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सेन्ट्रल माईन प्लानिंग एण्ड डिजाइन इंस्टीट्यूट लिमिटेड
(कोल इण्डिया लिमिटेड की अनुबंधी कंपनी / भारत सरकार का एक लोक उपक्रम)
गोन्दवाना प्रेस, कान्के रोड, राँची - 834 031, झारखंड (भारत)
Central Mine Planning & Design Institute Limited
(A Subsidiary of Coal India Limited / Govt. of India Public Sector Undertaking)
Gondwana Place, Kanke Road, Ranchi - 834 031, Jharkhand (INDIA)
CORPORATE IDENTITY NUMBER - U14292JH1975GOI001223

Speed Post

e-mail-(manik.jain@southwestpinnacle.com)

पत्रांक: सी.एम.पी.डी.आई/डी.जी/७६५ (ए) / १५५

दिनांक: 13/11/2020

WORK ORDER

(Open Global NIT No KARTALA BLOCK (Tender ID: 2020_CMPDI_173868_1))

सेवा में,

M/s South West Pinnacle Exploration Limited
Siddhartha House, 4th Floor, Plot No. 6,
Sector-44, Gurgaon – 122 003 (Haryana)

विषय : 2D Seismic Survey along with Exploration in Kartala Block, Mand-Raigarh Coal Field of Korba District in state of Chhattisgarh

- संदर्भ:** (i) Your Online Bid Id No. 530308 dated 04th July 2020
(2) CMPDI Letter of Acceptance No. CMPDI/CMC/2020-21/LoA/07 Dt. 27th Oct 2020
(3) Your Letter of Acceptance No. SWPE/CMPDI/Kartala/2020 Dt. 12th Nov 2020

महोदय,

Reference is invited to M/s South West Pinnacle Exploration limited., aforesaid online Bid submitted as L-1 bidder regarding Coal Exploration along with 2D Seismic Survey along with Exploration in Kartala Block, Mand-Raigarh Coal Field of Korba District in state of Chhattisgarh. CMPDI is pleased to award M/s South West Pinnacle Exploration Limited, the work for 2D Seismic Survey along with Exploration in Kartala Block, Mand-Raigarh CF of Korba District in state of Chhattisgarh against the above mentioned on-line tender as per following scope of work:

Scope of work: The exploration is proposed to be conducted in the block includes following activities to be carried out by the successful Bidder:

Item No.	Sr. No.	Sub-Item
Item-1: Preparation of Scheme and Surveying	1	Preparation of Exploration Scheme for both the 2D seismic and all the Geophysical surveys as well as for exploration of block involving drilling a total of 27 boreholes having estimated 22130 m of coring drilling as per specifications given in item nos. 3:1, 3:3, and 3:5 below). Time line for exploration in forest and non-forest areas in the block has to be specified separately by the Contractor in his Exploration Scheme as per the information provided by CMPDI in the Salient feature of the block in the NIT.
	2	Survey using Electronic Total Station (ETS) for laying line on ground for 2D Seismic survey work including marking points at every 10 m. interval along the line and putting wooden pegs at each point and determining coordinates and RL of each point.
	3	Simultaneously, staking out for location of each borehole to be drilled and end points of all the seismic profile lines using DGPS. The Topographical Survey in 2m contour interval on RF 1:4000/5000, (if required) to be decided by the Project Manager.
Item-2: 2D Seismic, Resistivity imaging and	1	2D Seismic Survey data acquisition over – 140 Line Km, using Explosives/Vibrators as source capable to investigate 1200 m depth. In case of totally inaccessible areas CROOKED lines may be allowed. The length of lines should cover entire block with minimum 28-fold. However, in case of Edge of block boundary, natural or manmade structures like river, very dense-inaccessible forest, villages, buildings, railway tracks, etc. nominal fold data can be accepted if in case full fold data is not possible. The Depth of investigation by Seismic survey would be up to 1200 meters. The seismic survey should be carried out as per details given in Annexure-IB of NIT.



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Geophysical logging surveys (Annexure-IA)		Resistivity Imaging Survey data acquisition over – 140 Line-Km using Wenner-Schlumberger and Dipole-Dipole Electrode configuration with 10m electrode spacing with appropriate roll-over to avoid data gaps in the subsurface. The 2D Seismic survey and Resistivity Imaging survey are to be conducted concurrently
	2	Out of a total of 27 boreholes to be drilled in the block involving a total of 22130 m, Geophysical Logging of boreholes to be done in 27 boreholes totaling 22130 m using P & S full wave Sonic, Dual Density, Caliper, Natural Gamma ray, Single Point Resistance and 16"-64" Resistivity and Deviation parameters.
	3	Processing and interpretation of Seismic Survey Data as per details given at Clause B and C with deliverables D.B and D.C in Annexure-IA of NIT
Item-3: Exploration (Annexure-IB)	1	A total of 22130 meters of vertical diamond core drilling in HQ/NQ/BQ or equivalent sizes having envisaged depth of Up to 1170 meters (approximate) with >90% recovery in coal and >80% recovery in non-coal portion; sealing of boreholes and erection of borehole pillars.
	2	Detailed geological mapping (on RF 1:4000/5000) including outcrops of different lithological units/coal seams, structural details.
	3	Detailed drill core logging (lithological characteristics, structural features, geotechnical properties, RQD).
	4	Packing and transportation of coal cores to laboratories for chemical analysis as per advice of the Project Manager
	5	Preparation of analysis advices for chemical analysis of coal cores of all boreholes covering required parameters for coking and non-coking coal (as the case may be); analysis advice to include band by band for all coal seams (100%), proximate (overall) analysis (100%), determination of calorific value (100%) and special tests for selected samples (20%) and petrographic studies of minimum two representative coal core samples of each potential seams and arrangement for above analysis.
	6	Packing and transportation of non-coal cores of one-two borehole wherein maximum strata and coal seams have been intersected to laboratory for physico-mechanical investigation as per advice of the Project Manager.
	7	Analysis advice for physico-mechanical investigation for determination of (a) RQD, (b) Density (c) Porosity (d) Compressive Strength, (e) Tensile Strength (f) Cohesion (g) Angle of internal friction (h) Young's modulus of elasticity (i) Point load test (j) Slake durability.
	8	Geological modeling through computer including all available geological and geophysical data of the block (refer Annexure-IB of NIT).
	9	Formulation of Interim Geological Note, Draft Geological Report and Final Geological Report (Refer Clause 1.1.2 of Annexure-IB of NIT)
	10	Geophysical Logging (meter) – 22130 in 27 boreholes.
	11	Full Wave (P & S) Sonic Logging (Meter) – 22130 in 27 boreholes
	12	Deviation Logging (meter) – 22130 in 27 boreholes
	13	Electrical Resistivity Imaging Survey=140 Line-Km using Wenner-Schlumberger and Dipole-Dipole Electrode configuration with 10m electrode spacing with appropriate roll-over to avoid data gaps in the subsurface.

