OIL & GAS DEVELOPMENT COMPANY LIMITED

TENDER ENQUIRY NO. PROC-SERVICES/CB/EXPL-4641/2020

HIRING OF SERVICES FOR INTEGRATED STRUCTURAL GEOLOGICAL (2D&3D) MODELING, GEOMECHANICAL MODELING AND BASIN & PETROLEUM SYSTEM MODELING STUDY OF NASHPA BLOCK

Note:

Bid bond of **USD 12,000/- (US Dollar Twelve Thousand Only)** to be submitted with the technical bid. Please see tender documents for further detail.

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

TERMS OF REFERENCE (TOR)

For

HIRING OF SERVICES FOR INTEGRATED STRUCTURAL GEOLOGICAL (2D&3D) MODELING, GEOMECHANICAL MODELING AND BASIN & PETROLEUM SYSTEM MODELING STUDY OF NASHPA BLOCK.

Oil & Gas Development Company Limited, Pakistan

(OGDCL)

ANNEXURE"A"

1. Introduction

Oil & Gas Development Company Limited (OGDCL) is the national Oil & Gas Company of Pakistan and a prime body of the country's E&P sector. The Company is the local market leader in terms of exploration, services, development, reserves, production and acreage. The Company is listed on the London Stock Exchange since December 06, 2006 and hence susceptible to international investment environment. The Company is confronting the challenges of a volatile E&P industry and the aggressive exploration program, it is necessary to be equipped with latest technology and research work with modern tools. To expedite the exploration activities the OGDCL invites well reputed and interested bidders to submit quotations for the services of Structural Geological Modeling (2D & 3D), Geomechanical Modeling along with Basin & Petroleum System Modeling of Nashpa block, as outlined in these terms of reference.

Nashpa Block located in Karak District of KPK province is a joint venture of OGDCL (65%), PPL (30%), and GHPL (5%), OGDCL serving as the operator. Nashpa Gas Processing & LPG Extraction Plant has a daily production of 90 MMscfd sales gas, 350 Mton LPG and 18000 bbl oil.

2. Objective

A comprehensive study & evaluation is required for Nashpa block fully exploration, exploitation and development. The study mainly focus on structural geological modeling (2D & 3D), which will be develop by integration of surface & sub surface G&G data i.e. integrating & interpreting existing seismic data (2D/3D), structural models (2D/3D) development, restoration, validation, balancing & justification of the models as per tectonic evaluation of the area. The study will include cross-section construction, 2D/3D model building, kinematic restoration and validation, geomechanical model building, rock's fractures analysis, stress analysis, fault seal analysis, sediment modeling, reservoir simulation, basin modeling and petroleum system modeling.

3. Scope of Work and Technical Features (Detailed Technical Evaluation Criteria)

3.1 The following are main objectives of Nashpa block outsource project;

A. Structural Geological Modeling (2D/3D):

3.1.1 To build geometrically consistent and balanced structural geological models in 2D & 3D space along selected transects, first to perform advance seismic structural interpretation (Horizon & Fault interpretation along with validation,

QC & mapping), analyze, integrate & re-visit existing interpretation of different vintages of available 2D/3D seismic data in Nashpa block in time domain, well to seismic tie, preparation of velocity models and time to depth conversions. (Note: The horizons may include primary & secondary targets of Nashpa block i.e. Top Eocene carbonates, Top Eocene Evaporites, Top Panoba/ Patala shale's, Top Lockhart, Top Cretaceous (Lumshiwal Formation), Top Jurassic (Samanasuk, Datta and Shinawari Formation), Top Triassic (Mianwali / Tredian / Kingriali), Permian (Amb / Wargal) along with possible deeper horizons and basement.)

3.1.2 To test, validate and improve seismic interpretation by using the modeling tools (Geometric and kinematic restoration and forward modelling).

3.1.3 To identify the pitfalls of seismic data during interpretation, which can be misinterpreted as a geological features.

3.1.4 To identify exploration challenges during seismic interpretation due to compressional cum transpressional & salt tectonic activities.

3.1.5 To integrate available wells core and image log datasets with seismic interpretation to help constrain complex fault geometries.

