

MTSS and CC Function

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**TECHNICAL ASSIGNMENT FOR THE PROCUREMENT
OF THE TURNKEY SLIM HOLE EXPLORATIONAL
WELLS DRILLING SERVICE**

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TECHNICAL ASSIGNMENT FOR THE PROCUREMENT OF THE TURNKEY SLIM HOLE EXPLORATIONAL WELLS DRILLING SERVICE

1.1. OBJECTIVE OF THE TECHNICAL ASSIGNMENT

The objective of the Technical Assignment is the contracting of a company specialized in the drilling of slim hole explorational wells. The contractor has to be certified according to ISO.

1.2. GENERAL INFORMATION

Table 1. The name of the reservoir and the number and type of wells.

Reservoir Name	Number of wells	Well Type	Layer Pressure Bar	Layer Temperature °C	Well Number
Pc	1	vertical	hydrostatic	61	3X
Pc	1	vertical	hydrostatic	65	4X
Mpl	1	vertical	hydrostatic	57	2B
Mpl	1	vertical	hydrostatic	66	2A
Ca	1	vertical	hydrostatic	50	16

- Date of Service Set-Off: 01.10.2016.

- If this deadline cannot be met, a new set-off date should be proposed.

Table 2. Project configurations

a) 3X

No.	Bit Diameter, mm	String Diameter, mm	Casing mm	Vertical Depth, m	Drilling Method	Mud Type
1	215,9	114,3	168,3	20	Rotary / wire line	polymer
2	146	114,3 / 88,9	139,7	500	Rotary / wire line	polymer
3	125,7 / 122,7	114,3 / 88,9	114,3	1000	Rotary / wire line	polymer

b) 4X

No.	Bit Diameter, mm	String Diameter, mm	Casing mm	Vertical Depth, m	Drilling Method	Mud Type
1	215,9	114,3	168,3	20	Rotary / wire line	polymer
2	146	114,3 / 88,9	139,7	500	Rotary / wire line	polymer
3	125,7 / 122,7	114,3 / 88,9	114,3	1080	Rotary / wire line	polymer

c) 2B

No.	Bit Diameter, mm	String Diameter, mm	Casing mm	Vertical Depth, m	Drilling Method	Mud Type
1	215,9	114,3	168,3	25	Rotary / wire line	polymer
2	146	114,3 / 88,9	139,7	500	Rotary / wire line	polymer
3	125,7 / 122,7	114,3 / 88,9	114,3	1100	Rotary / wire line	polymer

d) 2A

No.	Bit Diameter, mm	String Diameter, mm	Casing mm	Vertical Depth, m	Drilling Method	Mud Type
1	215,9	114,3	168,3	25	Rotary / wire line	polymer
2	146	114,3 / 88,9	139,7	500	Rotary / wire line	polymer
3	125,7 / 122,7	114,3 / 88,9	114,3	920	Rotary / wire line	polymer

e) 16

No.	Bit Diameter, mm	String Diameter, mm	Casing mm	Vertical Depth, m	Drilling Method	Mud Type
1	215,9	114,3	168,3	20	Rotary / wire line	polymer
2	146	114,3 / 88,9	139,7	450	Rotary / wire line	polymer
3	125,7 / 122,7	114,3 / 88,9	114,3	800	Rotary / wire line	polymer

1.3. EXPECTED LITHOGRAPHIC PROFILE OF THE RESERVOIR:

1.3.1. Lithographic profile of the 3X reservoir

Depth(m)	Lithological description	Stratigraphy
0-580	Alternation of sandy and marly clays, coaly clays, clayey to pure sands, loosely bonded sandstones with clayey and marly binder, containing quartz	Quaternary + Pliocene (Q+PI)
580-760	Marly and sandy clay, sand to loosely bonded sandstone, fine-grained, containing quartz, with marly binder	Upper Pontian (Pt2)
760-810	Marly clay, occasionally sandy, clayey and sandy marl	Lower Pontian (Pt1)
810-815	Sandstone, fine-grained, loosely bonded with carbonaceous binder	
815-910	Marlstone, sandy and alevrolitic	
910-925	Sandstone, fine-grained, loosely bonded with carbonaceous binder and sandy marlstone	
925-1000	Marlstone, sandy and alevrolitic, medium hard with rare interlayers of fine-grained sandstone	