Note:

1. The quantities of 2D Seismic profiling work/Resistivity Imaging surveys and total meterage to be drilled indicated is likely to vary by (+/-) 30% depending on the field conditions, complexities revealed during 2D Seismic & Exploration (Refer Clause 5.4 of General Terms & Conditions). Actual requirement shall be assessed on the basis of Interim Geological Note.2.
2. Any additional data of the block provided by CMPDI shall have to be incorporated and interpreted by the bidder in the GR.



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3. Bidder shall prepare Monthly Progress Report (both Hard Copy and Soft Copy) in respect of all activities as per standard format provided by CMPDI and submit to PRCO or his authorized representative for verification and certification for acceptance by CMPDI.
4. The Monthly Progress Report(s) submitted by the Bidder and accepted by the Project Manager (or his authorized representative) shall be the basis of assessment of the progress. This provisional assessment of LD shall be done at an interval of 6 months (excluding month in which the work has been awarded to bidder) and finally at the end of scheduled period of completion/ submission of FGR.
5. In case of 2D Seismic: The test processing parameterization and subsequent data analysis shall be done in association with CMPDI geoscientists.
6. In case of loss of data or data getting corrupted (both due to system malfunction), the same shall be replicated at the cost of the contractor. No time extension shall be given for such eventuality. Under no situation, the data shall pass to any third party in whatsoever manner.
7. Bidder shall confirm that Seismic data processing & interpretation shall be carried out with the best Industry standard and latest version of processing & interpretation software packages in India only.
8. Bidder shall deploy necessary hardware of not older than 5 years from the date of NiT and latest versions of required software for undertaking the complete scope work of processing & interpretation and for completing them within the given time frame or earlier. In case, it is found that the minimum required hardware and software are not sufficient to complete scope work of processing & interpretation within the given time frame, CMPDI shall ask the CONTRACTOR to increase the resources without any additional cost.
9. Bidder should deploy latest state of art software for seismic data processing and interpretation to achieve the objectives of the project.
10. Bidder shall submit the list of hardware & software proposed to be deployed along with the techno-commercial bid as pointed out earlier also.

SCOPE OF WORK FOR 2D SEISMIC STUDY

A. DATA ACQUISITION PARAMETERS (for 2D Seismic surveys): The suggested data acquisition Parameters are listed in the Table below. However, the CONTRACTOR shall carry out experimental work prior to commencement of actual data acquisition to finalize these parameters.

Geophones	Low distortion, high sensitivity with 10Hz Natural Frequency
Recording System	Telemetry (Wired)/ Wireless with 24-bit $\Delta\Sigma$ Technology
No. of channels per shot	240 for split spread
Sampling rate	0.5 ms
Record length	3 sec
Geophone group interval	10 m
Shot interval	20 m
No. of geophones per group	1 string of 6 Geophones to be bunched per station
Source@	Explosive/Vibrators
Fold-age of data	30 even at the Block boundary\$
Shooting pattern	Symmetrical split spread
Geophone Array Pattern	Bunched
Offset	Near offset shall be fixed after experimental work and shall normally be kept as short as possible but adequate enough to minimize shot generated noise.



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Statics correction

Using up-hole/Refraction surveys at every 1 Km interval

NOTE- See clause no-29 of NIT regarding site visit by the bidder,

\$: The profile lines may have to be extended beyond block boundary to get the full fold data. In case of totally inaccessible areas, CROOKED lines may be allowed; If full fold data is not possible due to natural or man-made structures like Bio reserves, totally restricted forest, river, ponds, villages, buildings, Railway lines etc. nominal fold data can be accepted.

@: . For Explosive/Vibrators source, the guidelines of MoEFC must be adhered to in any case.

IMP: A real-time monitor display shall be provided with the recording unit for monitoring the regular shots in the instrument van. The recording instrument should not be more than 5 years old on the date of submission of techno-commercial bid. The data shall be delivered to the CMPDI on high quality IBM compatible 3590/ 3590E cartridges or higher versions. The Contractor shall also have necessary hardware and application software for instrument and ground electronics performance evaluation. The CONTRACTOR shall deploy digital telemetry cables meeting industry standards and compatible with the recording instrument. The cable electronic modules shall have 24-bit digitization capability.

Experimental survey:

Contractor shall carry out experimental work prior to the commencement of regular data acquisition. The experimental work for 2D surveys shall include offset, noise analysis, geophone array design, shot depth, charge size etc.

CMPDI and the Contractor will jointly determine the scope and details of said experimental work. Field processing of experimental data shall be performed by the Contractor in consultation with CMPDI prior to commencement of regular data acquisition, at no extra cost to CMPDI. Contractor shall submit a detailed report on the experimental work along with the recommendations to CMPDI.

It'll be the responsibility of the contractor to obtain all the applicable/requisite statutory licences, permits like- the license to use, store and handle Explosives, Wi-Fi devices, authorizations to use of a particular frequency spectrum in the local area, local permits etc. from their own resources at no extra cost to CMPDI. Whenever necessary, CMPDI shall provide necessary documents only if required.

Test Report:

Bidders shall submit a detailed report on selection of the field parameters with test Record printouts within 48 hours of the completion of experimental work. The field work is to be started after approval and satisfaction of CMPDI representative.

Calibration:

Calibration of all the systems is the bidder's responsibility. In case of any bad record, bidder shall re-record at its own cost. Bad records shall be defined as records containing more than 2% of active traces that are defective due to noisy/dead trace, synchronization error, parity error, appreciable cross-feed/leakage/Noise or unacceptable S/N ratio due to poor loading of charge/ improper depth or insufficient thumps of AWD etc. (It does not include dead channel due to logistic reason, natural or manmade hindrances etc.)

Work shall not continue on any day if:

- There are more than 2% of active traces are defective
- Polarity of Geophone is not correct
- Controllable ambient noise exceeds 12 dB (compared to adjacent traces) on more than 2% of the active traces on the spread, as displayed on the noise trip recorded at the beginning of each day.
- Monitor device is inoperative.
- Five consecutive records are defective.



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Bad Records:

A record having any one of the following will be considered as bad record and shall not be considered for daily progress

- i) More than 2% dead channels of total channels recorded, per record. The contractor shall put all his efforts to rectify the dead/bad channels as early as possible. However, the contractor shall start every day's operations with all good traces.
- ii) Records with more than 6 consecutive dead channels in any record. However, total no of dead channels in a record cannot exceed more than 2% of total channels recorded per record.
- iii) Record with synchronized error.
- iv) Record with parity errors.
- v) Record with appreciable cross feed, leakage and spread noise etc.
- vi) If there are more than 25% of the records per ground line Km are bad, than the same shall be re-shot by the contractor.
- vii) The contractor will re-acquire the bad records at the advice of CMPDI's representative at site.
- viii) Data recorded with incorrect instrument settings.
- ix) Data is not identifiable to the recorded sort on not retrievable on cartridges.
- x) Loss of Magnetic recording occurs during designated record length.
- xi) Data recorded with only internal time break.

Quality Control:

CONTRACTOR shall provide industry standard Seismic data quality control system to monitor seismic coverage and overall seismic and positioning data quality. The system should have capability to generate coverage maps with user selectable offset ranges.