3.1.6 To address the seismic quality both in thrust & sub-thrust sheets, which may impact on modelling of the compressional cum transpressional & salt related structures (folds & faults) and the internal deformation on sub-seismic scale.

3.1.7 To finally build geometrically consistent and balanced geological structural models in 2D & 3D space along defined transects.

3.1.8 To develop digital field maps of different horizons of Nashpa block.

3.1.9 To restore/balance structural models in order to identify chronology of structures, structural style, sequence of thrusting, and the amount of shortening.

3.1.10 To determine the timing, geometry and kinematics of trap formation, fault movement and salt tectonics.

3.1.11 To understand the history of deformation & structuration, which involved the considerable salt tectonics, compression and/or transpression.

3.1.12 To validate geological structural models along geoseismic transects developed on final seismic interpretations analog with surface geology, borehole data (Conventional logs & image logs) and Landsat data across the tectonically active region then conduct restoration/balancing along each geo-seismic transects with multiple scenarios and produce final most appropriate geologically viable & geometrically admissible balanced structural cross-sections and elaborate 2D/3D kinematics.

3.1.13 To address the salt tectonics & structural evolution due to salt involvement, which turns out to be crucial to identify regional structural trends and its impact on basin & petroleum system modeling in the block.

3.1.14 To validate, restore & balance the models associated with salt movement deformation.

3.1.15 To understand the role of evaporites, lateral & vertical stratigraphic changes and their impact on deformational style and structural architecture.

3.1.16 To identify key signatures on seismic data for prediction of Eocene evaporites (Bahadur Khel salt, Jatta Gypsum), Panoba/Patala shales and Paleocene/Eocene Carbonates in the block.

3.1.17 To conduct 2D/3D kinematic modelling including restoration and forward modeling, and assessment of timing for critical geological events i.e. deformation through time in 2D/3D environment using seismic & image log data.

3.1.18 To use kinematic algorithms for restoration and forward modelling including block restoration, flexural slip, simple shear unfolding, simple shear, trishear, fault parallel flow and fault bend fold move-on-fault including sedimentation and erosion events, Jigsaw restoration and trishear move-on-fault model deformation associated with propagating fault tip. Contractor may decide most suitable any other kinematic algorithm for this purpose.

3.1.19 To interactively define fault displacement, shear angle, regional level, fault position, propagation angle, trishear angle, sediment deposition and erosions during forward modelling.

3.1.20 To identify different kind of structural deformation style in the Nashpa i.e. pure compressional, transpressional and inversion.

3.1.21 To explain the syn & post depositional deformation, structuration and trapping through time.

3.1.22 To determine the detachments levels and describe the genetic mechanisms of detachment system in the block area.

3.1.23 To develop cross section modeling, numerical simulation and 3D visualization of relationship between rock mechanical properties, structural deformation style vs. structural growth process to analyze the complicated structures in foreland thrust belts.

3.1.24 To identify the total shortening for each formation due to compressional / transpressional / rifting phase tectonics and also mention the restored / deformed length of individual horizons of Nashpa field.

3.1.25 To identify all the majors and minor faults timing and the resulted displacement in the developed models.

3.1.26 To develop accurate fault trajectories, calculate depth to detachment & detachment lithology's. The depth to detachment to be calculated using two separate methodologies; the area and bed length balance technique (White et al., 1986; Mitra, 1993), and the constant – slip technique (Williams and Vann, 1987).To identify the positions of objective reservoirs at faults and find out the effects of major and minor faults on production.

3.1.27 To address the limitations of workflow for restoration/balancing, modelling, its uncertainty and the quantification of its implications on the results.

B. <u>Geomechanical Modeling:</u>

3.1.28 To develop a series of geomechanical models after valid structural geological models development for the predication of multiscales fractures & stress analysis.

3.1.29 To develop multi 1D & 3D geomechanical earth model (MEM) using 2D/3D seismic data along with wells data for distribution of different mechanical properties of different rocks, stress & strain analysis and fracture predication.

3.1.30 The geomechanical model should develop for different horizons by incorporating standard and laboratory rock mechanical properties such as Young Modulus, Poisson ration, elasticity etc. along with available seismic & wells data.

