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Integrated 2D Seismic Survey for PSC TL-OT-21-17

INVITATION FOR BID

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Signature				

Table of Contents

Table of Contents	2
PART I – SELECTION PROCEDURES AND REQUIREMENTS	9
SECTION 1 – INVITATION LETTER.....	9
SECTION 2 – INSTRUCTION TO BIDDERS AND DATA SHEET	10
GENERAL PROVISIONS.....	10
Definitions	10
Introduction.....	11
Eligibility	11
PREPARATION OF PROPOSAL	12
General Consideration.....	12
Cost for Preparation of Proposal.....	12
Language	12
Confidentiality Agreement and Acknowledgement Letter	12
Only One Proposal	14
Proposal Validity.....	14
Clarification and Amendment of IFB	15
Technical Proposal Format and Content.....	16
Commercial Proposal Format and Content.....	16
Local Content Proposal Format and Content.....	17
SUBMISSION, OPENING AND EVALUATION.....	18
Submission and Marking of Proposals.....	18
Confidentiality.....	18
Opening of Technical Proposals	19

Proposals Evaluation.....	19
Evaluation of Technical Proposals.....	20
Opening of Commercial Proposals	20
Evaluation of Commercial Proposals	20
NEGOTIATIONS AND AWARD.....	21
Negotiation	21
Award of Contract.....	21
DATA SHEET	22
SECTION 3 – TENDER EXHIBITS.....	25
EXHIBIT 1 - SCOPE OF WORK AND SPECIFICATIONS	25
TERMS OF REFERENCE (TOR)	25
A. PROJECT OVERVIEW STATEMENT	25
B. PART A – SEISMIC ACQUISITION.....	26
1.0 Scope of Work.....	26
Seismic Acquisition.....	27
<i>Survey Parameters</i>	<i>27</i>
Scouting of the Survey Area	35
<i>Seismic Objectives.....</i>	<i>36</i>
Services	36
<i>Acquisition Technical Design and Actual Production Plan.....</i>	<i>36</i>
<i>Work schedule</i>	<i>37</i>
Advance and Basic Parties.....	40
Documentation and Reporting	42

<i>Data filling requirements:</i>	44
Geodetic Parameters.....	45
Bidder's Personnel and Field Equipment.....	46
<i>Personnel</i>	46
<i>Field Equipment</i>	47
Parameters and Technical Standards.....	49
<i>General Work Standards</i>	49
<i>The following standards shall apply to the WORK</i>	50
Equipment Testing before Commencement of Survey.....	54
Instrument/Equipment Tests during Operations.....	56
Technical Specifications	56
Defective Recording Channel and Defective Records	57
Geodetic Survey Specification	72
PART B – PROCESSING 2D SEISMIC	88
1.0 Processing Objective:.....	88
2.0 Processing Strategy:.....	88
3.0 Schedule of Services	89
4.0 General Information.....	89
5.0 Proposed scope of work for Fast Track PoSTM, PSTM and PSDM.....	90
6.0 Processing Sequence Testing	92
7.0 Quality Control.....	93
8.0 Deliverables.....	94
9.0 Project Execution Plan.....	95

10.0 Reporting	96
11.0 Key Success Factors for Processing Centre, Contractor Personnel and Project Schedule	97
12.0 Key Personnel and Location	98
13.0 Company Data.....	98
PART C – INTERPRETATION OF 2D SEISMIC	99
1.0 Primary Objectives	99
2.0 Available Data	99
3.0 Scope of Work To Be Performed by Contractor To Produce interpretation Deliverables 99	
4.0 Contractor Personnel.....	102
<i>Geophysicist / Seismic Interpreter.....</i>	<i>102</i>
<i>Petrophysicist.....</i>	<i>103</i>
<i>Interpreter Geologist</i>	<i>103</i>
5.0 Deliverables.....	104
6.0 Time Schedule.....	104
7.0 Contractor’s Equipment	104
PART D – PRELIMINARY WELL DESIGN	105
1.0 Primary Objectives	105
2.0 Scope	105
3.0 Contractor Personnel.....	107
4.0 Deliverables.....	108
5.0 Time schedule	108
6.0 Contractor’s Equipment and Software	108

PART E - REQUIREMENTS PRIOR TO COMMENCEMENT OF WORK	109
1.0 Project Execution Plan.....	109
2.0 Work Procedures.....	109
3.0 Scouting of the Survey Area	109
4.0 Readiness Review.....	110
5.0 Access and Entry to the site	110
6.0 Equipment	110
7.0 Work Programme	110
8.0 Resources, Personnel & Responsibilities.....	111
<i>MANAGEMENT</i>	<i>111</i>
<i>TECHNICAL STAFF</i>	<i>112</i>
<i>ON SITE (SEISMIC ACQUISITION).....</i>	<i>113</i>
<i>SURVEY CONTRACTOR RESPONSIBILITY.....</i>	<i>114</i>
9.0 Execution of Works.....	116
<i>MANAGEMENT</i>	<i>116</i>
<i>CONSUMABLES</i>	<i>117</i>
<i>MOBILISATION</i>	<i>117</i>
<i>EXECUTION.....</i>	<i>118</i>
<i>DEMOBILISATION.....</i>	<i>118</i>
<i>CARE OF WORKS AND CONTAMINATED GROUND</i>	<i>118</i>
<i>TIME OF COMPLETION.....</i>	<i>119</i>
<i>WATCHING AND LIGHTING</i>	<i>120</i>
<i>TEMPORARY WORKS.....</i>	<i>120</i>

<i>TEMPORARY ACCESS</i>	120
<i>SURVEY CONTRACTOR'S WORKING AREA</i>	121
<i>WORKERS ACCOMODATION</i>	121
<i>WATER SUPPLY</i>	121
<i>ELECTRICAL POWER SUPPLY</i>	121
<i>STORAGE FACILITY</i>	122
<i>WASTE DISPOSAL</i>	122
<i>PROTECTION OF EXISTING FACILITIES</i>	122
<i>DATA PROPRIETARY</i>	122
10. Services to Company.....	123
<i>SURVEY CONTRACTOR PREMISES</i>	123
<i>SURVEY AREA</i>	123
11. Health, Safety, Environment and Quality	123
<i>QUALITY ASSURANCE</i>	124
<i>COMPLIANCE</i>	125
12. Bidder's Technical Submission	125
<i>PART 1 – BIDDER'S DETAILS</i>	125
<i>PART 2 – CAPABILITY & EXPERIENCE</i>	127
<i>PART 3 – SURVEY EXECUTION PLAN</i>	128
<i>PART 4 – SURVEY SCHEDULE</i>	130
<i>PART 5 – SURVEY ORGANISATION & KEY PERSONNEL</i>	130
<i>PART 6 – QUALITY ASSURANCE</i>	130
13. Bidder's Commercial Proposal.....	131

