (300 X 300, symmetric split spread)
Nominal Fold	100
Expected No. of 2D Lines	23
Expected No. of SP's	7400 (Approx.)

Annexure-III

Tentative Processing Sequence

The tentative processing sequence as envisaged to process the 2D seismic data is mentioned below. However, the actual sequence will be determined after completion of test processing in consultation with OIL's representative(s):

- Reformat to internal format
- Geometry Merging, QC & Application
- First Break Picking, Refraction static solution/Tomo statics
- Random noise attenuation (testing and application in different domains)
- Linear noise attenuation (testing and application in different domains)
- Non Linear noise attenuation (in multiple domains)
- Surface Consistent Deconvolution
- Derivation and application of static solutions giving better resolution
- 1st pass velocity analysis (every 1 LKM)
- Surface Consistent Residual Statics
- 2nd pass velocity analysis (every 500 LKM)
- Surface Consistent Residual Statics
- Long period multiple attenuation
- Surface Consistent Amplitude Scaling
- Output "Pre-Migrated gathers" (statics in headers)
- Common offset regularization (advanced regularization techniques)
- Common Offset noise attenuation
- Inverse Q (Phase only) - if required
- Pre-PSTM data conditioning (Scaling, Band pass filtering) if required
- PSTM velocity analysis (every 250 m.)
- Kirchhoff isotropic PSTM
- Residual velocity analysis (every 250 m.)
- Radon Demultiple
- High density automatic residual NMO
- Output "Migration Gathers"
- Edge preserving spatial filtering
- Inverse Q (amplitude only)
- Deconvolution after stack if required
- Noise Attenuation (FX-Deconvolution, FK)
- Phase correction if required,
- Output near, mid & far angle stack
- TV filter
- Scale
- Shallow spectral enhancement
- 2D F-K
- Shallow scaling enhancement
- Stack

The tentative Pre-SDM processing sequences are given below; however, the actual sequence will be determined after completion of test processing in consultation with OIL's representative(s):

- Input "Pre-Migrated gathers" from PSTM sequence
- Pre-PSDM data conditioning
- Initialize velocity model
- Anisotropic velocity model building using available well information (if any)
- Velocity model updating
- Pre SDM (anisotropic using derived model)
- Stack

Performa-A

Experience details of seismic data acquisition in last 5 years as below

SN	Contract No	Contract Period	Client	Country/ Location	Volume of work (2D/3D)	Terrain conditions	Equipment used

Performa-B

Experience details of seismic data processing in last 5 years as below

SN	Contract No	Contract Period	Client	Country/ Location	Processing Type	Volume of work	Software used	Processing objective(s)

Performa-C

Budgetary quote for Seismic data Acquisition and Processing

Description	Unit of measurement	Quantity	Unit Rate (INR or USD)	Amount (INR or USD)
Mobilization Charges (A)	Lump sum	01		
Demobilization Charges (B)	Lump sum	01		
Seismic Data Acquisition(North Manabhum 2D)				
Data Acquisition Charges (C)	LKM			
Up-hole Survey (D)	No.			
Shallow Refraction Survey (E)	No			
Experimental Survey (F)	Per Day			
Any Other Charges (G)				
Total (H=C+D+E+F+G)				
Seismic Data Acquisition(Songking-Kumchai 3D)				
Data Acquisition Charges (I)	Km^2			
Up-hole Survey (J)	No.			
Shallow Refraction Survey (K)	No			
Experimental Survey (L)	Per Day			
Any Other Charges (M)				
Total (N=I+J+K+L+M)				
Seismic Data Processing				
North Manabhum -2D (PreSTM), (O)	LKM			
North Manabhum -2D (PreSDM), (P)	LKM			
Shongking-Namchik -3D (PreSTM), (Q)	Km^2			
Shongking-Namchik -3D (PreSDM), (R)	Km^2			
Total Charges for Data Processing (S=O+P+Q+R)				
Total Charges for Data Acquisition & Processing (T=A+B+H+N+S)				
Taxes (as applicable), U				
Total Charges for Data Acquisition & Processing including applicable taxes, V (V=T+U)				

Note:
The budgetary quotation is being sought for budgetary purposes only, i.e.to assess the market and project viability. It may be noted that the award of work will be made subsequently after invitation of bids through e-tendering as per laid down procedures/guidelines of OIL.