1.3.2. Lithographic profile of the 4X reservoir

Depth (m)	Lithological description	Stratigraphy
0-570	Alternation of sandy and marly clays, coaly clays, clayey to pure sands, loosely bonded sandstones with clayey and marly binder, containing quartz	Quaternary + Pliocene (Q+PI)
570-750	Marly and sandy clay, sand to loosely bonded sandstone, fine-grained, containing quartz, with marly binder	Upper Pontian (Pt2)
750-1030	Marly clay, occasionally sandy, clayey and sandy marlstone which in the bottom transforms into marl with rare interlayers of fine-grained sandstones	Lower Pontian (Pt1)
1030-1050	Sandstone, fine-grained, loosely bonded with carbonaceous binder and sandy marlstone	
1050-1080	Marl, sandy and alevrolitic, medium hard, with rare interlayers of fine-grained sandstones	

1.3.3. *Lithographic profile of the 2B reservoir*

Depth (m)	Lithological description	Stratigraphy
0-550	Alternation of sandy and coaly clays and sands, partially shaly	Quaternary+ Pliocene (Q+PI)
550-885	Clays, occasionally sandy with rare interlayers of clayey sand and loosely bonded fine-grained sandstone, with clayey binder	
885-895	Sandstone, fine-grained, crumbly, containing quartz and mica, with clayey binder	
895-920	Clays, occasionally sandy with rare interlayers of clayey sand and loosely bonded fine-grained sandstone, with clayey binder	

1.3.4. *Lithographic profile of the 2A reservoir*

Depth (m)	Lithological description	Stratigraphy
0-600	Alternation of sandy and coaly clays and sands, partially shaly	Quaternary+ Pliocene (Q+PI)
600-980	Clays, occasionally sandy with interlayers of loosely bonded fine-grained to alevrolitic sandstone, with clayey binder	
980-985	Sandstone, fine-grained, crumbly, containing quartz and mica, with clayey binder	Upper Pontian (Pt2)
985-1050	Clays, occasionally sandy with interlayers of loosely bonded fine-grained to alevrolitic sandstone, with clayey binder	
1050-1060	Sandstone, fine-grained, containing quartz and mica, loosed bonded with clayey and marly binder	
1060-1100	Alternation of clay and loosely bonded fine-grained to alevrolitic sandstone with clay and marly binder	

1.3.5. *Lithographic profile of the 16 reservoir*

Depth (m)	Lithological description	Stratigraphy
0-440	Alternating clay, sandy and coaly and sands, partially shaly	Quaternary+ Pliocene (Q+PI)
440-605	Alternation of sandy and alevrolitic clay and sands, fine-grained, partially shaly	Upper Pontian (Pt2)
605-700	Marl with interlayers of loosely bonded sandstone, moderately hard marl	Lower Pontian (Pt1)
700-710	Sandstone, fine-grained to alevrolitic, containing quartz and mica, crumbly, with carbonaceous binder	
710-740	Marl, moderately hard, partially sandy	
740-800	Marly limestones	Baden (Bd)

1.4. SERVICES

Services shall include the following activities:

- 1.4.1. Performing all operation according “Drilling program” (simplified mining project) SMP.
- 1.4.2. Mobilization of the drilling rig, drilling equipment and engaging the entire staff necessary for the project implementation.
- 1.4.3. Preparing and conditioning drilling mud according Drilling program. Mud materials must be according API 13A
- 1.4.4. Disposal of the mud and drill cuttings.
- 1.4.5. Moving between wells up to 150km

- 1.4.6. Providing casing according API 5CT
- 1.4.7. Providing float equipment according API
- 1.4.8. Providing X-mass three API 6A

1.5. READINESS FOR SERVICE PROVISION

The readiness for service provision includes:

- 1.5.1. Delivery of the drilling and staff equipment to the site
- 1.5.2. Rig up according the applicable rules.
- 1.5.3. The Contractor has provided the necessary equipment, spare parts and miscellaneous for the successful completion of the project.
- 1.5.4. The Contractor shall provide accommodation for the drilling staff and shall provide a sufficient number of units for servicing companies and Client representatives.
- 1.5.5. All necessary equipment for the communication between the Contractor's staff and the Contractor's and Client's offices should be in place;
- 1.5.6. The Contractor should provide sufficient materials for the preparation and maintenance of drilling mud and consumables on site.
- 1.5.7. The field drilling mud laboratory should be equipped according API 13B-1 and installed on the rig site.
- 1.5.8. The Contractor must be ready to provide all services for successful completion project according "Drilling program" (simplified mining project) SMP.
- 1.5.9. The Contractor must provide a sufficient quantity of adequate drilling bits. The type and quantity of bits should be agreed on with the Client's representative.
- 1.5.10. The Contractor should have working experience in drilling of oil and gas wells

1.6. CONTRACTOR'S EQUIPMENT REQUIREMENTS

- 1.6.1. Drilling rig load-bearing capacity - 25 t;
- 1.6.2. Equipment which can be used at temperatures between -40°C and +40°C.
- 1.6.3. At least two mud pumps, each with gradual capacity control switches
- 1.6.4. A mud pump distributor and surface collector (swivel, mud hose, pressure pipe, etc.) must be able to work at the operating pressure of 210 bar.
- 1.6.5. The BOP equipment with the operating pressure of 210 bar defined acc. to the API standard.
- 1.6.6. Minimum capacity of the mud system should be 15 m³ (mud reservoirs must have a sufficient number of mixers and a nozzle system). The mud system needs a functional TRIP TANK with a possibility of visual level control, a chemical tank with a vacuum funnel and water tanks with the minimum capacity of 10 m³.
- 1.6.7. The rig must have a vacuum funnel
- 1.6.8. The mud treatment system must have:
 - A suitable Poor boy.
 - At least two suitable shale shaker .
 - A suitable vacuum degasser.
- 1.6.9. Desander, desilter or the appropriate Mudcleaner.
- 1.6.10. All electric installations and electric equipment in explosion zone must be EX certified.
- 1.6.11. The complete treatment system MUST have a sufficient quantity of spare parts for uninterrupted operation.
- 1.6.12. The rig must have sound signalization (e.g. sirens).
- 1.6.13. The rig must be equipped with the necessary quantities of the following pipe tools:
 - Drill pipes OD 114,3 mm ID 101,6 mm #52,2 kg/3m
 - Drill pipes OD 88,9 mm ID 77,8 mm #34,15 kg/3m
- 1.6.14. A sufficient number of adequate bit subs.

- 1.6.15. The rig must have the necessary number and types of elevators with the sufficient capacity for the drilling tools.
- 1.6.16. The rig must have full handling tools in the rig floor (hand tools or hydraulically operated tools)
- 1.6.17. The rig must be equipped with BOP according API RP53 for 3M.

1.7. SERVICES PROVIDED ON THE CASING INSTALLATION, CEMENTING AND PRESSURE TESTS

The Contractor shall provide the following services:

- 1.7.1. The preparation of the program and calculations for the lowering of the string and their confirmation with the Client representative.
- 1.7.2. Preparation and confirmation Casing tally.
- 1.7.3. Running casing string according to the confirmed program with the Program Client.
- 1.7.4. Preparation cement job program and performing operation according cement program.
- 1.7.5. Indicators of the successful completion of work:
 - The cementing quality should be confirmed by EL methods:
 - Amplitude (mV) ≤ 10 , good;
 - Amplitude (mV) 10 - 27, partly good;
 - Amplitude (mV) 27 - 43, partial.
 - Amplitude (mV) 43 - 60, partly bad;
 - Amplitude (mV) ≥ 60 bad
- 1.7.6. In terms of the quality of the cement lining, 50 % of the measured interval in the well should meet the «Good» criterion (amplitude (mV) ≤ 10), and it is especially significant that this criterion is met in the reservoir zone and in the zones immediately above and below the reservoir in the length of 20 m for each zone, respectively. CBL measurements will be performed by the Client.
- 1.7.7. In terms of the quality of the cement lining, 50 % of the measured interval in the well should meet the «Partly Good» criterion (amplitude (mV) 10-27) and « partial » criterion (amplitude (mV) 27-43).
 - Achieving the designed levels of cement rising behind the string;
 - Tightness of the annular area;
 - No connection between the layers behind the string.
- 1.7.8. If the Success indicators do not comply with the above values, the Contractor shall agree on the further actions with the Client representative in order to achieve the desired results.
- 1.7.9. For payment will be used Scale of well cementing quality assessment.