CONTRACTOR shall be required to undertake QC processing of the data as a quality check. CONTRACTOR shall ensure that sufficient processing facilities, including hardware, software and experienced personnel are available to perform these tasks. A hard & soft copy of the full length of brute stack sections shall be generated for every line with QC processing flows like RMS amplitude displays, bad trace detection, position data merge as specified by CMPDI representative.

CMPDI representative shall have access to the QC processing system for any QC checks or verification.

CONTRACTOR shall provide facility for playing back the recorded data cartridges, to facilitate offline QC of seismic and survey data.

The bidder shall install state of the art workstation with requisite software at field camp office to carry out QC tests with acceptable plotting facility for

1. QC of survey data.
2. Planning of Seismic survey.
3. Up-hole/Refraction data interpretation and static computation.
4. Onsite field QC processing system with capability up to brute stack for every completed line.

The above QC tests shall be carried out jointly with the representative of CMPDI as well as of the party on daily basis at site offices.

Shot Records will be taken for every data point with displaying signals, from all seismic channels. Shot instant/thump instant, timing lines and up-hole time. All monitor records shall be suitably annotated.



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B. SEISMIC DATA PROCESSING:

- B.1 The acquired data must be processed using state of the art processing software (e.g. the latest versions of PARADIGM/CGG/PROMAX/LANDMARK or equivalent). The objective of the processing is to generate highest quality of interpretable seismic time and depth section (Ref: Item no.2, Sl. No. 4 Annexure-I) which can further be used for geological interpretation giving output like – Descriptive lithology, lithologs, structural floor contours of coal horizons, geological cross sections, Iso-chore coal horizons, broad coal horizon wise resources in 2D Seismic report along with geological model.
- B.2 The stand-alone workstations with adequate RAM disk space for the software packages like survey data management & processing, 2D field management & planning, survey simulation, up-hole/Refraction data processing and interpretation should be available with bidder. The work station should be connected to color plotter, line printer and drive for back-ups.
- B.3 CONTRACTOR is required to process and interpret the data at CONTRACTOR's work center in India. Being a turnkey project involving multiple activities and data volumes, CONTRACTOR has to make meticulous project planning for scheduling concurrent activities for acquisition, drilling of Bore wells logging, processing & interpretation to meet the scheduled time lines for timely completion of the project
- B.4 **Quality Control**
The quality control parameters shall be maintained as per the best in the industry standards. All necessary Quality Control and diagnostics such as data display, impulse response, amplitude spectrum etc. will be made available to CMPDI representative for study and verification at the processing centers. Examination of data for Quality Control may require hard copy as well as online evaluation on workstation. Facility should also exist to take the screen dump, whenever required.
CMPDI representatives will be made aware of interpretative processing procedures that will be applied during processing of data.
- B.5 **Parameter Test**
All necessary and sufficient testing shall be performed to determine optimum processing parameters at every stage of processing sequence. Testing, in general, will be conducted at different locations along the lines selected in consultation with CMPDI representative.
CMPDI at its option may request additional or extra QC displays to be produced. Any other testing requirements and displays on the data as requested by CMPDI representative or suggested by the contractor should be performed.
- B.6 **Suggestive Data Processing Flow**

The suggestive data processing flow is given below

1. Format conversion
2. Loading of data
3. Preparation of SPS to build geometry from acquisition details
4. Computation of source/receiver statics
5. Geometry and updating headers
6. Statics application
7. Data conditioning and S/N enhancement.



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8. Linear noise attenuation (testing and application in different domains)
9. Random noise attenuation (testing and application in different domains)
10. Spherical divergence correction
11. CDP binning & sorting
12. Trace Balancing
13. Deconvolution
14. Band pass filter
15. Velocity analysis 1st pass
16. Residual static application
17. Pre-stack time migration
18. Velocity analysis 2nd pass
19. Spectral balancing on PSTM gathers
20. RNA on PSTM gathers and SEG Y output for pre-stack
21. Inversion
22. Mute and Stack
23. RNA on PSTM stack
24. Spectral balancing to boost frequencies
25. Deconvolution to remove multiples
26. TVF
27. Trace Balance (full window) and SEG Y output

The suggestive PSDM processing sequences are given below

1. Input Pre-MiG gathers from PSTM sequences.
2. Pre-PSDM data conditioning.
3. Initialize velocity model
4. Velocity model updating
5. Output Final Stack (PSDM)

Note: -

1. The processing sequence given above is indicative only and will be finalized after thorough testing mutually by CMPDI's representative and the CONTRACTOR's processing manager which may change from area to area.
2. To improve the data quality, repetition or addition of suitable processes may be done, if required.
3. The data is likely to have low signal to noise ratio with multiples and peg legs due to the presence of trap. Effective multiple and peg leg suppression techniques need to be adopted.
4. It is anticipated that the sub basalt data will be of low frequency. Techniques like Low Frequency Enhancement and Q Compensation may be tested.
5. Initial velocity analysis should be done based on constant velocity stacks or perturbed velocity stacks.

(C) DATA INTERPRETATION

The scope of work of data interpretation is given below:

1. conditioning of the post stack seismic data
2. Identification of coal markers and other lithology and well to seismic tie.
3. Tracking of horizons corresponding to coal/shale tops and fault mapping.



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4. Time and Depth Structure mapping
5. Spectral decomposition for identification of tuning effects.
6. Iso-chore maps of Coal horizons
7. Fault analysis using geometrical attributes.
8. AVO, Pre and Post stack Inversion studies.
9. identification of seismic attributes that relates to coal properties, through cross plotting of seismic and well log data.
10. Preparation of various maps, lithologs, structural floor contour of coal horizons, geological cross sections.
11. Preparation of Iso-density maps of coal horizons.
12. Broad estimation of Coal horizon wise resources.

This is only a suggestive work flow for interpretation. However, the bidder should adopt the best and internationally accepted interpretation workflow in consultation with the representatives of CMPDI. Lithological logs generated from geological and geophysical logging of the drilled coring boreholes should be used to correlate the different coal horizons with seismic reflectors. The sonic and density logs can be used for generation of synthetic seismogram along with depth wise velocity determination which in turn can be utilized for time to depth conversion.

(D) DELIVERABLES

A. DATA ACQUISITION:

The CONTRACTOR shall provide the following deliverables to CMPDI within 15 days from the completion of data acquisition:

1. Seismic data (records) in SEG format on Hard Disc (in triplicate).
2. Survey data containing co-ordinates of stations lying on profile lines and bore holes on Hard Disc / CD (triplicate).
3. Geometry data in SPS format on CDs/Hard Disc (triplicate).
4. Quality Control processing outputs on Hard Disc.
5. A comprehensive operational report (3 hard copies and CDs each) including details of experimental work and the results of all Up-Hole surveys along with near surface model

B. DATA PROCESSING:

The following outputs & deliverables will be considered to be part of the processing sequence and price quoted for processing should include these. All output products must conform to the highest industry standards in terms of their quality and future usage.