3.1.31 The geomechanical models should elaborate the understanding of log-term reservoirs behavior, optimize fracturing and increase reservoir productivity and recovery in Nashpa area.

3.1.32 The geomechanics models elaborate stress distribution at the time of fracturing using the available reservoirs structure data such as faults, fractures and folds.

3.1.33 To identify the rock properties and the tectonic setting that can be characterized by stress or strain magnitude and orientation.

3.1.34 To analysis stress field and direction of min, intermediate & max stress, strain and fault response modelling.

3.1.35 To calculate and capture stress & strain on surfaces and volumes for further fracture Modelling.

3.1.36 To carry out fracture analysis and fracture network prediction on developed geometric and/or kinematic models.

3.1.37 To model fracture network (i.e. orientation, location, and spatial density) with the help of calculated stress fields, perturbed by the main structures, combined with rock failure criteria.

3.1.38 To predict fracture density, strains, orientations and failure modes associated with the mapped structural interpretation.

3.1.39 The geomechanical models should also investigate the long term effects such as compaction and subsidence in the Nashpa area.

3.1.40 To Identify different pore pressure regimes in the block area using geomechanical models.

3.1.41 To develop 3D mud weight cubes for the entire block.

3.1.42 To review and explain drilling problems and borehole stability issues encountered in wells of Nashpa block and provide recommendation to reduce these problems in future on the basis of these developed geomechanical models.

3.1.43 To evaluate geomechanics models for already drilled wells in project area to address the drilling complications in different pressure regimes regarding well trajectory design and safe mud weight windows with respect to stress/strain directions and fractures distribution.

3.1.44 To provide recommendations and identify zones for future Exploratory/ appraisal/development wells in Nashpa block keeping in view the structural geological modeling & geomechanical modeling.

3.1.45 To elaborate the points in series of geomechanical models in order to reduce uncertainties, refine seismic interpretations, and to understand fracture characteristics in order to improved reservoir characterization for future wells in Nashpa block.

3.1.46 To perform fault seal analysis and reactivation risking on developed structural geological models for Nashpa objective zones.

3.1.47 To perform fault seal analysis on the final 3D structural model, perform detail analysis of sealing capability and risk associated with each major and minor faults incorporated/validated 3D structural model and also analyze SGR data for Nashpa.

3.1.48 To generate robust property model; which would allow for the creation of shale gauge ratio, effective shale gouge ratio diagrams and column height predictions in the targeted zones of Nashpa.

3.1.49 To address the fault seal analysis techniques to quantify the seal characteristics of faults for the Nashpa block exploration and production enhancement.

3.1.50 To perform Nashpa dry hole analysis and to identify new potential lead/prospect, a reliable fault seal model will be construct to understand the sealing capacity and risk of major thrust, back-thrust and strike slip faults and their impact regarding compartmentalization/reservoirs deterioration in the lead/prospect areas of Nashpa block.

3.1.51 To model reservoir structure, volumetric and compartmentalization in Nashpa block.

3.1.52 To develop 3D structural framework, Facies, petrophysical and discrete fracture network model of Nashpa Block.

3.1.53 To measure objective horizons areas and volumes using the 3D models analysis for quick validation and estimate reservoir volumetric of conventional & fractured reservoirs in Nashpa block.

3.1.54 To develope geo-cellular model for reservoir simulation in Nashpa block in order to estimate the field performance for present and future HC extraction.

3.1.55 To identify the fault properties for reservoir simulation in Nashpa block.

3.1.56 To identify the role of small & major faults and fractures on fluid flow in Nashpa area.

3.1.57 Identify any fresh water intrusion during evaluation of the structuration if any in the block.

C. <u>Basin & Petroleum System Modeling:</u>

3.1.58 To address basin and petroleum system modeling to tracks the evolution of this complex tectonic regime through time as it fills with fluids and sediments that may eventually generate hydrocarbon.

3.1.59 To address the basin dynamics related to regional tectonic process.

3.1.60 To establish basin configuration and existence of working petroleum system in the block i.e. source, reservoirs, seal, charging and entrapment to identify hydrocarbon prospects and mitigate risk for drilling exploration wells.

3.1.61 To reconstruct palaeobathymetry and depositional models.

3.1.62 To build 2D basin model using reliable depth converted seismic lines covering burial, maturation, generation and migration from the lead/prospect to the nearby local and regional kitchens.

