ऑयल इंडिया लिमिटेड
(भारत सरकार का उद्यम)
Oil India Limited
(A Government of India Enterprise)

CONTRACTS DEPARTMENT
P.O: DULIAJAN,
DIST: DIBRUGARH
ASSAM (INDIA), PIN-786602
Tel: +91-374-280 0548
Fax: +91-374-280 3549
Email: contracts@oilindia.in
Website: www.oil-india.com

EXPRESSION OF INTEREST (EOI) NO. EOI/SEISMIC/G/005/2022-2023 DATED 28.09.2022

FOR

ACQUISITION OF REGIONAL SCALE CONTIGUOUS 3D SEISMIC DATA (CARPET 3D) OVER MAIN PRODUCING AREA OF OIL INDIA LIMITED IN ASSAM

1.0 PREAMBLE:

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 for over five decades. It is a Navaratna Company under Ministry of Petroleum and Natural Gas, Government of India and the second largest National Oil Company in the country.

As part of its strategy to strengthen its position as a leading operator, OIL is continuously carrying out seismic data acquisition, exploratory and development drilling in its operated acreages. OIL is currently carrying out domestic E&P activities in a total of 59 nos. of operated acreages. These include 25 nomination Petroleum Mining Leases (PML) (21 in Assam, 2 in Arunachal Pradesh and 2 in Rajasthan), 3 nomination Petroleum Exploration Licenses (PEL) in Arunachal Pradesh, 4 NELP blocks (2 in Assam, 1 in Mizoram and 1 in Andhra Pradesh), 29 OALP Blocks (12 in Assam & AP, 1 in Nagaland, 3 in Tripura, 5 in Rajasthan, 5 in Odisha, 2 in Andaman shallow offshore and 1 in Kerala Konkan shallow offshore) and 2 Discovered Small field (DSF) blocks (1 each in Tripura and in KG Shallow Offshore). The total operating acreages cover an area of 63,045 sq. km.

In connection with its ongoing exploration activities, OIL has planned to carry out **REGIONAL SCALE CONTIGUOUS SEISMIC DATA ACQUISITION (CARPET 3D) OVER MAIN PRODUCING AREA OF OIL**.

2.0 BROAD SCOPE OF WORK:

Acquisition of 3500 Sq. Km. (Full fold Coverage Area) of High-Density (HD) 3D Seismic data in OIL's MPA, falling in the state of Assam (Refer **Figure-1**). The Scope of work & technical specifications are enclosed as **Enclosure-I.**

3.0 OBJECTIVE:

OIL invites reputed and established E&P Service Providers to provide the best possible execution modalities, feasible execution plan and timeline to carry out the regional scale contiguous 3D seismic data acquisition over OIL's main producing areas in Assam in the minimum possible time.

4.0 PRE-TENDER MEETING:

A pre-tender meeting is scheduled to be held on **10.10.2022 (10.30 AM onwards)** at **Corporate Office of OIL in Noida, India**. Interested Service providers are invited to attend the same. Since OIL is interested to complete the Acquisition in the shortest possible time, the Service Providers are requested to come prepared during the proposed pretender meeting with their proposed detailed execution plan along with a presentation in compliance with the technical requirement and schedule of activities mentioned above in order to complete the jobs in shortest possible time.

5.0 NOTE:

The Service Providers willing to participate in the aforementioned pre-tender meeting are requested to forward the e-mail IDs and Contact Details of their authorised representatives (max. 2 persons per organisation) who will be attending the meeting on their behalf to e-mail ID: eoi_contracts@oilindia.in or buburaj_brahma@oilindia.in within **07.10.2022**.

