OIL & GAS DEVELOPMENT COMPANY LIMITED
REQUEST FOR QUOTATION
(SERVICES)

OGDCL House, Jinnah Avenue, Islamabad Pakistan

Description: 1D Mechanical Earth Modelling and Borehole Stability Study of Gurgalot X-01 Well.

RFQ No.: PROC-SERVICES/CB/EXPL-6400000103/2022

Services Required For: Gurgalot X-01 Well

Bidding Procedure: Single Stage Two Envelope

Evaluation Criteria: Full Consignment Basis

Tax: All applicable Taxes except ICT/PCT

Bid Validity: 180 days from Technical bid opening

Bid Bond Amount: USD 300/-

Bid Bond Validity: 210 days from Technical bid opening

Duration of Contract/ Completion Period: Three (03) Months

Payment Terms: Payment will be made after completion of the project

Item No.	Description	Unit	Total Price (USD)
10	1D MEM & Borehole Stability Study of Gurgalot X-01	Lump Sum	

TERM OF REFERENCE

FOR

# 1D MECHANICAL EARTH MODELLING AND BORE HOLE STABILITY STUDY OF GURGALOT # X-01 WELL (GURGALOT E.L)

1. **Introduction**

   Gurgalot Block located in Kohat District of Khyber Pakhtunkhwa province is a joint venture of OGDCL (75%), POL (20%), and GHPL (5%), OGDCL serving as the operator. Kohat basin is currently a main focus for exploration activities of OGDCL with operating different exploration licenses.

   OGDCL drilled three wells in Gurgalot Block i.e. Drabokas-01, Khawaja-01, and Surqamar-01. While drilling in Khawaja-01, severe downhole complications were encountered and 05 side tracks drilled but reservoir could not be penetrated/ evaluated. In Drabokas-01, due to BK Salt and repetition of Eocene strata, reservoir could not be encountered. In Surqamar-01 despite severe downhole complication, Lockhart was encountered but due to severe losses, testing couldn't be concluded.

   The area lies in one of the most tectonically active regions of the world, where tectonic forces have severely deformed the strata under high stresses that resulted in complex geology and sub-surface structures. The drilling through these complexities is a challenging job. During drilling, wireline logging and production testing in reservoirs sections as well as drilling in non-reservoir sections various complications are encountered; which include salt creeping in Bahadur Khel salt, clay & shale swelling/sloughing and pipe sticking in Kuldana/Panoba/Patala Formation, gains in sandstones of Murree/Kamlial Formation, losses in fractured limestone of Kohat/Lockhart Limestone, differentially pipe stick in Datta Sandstones and wash outs in different formations. Due to these down hole problems, the drilling proves to be uneconomical and time consuming.

