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TENDER BULLETIN 1

ENQUIRY NO: CTT26582

DESCRIPTION: F-O REDEVELOPMENT SUBSURFACE STUDY PROJECT – TO CONDUCT WELL AND RESERVOIR STUDIES FOR THE REDEVELOPMENT OF THE F-O GAS FIELD

QUESTION 1.

To drive optimum value and aid the decision-making process, SLB processes that the subsea element be considered as part of the scope for Phase 1.

ANSWER 1

We do not deem it necessary to add anything to Phase 1 scope. The subsea element is captured in the following Phase 1 work element:

- Develop a number of field development concepts, with associated high level cost estimates.
- In order to deliver reasonably representative cost estimates, we expect that the field development concepts will include, on a high level, the subsea infrastructure needed to tie-in the new wells. We assume that this step will include the use of reasonable assumptions that are appropriate for this phase of the study.

QUESTION 2

To further ensure that optimum value is derived from the planned scope of work in phase 2, SLB proposes that PETROSA includes Geomechanics as part of the scope of work.

ANSWER 2

Regarding geomechanics we request SLB to quantify what decision it would influence and what economic upside it could unlock.

QUESTION 3

Halliburton would respectfully request PetroSA to confirm whether we may submit a firm commercial proposal for Phase 1 only, with Phase 2 provided on a budgetary basis.

ANSWER 3

In accordance with PetroSA's Procurement processes and evaluation methodology, tenders must include firm commercial pricing for both Phase 1 and Phase 2. The bid evaluation will be conducted on the total cost of Phase 1 and Phase 2 combined.

QUESTION 4

Our understanding is that Phase 2 is optional and subject to the successful completion and approval of Phase 1. In view of this, we propose to firm up Phase 1 pricing at this stage, while providing an indicative budgetary estimate for Phase 2.

ANSWER 4

As the successful bidder for Phase 1 will also be required to execute Phase 2, it is essential that firm pricing be provided for both phases at this stage. This ensures a fair, transparent, and equitable evaluation process across all tenderers. Accordingly, PetroSA is unable to accept a submission where Phase 2 pricing is provided on a budgetary or indicative basis only.

QUESTION 5

What does the seismic dataset include, in terms of pre-stack, post-stack, seismic velocity cubes?

ANSWER 5

Seismic Dataset Description

The seismic dataset comprises both 2D and 3D seismic data, with vintages ranging from 1979 to 2012, including multiple reprocessed products. A summary is provided below:

3D Seismic Data:

1995 3D seismic cube (~347 km²), reprocessed in 2011.

Deliverables:

- 3D PSTM Raw Gathers
- 3D PSTM NMO Zero Phase Gathers
- PSTM Stack Near Angles
- PSTM Stack Mid Angles
- PSTM Stack Far Angles

- PSTM Full Offset Stack - No Post Proc
- PSTM Full Offset Stack - Post Proc
- PSTM Full Offset Stack - Post Proc + AGC
- PSTM Full Offset Stack - Post Proc + 1.5 x Multiplier Scalar
- VEL1: Raw PSTM Velocity Field (ASCII)
- VEL2: Final PSTM Velocity Field (ASCII)
- VEL3: Stacking PSTM Velocity Field (ASCII)
- VEL4: Final Stacking PSTM Velocity Field (SEG-Y) – 2nd order Continuous velocities
- VEL5: Final Stacking PSTM Velocity Field (SEG-Y) – ETA Continuous velocities

2012 3D seismic cube (~662 km²) acquired using WesternGeco over/under acquisition technology for enhanced bandwidth and resolution.

Deliverables:
- Raw PSTM CMP gathers (no NMO)
- PSTM NMO applied CMP gathers 3) Kirchhoff PSTM stacks, Raw (Near, Mid, Far & Full)
- Kirchhoff PSTM stacks, Post Stack Processing (Near, Mid, Far)
- Interpretation stack (Full)
- Interpretation stack (Full) AGC
- Interpretation stack (Full) AGC [Converted to WGS84 Coordinate system]
- Picked 500x500 m velocities in ASCII (Essov2petrel and charisma VL_D for 3D, VG_B for 2D) and SEGY formats
- Final Migration ETA Field ASCII (ESSOv2petrel and charisma VL_D for 3D,VG_B for 2D) and SEGY formats
- Final Stacking Velocity Field ASCII (EssoV2petrel and Charisma VL_D for 3D, VG_B for 2D) and SEGY formats
- Picked 500x500 m velocities after WGS84 conversion in SEGY format
- Final stacking velocity field after WGS84 conversion in SEGY format.

2012 3D cube reprocessed in 2020.