<i>PART 8.1 – LUMP SUM FEES</i>	<i>131</i>
<i>PART 8.2 – SCHEDULE OF RATES</i>	<i>132</i>
<i>PART 8.3 – PAYMENT SCHEDULE</i>	<i>132</i>
Appendix A - IFB FORM AND ACKNOWLEDGEMENT	133
Appendix B - PROPOSAL RESPONSE FORM	136
Appendix C - PROPOSAL EVALUATION CRITERIA.....	139
Appendix D - PRICING AND COMPENSATION	146
Appendix E – BIDDER CLARIFICATION REQUEST FORM	151

PART I – SELECTION PROCEDURES AND REQUIREMENTS**SECTION 1 – INVITATION LETTER**

Dear Sir/Madam,

TIMOR GAP PUALACA BLOCK, a company of TIMOR GAP E.P, having its registered office at CBD2 Building, Level 3, Timor Plaza Complex Rua Presidente Nicolao Lobato, Comoro, Dili, Timor-Leste, invites submissions for the “Integrated 2D Seismic Survey for PSC TL-OT-21-17” in Timor-Leste.

The procedure requirement, Instruction to Bidders and Terms of Reference are provided to bidder for assessment. We shall appreciate and welcome any suggestions or recommendations regarding any innovative options you may have to help the COMPANY costs effectiveness, quality, health, safety, and environment, etc.

The deadline for submission of proposals shall be on or before 24th May 2023, time: 4:00PM (Dili local time). Late submission will be rejected. Bidders are encouraged to carefully follow the submission, format and other instructions contained in the Instructions to Bidders and Data Sheet in Section 2 of this IFB.

Yours Faithfully,



Lamberto Fernandes
Managing Director

SECTION 2 – INSTRUCTION TO BIDDERS AND DATA SHEET

GENERAL PROVISIONS

DEFINITIONS

“Affiliate(s)” means an individual or an entity that directly or indirectly controls, is controlled by, or is under common control with the BIDDER.

“Applicable Law” means the laws and any other instruments having the force of law in Timor-Leste, or in such other country as may be specified in the Data Sheet, as they may be issued and in force from time to time.

“BIDDER” means Company invited by TIMOR GAP PUALACA BLOCK to bid for the “Integrated 2D Seismic Survey for PSC TL-OT-21-17”.

“Contract” means a legally binding written agreement signed between TIMOR GAP PUALACA BLOCK and the BIDDER.

“Data Sheet” means an integral part of the Instructions to BIDDER contained in Section 2 that is used to reflect specific country and assignment conditions to supplement, but not to overwrite, the provisions of the Instructions to BIDDER.

“Day” means a calendar day.

“IFB” means the Invitation for Bid prepared by TIMOR GAP PUALACA BLOCK for the selection of BIDDER.

“Joint Venture (JV)” means an association with or without a legal personality distinct from that of its members, of more than one BIDDER where one member has the authority to conduct all business for and on behalf of all the members of the JV, and where the members of the JV are jointly and severally liable to TIMOR GAP PUALACA BLOCK for the performance of the Contract.

“Key Personnel” means an individual professional whose skills, qualifications, knowledge, and experience are critical to the performance of the Services under the Contract and whose CV is considered in the technical evaluation of the BIDDER’s proposal.

“Personnel” means, collectively, Key Personnel, Non-Key Personnel, or any other personnel of the Consultancy Team, Sub-contractor, or Joint Venture member(s).

“Services” means the work to be performed by the BIDDER pursuant to the Contract.

“Sub-contractor” means an entity to which the BIDDER intends to subcontract any part of the Services while remaining responsible to TIMOR GAP PUALACA BLOCK during the performance of the Contract.

“TIMOR GAP PUALACA BLOCK” means a subsidiary of TIMOR GAP, E.P. that signs the Contract for the Services with the selected BIDDER.

“REQUISITION” (Section 3 of the IFB) means the Requisition which explains the objectives, scope of work, activities, and tasks to be performed, respective responsibilities of TIMOR GAP PUALACA BLOCK and the BIDDER, and expected results and deliverables of the assignment.

INTRODUCTION

1. TIMOR GAP PUALACA BLOCK intends to select a BIDDER for services required for the assignment named in the Data Sheet.
2. The BIDDER(s) are invited to submit a Technical Proposal and a Commercial Proposal, as specified in the Data Sheet. The Proposal will be the basis for negotiating and ultimately signing the Contract with the selected BIDDER.
3. The BIDDER should familiarize themselves with the local conditions and take them into account in preparing their Proposals, including attending a Pre-Bid Meeting if specified in the Data Sheet. Attending any such pre-bid meeting is optional and is at the BIDDER’s expense.

ELIGIBILITY

1. TIMOR GAP PUALACA BLOCK permits BIDDER (including Joint Ventures and their individual members) from all countries to offer services for this project.
2. Furthermore, it is the BIDDER’s responsibility to ensure that it’s Personnel, Joint Venture members, Sub-bidders, Agents (declared or not), Sub-contractors, Suppliers and/or their employees meet the eligibility requirements as established in this Bidding Document.

PREPARATION OF PROPOSAL

GENERAL CONSIDERATION

In preparing the Proposal, the BIDDER is expected to examine the IFB in detail. Material deficiencies in providing the information requested in the IFB may result in rejection of the Proposal.

COST FOR PREPARATION OF PROPOSAL

The BIDDER shall bear all costs associated with the preparation and submission of its Proposal and TIMOR GAP PUALACA BLOCK shall not be responsible or liable for those costs, regardless of the conduct or outcome of the selection process. TIMOR GAP PUALACA BLOCK is not bound to accept any proposal and reserves the right to annul the selection process at any time prior to Contract award, without thereby incurring any liability to the BIDDER.

LANGUAGE

The Proposal, as well as all correspondence and documents relating to the Proposal exchanged between the BIDDER and TIMOR GAP PUALACA BLOCK shall be written in the language(s) specified in the Data Sheet.