   Prior information of rock strength, pore pressures and stress directions can help to minimize the drilling risks. The Mechanical Earth Modeling (MEM) and borehole stability studies can help to understand regional stresses, rock strengths prediction of pore pressures which ultimately be used to precisely design the wells, casing shoe setting depths, suitable BHA design, bit selection, mud type & parameters and hydraulic optimization. As a result, the drilling practices can be improved in accordance with the recommendations of these studies, which will save lot of money and time.
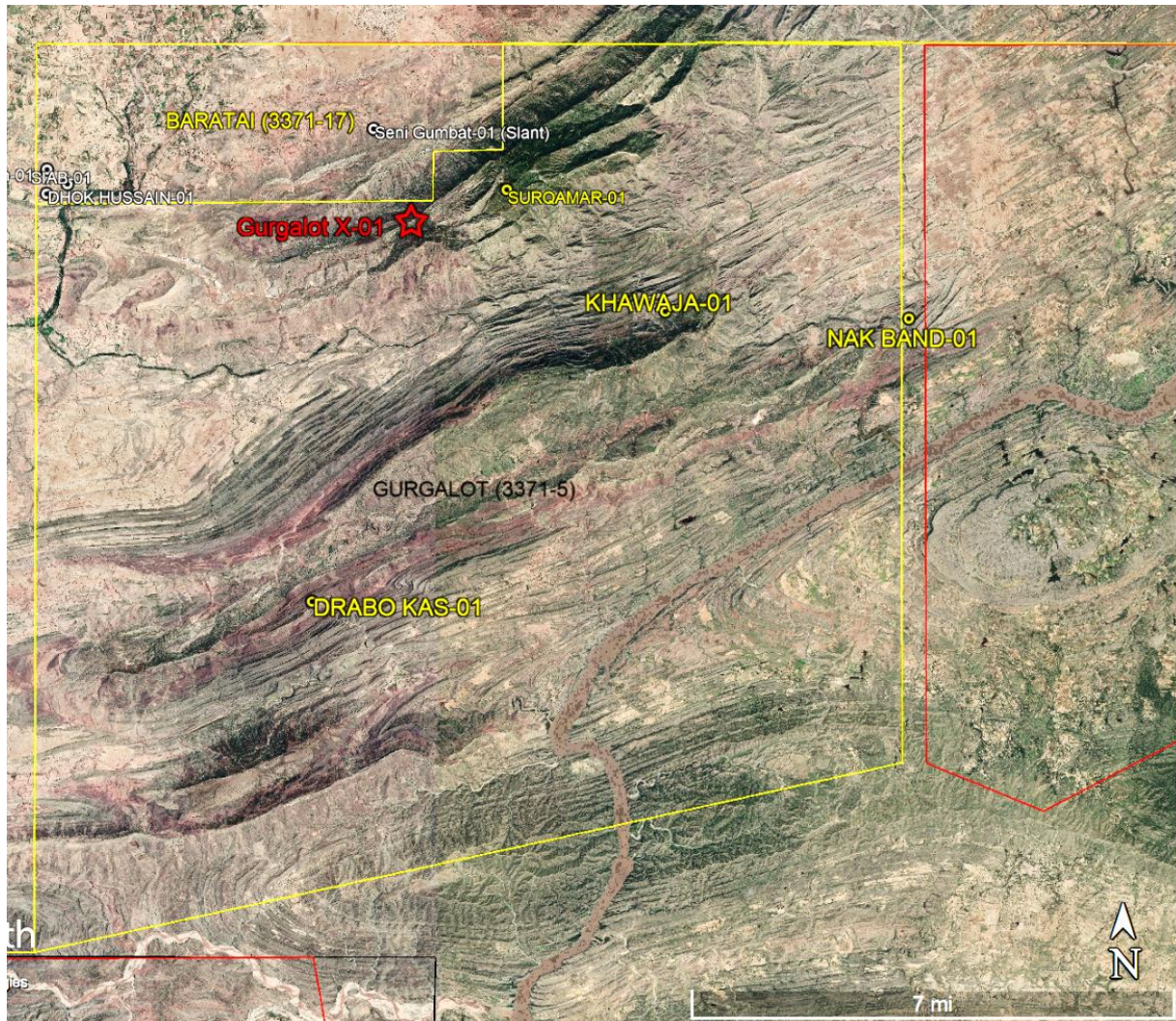
2. Objective

A comprehensive multi 1D geo-mechanical study (Mechanical Earth Modeling) is required in order to prepare a well design for the future wells to be drilled in Gurgalot Block.

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

The main objectives of multi 1D MEM study of Gurgalot block includes;

Evaluate and scrutinize available data of offset wells and summarize drilling problems encountered, perform data quality control.

3.1 To develop geo-mechanical models of offset wells for the evaluation and predication of geo-mechanical properties and stress analysis.

3.2 To develop multi 1D geo-mechanical earth model (MEM) using seismic data along with wells data for distribution of different mechanical properties of different rocks, stress & strain analysis.

3.3 Calculation of overburden pressure gradient, pore pressure gradient, fracture gradient and shear failure pressure gradient versus depth.

3.4 Calculation of minimum and maximum horizontal stress direction and magnitude using available datasets i.e. wireline / image logs etc.

3.5 Calculate and calibrate rock properties using available datasets including rock failures, image logs, caliper logs, drilling data.

3.6 To carry out well bore stability analysis in offset wells to explain drilling complications including pipe sticking, mud losses/gains, salt creeping, shale instability and caving etc.

3.7 To prepare a report on offsets wells showing drilling problems, along with suggestions for improvement.

3.8 The geo-mechanical model should be developed for different horizons by incorporating standard and laboratory rock mechanical properties such as Young's Modulus, Poisson's ratio and elasticity etc. along with available seismic & wells data.