3.1.63 To explain the basin architecture through time utilizing (back stripping techniques) physical compaction, isostatic and thermal subsidence effects.

3.1.64 To find out the basement if possible on seismic sections as per resolution in order to determine total thickness of the sedimentary wedge above the basement and

also locate the decollement horizons, determine basement slope, which is important for consideration of mechanics and determine the role of basement structures and their effect on thrusting.

3.1.65 To investigate the influence of multi-level detachment structural system on oil and gas entrapment.

3.1.66 To identify Kitchen, burial history, timing of source, reservoir, seal and trap development relative to HC generation and migration.

3.1.67 To evaluate distinct source units, maturity (VR) and transformation ratio (TR), its distribution and volume potential to generate hydrocarbon.

3.1.68 To assess the time of maturation/expulsion, migration pathways, predicted hydrocarbon phases and possible effect of uplift/erosion on hydrocarbon generation, entrapment and preservation.

3.1.69 To interpret/explain/ verify the trap integrity of each structure and possible structural trap in the block.

3.1.70 To describe the structural controls on the petroleum systems, such as the effects of thrusting on pressure and hydrocarbon generation, dynamic structure-related migration pathways, and the general impact of deformation and also seal integrity by analyzing simulated stresses through geologic time.

3.1.71 To quantify the preserved hydrocarbon column in the identified leads/prospects in the Nashpa area.

3.1.72 To identify the best structural leads for future wells and associated risk/recommendation.

3.1.73 To identify risk assessment and uncertainties for viable structural and stratigraphic leads/prospects in Nashpa field.

3.2 Bidders/Venders Capabilities

3.2.1 It shall be examined the following points in details, that whether the services offered by the bidders/vendor's comply with the technical objectives mentioned above. The following technical features/criteria of the bidders/vendor's detailed specifications will be compared with the bidder's expertise & past projects delivered, which will be submitted with the bid. The services provider must have;

3.2.2 Experience of working on projects including Structural Geological Modeling, Geomechanical modeling, Basin & Petroleum system modeling on petroleum exploration blocks for E&P companies (The bidders/vendor's must provide the details of some projects with bid submission).

3.2.3 Expertise in advanced seismic structural interpretation, validation & QC, fault seal & reactivation risking, framework & cellular model building, transmissibility modelling, geomechanical fracture prediction.

3.2.4 Expertise in integrating G&G data of the exploration blocks and regions to perform seismic interpretation in complex tectonic zone, facilitate/revise the existing seismic interpretations, 2D&3D structural model building, kinematic restorations & validations, rock's fractures, stress analysis, fault seal analysis, reservoir simulation, basin & petroleum system modeling.

3.2.5 Ability to build structural model, validate, balance, restore and analyses structural cross-sections at a local and regional scale including salt & mud diapirisms through geological time.

3.2.6 Ability to perform backwards and forwards modeling through time and assess the timing of critical geological events especially in complex tectonic regime.

3.2.7 Ability to re-construct faults, fault trajectories, depth to detachment evaluation for complex tectonic zones.

3.2.8 Ability to model development for complex zones and determining deformation rates, the geometric and evolutionary feasibility of area on the basis of model, areas of geological uncertainty and constrain the system evolution.

3.2.9 Ability to model ductile deformation associated with a propagating fault tip in complex tectonic zone.

3.2.10 Ability to measure horizon areas and volumes in 3D models to estimate reservoir volumes, sweet spots and to optimize oil volumes in exploration blocks.

3.2.11 To have experience of modeling various fracture types, including those due to exhumation, thermal contraction, compaction and tectonic deformation.

3.2.12 Ability to characterize fracture networks by carrying out quantitative analysis with volumetric and directional outputs for reservoir simulation.

3.2.13 Having experience to carry out predictive stratigraphic modeling on present-day and palaeo-bathymetric surfaces with reservoir quality map and 3D surface outputs.

3.2.14 Having the experience in projects to achieve a best fit to well data and relevant seismic attribute data, generate stacked flows to reduce uncertainty surrounding lateral reservoir connectivity and stratal stacking patterns.