CONFIDENTIALITY AGREEMENT AND ACKNOWLEDGEMENT LETTER

BIDDER agrees and acknowledges that information of whatever nature relating to TIMOR GAP PUALACA BLOCK disclosed or made available to you and the information disclosed and contained in this document or referred to in this document together with all other information relating to TIMOR GAP PUALACA BLOCK and/or the scope of services/supplies ("Confidential Information") shall be regarded as secret and confidential and shall not be disclosed by BIDDER except to the extent that it becomes necessary to furnish information to others solely for the purposes of submitting the proposal under this document. BIDDER will also keep confidential all Confidential Information. BIDDER shall impose the same obligations of secrecy and confidentiality on those parties to whom the Confidential Information is passed. This obligation of secrecy and confidentiality will continue in full force and effect

notwithstanding termination or completion of the proposal submission hereof. BIDDER undertakes to indemnify and hold harmless TIMOR GAP PUALACA BLOCK from any damages, loss, cost or liability and the cost of enforcing this indemnity arising out of or resulting from the BIDDER's breach of these obligations of secrecy and confidentiality or any other unauthorized use or disclosure of the Confidential Information.

BIDDER acknowledges that, if at any time in the future any term or provision of the Confidential Information thereof shall be related to any third party, TIMOR GAP PUALACA BLOCK may request BIDDER to enter into a more definitive confidentiality agreement, and you agree to do so upon TIMOR GAP PUALACA BLOCK's request.

Note also that TIMOR GAP PUALACA BLOCK cannot issue any of the Historical Documentation noted within Appendix A until such time as the ACKNOWLEDGEMENT Form (Appendix A) has been executed and returned to TIMOR GAP PUALACA BLOCK. At TIMOR GAP PUALACA BLOCK's discretion, a further Non-Disclosure Agreement may be requested, typically where BIDDER requests access to a substantial element of the Historical Documentation prior to submission of BIDDER's Proposal.

If BIDDER determines that the transaction will not proceed or you are no longer interested in submitting proposal, BIDDER will return to TIMOR GAP PUALACA BLOCK, the Confidential Information and copies that are in BIDDER's possession or under BIDDER's control which incorporate, reflect, or are derived from any of the Confidential Information and will ensure that BIDDER's representatives, agents and employees will do the same. BIDDER shall be deemed to have also destroyed/deleted any electronic information held, in addition to the return of all physical and hard copy information.

Please confirm your acknowledgement and acceptance of the above obligations of secrecy and confidentiality concerning the information disclosed in this Invitation for Bid by signing on the attached ACKNOWLEDGEMENT Form included as Appendix

A and returning to TIMOR GAP PUALACA BLOCK within 3 days after receipt of this IFB for our records and reference via email at: procurement.dept@timorgap.com

A Pre-bid Teleconference may be held at a mutually agreed date and time. The purpose is to clarify issues and to answer questions on any matter that may be raised related to this tender. Pre-bid Teleconference will provide BIDDERS an opportunity to familiarize themselves with the project scope and baseline information to assist them in preparing their proposal.

ONLY ONE PROPOSAL

The BIDDER (including the individual members of any Joint Venture) shall submit only one Proposal, either in its own name or as part of a Joint Venture. If a BIDDER including any Joint Venture member, submits or participates in more than one Proposal, all such proposals shall be disqualified and rejected. This includes a Sub-BIDDER, or the BIDDER's staff from participating as Key Personnel and Non-Personnel in more than one Proposal as stated in the Data Sheet.

PROPOSAL VALIDITY

1. The Data Sheet indicates the period during which the BIDDER's Proposal must remain valid after the Proposal submission deadline.
2. During this period, the BIDDER shall maintain its original Proposal without any change, including the availability of the Key Personnel, the proposed rates and the total price.
3. TIMOR GAP PUALACA BLOCK will make its best effort to complete the negotiations within the Proposal's validity period. However, should the need arise, TIMOR GAP PUALACA BLOCK may request, in writing, all BIDDERS who submitted Proposals prior to the submission deadline to extend the Proposals' validity.
4. If the BIDDER agrees to extend the validity of its Proposal, it shall be done without any change in the original Proposal and with the confirmation of the availability of the Key Personnel.

5. The BIDDER has the right to refuse to extend the validity of its Proposal in which case such Proposal will not be further evaluated.
6. If any of the Key Personnel become unavailable for the extended validity period, the BIDDER shall provide a written adequate justification and evidence satisfactory to TIMOR GAP PUALACA BLOCK together with the substitution request. In such case, a replacement Key Personnel shall have equal or better qualifications and experience than those of the originally proposed Key Personnel. The technical evaluation score, however, will remain to be based on the evaluation of the CV of the original Key Personnel.
7. If the BIDDER fails to provide a replacement Key Personnel with equal or better qualifications, or if the provided reasons for the replacement or justification are unacceptable to TIMOR GAP PUALACA BLOCK, such Proposal will be rejected with the prior TIMOR GAP PUALACA BLOCK's no objection.
8. The BIDDER shall not subcontract the whole of the Services.

CLARIFICATION AND AMENDMENT OF IFB

1. The BIDDER may request a clarification of any part of the IFB during the period indicated in the Data Sheet before the Proposals' submission deadline. Any request for clarification must be sent in writing, or by standard electronic means, to TIMOR GAP PUALACA BLOCK's address indicated in the Data Sheet. TIMOR GAP PUALACA BLOCK will respond in writing, or by standard electronic means, and will send written copies of the response (including an explanation of the query but without identifying its source) to all BIDDERS. Should TIMOR GAP PUALACA BLOCK deem it necessary to amend the IFB because of a clarification, it shall do so following the procedure described below:
2. At any time before the proposal submission deadline, TIMOR GAP PUALACA BLOCK may amend the IFB by issuing an amendment in writing. The amendment shall be sent to all BIDDERS and will be binding on them. The BIDDER shall acknowledge receipt of all amendments in writing.

- a. If the amendment is substantial, TIMOR GAP PUALACA BLOCK may extend the proposal submission deadline to give the BIDDER reasonable time to take an amendment into account in their Proposals.
- b. The BIDDER may submit a modified Proposal or a modification to any part of it at any time prior to the proposal submission deadline. No modifications to the Technical or Commercial Proposal shall be accepted after the deadline.

TECHNICAL PROPOSAL FORMAT AND CONTENT

1. The Technical Proposal shall not include any financial information. A Technical Proposal containing material financial information shall be declared non-responsive.
2. BIDDER may propose alternative Key Personnel. CVs shall be submitted for each Key Personnel position. Failure to comply with this requirement will make the Proposal non-responsive.
3. The Technical Proposal shall comprise the information and documents stated in the Data Sheet.
4. Technical Proposal shall be accompanied by BIDDER's Proposal Response Form, details of which are provided within Appendix B.

COMMERCIAL PROPOSAL FORMAT AND CONTENT

1. The BIDDER shall propose a Commercial Proposal with "overall lump sum price" which includes the details of break down price as indicated in the Data Sheet.
2. The BIDDER shall propose the price using currencies as stated in the Data Sheet.
3. The BIDDER and its Sub-bidders and Personnel are responsible for meeting all tax liabilities arising out of the Contract unless otherwise stated in the Data Sheet.
4. Commercial Proposal shall be accompanied by BIDDER's Proposal Response Form, details of which are provided within Appendix D.