- (A) The contractor will furnish to CMPDI all output results of all the testing carried out to determine optimum processing parameters.
- (B) Soft and hard copies in triplicate of detailed processing report which must include details of all parameter testing including quality control displays, final processing sequence, and final location map with appropriate annotation.
- (C) Three (03) copies of the following data volumes in SEG-Y Format (Rev. 1) will be produced as part of the standard processing sequence on Hard disk. All SEG-Y output will follow standard byte location for different headers. Details of byte locations should be included in EBCDIC header of the outputs.
 - a. Geometry updated SP gathers
 - b. Residual statics applied CMP De-convolution gathers
 - c. BSTM gathers (without any mute)

(without any mute)



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- d. RMS velocity (ASCII & SEG Y) – original picks at locations
- (D) Raw Stack, Final PSTM and Final PSDM stack.
- (E) Soft and hard copies in triplicate of processing report including the details of processing steps and parameter test results and final presentation to CMPDI.

C. DATA INTERPRETATION:

The following minimum deliverables are required to be incorporated in the composite Geological Report (GR) within the specified time at the end of field data acquisition. In the Seismic portion of the report, the deliverable maps, figures of international standard should be provided. Essential deliverables should be –

- Seismic time section along profile lines
- Interpreted depth section along profile lines depicting subsurface set up of coal horizons with thickness preferably on 1:10000 scale and structural disturbances e.g. faults with throw etc., deciphered if any.
- Velocity model
- Synthetic seismograms
- Structural floor contours of coal horizons on RF 1:5000
- Iso-chore of coal horizons on RF 1:5000
- Iso-density of coal horizons on RF 1:5000
- Interpreted lithologs after combining geological and geophysical logs of boreholes on RF 1:500.
- Geological cross sections of the coal horizon on RF 1:2000
- Incorporation of all of the above 2D Seismic survey deliverables and Geological Data generated simultaneously. More specifically the report should include geological data/plan out puts like Descriptive lithology, lithologs, structural floor contours of coal horizons, geological cross sections, iso-chores of coal horizons, iso-density of coal horizons, broad coal horizon wise resources along with geological model within the specified Time limit as per page No-1 of NIT. Other maps and figures are open to bidder to provide with report as per international practice of presentation in two hard copies and one soft copy in CD/DVD in printable format, during submission of Report.

FOR RESISTIVITY IMAGING SURVEYS:

- Resistivity pseudo-depth sections over individual profile lines on Plan and observations and description in the Text.
- Identification of faults and In-Crop position (if any) of coal seams and correlation with Seismic and Drilling data
- Marking of the position of faults and In-Crops over the Plan with Profile lines.

Scope of Work for Geology & Specialized Study

1. **Item wise Bidder's Scope of work.** The detailed exploration proposed to be conducted in the block includes activities mentioned in Annexure-I are to be carried out by the successful Bidder:

Note:

1. The total meterage indicated is likely to vary by (+/-) 30% depending on the complexities revealed during exploration (Refer Clause 5.4 of General Terms & Conditions).
2. Any additional data of the block provided by CMPDI shall have to be incorporated and interpreted by bidder in GR.



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3. Bidder shall prepare Monthly Progress Report (both Hard Copy and Soft Copy) in respect of all activities as per standard format provided by CMPDI and submit to PRCO or his authorized representative for verification and certification for acceptance by CMPDI.
 4. The Monthly Progress Report(s) submitted by the Bidder and accepted by the Project Manager (or his authorized representative) shall be the basis of assessment of the progress. This provisional assessment of LD shall be done at an interval of 6 months (excluding month in which the work has been awarded to bidder) and finally at the end of scheduled period of completion/ submission of FGR.
- 1.1 **Geological Modeling:** The Bidder shall take up geological modeling through computer including all available geological and geophysical data of the block. Bidder to provide the software based geological model in MINEX format.

1.1.2 (i) **Interim Geological Note (IGN):**

(a) Bidder shall prepare and submit two copies of IGN incorporating the seismic and drilling data to CMPDI within one month after completion of 50% of field work of the quantum of allotted Seismic surveys and drilling data of the boreholes already completed till that time. The BH points and Seismic Profile lines shall be released by CMPDI.

(b) The IGN shall contain the following:

- I. All the results of the Seismic and other Geophysical surveys
- II. Borehole and Seismic/Geophysical survey profile lines location plan (RF 1:4000/5000)
- III. Geological plan (RF 1:4000/5000)
- IV. Graphic and descriptive log of the completed boreholes
- V. Coal seam wise geological structure
- VI. Representative geological cross-sections
- VII. Coal seam wise seam-folio plans showing iso-thickness and iso-grades lines
- VIII. Recommendation in respect of revised estimate of exploration and scope of sub-blocking for separate GRs for CMPDI's consideration and approval.

Draft Geological Report (DGR): Bidder shall prepare DGR incorporating all the findings of the 2D Seismic and all the other Geophysical surveys and submit two copies to CMPDI for vetting purpose. The DGR shall comprise following

1	Salient Feature (Location, Accessibility / Communication, Objective, Period of investigation, Status of Mining, Area of the block, Details of drilling, Seam-wise borehole density, Tabulation showing the quantum of all investigations including 2D seismic, geophysical logging, Geological Formations, Geological Structure, Faults, Intrusive, Coal seams & Quality, Geological Reserves and Land use pattern (To be given at the beginning of GR)
2	CHAPTER 1: INTRODUCTION (Objective, Location, Communication & Accessibility, Area of the block, Physiography & Drainage, Climate, Previous work, Mining History of the block, Exploration Design, Important Features in the Area, Present geological and geophysical Investigation, Quantum of Total Exploration inputs, Scope and limitations, Acknowledgements, Personnel Associated with Investigation)
3	CHAPTER 2: EXPLORATION SCHEME (Topographical survey, Geological Mapping, Remote Sensing*, Surface Geophysical Survey, Drilling Equipment and year wise, Agency wise drilling quantum, Core logging / Sampling / Packing / Boxing, Geophysical equipment, quantum of geophysical logging and surface geophysical survey, Coal analysis, Data Synthesis). *If provided by CMPDI