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ENCLOSURE-I

1.0 SCOPE OF WORK:

Oil India Limited (OIL), a Govt. of India Enterprise, presently engaged in exploration, drilling, production and transportation of hydrocarbons, proposes for Acquisition of 3500 Sq. Km. (Full fold Coverage Area) of High-Density (HD) 3D Seismic data in OIL'S MPA, falling in the state of Assam (Refer **Figure-1**) by hiring the services of reputed and competent service provider having required infrastructure and relevant experience of carrying out seismic data acquisition in similar terrain/areas. The proposed area of the seismic survey is mix of both Normal areas (traditional flat areas upto the bank of River Brahmaputra) & logistically difficult areas (foothills with near surface boulder bed). The service provider shall deploy seismic crews equipped individually with state-of-the-art Seismic Data Recording system with allied ground electronics, sufficient MEMS based Digital Single component sensors compatible with recording equipment, skilled manpower & adopt terrain specific shot hole drilling technology (we envisage approx. 20% of the work quantum will require deployment of mechanized shot hole drilling rigs) to meet the objective of the survey. Usually in Northeast for seismic survey operations we consider maximum available working window of seven operating months per field season i.e., November to May.

2.0 LOCATION & BRIEF GEOLOGY OF THE STUDY AREAS:

The study area lies in Assam-Arakan Basin. The area is a part of well-known petroliferous province of India, where exploration for hydrocarbon was started way back in the 19th century. The basin is bounded towards north by Eastern Himalayas, towards east by Mishmi Massif, towards south by Naga-Patkai Hills and towards the west by the Mikir Hills and Shillong plateau. A thick pile (maximum up to 7000 m) of sediments ranging in age from Cretaceous to Pleistocene has been deposited in the basin and commercial hydrocarbon production has been established from multiple stratigraphic horizons ranging in age from Palaeocene to Mio- Pliocene till date. The proposed study area (3500 Sq. Km) covers the many major Oil & Gas field of the OIL's MPA.

This proposed area covers major townships like Duliajan, Digboi, Tinsukia, Dibrugarh, Namrup & Jaipur, Nahorkatiya, Tingkhong, Shalmari, Rajgarh etc. Many tributaries of Brahmaputra rivers are cutting across the block.

The corner point co-ordinates of the proposed 3D block (in WGS84) are given in **Annexure-I**.

3.0 TOPOGRAPHY:

3.1 Most part of proposed 3D block is mainly flat area in the south bank of river Brahmaputra covered with tea gardens, paddy fields, towns, villages, etc. The proposed area is partly covered with reserved forests, wildlife sanctuaries, Defence Installations, Oil & Gas installations, Lowlands/Swamps/Wetlands. Several tributaries of River Brahmaputra are flowing across the proposed area and near these rivers some overgrown swamps may be encountered.

3.2 The area includes of many townships with dense to moderately populated. Some of these townships are Dibrugarh, Namrup, Jaipur, Nahorkatiya, Duliajan, Tingkhong, Shalmari, Tinsukia, Digboi, Makum, Rajgarh, Moran, Sonari, etc. The elevation (100m-130m) difference is very less across the East-West profiles. Most of the area of the block is well connected with bituminous and concrete road. As elevation profile of Northern part is less varying and connectivity of road is also good make the area logistically less challenged to operate.

3.3 However southern boundary of the block run along the hilly terrain hence, pebbles, cobbles and boulder bed may encounter in shallow subsurface which could be challenge for drilling shot holes. Hence proposed block is comprised of both Normal Area (traditional flat areas in south banks of River Brahmaputra) & logistically difficult area (foothills and near surface boulder beds).

4.0 GENERAL INFORMATION:

4.1 Under this proposed work program, the service provider has to acquire about 3500 SQKM (Full Fold Coverage area) of high quality HD3D seismic data in the area mentioned in Para 1.0 & shown in figure-1 by deploying sufficient nos. of latest state-of-the art 24 bit delta -sigma based Seismic data acquisition systems will requisite accessories (one recording system per crew) compatible with MEMS technology based single component digital sensors suitable to logistics and terrains of the area using Explosive as energy sources. In view of surface/subsurface topography (Plain & hilly areas mainly covered with Paddy fields, Tea gardens, townships, jungles, and hills) encountered during vintage seismic campaigns in and around the area it is envisaged that 80% manual and 20% mechanized shot hole drilling rigs having capabilities to drill single hole to a depth of minimum 25 m apart from Uphole of up to 75 m depth is required for the project.