LOCAL CONTENT PROPOSAL FORMAT AND CONTENT

1. The BIDDER shall propose a Local Content Proposal with the objective of the local content plan is to provide employment opportunities, enhance labour skills, and transform villagers into industrial workers.
2. The BIDDER shall outline the measures will be undertaken to achieve these objectives in point 13.1.
3. The BIDDER shall outline community engagement measures that will be taken.
4. The BIDDER shall propose the knowledge transfer measures and Joint Cooperation between CONTRACTOR and BIDDER.
5. The Local Content Proposal shall be accompanied by BIDDER's Proposal Response Form, details of which are provided within [Appendix D](#).

SUBMISSION, OPENING AND EVALUATION

SUBMISSION AND MARKING OF PROPOSALS

1. The BIDDER shall submit a Proposal comprising the information required in accordance with Clause 11) and 12). Bid submission shall follow the electronic bid submission procedure specified in the Data Sheet.
2. A Proposal submitted by a Joint Venture shall be signed by all members to be legally binding on all members, or by an authorized representative who has a written power of attorney signed by each member's authorized representative.
3. Any modifications, revisions, interlineations, erasures, or overwriting shall be valid only if they are signed or initialled by the person signing the Proposal.
4. The Proposal or its modifications must be submitted to the drop box address indicated in the Data Sheet and received by TIMOR GAP PUALACA BLOCK no later than the deadline indicated in the Data Sheet, or any extension to this deadline. Any Proposal or its modification received by TIMOR GAP PUALACA BLOCK after the deadline shall be declared late and rejected.

CONFIDENTIALITY

1. From the time the Proposals are opened to the time the Contract is awarded, the BIDDER should not contact TIMOR GAP PUALACA BLOCK on any matter related to its Technical and/or Commercial Proposal. Information relating to the evaluation of Proposals and award recommendations shall not be disclosed to the BIDDER who submitted the Proposals or to any other party not officially concerned with the process, until the publication of the Contract award information.
2. Any attempt by BIDDER or anyone on behalf of the BIDDER to influence improperly TIMOR GAP PUALACA BLOCK in the evaluation of the Proposals or Contract award decisions may result in the rejection of its Proposal and may be subject to the application of prevailing TIMOR GAP PUALACA BLOCK's sanctions procedures.
3. Notwithstanding the above provisions, from the time of the Proposals' opening to the time of Contract award publication, if a BIDDER wishes to contact TIMOR GAP

PUALACA BLOCK on any matter related to the selection process, it should do so only in writing.

OPENING OF TECHNICAL PROPOSALS

1. TIMOR GAP PUALACA BLOCK's evaluation committee shall conduct the opening of the Technical Proposals in the presence of the BIDDER's authorized representatives who choose to attend (in person, or online if this option is offered in the Data Sheet). The opening date, time and the address are stated in the Data Sheet. The Commercial Proposal shall unopened and shall be securely stored until they are opened in accordance with Clause 18) of the IFB.
2. At the opening of the Technical Proposals the following shall be read out: (i) the name and the country of the BIDDER or, in case of a Joint Venture, the name of the Joint Venture, the name of the lead member and the names and the countries of all members; (ii) the presence or absence of a Commercial Proposal submission; (iii) any modifications to the Proposal submitted prior to proposal submission deadline; and (iv) any other information deemed appropriate.

PROPOSALS EVALUATION

1. At the time of Technical Proposal opening, the preliminary examination shall be conducted with reference to the requirements stated in Data Sheet.
2. Subject to provision of Clause 11.1) of the IFB, the evaluators of the Technical Proposals shall have no access to the Commercial Proposals until the technical evaluation is concluded.
3. The BIDDER is not permitted to alter or modify its Proposal in any way after the proposal submission deadline except as permitted under Clause 9.6) of this IFB While evaluating the Proposals, TIMOR GAP PUALACA BLOCK will conduct the evaluation solely based on the submitted Technical and Commercial Proposals.

EVALUATION OF TECHNICAL PROPOSALS

TIMOR GAP PUALACA BLOCK's evaluation committee shall evaluate the Technical Proposals based on their responsiveness to the Scope of Work and the IFB, applying the evaluation criteria, sub-criteria, and point system specified in the Data Sheet. Each responsive Proposal will be given a technical score. A Proposal shall be rejected at this stage if it does not respond to important aspects of the IFB or if it fails to achieve the minimum technical score indicated in the Data Sheet.

OPENING OF COMMERCIAL PROPOSALS

1. After the technical evaluation is completed, the Commercial Proposals shall be opened by TIMOR GAP PUALACA BLOCK's evaluation committee of that BIDDER whose proposals have passed the minimum technical score.
2. Bids are technically compliant and pass the threshold will check for arithmetical errors. Errors will be corrected by TIMOR GAP PUALACA BLOCK as follows:
3. Where there is a discrepancy between the amounts in figures and in words, the amount in words will govern; and
4. Where there is a discrepancy between original proposal and copy, the original proposal will govern;
5. Where there is a discrepancy between the unit rate and the line-item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern, unless in the opinion of TIMOR GAP PUALACA BLOCK there is an obviously gross misplacement of the decimal point in the unit rate, in which case the line item total as quoted will govern, and the unit rate will be corrected.

EVALUATION OF COMMERCIAL PROPOSALS

1. TIMOR GAP PUALACA BLOCK's evaluation committee shall evaluate the Commercial Proposals applying the point system specified in the Data Sheet.
2. The combined score is calculated by weighting the technical and commercial scores and adding them as per the formula and instructions in the Data Sheet. The BIDDER achieving the highest combined technical and commercial score will be invited for negotiations.

NEGOTIATIONS AND AWARD

NEGOTIATION

1. The negotiations include discussions of the Scope of Work, the proposed methodology, TIMOR GAP PUALACA BLOCK's inputs, Conditions of the Contract, and finalizing the "Description of Services" part of the Contract. These discussions shall not substantially alter the original scope of services under the TOR or the terms of the contract, lest the quality of the final product, its price, or the relevance of the initial evaluation be affected.
2. The negotiations include the clarification of the BIDDER's tax liability in Timor-Leste and how it should be reflected in the Contract.
3. In the case the offered Key Personnel and Non-Key Personnel' remuneration rates are much higher than the typically charged rates by BIDDER in similar contracts, TIMOR GAP PUALACA BLOCK may ask for clarifications and, if the fees are very high, ask to change the rates after consultation with the BIDDER.
4. If the negotiations fail, TIMOR GAP PUALACA BLOCK shall inform the BIDDER in writing of all pending issues and disagreements and provide a final opportunity to the BIDDER to respond. If disagreement persists, TIMOR GAP PUALACA BLOCK shall terminate the negotiations informing the BIDDER of the reasons for doing so. After having obtained the Approval, TIMOR GAP PUALACA BLOCK will invite the next-ranked BIDDER to negotiate a Contract. Once TIMOR GAP PUALACA BLOCK commences negotiations with the next-ranked BIDDER, TIMOR GAP PUALACA BLOCK shall not reopen the earlier negotiations.