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4	CHAPTER 3: GEOLOGY & STRUCTURE (REGIONAL GEOLOGY indicating General description of the coalfield, Formations, Stratigraphy, Description of Formations, Intrusive & Distribution, REGIONAL STRUCTURE indicating Tectonic Set-up & Basin Configuration, GENERAL GEOLOGY OF THE BLOCK indicating Location, Geological Succession, Description of Formations, GEOLOGICAL STRUCTURE OF THE BLOCK indicating General description, strike and Dip, Pattern of Faulting & Description of faults.
5	CHAPTER 4: DESCRIPTION OF COAL SEAMS (General definition of coal, Dirt bands & Parting, Formation wise number of coal seams, Correlation, Quality Parameter & basis of Assessment, Sequence of coal seams & PARTINGS , <i>Description of individual coal seams</i> indicating seam name, Reference of plates and annexure, Status of Mining. Details of Borehole Intersection, Depth of Intersection (Roof), Minimum & Maximum FRL's, Stratigraphic Position, Parting above & below, Thickness (Stratigraphic and effective), Splitting, Outcrop / In-crop, Lithology of Immediate Roof & Floor, Pyrolytization, Dirt bands (combustible & non-combustible in-seam dirt bands & its percentage, for details reference to Annexure-VI), Proximate Analysis (Ranges, observations ; reference to Annexure-VII for details, BCS I ₃₀ / I ₁₀₀ / I _p sample as per requirement. Similar details may be given for seam sections which merits attention from mining point of view), Determined Gross CV (Ranges, observation; reference to Annexure VII for details), Ultimate Analysis (Ranges, observation; reference to Annexure VIII for details), Sulphur (Ranges, observation; reference to Annexure VIII for details), Petrographic studies (Ranges, observation; reference to Annexure IX for details), HGI (Ranges, observation ; reference to Annexure VIII for details), any other <i>*Specific Parameters for Non coking coal</i> , Long flame Characteristics, Ash Fusion Range (Ranges, observation; reference to Annexure VIII for details), Ash Analysis (Ranges, observation; reference to Annexure VIII for details), Wash-ability Studies (Reference to Annexure X for details). Additionally, in case of Coking coals Parameters of Caking Propensity like Caking Index, Coke Type, Swelling Index etc. (Ranges, observation; reference to Annexure VIII for details) & Determination of Alkalies (Ranges, observation; reference to Annexure VIII for details), Statistical Analysis of key parameters and at the end of each seam description Summary of seam parameters and special Observation. <i>* Give characteristics of coking / non-coking coals as per requirement.</i>
6	CHAPTER 5: RESERVES (GENERAL DESCRIPTION, BASIC ASSUMPTIONS AND NORMS FOLLOWED indicating Definitions, Seams affected by Intrusive, Categorization of reserves & Grade Estimation, PROCEDURE OF RESERVE CALCULATION indicating Block boundary, Barriers, Sector /Sub sectors, Mine data considered, Methodology, Average Specific Gravity, Computation of coal reserves (Brief Description for calculation of gross reserves), DESCRIPTION OF OVERBURDEN (only in case of Open Cast reserves) indicating Nature, In-seam burden, Methodology For Overburden Estimate & Depth of excavation, DESCRIPTION OF RESERVES (details in Annexure XI), its Summary (Description of coal reserves estimated) and Summarized tabulated statements for Reserves as per opencast / underground norms and SURFACE CONSTRAINTS indicating Coal Reserves under surface constraints
7	CHAPTER 6: SPECIALISED STUDIES (DESCRIPTION OF SPECIALISED STUDIES UNDERTAKEN, GEOPHYSICAL INVESTIGATION INCLUDING UPDATED SEISMIC AND GEOPHYSICAL LOGGING FINDING PHYSICO-MECHANICAL PROPERTIES indicating Design, Tests undertaken, summary of Test Results (The detailed test results in Annexure- VIII to be summarized), Discussion (Above test result in terms of various lithologies) & Results (Physico mechanical characteristics of major partings between coal seam) and any other tests undertaken.
8	Environmental Data (Demography, water quality analysis, soil quality, flora and fauna, land use pattern, air quality, noise level, etc.). Data is to be collected by the bidder to the extent available with statutory agencies/authorities.
9	Discussions of Results and Conclusion
10	LIST OF ANNEXURES Annexure I Details of Co-ordinates, Reduced Levels of boreholes, Seismic profile lines and Closing Depths of Boreholes drilled in block, CF. Annexure II Descriptive Geological Log of boreholes drilled in block, CF. Annexure III Statement showing thickness of Soil, Weathered mantle and different Formations intersected in boreholes drilled in block, CF. Annexure IV Seam Correlation chart, block, CF. Annexure V Seam Wise Borehole Wise Band by Band Analytical Data in block, CF.



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	Annexure VI Seam wise Borehole wise details of Dirt bands in block, CF.		
	Annexure VII Seam wise Borehole wise Overall Proximate Analysis, GCV etc. in block, CF.		
	Annexure VIII Seam wise results of Special Tests of boreholes drilled in block, CF. (Coking coals or Non coking coals, applicable)		
	Annexure IX Seam wise results of Petrographic Tests in block, CF.		
	Annexure X Test result of wash-ability Studies & Characteristics of cleans and middlings of borehole samples in block, CF.		
	Annexure XI Test Results on Physico - Mechanical properties of rock / coal samples from Borehole no....., block, CF.		
	Annexure XII Details of reserves estimation, block, CF		
	Annexure XIII Details of OB estimation, block, CF. (in case of Opencast block)		
	LIST OF PLATES		
	Subject	Plate no	RF / Scale
11	1. Location Map	I	1 : 50000 / 1 : 100000 (Location of block within map of coalfield with a inset map of India showing location of coalfield)
	2. Topographical Map	II	1: 5000 / 4000 (Surface contours, Boreholes, Inclines, Shafts, Limits of OC mines, River, Naia, Road, Rail lines, Wells, Habitations, High tension lines etc.)
	3. Geological Map	III	1: 5000 / 4000 (Seismic profile lines, Boreholes, Special tests boreholes with distinctive style, Inclines, Shafts, Limits OC mines, in addition to formational boundaries, Coal seams In-crops / Outcrops, Structural features etc.)
	4. Graphic Lithologs of Bhs along with Geophysical logging curves	IV A to IV ...	1: 500
	5. Graphic Correlation	V A to V....	1: 1000
	6. Geological Cross section	VI A to VI.	1: 2000
	7. Floor Contour Plan	VII A to VII.	1: 5000 / 4000 (in ascending order)
	8. Seam structure	VIII A to VIII ...	1: 50 (in ascending order)
	9. Seam Folio Plan	IX A to IX.	1: 5000 / 4000 (in ascending order)
	10. Iso-parting Map	X A to X.	1: 5000 / 4000 (As per requirement / optional in case of Opencast block)
	11. Total Overburden Plan	XI	1: 5000 / 4000 (As per requirement / optional in case of Opencast block)
	12. Iso-Excavation Plan	XII	1: 5000 / 4000 (As per requirement / optional in case of Opencast block)
	13. Coal: OB Plan	XIII	1: 5000 / 4000 (As per requirement / optional in case of Opencast block)
	14. Interpreted Geophysical logs	XIV A to XIV.	1:200/ 1:500
	15. Interpreted Seismic sections	XV A to ...	1:10,000
	16. Interpreted Imaging pseudo sections		
	17. Any other map as per requirement		

11/ Final Geological report (G.R.) Bidder shall attend and incorporate in FGR all vetting comments given on the GCR and shall submit 5 copies of FGR within one month of receipt of vetting comments. Bidder shall also submit two soft copies of the FGR on CDs.

1.2 CMPDI's Scope of Work

a) CMPDI shall arrange necessary statutory clearances for exploration in Forest Areas.



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(i) Status of permission for exploration in Forest Areas:

Note: In case statutory clearance(s) is not provided within the contract period/mutually agreed extended period; the work order will be terminated (Partly or fully) without any financial implication on either side.