The total numbers and different type of manual & mechanized shot hole drilling rigs along with accessories/operators for deployment during execution of entire project is required to be estimated by the service provider for early completion of the acquisition over entire area. It is pertinent to note that project timeline must be estimated based upon associated activities like networking, reference pillar fixation, navigation survey, recording of Uphole/LVL data etc.

4.2 The service provider has to acquire 3D seismic data of approximate 3500 SQKM volume of work as a whole in the area mentioned in Para 1.1 above to be completed in minimum possible time proposed by service provider.

4.3 It is to be noted that proposed block has to be covered with full fold. To cover it with full fold service provider may have to lay out the sources and receivers outside the boundary of the block.

5.0 DETAIL DESCRIPTION OF WORK:

5.1 MOBILISATION: The service provider shall mobilize all requite technical resources, shot hole drilling rigs along with manpower and start the data acquisition in the area in shortest possible time (not more than 90 days) from issue of Letter of Award (LoA) from the company. The mobilization period shall be inclusive of Experimental work for shot hole depth and charge optimization as per the mutually agreed experimental plan.

5.2 TOPOGRAPHIC SURVEY:

a. Before start of normal seismic survey, service provider is required to fix adequate satellite points/reference points all over the areas.

b. Service provider will properly fix permanent pillars at regular grid, major road / river crossing and important cultural features with details engraved on the pillars. All these must be validated based on above DGPS observations. The survey accuracy should be less than 1 meters.

c. Service provider will carry out control survey and line implantation using latest survey equipment such as DGPS, total stations, etc. with the accuracy less than 1 meter from the planned lines.

5.3 RECORDING PARAMETERS: The area is expected to have complex sub-surface geology due to severe thrusting and thrust imbricates.

Company's requirement is a continuous, full-fold data coverage in the area with the following survey parameters:

Sl. No.	Acquisition Parameters	
1	Receiver Station Interval (RI)	30 m
2	Source Station Interval (SI)	30 m
3	Bin Size	15m x 15m
4	Receiver Line Interval	390 m
5	Source Line Interval	390 m
6	No. of Receiver lines in swath	16
7	No. of active receivers per line	416 (208-208)
8	Total no. of receivers in template	6656
9	Nominal Fold	128 [IL Fold (16) X Cross Line Fold (8)]
10	Maximum minimum offset	551 m
11	Maximum offset	6877 m
12	Maximum Inline Offset	6225 m
13	Maximum Crossline Offset	3480 m
14	Salvo	104
15	Roll over	50%
16	Shot Density (Approx.)	115 per Sq. Km.
17	Aspect Ratio	0.47
18	Receiver Line Orientation	N 135°
19	Sensor type	MEMS technology based single component sensors
20	Full Fold Area*	3500 Sq. Km.
21	Type of geometry	Orthogonal
22	Sample interval	2 ms
23	Record length	8 sec
24	Shot hole depth	Will be finalized based on Near Surface Modelling
25	Charge size	Will be finalized after experimental survey
*Required surface area will be needed to acquire with full fold (128) data within the boundary by the service provider using above acquisition parameter.		

5.4 ENERGY SOURCE:

Service provider will be required to use appropriate amount of explosives per shot hole as energy source as per Charge Optimization arrived after analyzing the results of Experimental Shooting ensuring following geophysical requirements:

a) Adequate energy to image target horizons.

b) Proper source coupling.

Service provider shall arrange at its own cost & own name the necessary permits to procure, store and transport explosives and detonators including security during storage, field use operation time and transportation.