AWARD OF CONTRACT

1. After completing the negotiations TIMOR GAP PUALACA BLOCK shall obtain the approval to publish the award information as per the instructions in the Data Sheet; and promptly notify the other BIDDERS.
2. The BIDDER is expected to commence the assignment on the date specified in the Data Sheet includes duration of the assignment.

DATA SHEET

IFB Clause	Data Sheet
A. GENERAL PROVISIONS	
1 (b)	Democratic Republic of Timor-Leste
2.1	TIMOR GAP PUALACA BLOCK The service of the assignment is: Invitation for Bid for “Integrated 2D Seismic Survey for PSC TL-OT-21-17”
2.2	<p>BIDDER shall submit a Commercial Proposal and a Technical Proposal as digital files (PDF format) to separate drop boxes as follows:</p> <p>Drop Box for Commercial Proposal</p> <p>https://timorgapit-my.sharepoint.com/:f:/g/personal/lamberto_fernandes_pualaca_timorgap_com/Evj6kc7i91NBh_H5YQLhQY0Bbc8p06cZoGY1h-JcJmINww?e=LDyrrx</p> <p>Drop Box for Technical Proposal</p> <p>https://timorgapit-my.sharepoint.com/:f:/g/personal/lamberto_fernandes_pualaca_timorgap_com/EvedriS V1QNDpUGCf8jzJIYBF4C4vvOEYY9H_EacJYkwdA</p> <p>BIDDER shall password protect each proposal file. BIDDER shall provide TIMOR GAP PUALACA BLOCK with the password for each file upon request by TIMOR GAP PUALACA BLOCK during the Bid Opening meeting.</p>
B. PREPARATION OF PROPOSAL	
6	Proposals shall be submitted in the English. All correspondence exchange shall be in English.
7	BIDDERS shall sign and return the Confidentiality Agreement and Acknowledgment form, ten (10) days after received the IFB documents.
8	All BIDDERS must only submit one proposal and not permitted participation of Sub-BIDDERS, Key Personnel and Non-Key Personnel in more than one Proposal.
9.1	Proposals shall remain valid for 120 days after the proposal submission deadline

IFB Clause	Data Sheet
10.1	<p>Clarifications may be requested no later than five (5) working days prior to the submission deadline using the clarification request form included in Appendix E.</p> <p>The contact information for requesting clarifications is:</p> <p>Mr. Domingos Freitas Senior Manager Procurement & Logistic Email: procurement.dept@timorgap.com</p> <p>With a copy to:</p> <p>Mr. Lamberto Fernandes Managing Director of TIMOR GAP PUALACA Block Email: Lamberto.Fernandes@timorgap.com</p>
11.3	The Technical Proposal shall meet all requirements as defined in Section 3 – Terms of Reference, Chapter 7– BIDDER’S Technical Submission Requirements.
12.1	The Commercial Proposal shall meet all requirements as defined in Section 3 – Terms of Reference, Chapter 8 BIDDER’S COMMERCIAL SUBMISSION
12.2	The Commercial Proposal shall use United States Dollar (USD).
12.3	The BIDDER and its sub-contract are subject to all the taxes and duties levies by RDTL law. The firm shall be solely liable for and pay any tax arising from income, gains, and profits that the BIDDER will receive from TIMOR GAP PUALACA BLOCK in connection with this project.
C. SUBMISSION, OPENING AND EVALUATION	
13.1	<p>The BIDDER shall submit their Commercial Proposal and Technical Proposal as digital files (PDF format) to separate drop boxes as follows:</p> <p>Drop Box for Commercial Proposal</p> <p>https://timorgapit-my.sharepoint.com/:f:/g/personal/lamberto_fernandes_pualaca_timorgap_com/Evj6kc7i91NBh_H5YQLhQY0Bbc8p06cZoGY1h-JcJmINww?e=LDyrrx</p> <p>Drop Box for Technical Proposal</p> <p>https://timorgapit-my.sharepoint.com/:f:/g/personal/lamberto_fernandes_pualaca_timorgap_com/EvedriSV1QNDpUGCf8jzJIYBF4C4vvOEYY9H_EacJYkwdA</p>

IFB Clause	Data Sheet
13.1 & 13.4	The proposals must be submitted no later than: Date : 24 th May 2023 Timor-Leste Time: 16:00
15.1	The opening shall take place at: ABOVE ADDRESS date 19 th May 2023, Timor-Leste Time: 16.30
16.1	Preliminary Examination Only BIDDERS who passed this preliminary examination will be accepted for step II of technical evaluation.
17	Technical Evaluation Criteria are as defined within Appendix C – Proposal Evaluation Criteria
19.1	Commercial Evaluation Criteria are as defined within Appendix C – Proposal Evaluation Criteria.
19.2	Derivation of the Combined Technical and Commercial Score is as defined within Appendix C – Proposal Evaluation Criteria.
21.2	Expected date for the commencement of the Services: 9 th June 2023

SECTION 3 – TENDER EXHIBITS

EXHIBIT 1 - SCOPE OF WORK AND SPECIFICATIONS

The Company is conducting tenders for the design and provision of 2D seismic data acquisition, processing, interpretation and well panning services ("SERVICES") which is more specifically set out as follows:

TERMS OF REFERENCE (TOR)

A. PROJECT OVERVIEW STATEMENT

TIMOR GAP, E.P. is the Timor-Leste's national oil company which was established in 2011 under the Decree Law no. 31/2011 on 27 July 2011. It was fully operation on the 3rd of January 2012. Its main objective is to act on behalf of the Timor-Leste's Government in conducting business within the petroleum sector to develop upstream and downstream petroleum activities, provide services to the industry, and engage in onshore and offshore activities, national and international.

TIMOR GAP Pualaca Block is a wholly owned subsidiary of TIMOR GAP,E.P. and is the Operator of PSC TL-OT-21-17.

TIMOR GAP Pualaca Block wishes to engage an international consultancy / international service provider with required experience to provide the services in Integrated 2D Seismic Survey including Seismic Acquisition, seismic processing, seismic Interpretation (Prospects identification, risking and ranking, Volumetric calculations and chance of success of the prospects) and well design in the PSC TL-OT-21-17 area.