3.2.15 Experience to assess interaction between tectonics and sedimentation, quantitative analysis of grain size distribution and net-to-gross.

3.2.16 Ability to perform basin modeling and find out de-compaction, effects of rock volume, porosity loss/gain with burial and uplift blocks restoration/validation.

3.2.17 Experience to generate diagram and map of faults throws, heaves and slips along with generation of the geomechanical models for fracture predication, stress/strain analysis, fault seal analysis, reservoir simulation, sediment modeling.

4. Deliverable & Reports (Hard & Soft data)

On the completion of outsource project of Nashpa Field the bidder/vendors should provide the complete suits of Final Reports (FR) along with tables, enclosures, maps, figures (hard & soft copy), along with following chapters with deliverable's i.e. ;

4.1 <u>Structure Geological Modeling</u>:

4.1.1 All interpreted/revised seismic lines, balance & restore structural geological models enclosure/figures/maps along all selected transects with tables showing shortening/extension, all data used & analyzed during interpretation/conversions and model building/restoring i.e. acoustic impedance, VP/VS, density cubes in SEG-Y format, time-depth relations for

well to seismic tie analysis, edited and simulated well logs, calculated rock physical properties curves and maps.

4.2 <u>Geomechanical Modeling</u>:

4.2.1 Deliverables of Geomechanical earth modeling will include, geo-mechanical models (1D, 2D, 3D in designated software formats).

4.2.2 The bidder/vendor must provide all target horizons (Thrust & sub-thrust sheets) continuous fracture models (CFM), fracture distribution maps.

4.2.3 The comparison maps/tables/enclosures of Model fractures forecast with the actual drilling results (FMI) and Cores data.

4.2.4 The tables of all mechanical properties of rocks used in modeling for different horizons (Carbonates & Clastics).

4.2.5 Maps showing the Visualization of the connectivity analysis for different horizons from the continuous fracture models (CFM).

4.2.6 Comparison maps of the fracture indicators (in wells) with various fracture drivers and seismic attributes in the Nashpa block.

4.2.7 Provision of 3D cubes/ maps/ profiles of pore pressure, fracture gradient, safe mud weight windows, minimum and maximum stress directions and magnitudes along with reports and recommendations.

4.3 **<u>Basin & Petroleum System Modeling:</u>**

4.3.1 The basin & petroleum system modeling deliverable should include final report (FR) along with tables, enclosures & maps covering all topics along with following chapters and illustrations:

4.3.1.1 Regional tectonics.

4.3.1.2 Plot of stratigraphic input with lithology definition.

4.3.1.3 Tabulation of events.

4.3.1.4 Burial history curve with overlays of vitrinite, isotherms, maturation and expulsion level.

4.3.1.5 Heat flow model (Geothermal gradient and Paleo-heat flow model) with tabulation of vitrinite reflectance and temperature calibration data.

4.3.1.6 Timing of generation, expulsion, migration and accumulation of hydrocarbon with illustrations.

4.3.1.7 Charge mechanism, migration routes, quantity and hydrocarbon type of each reservoir.

4.3.1.8 Expulsion rate and gas oil ratio with its composition.

4.3.1.9 Transformation ratio with illustration.

4.3.1.10 Trap infill estimation.

4.3.1.11 Effects of biodegradation in petroleum system model.

4.3.1.12 Graphically demonstration of:

4.3.1.13 Calculated vitrinite reflectance, temperature against depth and Time (m.y).

4.3.1.14 Heat flow history models, trends [mW/m2] through time and structuration.

4.3.1.15 Maturity model / history.

4.3.1.16 Thermal maturity calibration of the models.

4.3.1.17 Effective stress and overpressure distribution at present day and through time.

4.3.1.18 Petroleum systems events chart.

4.3.1.19 Maps to explain:

4.3.1.20 Migration pathways delineation

4.3.1.21 Temperature / Geothermal

4.3.1.22 Facies distribution of source, reservoir and seal rock(s).

4.3.1.23 Paleo time / depth structure maps in relation to timing of hydrocarbon charging, migration pathways delineation and possible barriers in migration.

5. Validation and Acceptance of Project Work/Completion

5.1 Once the project is completed, OGDCL professionals shall have the opportunity to validate/examine the bidders/vendors performance to determine whether it functions in accordance with the technical objectives sets in term of references (TOR).

