

CLARIFICATION#5 AGAINST TENDER # PROC-SERVICES/CB/EXPL-4939/2021- HIRING OF SERVICES FOR 3D SEISMIC UNCONVENTIONAL RESERVOIR CHARACTERIZATION STUDY FOR IDENTIFICATION OF THE SWEET SPOTS IN LOWER INDUS BASIN OF PAKISTAN

Following Clarifications have been made in the subject tender.

| S. No. | Clarifications | OGDCL Reply |
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| 1 | Acquisition Patch/Parameters - This will help determine the anisotropic measurements that are available. | Station and Receiver Interval: 50 meter, Station line Interval: 250 meter, Receiver line Interval: 300 meter, No. of lines: 10, Channel per line: 60, Fold: 30 |
| 2 | Seismic Vintage - year acquired, year processed and companies that did the work | OGDCL Seismic Party has acquired data in 2000 which was recently reprocessed in 2018. |
| 3 | Seismic Source - dynamite or vibroseis? | Dynamite |
| 4 | Data Sample - an image or segy file of the data? | SEG-Y Format |
| 5 | Any information regarding the legacy processing flow utilized (amplitude scaling, etc.) | Seismic processing report will be provided. |
| 6 | As per clauses 3 & 4 of Annexure IIIA, Rock physics feasibility for reservoir characterization & Turnaround Time for reservoir characterization, Please clarify the total turnaround time is either three (03) months or Six (06) Months? | The total turnaround time for 3D Seismic Reservoir Characterization study is Six (06) months which include three (03) months for Rock Physics feasibility. |
| 7 | 6 wells drilled to Jurassic @ 4000m Does this include the horizontal wellbore or is this the depth to the zone of interest (ZOI) below the surface? | This include the six (06) vertical wells drilled down to depth of 4000 m below the surface. |
| 8 | 150 sq. km. of 3D seismic, Does this cover the entire field including the edge of the producing structure? What are the acquisition parameters of the seismic (source: dynamite or vibroseis?) Cable or nodal receivers? Shot interval and receiver interval spacing? What is the frequency spectrum of the seismic data within the Zone of interest? | Source: Dynamite Station and Receiver Interval: 50 meter, Station line Interval: 250 meter, Receiver line Interval: 300 meter, No. of lines: 10, Channel per line:60, Fold: 30 Prominent Frequency in the zone of interest is 15 Hz. |
| 9 | Cretaceous shale reservoir from 1000- | Thickness of Cretaceous shale reservoir is |

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| | 3000ms, What is the thickness of the zone of interest (ZOI) in meters? | approximately 600 m. |
| 10 | Extensional basin, normal faults, How extensive is the faulting? Currently how many faults have been mapped in the zone and area of interest? | The extension of the faults are from cretaceous to Paleocene and two major faults have been mapped in the area. |
| 11 | Final PSTM CDP-gathers w/ NMO and velocity volume in SEG-Y, What is the quality of the seismic data? Will we have a chance to view one cross-line and one in-line to get an idea of the image quality in the zone of interest? Are there an Near, Mid and Far Angle stacks, as well as Azimuthal Angle Gathers Can we see an example of one line from each of these volumes? | The seismic data quality is fair to good. Each and everything will be provided after the award of contract. |
| 12 | There needs to be sufficient offsets (>40degrees) to make rock properties – especially critical for density estimates and any brittleness predictions. Can the client provide an azimuthal spider plot for the gathers color coded with maximum offset? Or equivalent plot to convey the information requested. | Azimuth information is not available, however offset of source and receiver will be provided. |
| 13 | The stratigraphic chart provided in the TOR shows Indus Fan sandstone or Flysch above the Chiltan. In the AOI, what is above the Chiltan? Is there only sandstone or Flysche above the Chiltan? Do any Gypsum, Anhydrite, or Volcanics exist above the Chiltan or are they strictly contained within the Cambrian and PreCambrian sequence as indicated in the Stratigraphy of Pakistan plot? Are there any coal sequencies in the overlying intervals above the Chiltan? | The AOI lies in Lower Indus basin, the Cretaceous Formation (Sembar) is deposited above the Chiltan. Semabr is mainly consist of shale. Volcanic are deposited at K-T boundary. Gypsum, Coal and Anhydrite may occur occasionally above the Chiltan but not in the Sembar. |
| 14 | 6 Wells are listed in the Area of Interest (AOI) and covered by the 3D seismic. What are the logging suites in these wells? How much of the Zone of Interest (ZOI) are covered by these logging suites? How much of the vertical and/or horizontal sections are covered by image logs? What types of image logs are available? FMI, UBI and have they been processed? What logs are taken in the horizontal section of the wells? What is the general stimulation pattern utilized? | Conventional log suit (GR, Density, Neutron, Sonic, and Resistivity) of all wells. Complete log suits are available in the zone of interest. Image log is available in the zone of interest in 03 to 04 wells. FMI processed logs are available. N.A N.A |