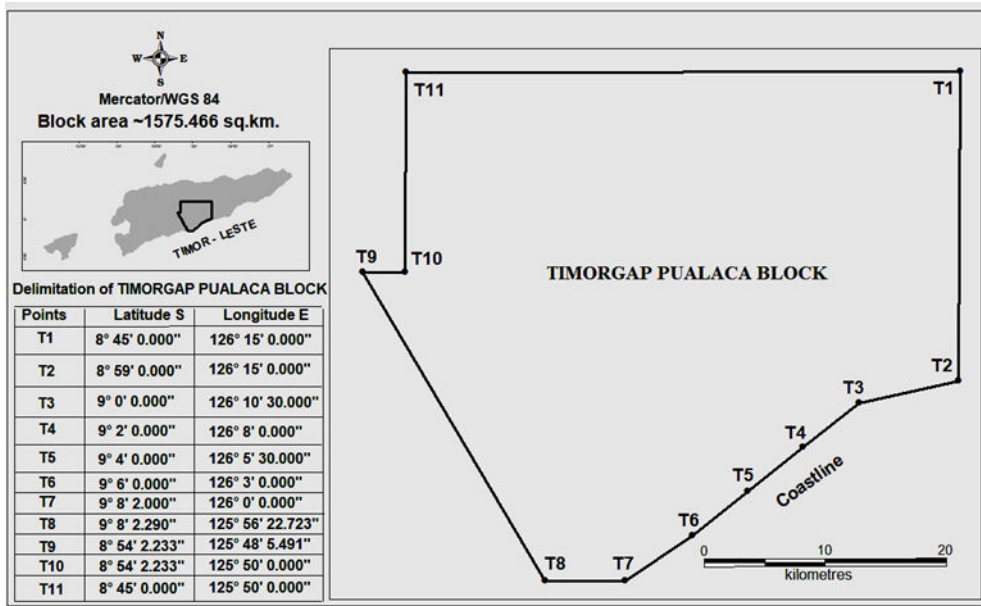


Figure 1. PSC TL-OT-21-17 Location Map

B. PART A – SEISMIC ACQUISITION

1.0 SCOPE OF WORK

COMPANY will provide 2D seismic acquisition program to CONTRACTOR in the year 2023, 2D Seismic survey length will be approximately 267 source line kilometers. The schematic diagram of 2D seismic acquisition lines are shown in figure 6.

COMPANY shall have the right to change the design according to the actual situation, which will reduce or increase the number or length of the seismic lines.

CONTRACTOR will provide COMPANY with 2D acquisition operation design and furnish the necessary equipment and personnel to carry out the seismic acquisition that including the persons and equipment of the basic crew, materials, tools and supplies, transportation, documentation and shall perform all operations necessary to satisfactorily provide seismic data acquisition services as described herein.

Primary objective of the study is to acquire integrated 2D seismic survey in interest area (TG Pualaca Block area) consists of:

- 2D Seismic Acquisition
- 2D Seismic Processing
- Seismic Interpretation (Prospects identification, risking and ranking, Volumetric calculations, chance of success of the prospects and well design/planning)

SEISMIC ACQUISITION

Survey Parameters

Survey Line Orientation

Figure 2 shows the modelled and interpreted section along the Regional WNW-ESE line. Faults are steeply dipping. West facing faults are steeper compared to East facing faults. Pualaca contains thick and varied sediments with complex structuring up to 3.5 km deep. Beaco largely benign –minimal / subtle structuring, higher post Mesozoic sediment content likely. Meta sediment (orange) and overlying compact sediments (dark green) thickens to West.

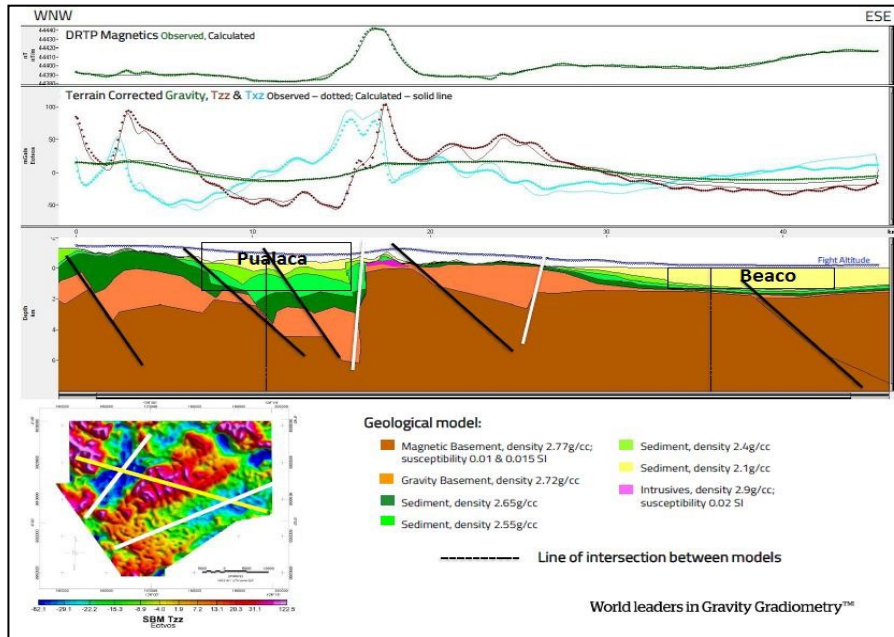


Figure 2. Pualaca Block model interpreted section

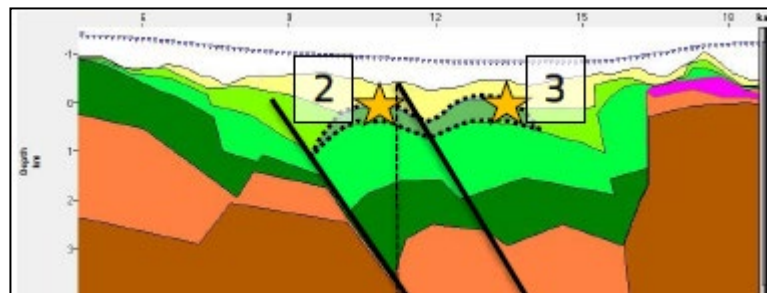


Figure 3. Geological Model and Leads – Regional line.

FTG modelled two Anticline Type Structural leads (2,3) along this line (Refer Zoomed Section) in Pualaca. Primary Faults are downthrown to East. High density contrast between 'yellow' and 'green' sediments best captured with FTG. Structures reside between 500m and 1km depth.