5.5 RECEIVERS:

Service provider needs to deploy MEMS technology based single component digital, High Sensitivity & Low Distortion Sensor. In regard to receiver type, sensitivity & seamless interface, service provider must maintain followings up to satisfaction of Company. All the receivers must be compatible to 24-bit Delta-Sigma technology based seismic data acquisition system for recording high bandwidth signal, which is necessary to resolve the thin reservoirs.

5.6 RECORDING EQUIPMENT:

Service provider will deploy sufficient nos. of latest state-of-the-art seismic data acquisition system with 24-bit Delta-Sigma technology and allied ground electronics. The recording system must be compatible with all accessories/paraphrenia ground electronics, MEMS technology based single component digital sensors suitable to acquire the required quality data in the logistics and the terrain condition prevailing in the areas mentioned above. Each of seismic data recording equipment must have facilities of recording minimum 10000 channels per shot record.

5.7 LVL/ UPHOLE SURVEY: Considering the terrain service provider is required to provide accurate and model validated source, receiver statics model for the entire area by Acquisition & Interpretation of Uphole/LVL survey at:

a) Uphole up to 75 m depth at a grid of 2 Km x 2 Km

b) LVL at a grid of 1 Km x 1 Km

5.8 EXPERIMENTAL SURVEY:

Service provider shall carry out all necessary experiments and tests to determine optimum charge size prior to the commencement of the survey. The tests shall be carried out as per the practice in the international geophysical industry.

5.9 QC MEASURES:

The service provider will install a state of-the-art workstation with requisite hardware, latest software, accessories and consumables to carry out following QC tests with acceptable plotting facilities at field site:

a) Survey processing & plot generation.

b) Planning of Seismic Survey

c) Analysis for design of field parameters.

d) Fold, Offset, and Azimuth

e) Up-hole / LVL analysis, preparation of Near Surface Model and model-based statics computation.

f) Monitor display and pre-processing for quality control.

g) S/N ratio analysis

h) Onsite Basic Field QC processing to check the quality of acquired data by analysis of raw shot gather/geometry merging/ full fold/brute stack output etc.

5.10 DELIVERABLES:

Service provider shall submit interim/final project deliverables stipulated as per scope of work within stipulated (not more than one month) of completion of Seismic data recording.

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ANNEXURE-I

CORNER POINT CO-ORDINATES

INDEX	XCOORD (LATITUDE)	YCOORD (LONGITUDE)
0	95.17857	27.62782
1	95.08428	27.57424
2	94.96487	27.50880
3	94.89327	27.47215
4	94.88636	27.39862
5	94.88597	27.35021
6	95.00126	27.26957
7	94.88731	27.22929
8	94.85838	27.23093
9	94.80475	27.23485
10	94.83979	27.28383
11	94.81962	27.30772
12	94.78126	27.26552
13	94.75223	27.18387
14	94.79798	27.18023
15	94.83195	27.13927
16	94.78071	27.15583
17	94.72904	27.14381
18	94.70095	27.09380
19	94.71009	27.07351
20	94.75449	27.07371
21	94.79908	27.08649
22	94.82444	27.09764
23	94.88550	27.12493
24	94.96623	27.08663
25	94.96839	26.92931
26	95.11027	26.96688
27	95.20699	27.03398
28	95.24991	27.02377
29	95.26030	27.03053
30	95.21704	27.10483
31	95.35109	27.14105
32	95.33604	27.18979
33	95.42781	27.26149
34	95.50298	27.32805
35	95.63566	27.36071
36	95.78286	27.42320
37	95.79100	27.42679

38	95.79230	27.46567
39	95.67579	27.48933
40	95.63080	27.45806
41	95.61262	27.52300
42	95.53586	27.63027
43	95.48493	27.67177
44	95.38707	27.60634
45	95.29101	27.56880
46	95.17857	27.62782