- h) CMPDI shall scrutinize the exploration scheme, suggest and approve the borehole locations, select/approve boreholes for special tests, randomly/regularly check and verify completed and ongoing works; and decide need of geophysical logging/surface geophysical surveys, etc. by Bidder/CMPDI.
- c) CMPDI shall assess the recommendations given in IGN by the Bidder in respect of revised estimate of exploration and respond within 15 days.
- d) CMPDI shall scrutinize the Integrated DGR submitted by the Bidder and submit its comments/observations within 30 days which needs to be incorporated by the Bidder in Integrated FGR.
- e) CMPDI shall scrutinize the FGR to verify incorporation of its comments given earlier on Integrated DGR within 15 days.

2. Laws governing the coal sector in India

The indicative list of laws governing the coal sector and mining operations in India is given below. As the laws and statues listed below are not exhaustive, Successful Bidder should obtain independent legal advice with regard to compliance to all applicable laws.

Table-3.1

Sl. No	Acts / Rules /Regulations	Promulgation
1.	The Mines & Minerals (Regulation & Development) Act	1957
2.	The Mineral Concession Rules	1960
3.	The Coal Bearing Areas (Acquisition and Development) Act	1957
4.	The Mineral Conservation and Development Rules	1988
5.	Coal Mines (Nationalization) Act	1973, amended in 1993
6.	The Coal Mines (Conservation and Development) Act	1974
7.	The Land Acquisition Act	1894
8.	Forest (Conservation) Act including Rules	1980
9.	Water (Prevention and Control of Pollution) Act including Rules	1974
10.	Air (Prevention and Control of Pollution) Act including Rules	1981
11.	Environmental (Protection) Act	1986
12.	The Mines Act	1952
13.	Mines Rules	1955
14.	Coal Mines Regulations	1957
15.	The Contract Labour (Regulation and Abolition) Act	1970
16.	The Explosive Rules	2008

In addition to the **Acts / Rules /Regulations** mentioned above in the table 3.1, there are acts, bye laws dealing with the use of explosives, motor vehicles, electricity, wages and remuneration etc. Another category of acts relates to marketing, distribution, sales, pricing, contracts, transportation, exports / imports of various minerals.

3. Duration of the Contract: Duration of contract shall be as follows:



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Mobilization period for 2D Seismic and Drilling	For Field & Lab Studies	Report Preparation	Total
	2D Seismic and Drilling	Geological Report (GR) incorporating all the results of Drilling, Chemical analysis, PMT, Seismic and other Geophysical surveys etc.	
75 days	240	180 days	495 days
N.B: Zero date shall be the day of the issue of letter of acceptance/work order or handing over the relevant document to the contractor for preparation of Exploration Scheme, whichever is later.			
CMPDI after reviewing the recommendations given by the Bidder in IGN may, however, may reduce/increase by 30% the drilling/Seismic/Imaging meterage at existing terms and conditions. Accordingly, the duration of the contract would be adjusted on pro rata basis for any increase/decrease in quantities (Refer Clause 5.4 of General Terms & Conditions).			

4.0 Details of Scope of Works

- 4.1 Bidder with his declared owned/leased drills and equipment shall carry out drilling in HQ/NQ/BQ sizes. Reduction in size of boreholes below BQ size shall not be allowed. Bidder shall mobilize within mobilization period all the rigs declared in the bid submitted against the tender of the block.
- 4.2 Bidder shall make efforts to obtain maximum core recovery in coal seams and non-coal strata. In no case the recovery should be less than 80% in non-coal and 90% in coal strata, except in fault zone, weathered zone, soil and structurally disturbed area.
- 4.3 Boreholes are desired to be vertical. Bidder will take all possible precautions and skill to maintain verticality of the boreholes.
- 4.4 The locations of the boreholes finalized in consultation to CMPDI shall be fixed on the ground by the Bidder.
- 4.5 After completion of drilling, each borehole shall be sealed (plugged) by the bidder. After sealing, the bidder shall construct and erect pillars [of standard size to be specified by CMPDI] with Borehole Number at the borehole sites at his cost.
- 4.6 The bidder shall be responsible for:
 - (i) Preservation of cores with proper depth markings at the end of every run,
 - (ii) Geological logging of the cores and keeping cores ready for inspection by CMPDI,
 - (iii) Providing strong core boxes and preserving samples therein duly wrapped in polythene,
 - (iv) Sending packed core boxes for chemical/physico-mechanical investigations on coal cores/borehole cores to laboratories designated by CMPDI for analysis at his cost. CMPDI will bear the cost of analysis.

In case the designated laboratory expresses its inability to undertake analysis of cores, the bidder shall be free to select an accredited laboratory to get the analysis completed within the project schedule. However, CMPDI shall reimburse the actual cost of analysis on production of certified laboratory bills. The maximum reimbursable rates shall be CIMFR rates applicable for CMPDI.

- 4.7 In case of lower core recovery in normal geological conditions or jamming of the boreholes before completion of depth, deviation drilling/re-drilling shall be carried out by the bidder at his own cost on the instruction of CMPDI. However, if re-drilling is resorted to, the borehole location point shall be at the nearest possible distance from the original borehole and the bidder shall be free to do non-coring drilling up to the depth from where the coring drilling is required for generating cores with stipulated recovery.



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- 4.8 If a borehole fails to drill up to the targeted depth due to drilling difficulties or otherwise, the bidder shall have to re-drill a fresh borehole in lieu of the abandoned borehole. However, bidder need not to drill a fresh borehole in lieu of that abandoned borehole in which more than 80% of the targeted depth has been achieved provided that number of such abandoned boreholes are within 10% of the planned number of boreholes for the block and they are scattered over the block. CMPDI shall pay for drilling against such abandoned borehole(s) up to 3 (three) m depth beyond floor of last correlated seam
- 4.9 CMPDI shall have no responsibility towards construction of approach roads to field sites, arranging the water supply for drilling, watch and ward, and safety of men and material of the Bidder.
- 4.10 Decision for closure of the boreholes shall be taken by the Project Manager with approval of DBO.
- 4.11 Immediately after completion of work on each site, the Bidder shall at his own cost remove all equipment and unused materials; fill in and level pit and reinstate the site to its original conditions.
- 4.12 No extra cost shall be paid towards any "fishing" operation in connection with failure of tubular, bit etc., inside the borehole. No time extension will be provided for "fishing" operation and delay shall attract L/D clauses.
- 4.13 The Successful Bidder's Scope of Work shall also include all the obligations covered in NIT, General Terms & Conditions, Additional Terms and Conditions and Technical Document.
- 4.14 The Scope of Work shall include bringing in and/ or procurement and/ or deployment of Bidder's own equipment and personnel.
- 4.15 Site preparation, supply, transportation to site, water arrangement, lighting, etc., shall be responsibility of the successful Bidder.
- 4.16 The manpower deployment by the Bidder should be in conformity to the laws and regulations applicable in India. However, CMPDI will have no liability, whatsoever, with regard to the manpower provided by the selected Bidder within or after the contractual period.
- 4.17 The Bidder shall also submit recorded data of geophysical investigations carried out by him in digital format.
- 4.18 The bidder is required to carry out multi-parametric geophysical logging of boreholes as per the details given in Quantum of work in Annexure-XI.