6. Delivery/Handover of Project reports, models and process data

6.1 All reports regarding project (hard & soft copy) shall be delivered/handover from vender/contractor destination to OGDCL designated destination in Islamabad by vender/contractor own responsibility.

6.2 Five (05) sets (Hard & soft along with editable formats (Shape files, ASCII, Las, SEG-Y, grids etc.) of final reports (FR), tables, enclosures, maps & figures at the completion of project must be submitted by the bidder/vendor.

6.3 Project models data shall be provided by the contractor compatible with 2D&3D structural / geological modeling software's (Petrel, Decision Space & StructureSolver/T7/Flex DECOPM).

6.4 During the course of study, a weekly video conference (VC) will be held to update on the progress of project along with submission of fortnightly reports.

7. Presentation on project achievement at the end

7.1 Once the project completed and all objectives were achieved, a detailed presentation at contractor research work must deliver to client concern representative at contractor or client office, before dispatch of final report and data and then after delivery/handover of project materials/outputs/reports a brief presentation must be given to OGDCL higher management and joint venture (JV) partners by the Bidder/Vendor representative at the OGDCL head office Blue Area, Islamabad.

7.2 The contractor or his authorized person shall ensure that the project should address all the questions, which will be raised by the management & partners.

8. Project Completion Time frame

The delivery and implementation of the project is time sensitive. It is expected that the contractor be able to complete the project in every aspect (G&G data analysis, Validation, Model Building, Restoration/Balancing etc.) within 240 calendar days (08 months) from the day of tender award.

9. Technical Documents and Instructions

Technical documents shall be supplied by the bidder/vender to OGDCL in English Language and safe/standard media.

10. Warranty

10.1 The contractor shall warrant that the project data is confidential and not to be provide to any other company.

10.2 The contractor shall be solely responsible for confidentiality, loss or damage of data due to any reason including fire, theft of any documents/cartridges/soft copies and other important documents/CDs etc. pertaining to the contract, while in their custody or control.

10.3 Neither the contractor is liable to reproduce the same data for any other business reasons other than specified by the Client.

10.4 The provided data should be returned to OGDCL once the project completed.

10.5 The contractor shall warrant that the project data/outputs provided to OGDCL shall (1) contain no hidden files, (2) not replicate (3) not alter, damage, or erase any date.

10.6 The CD's on which the soft copy of the project dataset and outputs is provided shall be free of defects.

11. Supervision of professionals regarding project technical workflow

11.1 Each time three (03) OGDCL professionals & 01 representative from each JV partner shall be participating in the project main center of the contractor.

11.2 Supervision/observation during the project should be two (02) weeks for three (03) times (Start, Mid, End) during the project duration involving workflow familiarization and project progress with experts of contractor.

11.3 Contractor will take all necessary measures regarding visas (invitation letters & residence booking etc.) and shall courier to the OGDCL Head Office in Islamabad from abroad. Any delay in the departure of OGDCL professionals due to visa/tickets problems would have to be accommodated by the Contractor in their project plan.

11.4 Contractor shall provide office space, computers, internet facility and international telephone/fax facilities to the OGDCL visiting professionals

11.5 Traveling expenses (air tickets) regarding the visit of OGDCL geoscientists to the contractor's offices shall be responsibility of the OGDCL.

11.6 Expenses during supervision/guidance period, boarding, and lodging of OGDCL geoscientists shall be responsibility of the OGDCL.

12. Payment Schedule

12.1 Payment will be made after completion of the project in every aspect i.e. after acceptance of the project results/outputs.

12.2 Payment for project will be made against verified invoices after delivery of services, based on the rates quoted in the respected bid.

12.3 Prices must be quoted inclusive of all taxes, duties, courier charges and levy etc. except provincial sales tax/ICT tax on services where applicable will be borne by OGDCL on actual.

12.4 Any additional job require to be done during the project for improvement of results/objectives will be with mutual consent of company & contractor, without affecting the cost of the project.