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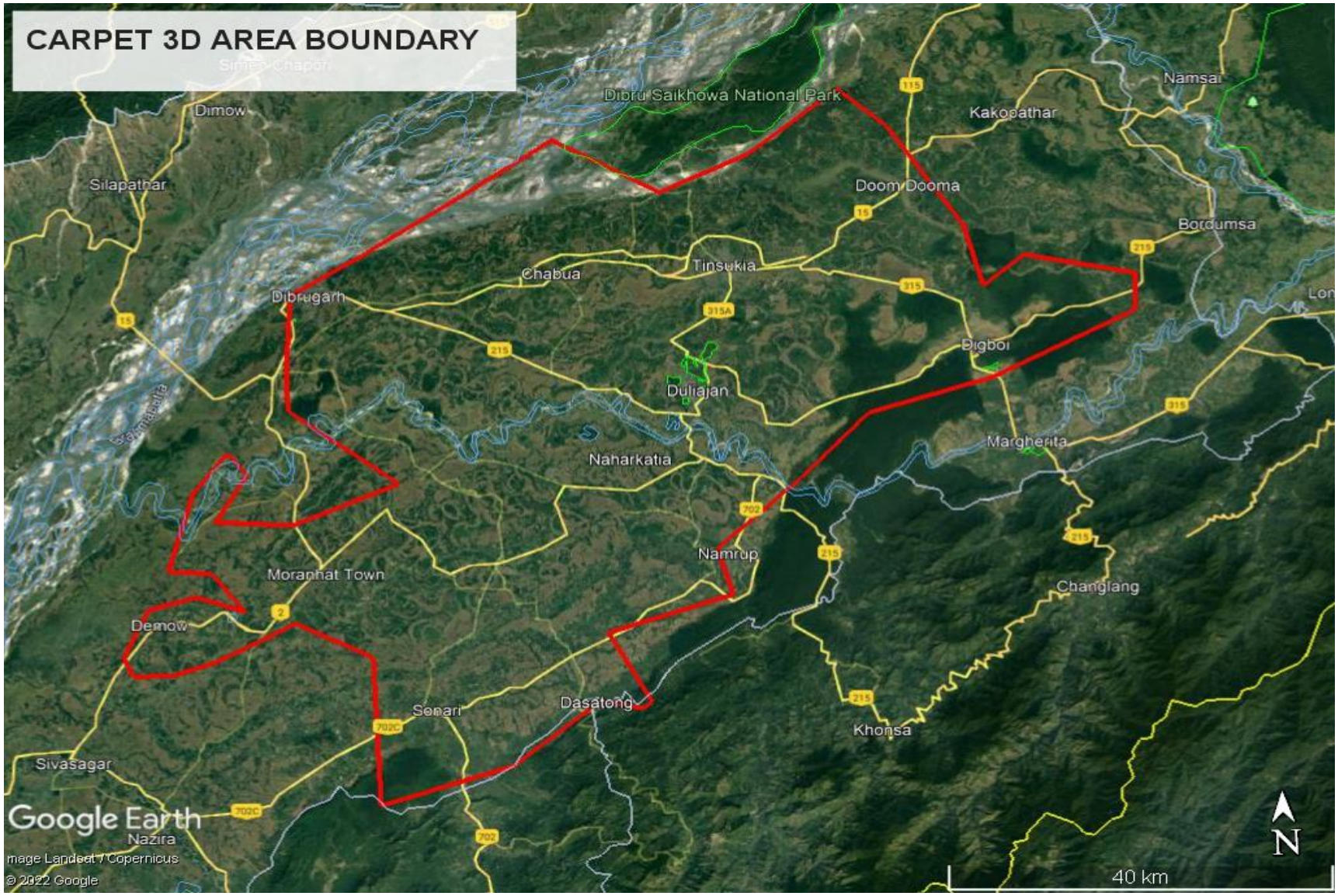

Figure-1: Full fold Coverage Area of High-Density (HD) 3D Seismic data in OIL's MPA, falling in the state of Assam