Deliverables:
- Raw Full Stack
- Raw 00 to 15 degree Stack
- Raw 10 to 15 degree Stack
- Raw 20 to 35 degree Stack
- Raw 30 to 45 degree Stack
- Final Full Stack
- Final 00 to 15degree Stack
- Final 10 to 25 degree Stack
- Final 20 to 35 degree Stack
- Final 30 to 45 degree Stack
- 3D NMO CMP Gathers
- Unsmoothed migration interval velocity picks (1x1 km)
- SCVA stacking velocity picks (250 x 250 m)

- Smoothed migration interval velocity field
- SCVA RMS stacking velocity field
- ETA interval velocity field
- HMULT Final full stack
- HMULT Final 00 to 15 degree angle Stack
- Additional seismic data:
- 2D Seismic Data
- Multiple 2D surveys acquired between 1979 and 1993, tied to several wells in the F-O field.
- The most recent vintage is the F-O 2D 2012 dataset.

QUESTION 6

Is the dataset suitable for seismic elastic inversion, or only post-stack inversion is applicable?

ANSWER 6

Based on previous internal and contractor studies, the seismic dataset is suitable for seismic elastic inversion. PetroSA has successfully performed inversion workflows on similar or identical vintages.
The seismic inversion was completed prior to drilling in 2012, so we want to redo it using the latest inversion workflows to improve subsurface lithology and pore-fluid predictions.

PetroSA Example Studies

• 2D Simultaneous PP AVO Inversion F-O Field, Bredasdorp Basin (WesternGeco Geosolution, 2012)

• 3D Simultaneous AVO Inversion and Lithology Prediction F-O Field, Block 9 (WesternGeco Geosolution)

QUESTION 7

No reference is made in the scope document about velocity modelling and depth conversion. Is this part of the technical tasks for Phase 2?

ANSWER 7

Velocity Modelling and Depth Conversion

PetroSA has confirmed that the existing velocity model is accepted and sufficient for ongoing and upcoming technical studies. No additional velocity work is planned under this phase 1 unless it is later deemed necessary

QUESTION 8

Is dynamic model calibration to historical production data (History Matching) part of the scope for Phase 2?

ANSWER 8

Yes, it's part of phase 2. If a new static model is built/updated then that will require calibration to production data viz, History matching of production data and ideally well test results as well

QUESTION 9

No explicit mention of a geomechanical study in the scope. Are pore and fracture pressures (in tabular format as function of TVD), and geothermal gradient part of the initial dataset that will be shared by PetroSA, for well design?

ANSWER 9

Relevant well data will be included in the Phase 1 dataset where available. This includes pore pressure information derived from pressure measurements and drilling experience, as well as fracture pressure indicators from leak-off / formation integrity tests and geothermal gradient data from existing wells.

QUESTION 10

Available geomechanical study (and related input data) for hydraulic fracturing: is this part of the initial dataset that will be shared by PetroSA?

ANSWER 10

Several geomechanical and wellbore stability studies were conducted during the initial development phase of the F-O field, including Mechanical Earth Model (MEM) work and fracture design studies prepared for earlier development concepts. These reports can be shared as part of the Phase 1 dataset for background reference.

However, these studies were prepared for earlier development scenarios and should therefore be regarded as historical reference material. Any updated geomechanical evaluation required to support detailed well design or hydraulic fracturing would typically form part of future project stages.

QUESTION 11

Is there any Material Balance or P/Z model available for review as part of the initial dataset to be shared by PetroSA, or should it be considered as part of the technical scope for Phase 2?

ANSWER 11

Material balance / P/Z models

Material balance models have previously been developed for the three producing

wells. These models are simplified representations in which each well is connected to a relatively small local tank that communicates with a larger surrounding volume through limited transmissibility.
The models can be shared as part of the Phase 1 dataset. However, they should be considered screening-level tools, as the matches are non-unique and rely on simplified assumptions regarding connected volumes and transmissibility within the reservoir.

QUESTION 12

Could the Company please confirm whether any 1D or 3D geomechanical studies have previously been conducted in the field? If so, please confirm whether the associated data and results will be made available to the bidder as part of the project data package.

ANSWER 12

Several geomechanical studies were conducted during earlier phases of evaluation and development planning for the F-O field. These include 1D Mechanical Earth Model (MEM) work based on log and core data, as well as field-scale 3D geomechanical modelling undertaken using the VISAGE geomechanics simulator in support of earlier dynamic simulation and hydraulic fracture design studies.
Relevant reports and associated supporting information will be included in the Phase 1 dataset where available. This includes, where available, pore pressure information derived from pressure measurements and drilling experience, fracture pressure indicators from leak-off / formation integrity tests and mini-frac data, geothermal gradient data from existing wells, and historical geomechanical and fracture-related studies.
However, these studies were undertaken in the context of earlier development concepts and with a more limited well dataset, and should therefore be regarded as historical reference material only. Bidders should satisfy themselves as to the applicability of any such historical studies to the redevelopment concepts they propose.
Any updated geomechanical evaluation required to support revised well designs, stimulation concepts, or detailed redevelopment planning would typically form part of future project stages.

QUESTION 13

Beyond the final presentation, report, and results, could you please clarify the expected format of the dynamic model at the end of the study? Specifically, should the model be built and delivered in Eclipse, or is a Nexus project acceptable as the final deliverable?

ANSWER 13

Contractors may conduct the study and provide deliverables using the simulation platform of their choice. However, they need to advise in their tender submission if and how the final model can be imported or converted to Eclipse