13. Bid Evaluation

All bids/proposals shall be evaluated technically and financially. Technical proposal shall be reviewed first to determine its technical responsiveness and conformity with the requirement of TOR. After completion of Technical Evaluation, the Financial Proposal of only the technically responsive / qualified bidder(s) shall be opened and evaluated. The bids requiring substantial modifications to make it responsive shall be rejected out rightly.

13.1 Technical Evaluation

13.1.1 The technical evaluation shall be based on the specifications mention under the heading of "**Scope of Work & Technical Features**" of this document.

13.1.2 Below are the **"criteria"** to short list the bidders for technical evaluation. Bidders fulfilling the **"criteria"** shall be considered eligible for technical evaluation. Overall 100 points have been assigned for qualifying criteria for the bidder (s) to be short listed. The qualifying points are 70% in total and 60% in each category. The bidder (s) obtaining less than 70% points in total and less than 60% points in each category shall be out rightly rejected. All bidders are requested to submit their bid considering the evaluation and short listing criterion.

No.	Qualifying Criteria for Short Listing	Maximum allocated points
1	**Firm/Vender experience in related field** • > 20 years 40 points • 15-20 years 30-40 points • < 15 years 20 points	40
2	**Number of Clients in E&P Sector** • > 15 clients 30 points • 10 – 15 clients 20-30 points • < 10 clients 15 points	30
3	**Project progress, completion, outputs, delivery and related data in time frame** • Within 180 calendar days 30 points • 180-240 calendar days 30-20 points • > 240 calendar days 15 points	30

13.2 Financial Evaluation

13.2.1 Financial evaluation shall be carried out on total lump sum project cost basis.

13.2.2 The tender will be awarded to the technically responsive bidder offering the lowest financial bid.

Financial Bid Format

Rates for present study shall be provided as per given table;

S. No	Items	Price (US$)
1	Structural Geological Modeling (2D/3D) of Nashpa Block (Seismic Interpretation, Validation/QC, Models building, Restoration/Balancing)	
2	Geomechanical model (1D/3D), estimation of geomechanical properties, calibration of models, pore pressure and fracture pressure gradient/ safe mud weight window cubes generation,, Fracture Prediction and Stress & Strain Analysis, Fault seal analysis, reservoir simulation etc.	
3	Basin & Petroleum System Modeling, Dry hole Analysis, Structural trap analysis of new prospects, Conclusions, Recommendations etc.	
Lump Sum Cost (1+2+3) including all applicable taxes etc. except PST/ICT on services in Pakistan		

Terms & Conditions

13.2.3 The bidders should submit the profile of firm/company, details on technical staff, list of major clients and details on similar projects related to E&P Sector completed.

13.2.4 In case of authorized dealer, partner, etc., Certificate of the principle/manufacturer for Pakistan must be provided.

13.2.5 The bidders should submit the detailed workflow of the company past experience and nature/types of projects, which they have execute in the past along with workflow.

13.2.6 The bidders should submit one of the project delivered in the past covering all topics mention above in TOR.

13.2.7 The bidders should provide the details on how effective technical services and support shall be provided.

13.2.8 The contractor shall allocate a dedicated team for OGDCL project. At the time of award of contract the contractor shall ensure to provide professionals of same level on which they have been awarded the contract.

13.2.9 OGDCL shall not be held liable for any expenses incurred with the preparation or submittal of the proposals or any subsequent discussion and / or negotiations.