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| 15 | <p>Core, What is the extent of core taken in the wells? What routine and special core analyses have been performed? Has there been rock physical properties conducted on the core to calibrate the dynamic elastic properties calculated from logs and seismic? What geochemistry data are available from the wellbores and/or producing wells? Are the data obtained only from the ZOI, or has the geochemical data been collected from comingled producing intervals? Have the core been described and detailed facies calibrated to core properties</p> | <p>Nine (09) meter cores at different depth intervals of Four wells are available Yes, routine and special core have been performed. Elastic rock properties have been conducted and are required to be calibrated with dynamic and seismic.</p> <p>TOC, Rock eval pyrolysis and Vitrinite reflectance data are available.</p> <p>In the zone of interest.</p> <p>Some of the cores have been studied and their correlation with core properties will be available.</p> |
| 16 | <p>Item 6.5 states: The data obtained from any new drilled well during the study period will be provided to the Consultant to refine their work for a concrete recommendation. How many additional wells are expected to be drilled prior to the end of the project and will there be core data be available? If yes, how much and does the consultant need to wait for these core data to be integrated into the analyses?</p> | <p>One or two wells may be drilled. Core data may be provided within stipulated time of the contact.</p> |
| 17 | <p>Item 4.6 states: The contractor must provide schedule for CLIENT professional in the project for QC purpose and skill transfer. CLIENT professionals (at least 02 professionals at each stage as per Annexure-III, Cat. No. 7) will participate at mentioned stages at contractor's premises within Pakistan or outside the Pakistan. CLIENT will bear all such costs and however, bidder will provide the invitation letter for visa facilitation purpose. Any delay due to visa, air tickets etc. will, however, be accommodated by the contractor. With three phases to the project, can the contractor expect 6 people for professional development? Or will some stay for multiple phases?</p> | <p>Yes, As per TOR para/n 4.6 at least 02 professional for each stage and some may stay for multiple phases.</p> |
| 18 | <p>Item 5.3 states: All payments will be made against accrual verified invoices upon completion of the project. Is the client open to payments monthly or end of a given feasibility phase? Will the CLIENT reimburse the contractor for expenses accrued for the data collection trip or</p> | <p>All payment will be made upon the completion of the project.</p> <p>As per TOR para/N 6.2, the contractor visit OGDCL office for data collection with no cost.</p> |

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| | will they need to wait until the completion of the project? | |
| 19 | List of OH Logs available (Both Basic & Advanced Logs) | Complete log suit (GR, Density, Neutron, Sonic, Resistivity) of six (06) wells are available. |
| 20 | If available, advanced OH Logs (CMR, ECS, Lithoscanner, ADT. etc.) are they already processed? | Two or three wells have advance logs (CMR, Lithoscanner etc.) are available and already processed. |
| 21 | Is OGDCL going to share already performed petrophysical analysis? | As per TOR para 3.1.5 petrophysical analysis is required. |
| 22 | Are there any cores available across cretaceous shale formation? If yes, upon how many wells and what are the analysis performed on them? | Yes, cores are available in Cretaceous shale in three to Four wells and core analysis (XRD, XRF, Porosity, Permeability, Geochemistry etc.) are available. |
| 23 | Do we have cuttings description/analysis available across cretaceous shale formation? | Yes, cutting description /analysis in Cretaceous Shale have available. |
| 24 | How many wells have basic sonic data available? | All six wells have basic sonic data. |
| 25 | How many wells have dipole sonic data available? If yes, is that processed? Do we have advanced analysis (2D, 3D anisotropy etc.) available? | Three or four wells have dipole sonic and it is processed. Advance analysis (2D, 3D anisotropy etc.) of two or three wells have available. |