In order to verify and support the drilling data and to have velocity estimation and for generating synthetic seismogram the multi parametric geophysical logging must include the following parameters:

(I) DUAL DENSITY, (II) CALIPER, (III) NATURAL GAMMA RAY, (IV) SINGLE POINT RESISTANCE, (V) RESISTIVITY (16" and 64"), (VI) P & S FULL WAVE SONIC AND (VII) DEVIATION (To be done in case drilling depth more than 600m for the logged BH). All these parameters must be recorded.

- Payment for Geophysical Logging can only be made when above mentioned compulsory parameters are logged {Sl. No. (i) To (vii)}.
- In case of absence of Parameters (vi) and (vii) 10% deduction shall be made.

The bidder is also required to conduct Electrical Resistivity Imaging Survey with 10m inter-electrode spacing using Wenner-Schlumberger and Dipole-Dipole electrode configurations. Suitable roll-over of spreads shall be observed to avoid data gaps in the sub-surface. The Imaging survey is to be conducted over the same profiles as that used for 2D Seismic surveys.



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In case CMPDI itself decides to take up geophysical logging of any borehole/and surface geophysical survey, the bidder shall have to provide access to boreholes and extend all logistic support to CMPDI for conducting the investigations and survey of profile lines at bidder's cost. The logistic support in geophysical logging would include washing of boreholes, fishing of stuck up borehole and space for logger van at the drill site. The casing provided in the borehole needs to be kept intact till completion of geophysical logging. In case of geophysical survey, the logistic support shall include physical sighting of boreholes in the block besides supply of coordinates of boreholes.

In case of Geo-physical Logging in a Coring borehole, the CMPDI shall pay for drilling up to 6 (six) m depth beyond floor of last correlated seam. However, in case of Non-coring Borehole the CMPDI shall pay for drilling up to 9 (nine) m depth beyond floor of last correlated seam.

This is done to facilitate the probe to demarcate the floor of the last correlative seam in case of coring/non-coring borehole.

4.18(a) Any other Surface Geophysical surveys shall be proposed depending upon the specific requirement and completeness of the exploration work.

4.19 Locations of all surface features (natural & artificial) shall be surveyed by the Bidder for their three-dimensional coordinates. Spot levels at suitable intervals shall be taken up for generating contours at specified interval for the entire area. The detailed survey for topographical mapping shall be carried out with reference to the primary order of Control Stations or by establishing secondary order of Control Stations (with reference to primary order of control station), depending upon nature and extent of the area. Any unusual condition or formation on the ground, forest area, location of rock outcrops (if visible on the surface) and springs / falls, possible aggregate deposits etc. shall also be surveyed.

4.20 Spot levels shall be taken at about every 20m interval and also at closer interval wherever abrupt change in ground elevation is found so that sufficient points properly distributed over entire area shall be located for generating contours at specified intervals.

4.21 All surface features, contours including control stations, boundary pillars, forest area existing and / or abandoned quarried etc. shall be shown on topographical plan / map by means of conventional symbols (preferably symbol of Survey of India Maps).

4.22 The field survey work shall be conducted with DGPS/Total Station (Refer Item no's 1.2 and 1.3 of Annexure-I) associated with software(s), Auto Set / Precise leveling and other required surveying equipment in the following steps.

- Establishing horizontal and vertical controls of primary and secondary/ tertiary orders.
- Detailed surveying and leveling for locating all kinds of surface features (natural & man made) and contours at specified intervals.
- All surveying and leveling operations shall commence and close upon known control stations.
- All necessary precautions as per standard survey practice should be scrupulously observed to avoid various types of errors.
- Seismic Profile lines, Borehole and Block Boundary to be surveyed on WGS-84 Platform. The base should be fixed in consultation with CMPDI.

4.23 Accuracy of the surveying & leveling: Linear accuracy of triangulation / trilateration (b) should be 1:1000. Minimum accuracy of the surveying and leveling shall be as follows:

Sl. No.	Type of surveying & leveling	Accuracy in surveying		Accuracy in leveling	Remarks



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गोन्दवाना प्लेस, कान्के रोड, राँची - 834 031, झारखंड (भारत)
Central Mine Planning & Design Institute Limited
(A Subsidiary of Coal India Limited / Govt. of India Public Sector Undertaking)
Gondwana Place, Kanke Road, Ranchi - 834 031, Jharkhand (INDIA)
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		Angular	Linear		
1	Primary order				
	a) Traversing	LC√n second	1:10,000	-	Where LC is the least count of the instrument and n is no. of traverse stations
	b) Triangulation / Trilateration	15 second (triangles closure)	- do - (discrepancy between measured & computed base)	-	
	c) Levelling for B.M. establishment	-	-	(+/-) 1 cm per km	
2	Secondary order				
	a) Traversing	10√n second	1:5000	-	- do -
	b) Levelling for B.M. establishment	-	-	(+/-) 1 cm per km	

5. Statutory Rules

It is proposed that the following statutory rules and regulations be followed by the successful Bidder undertaking the promotional coal exploration:

- (a) The successful Bidder should follow all statutory rules, regulations applicable laws etc. and statutory requirement related to government licenses, workmen compensation, insurance etc, including Minimum Wage Act, for their personnel. Machine operators and others, to whom the work would be allotted, should be provided safety shoes and helmets etc. by the successful Bidder. The successful Bidder is required to indemnify CMPDI from any liability falling on CMPDI due to an act of commission/omission by the successful Bidder or by its representatives or by its employees or by any third party in execution of the contract. If CMPDI is made liable for such claim by the Court or other Authority, the same should be reimbursed to CMPDI by the successful Bidder as if CMPDI has paid on their behalf.

The Successful Bidder is not required to indemnify CMPDI in the event of an act of commission/omission by CMPDI including that contributing to the injury, sickness, disease or death.

- (b) During the course of execution of the work, if any accident occurs whether major or minor, the successful Bidder or his supervisory staff should inform the same immediately without any delay to the concerned authorities and take steps in accordance with the Mines Act and other relevant laws, else, it is envisaged to take necessary action against the successful Bidder or his supervisory staff for violation of the mines act and other relevant laws.

Execution of the work with contract labour is prohibited vide notification U/S 10(1) contract labour (Regulation & Abolition) Act, S.O 2063, dated 21.06.1988. So, the successful Bidder should execute the work in such a way that the above Act is not violated in any manner.



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6. Accommodation, site office:

Bidder shall have to make his own arrangement for accommodation/site office/store etc. The Successful Bidder shall deploy all Supervisory & operation personnel and pay as per his norms. CMPDI shall not carry any responsibility for the personnel deployed by the Bidder.

7. Wage Payment

The successful Bidder shall make payment of minimum wages to its staff/personnel as per Contract Labour (R&A) Act 1970 and Contract Labour (R&A), Central Rules 1971. The successful Bidder shall submit to CMPDI monthly return of payments made to its employees. Copies of returns towards payment of provident fund on behalf of its employees shall also be submitted to CMPDI within seven (7) days of its submission. Inadequate wages paid and other statutory dues (including provident fund) not paid to the employees in terms of minimum wages act or other statutory rules and regulations in force in India shall be treated as breach of contract.