The Line direction (WNW-ENE) is clearly the survey Dip Line orientation for the leads as it cuts across structures. The direction largely corroborates with the Dip line orientation of the Regional survey parameter decided based on Gravity Maps.

Figure-17 Shows the modelled section along SW-NE profile through Pualaca. The basin is primarily dipping towards East. Two Leads are identified which are gentler anticlinal structures bounded by faults (See Zoom Part). Lead in the East is common with the Dip Line lead.

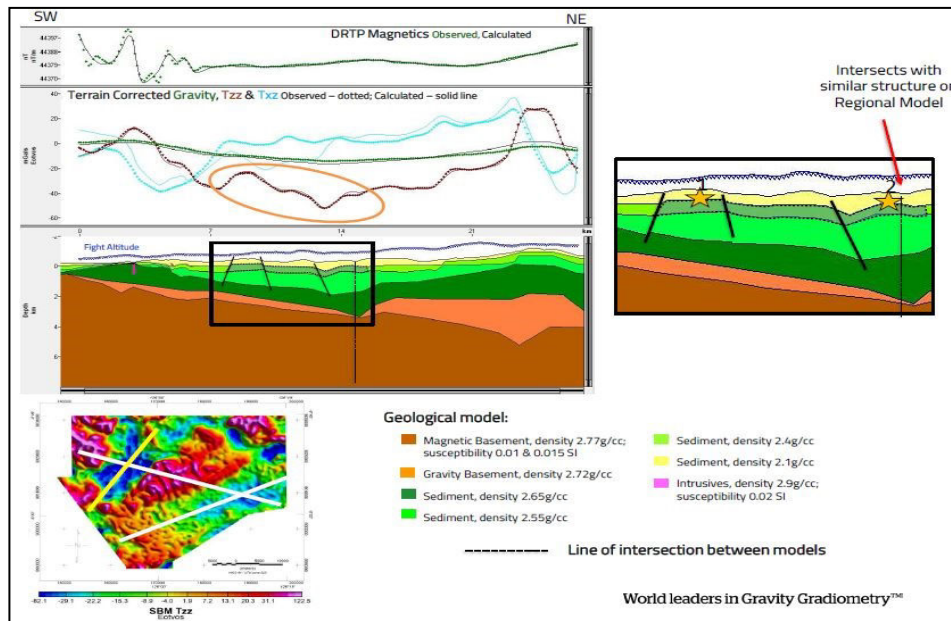


Figure 4. Geological Model and Leads of Profile through Pualaca

This SW-NE Line orientation is clearly the strike line for the Leads of Pualaca Basin.

Strike Line Model for the Beaco Basin with Zoomed section is shown at Figure 5 Two Leads (5,6) are modelled with gentle Anticlinal structures bounded by normal/transitional faults. Structures are anticipated between 500 mt to 1 km depth.

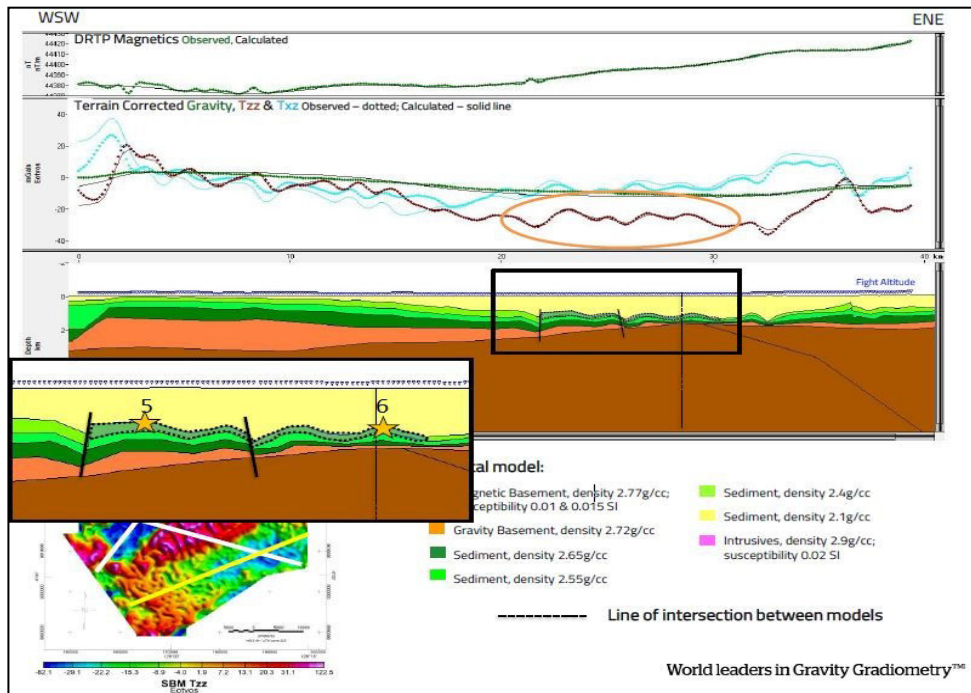


Figure 5. Geological Model and Leads of Profile through Beaco

This WSW-ENE direction can be taken as the strike line direction for the Leads of Beaco Basin.

Type of Survey

Though the Lead depths are anticipated to be shallow, Mesozoic sediments should be considered for imaging. Late Triassic- Mid Jurassic is considered to be the target zone in the survey region from a regional standpoint. The depth of Mesozoic may continue up to a depth of 3 km particularly in the Pualaca Basin from the regional understanding and also from the Modelling results. Also, we observe predominant regional dip at the Mesozoic level around the lead area.

Required Offset Distance

Whilst the primary target is defined as between 500ms and 1000ms, based on a requirement to adequately image the deeper data above 3000ms for structural detail, the maximum offset to be recorded will be 4,500m.

Receiver Interval

With the use of single sensors, it is critical that both the primary signal and noise are imaged with minimal aliasing to allow for effective removal of noise, and imaging of primary data. A receiver interval of 10m is expected to be optimal in both coastal and mountainous survey areas.

Line Interval

Average size of the leads is approximately 3.5 km x 2 km. To capture such small structures closer dip lines with 1.5 km interval would be required. Dip Lines can be placed one along the regional line and a few others parallel to the regional line. To adequately cover the Leads of Paulaca and Beaco, at least two lines above and five lines below the regional line would be needed apart from the central line. Therefore a total of 8 Dip line are recommended. Dip line will be restricted to the respective basins as per imaging requirements of the Leads. Minimum one strike line as tie line is required each for Pualaca and Beaco which are to be placed along the modelled line directions. It will be desirable to put two additional lines one line to the left and one line to the right of the central line. Therefore a minimum of 11 (8 dip +3 strike) survey lines are recommended for each area.