3.9 To identify different pore pressure regimes in the block using geo-mechanical models.

3.10 To review and explain drilling problems and borehole stability issues faced in the earlier drilled wells of Gurgalot block and provide recommendation to reduce these problems in future on the basis of these developed geo-mechanical models.

3.11 To evaluate geo-mechanics 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.

    3.11.1 To prepare and recommend safe mud weight windows, casing design and casing shoes setting depths, drilling trajectory for proposed well.

    3.11.2 To provide / define different formation pressure regimes for proposed wells.

    3.11.3 To provide trajectory analysis of new proposed well.

    3.11.4 To elaborate the potential drilling risks along with suitable recommendations for mitigating the risks for drilling of future wells in the block.

4. Bidders/Venders Capabilities

It shall be examined in details that whether the services offered by the bidders/vendor's comply with the technical objectives mentioned above which will be compared with the bidder's expertise & past projects delivered, that will be submitted with the bid.

5. Deliverables

5.1 Deliverables of Geo-mechanical earth modeling will include, geo-mechanical models (Multi 1D, in designated software formats).

    5.1.1 The tables of all mechanical properties of rocks calculated in study.

    5.1.2 Provision of profiles of pore pressure, fracture gradient, safe mud weight windows, minimum and maximum stress directions and magnitudes along with reports and recommendations.

    5.1.3 All the digital data must be provided in DVD / CD in soft form.

Presentation and final report with complete workflow, data QC, analysis, findings, conclusion and recommendations.

6. Technical Evaluation

The technical evaluation shall be based on the specifications mention under the heading of "Scope of Work & Technical Features" of this document. Below are the "criteria" for

technical evaluation. Overall 100 points have been assigned for qualifying criteria. The qualifying points are 70% total in all tabulated description below. The bidder(s) obtaining less than 70% points shall be out rightly rejected. All bidders are advised to submit their bids considering the evaluation criterion.

	Technical Evaluation Criteria		
Sr No.	Description	Qualifying Criteria	Max Points
1	Company projects in relevant studies/MEM in highly deformed fold & thrust belts including salt tectonics	**No. of relevant projects completed in last 10 years** 07 or more than 07 Projects = 35 Points 05 to 06 Projects = 25 – 30 Points 02 to 04 Projects = 10 – 20 Points Less than 02 Projects = 00 Point	35
2	Company experience in relevant studies/MEM in highly deformed fold & thrust belts including salt tectonics	12 or more than 12 years of relevant experience = 18 Points 07 – 11 years of relevant experience = 10.5 – 16.5 Points Less than 07 years of relevant experience = 00 Point	18
3	Company having worldwide centers	05 or more than 05 centers = 05 Points 03 – 04 centers = 03 – 04 Points 01 – 02 centers = 00 Point	05
4	Software/ Module Version used for MEM study. List of all the available software/module must be provided.	Latest available = 05 Points 01 – 02 Years old = 04 – 02 Points More than 02 years old = 00 Point	05
5	Professional Experience (team lead) in relevant field/MEM studies of highly deformed fold and thrust belts including salt tectonics (CVs of professionals must be provided)	12 or more than 12 years of experience = 18 Points 08 – 11 years of experience = 12 – 16.5 Points 05 – 07 years of experience = 7.5 – 10.5 Points Less than 05 years of experience = 00 Point	18
6	Number of the professionals having more than 07 years' experience in relevant fields/MEM studies of highly deformed fold and thrust belts involving salt tectonics.	03 or more than 03 professionals = 09 Points 01 – 02 professionals = 03 – 06 Points Zero professional = 00 Point	09
7	Time to complete the study (from the date of complete data handing over and confirmation by contractor)	Within 90 Days = 10 Points 90 - 120 days = 06 Points More than 120 days = 00 Point	10
		Total Points	**100**

7. **Financial Evaluation:**

Financial Evaluation shall be carried out on Full consignment basis. The amount will be paid after successful completion of the project.

8. **Performance Bank Guarantee**

5% of the contract value will be submitted by the successful bidder as Performance Bank Guarantee.

(This clause will prevail instead of tender documents clauses of PBG to the extent of 5% PBG instead of 10% PBG only).