8. Other Obligations of Successful Bidder.

The responsibility of acquiring/hiring land required for drill sites, conducting 2D Seismic surveys and laying of profile lines etc. and other allied operations as well as payment of compensation to land owners shall be the responsibility of the Bidder.

Restriction: Sub-contracting of drilling shall not be permitted.

Terms and conditions:

1 Rate of the Contract:

1.1 The rate for payment of various works shall be as per accepted price bid which is reproduced below for reference and record:

Sl. No.	Item	Depth Range	Quantity(m)	Rate (In Rs.)	Total Cost (in Rs.)
1	Coring Drilling, Survey, Geological Logging, FGR, etc. (meter)	<600 m	16200	2420	5,44,07,650.00
		600-800m	4890	2541	
		800-1000m	960	2662	
		1000-1200m	80	2783	
2	Geophysical Logging (meter) with Dual Density, Caliper, Natural Gamma, SPR and Resistivity (16" and 64") parameters		22130	240	53,11,220.00
2a	Sonic Logging (meter)		22130	75	16,59,750.00
2b	Deviation logging (meter)		22130	25	5,53,250.00
2c	Resistivity Imaging (Line km)		140	96500	1,35,10,000.00
3	2D Seismic Survey (Line. km)		140	683000	9,56,20,000.00
TOTAL					17,10,61,850.00
Add GST @ 18%					3,07,91,133.00
TOTAL					20,18,52,983.00



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The above rates have been taken inclusive of GST as applicable on the last date of submission of the tender. You shall be required to submit regularly documents in support of payment of GST.

However, such duties, taxes, levies etc. which is notified after the last date of submission of tender and/or any increase over the rate existing on the last date of submission of tender shall be reimbursed by the CMPDI on production of documentary evidence in support of payment actually made to the concerned authorities. Any reduction of cost on account of Govt. notification for duties or levies shall be recovered from the bills submitted by the Tenderer.

1.2. The above rate shall remain firm & final for the period stipulated for completion of the work, except the escalation/de-escalation on account of increase/ decrease in the price of POL as per provision given at sl.no. 1.3, 1.4 & 1.5 (only POL component), apart from that the other provisions of ADDITIONAL TERMS & CONDITIONS of GTC will also be applicable.

1.3 Performance Security/Security Deposit is Rs.74,42,054.00/- in accordance with Clause 41 of NIT & 4.2 of General Terms & Conditions of the tender document.

Paying Authority:

General Manager (Finance) of CMPDI, Ranchi shall be the paying authority for all purposes. You shall submit monthly bill in triplicate for the work carried out in accordance with the contract to the Project Manager. The Project Manager shall then arrange for certification of the meterage claimed in the bill(s) with reference to the measurements taken or to be taken or any other records relevant for the purpose and sent to PRCO for acceptance and forwarding it to the paying authority for checking and payment. The payment will become due and payable by CMPDI within 30 days from the date of receipt of bill/invoice/ debit note by CMPDI.

Payment shall be made only to the account mentioned in the mandate form as given below.

Account Number	50100256457412
Bank Name	HDFC BANK Ltd.
Branch Code	HDFC0000044

I. Payment on account shall be made on the Project Manager certifying the quantity for which the contractor is considered entitled by way of interim payment for the work executed as covered by the bill after deducting the amount already paid, if any, the security deposit and such other amounts as may be deductible or recoverable in terms of the contract.

The advance payment, if any and 5% towards retention money shall be recovered by adjustment from on A/c bills of the contractor. The payment excluding advance payment, if any and retention money shall be made based on the quantum of job executed by the contractor and accepted by the CMPDI during the month only when the logs of all the boreholes drilled/QC data of Seismic surveys and other surface surveys (if any) as specified in the approved work programme, conducted during the month are received by CMPDI with the monthly progress report

II. Any certificate given by the Project Manager/PRCO for the purpose of payment of monthly bill/bills shall not have itself be conclusive evidence that any work to which it relates is in accordance with the contract and may be modified or corrected by the Project Manager/PRCO by any subsequent certificate or by the final certificate.

III. The Company reserve the right to recover/enforce recovery of any overpayments detected after payment as a result of post-payment audit or technical examination or by any other means, notwithstanding the fact that the amount of disputed claims, if any, of the contractor exceeds the amount of such overpayment and irrespective of the facts whether such disputed claims of the contractor are the subject matter of arbitration or not. The amount of such overpayments may be recovered from the subsequent bills under the contract, failing that from contractor's claim under any other contract with the company or from the contractor's security deposit or the contractor shall pay the amount of overpayment on demand.

IV. Amount payable/ repayable for any subsequent change in the Goods and Services Tax (GST) will be made to/ from the Contractors after departmental verification of such changes of tax law issued by Statutory authority.



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Settlement of disputes/claims:

Settlement of disputes/claims are followed in accordance to the procedures mentioned in NIT

Delay in execution of work:

Delay in execution of work on account of Force Majeure or other reasons shall be dealt in accordance to provision of clause 6.0 (and its sub-clauses) of GTC.

भवदीय.

[Signature]
13/11/2020

महाप्रबन्धक (गवेषण)



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प्रतिलिपि :-		Note:
1	अध्यक्ष सह प्रबंध निदेशक, सी.एम.पी.डी.आई, राँची को सादर सूचनार्थ।	Approval for issuing the order is obtained on 26/10/2020 and BC for the year 2020-21 for Rs. 4,89,34,056.49/- (Rupee Four crore Eighty nine lakh Thirty Four Thousand Fifty Six and Forty nine paisa only) is obtained vide No.R/4012/158/1 dt.27/10/2020 (E-258209)
2	निदेशक (तकनीकी/सी.आर.डी), सी.एम.पी.डी.आई, राँची को सादर सूचनार्थ।	
3	मुख्य सतर्कता पदाधिकारी, सी.एम.पी.डी.आई, राँची को सादर सूचनार्थ।	
4	महाप्रबन्धक (वित्त), सी.एम.पी.डी.आई, राँची।	
5	महाप्रबन्धक (कार्मिक एवं प्रशासन), सी.एम.पी.डी.आई, राँची।	
6	क्षेत्रीय निदेशक, सी.एम.पी.डी.आई क्षेत्र- V, बिलासपुर।	
7	विभागाध्यक्ष (गवेषण), सी.एम.पी.डी.आई क्षेत्र- V, बिलासपुर।	
8	महाप्रबन्धक (CMC), सी.एम.पी.डी.आई, राँची। - <i>for uploading in website</i>	
9	महाप्रबन्धक (भू-विज्ञान), सी.एम.पी.डी.आई, राँची।	
10	श्री राजीव कुमार सिंह, मुख्य प्रबंधक (भू- विज्ञान), सी.एम.पी.डी.आई, राँची।	
11	मुख्य प्रबंधक (भू-भौतकी), सी.एम.पी.डी.आई, राँची।	
12	कम्पनी सचिव, सी.एम.पी.डी.आई, राँची।	