1.8. WIRELINE LOGGING MEASUREMENT SERVICES

- 1.8.1. The Client shall provide electric logging measurement both in open hole and in the cased hole.
- 1.8.2. The Contractor obligation is to prepare and condition the well bore for safe logging operation.

1.9. MUD LOGGING-RELATED SERVICES

- 1.9.1. These services shall be performed by Client.
- 1.9.2. Contractor obligation is to enable following so Client Mud logging equipment can be connected to the rig and continuously working:
 - Continuous electric supply for the sensors and laboratory – 5 kW
 - Water for cuttings samples washing
 - Availability for mounting gas sensors on the flow line – flow line should be metal to support sensor weight.

- Place for the laboratory container dimension 8m X 2.5m

1.10. PERSONNEL

- Contractor's personnel must be fully equipped with safety clothes and complete personal must work according NIS HSE rules.
- Drilling brigade needs to be organized in order to perform safe and continuous work on the rig site.
- Drilling brigade needs to have valid certificates for well control IWCF/IADC and Medical certificate
All members of the drilling brigade must have at least 5 years of working experience.
- Contractor shall submit resumes of all personnel that are to provide services on Investor's facilities.
- Personnel for preparing a casing for installation:
 - Technician/engineer for execution of works;
 - Lead operator and operator with hydraulic pliers;
 - Personnel for preparing a column for installation must have at least 5 (five) years of working experience.
- Personnel for casing cementing:
 - Engineer and technical for execution of works;
 - Lead operator and operator of the cementing aggregate;
 - Lead operator and operator of the cementing aggregate if there is a mixer for homogenization;
 - Lead operator and operator on tanks and silos 2 or 3 depending on whether there are 2 or 3 tanks or work is done through silos;
 - Lead operator and operator of hydraulic pliers 2;
 - Assistant pump operator;
 - Personnel for preparing a column for installation must have at least 5 (five) years of working experience.
- Contractor's representative shall submit the documentation referring to the personnel (certificates, CVs, recommendations);
- After the inspection of the documentation related to the personnel and the conducted interviews, the Client shall be entitled to ask for a replacement of certain members of the personnel.

1.11. OTHER CONTRACTOR'S OBLIGATIONS

- Contractor shall provide adequate housing and meals for all the personnel who are employed on the realization of the project;
- Contractor shall supply all consumables necessary for project realization;
- Contractor shall provide the fuel necessary for project realization;
- Contractor shall provide well heads and X-mass tree 5 1/2" X 4 1/2" 2000 psi, according casing design and API standard (** Attachment)
- List of reports supplied by the Contractor:
 - During the making of the well, the contractor is obliged to provide all the necessary certificates, pursuant to NIS procedure, for review during inspection and commissioning of the tower;
 - Contractor shall send in the following reports on daily basis: Logistic report, Daily moving report (MOV), Daily drilling report (DDR), Daily mud report,
 - Report (with photos) on the operating of the bit after each bit replacement;
 - Report on the installation and cementation of casing

- Scheme of well heads (basic flange and blowout preventers)
- Contractor is obliged to secure a detailed work schedule and to coordinate it to the investor, prior to the start of works:
 - column cementation with the layout, type and number of centralizers
 - mud schedule for each phase
 - directional drilling schedule
 - detailed work schedule and coordination to the Client shall be defined additionally

1.12. LIST OF TECHNICAL DOCUMENTATION

As a part of the documentation, the Bidder shall deliver the following certificates, lists, schemes and test reports:

- Plant and equipment technical specification
- Fuel tank certificates
- Certificates for all pressure vessels
- Technical specifications of the automated system for monitoring and supervision of operations of the drilling equipment
- Description of the functional system of preventive maintenance
- List of available spare parts for the existing drill equipment
- Report on the testing of the drill set and the accompanying equipment by an independent authorized institution
- Manufacturer's certificates for the drill equipment
- Rig load capacity certificate
- BOP equipment certificates
- Reports on the last NDT test of the drilling equipment
- Test certificate for electrical equipment
- Resumes of personnel employed at the plant
- Copies of IWC of key personnel.
- Certificates on chemicals used for mud treatment and loss rehabilitation
- Bit passport