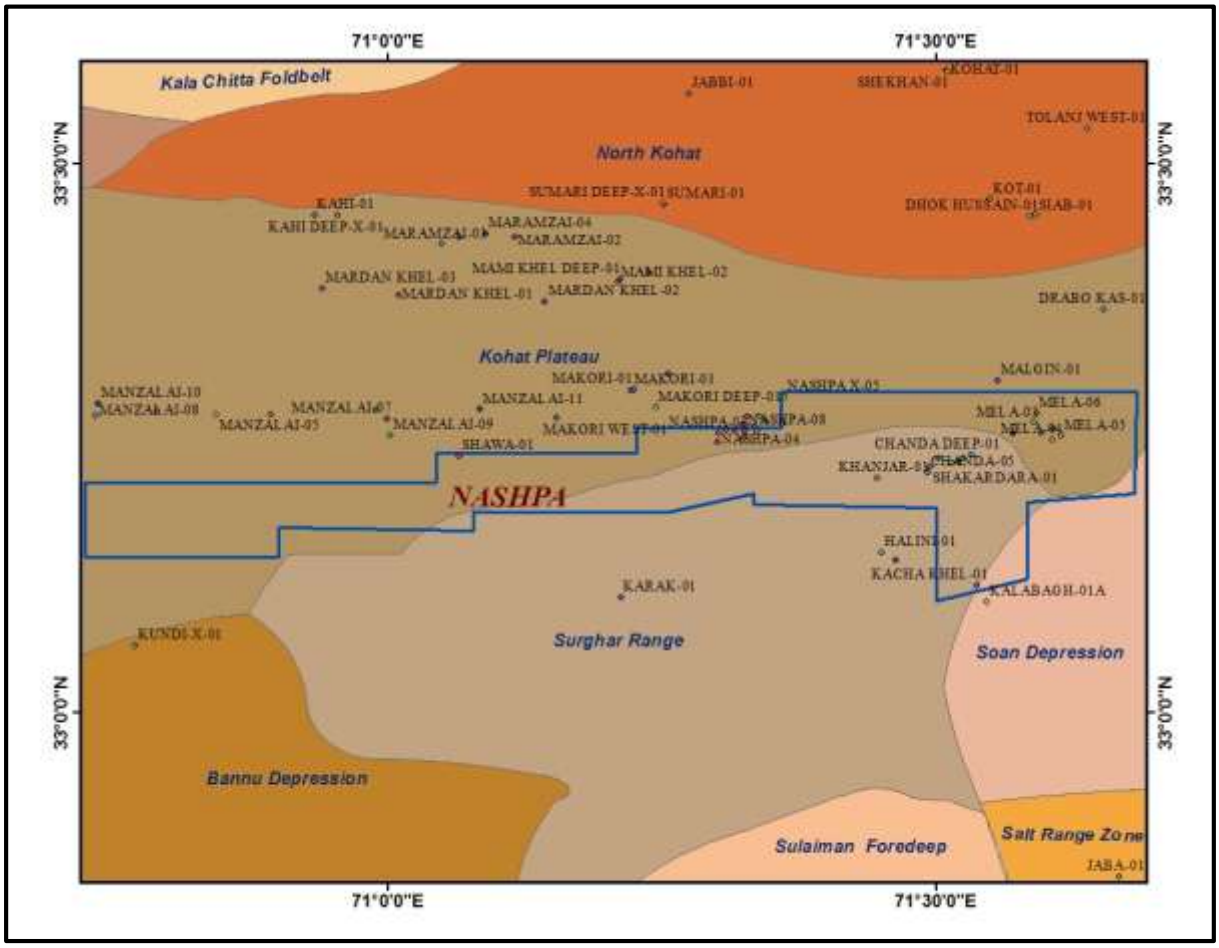
13.2.10 The contractor should mention the project execution centre.

13.2.11 The contractor must have workable schedule and turnaround time for completion of the project.

13.2.12 The bidders should submit project schedule in the form of Gantt chart.

13.2.13 The contractor must provide schedule for the participation of professionals.

13.2.14 If the contractor may not be able to complete the project with in designated time frame then **10%** penalty will be charged from total project cost.



LOCATION MAP OF NASHPA BLOCK

DATA SET AVAILABLE IN NASHPA BLOCK FOR PRESENT STUDY:-

MELA –CHANDA 3D SEISMIC DATA (PSTM/ PSDM)	518 SQ.KMS
NASHPA 3D SEISMIC DATA (PSTM/ PSDM)	215 SQ.KMS
NASHPA 2D SEISMIC DATA	1198 L.KMS
NASHPA WEST 2D SEISMIC DATA	195 L.KMS
VERTICAL SEISMIC PROFILES	AVAILABLE IN EXPLORATORY & APPARAISAL WELLS
FORMATION TOPS/ IMAGE AND CONVENTIONAL WELL LOGS/ PARTIAL CORE DATA	AVAILABLE IN 27 WELLS
GEOLOGICAL MAPS	GEOLOGICAL MAP OF NASHPA E.L & ADJACENT BLOCKS ARE AVAILABLE