1.13. OBLIGATIONS OF THE CLIENT

- Supply of water to the site;
- Site construction and access roads based on the Site construction plan which is to be delivered by the selected contractor for executing drilling works;
- Making of the Simplified mining project for well drilling
- Permits for start of the project

Attachment:

ITEM	QTY	DESCRIPTION
5 SET WELLHEAD & X-MAS TREE ASSEMBLY, 5 1/2" X 4 1/2" X 2 3/8" x 2000 PSI W.P., PSL 1, PR 1, TEMPERATURE CLASS P, MATERIAL CLASS AA		
Section A: Casing Head Assembly, consisting of:		
1	1	Casing head housing 5 1/2" BTC, female threaded bottom x 7 1/16 x 2000 psi WP top flange, with 2 x 2" LP 2000 psi WP LP threaded side outlets
2	1	Slip & Top and Bottom seal assembly, 5 1/2" x 4 1/2" OD Casing
3	1	Gate Valve, 2 1/16" 2000 psi WP manual operated, with 2" LP threaded ends
4	1	Nipple, size 2" LP x 6" long
5	2	Bull Plug, 2" LP x 1/2" NPT female thread
6	1	Ring Gasket R45, Cadmium plated
7	1	Set of 12 Studs complete with 2 Nuts each, Zinc plated suitable for top flange of Casing Head
Section B: Tubing Spool Assembly, consisting of:		
8	1	Tubing Head Spool, 7 1/16" 2000 psi WP bottom flange x 5 1/8" 2000 psi WP top flange, with 2 x 2 1/16" 2000 psi WP studded side outlets completed with studs and nuts
9	2	Tubing Hanger Assembly, 2 3/8" API EUE top & 2 3/8" API NU bottom threads
10	2	Gate Valves, 2 1/16" 2000 psi WP manual operated, with flanged ends
11	1	Ring Gasket 41, Cadmium plated
12	2	Companion flange, size 2 1/16" 2000 psi WP x 2" LP thread
13	4	Ring Gasket 23, Cadmium plated
14	2	Bull Plug, 2" LP x 1/2" NPT female thread
Section C: X-Mas tree Assembly, consisting of:		
15	1	Tubing Adapter Assembly, 5 1/8" 2000 psi WP flanged bottom x 2 9/16" 2000 psi WP studded top completed with stud and nuts
16	3	Gate Valve, 2 9/16" 2000 psi WP manual operated, with flanged Ends
17	5	Ring Gasket R26, Cadmium plated
18	1	Cross, studded, four way, 2 9/16" x 2 1/16" 2000 psi WP completed with studs and nuts
19	2	Gate Valve, 2 1/16" 2000 psi WP manual operated, with flanged Ends
20	5	Ring Gasket R23, Cadmium plated
21	1	Companion flange, size 2 1/16" 2000 psi WP x 2" LP thread
22	1	Bull Plug, 2" LP x 1/2" NPT female thread
23	1	X-mas tree cap assembly, 2 9/16" 2000 psi WP flanged bottom with 2 3/8" OD EUE pickup thread
24	5	Set of 8 Studs with 2 Nuts for flange 2 1/16" x 2000psi
25	2	Set of 8 Studs with 2 Nuts for flange 2 9/16" x 2000psi
26	1	Set of Studs with 2 Nuts for flange 5 1/8" x 2000psi
27	5	Needle valves, angle, 1/2" NPT male x female 5000 psi WP

28	1	Needle valves, straight, 1/2" NPT male x female 5000 psi WP
29	1	Positive choke, 2 1/16" x 2000 psi WP, with flanged ends
Related equipment for wellheads per sets		
Pressure gauge for range 2000 psi with needle valve 1/2" NPT		5
Plastic injection gun		1
Gate valve 2 9/16" – 2000		2
Gate valve 2 1/16" – 2000		2
Back pressure valve		1
Plug for Tubing Hanger		1
Running & retrieval tool for Back pressure valve		1
Grease		10 kg
Top and Bottom Sealing elements for tubing hanger		4
Lockdown screw		3
Sealing elements for lockdown screw		10
Slip & Top and Bottom Seal Assembly 5 1/2" x 4 1/2" OD Casing		1