Line Length

Line length should adequately cover Lead length, adjacent basin floor on either side (min 3 km) to distinguish the structure properly. For proper imagine of the desired subsurface part, additional surface extension on either side are to be provided for Full fold coverage and to address migration aperture. With expected good dip in the area, min 3 to 4 km surface extension on either side is recommended. Considering the above factors, expected line length would be about 8 km in the dip direction and 18km in the Strike direction. Total expected volume per area is approximately 135 source line km, noting that the receivers will extend beyond this distance.

Source type

Based on the terrain condition, Contractor is requested to propose both a Weight drop seismic source option for the mountain area and vibroseis option to be used for the flat area.

Contractors are also requested to provide a dynamite option should pre-tender scouting indicate that it is the most suitable source within the mountain area

Receiver type

For the receiver, Contractors are requested to propose a wireless solution, with preference being the STRYDE Nimble System equivalent due to small size.

The Zoomed part of the modelled sections will give good idea of the start and end of the line disposition.

Note: The indicated line length is from the 1st Shot point to the Last Shot point. For the First Shot point Receiver Spread will be within the line (Spread is in the advance position), but for the Last shot point spread will go beyond the indicated line length. This may be ensured.

2D Survey Parameter Summary for the Leads:

SI No	Parameter	Value	REMARKS
1	Survey line orientation	Dip Line- Along the modelled regional line. Strike Lines- Along the modelled strike lines.	Based on Geological Modelled sections from FTG survey result and geological data(Integrated).
2	Type of survey	Split Spread	Mesozoic Target deep for split spread and predominant dip direction around the Lead area.
3	Near offset distance	Source centred between receiver stations	Shallow Lead target

4	Far offset distance	Approx. 4500 mts	Considering Mesozoic
5	Receiver interval	5, 10, 15m options	On dip, frequency and velocity considerations
6	No of receiver channels	Dependant on receiver interval	Contractor to indicate total number of nodes, but expectation is for crew to have sufficient nodes to lay out 2 full lines to maintain production
7	Line Interval	1.5 Km for Dip and Strike Lines	Closer lines for small leads
8	Shot point interval	30m	
9	Line length	8-18 km	Covering Leads, adjacent basin floor and surface extension for migration aperture

Survey Area Map and 2D Seismic Survey Plan

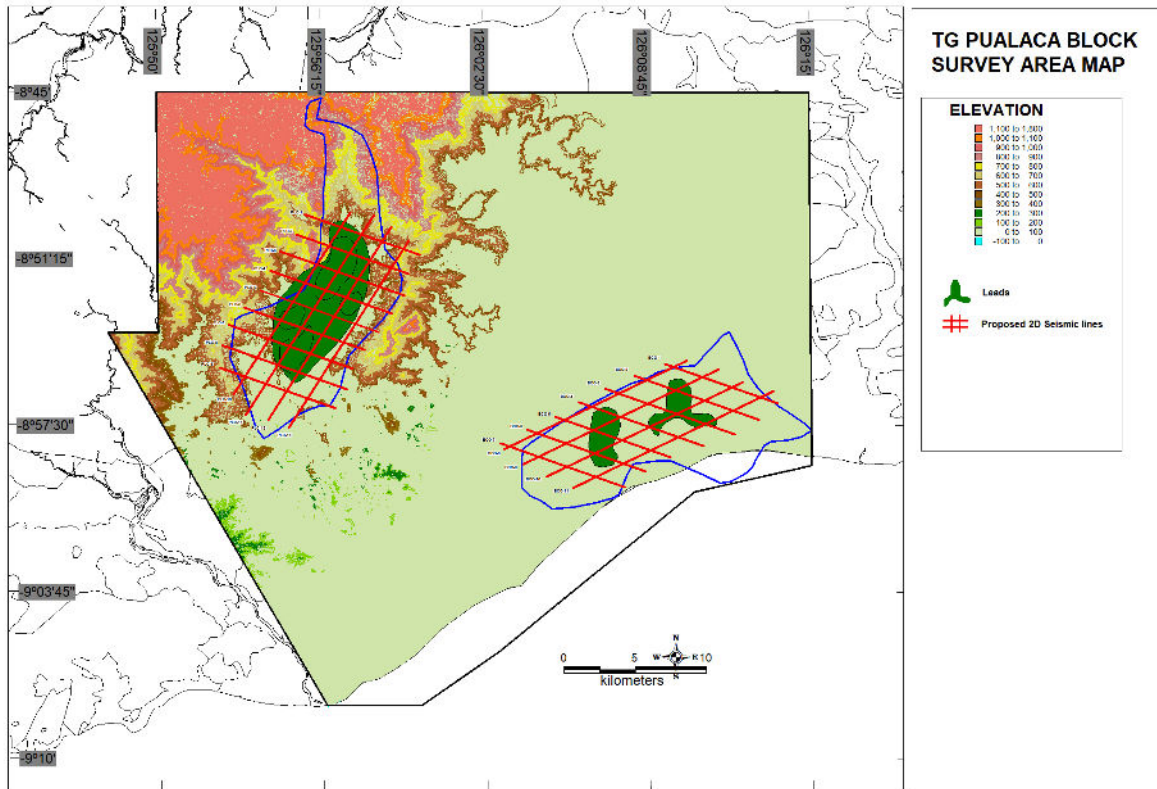


Figure 6. The schematic diagram of 2D seismic acquisition lines.

Table 1 Coordinate table of 2D seismic acquisition lines.

No.	Line Number	Distance(Km)	Coordinates Systems, Degree (Longitude/Latitude), WGS 1984				Azimuth
			Start Point (A)		End Point (B)		
			X (Easting)	Y(Northing)	X (Easting)	Y(Northing)	
1	PLC-1	8.54	125° 55' 39.1296"	-8° 49' 36.1452"	126° 0' 3.3228"	-8° 51' 6.9696"	109
2	PLC-2	8.34	125° 55' 18.4728"	-8° 50' 20.6484"	125° 59' 36.492"	-8° 51' 49.3524"	109
3	PLC-3	9.19	125° 54' 42.3648"	-8° 50' 59.838"	125° 59' 26.6532"	-8° 50' 59.838"	109
4	PLC-4	9.04	125° 54' 18.612"	-8° 51' 43.2756"	125° 58' 58.2672"	-8° 53' 19.4352"	109
5	PLC-5	8.84	125° 53' 54.7188"	-8° 52' 26.7672"	125° 58' 28.3368"	-8° 54' 0.756"	109
6	PLC-6	8.94	125° 53' 18.7404"	-8° 53' 5.8992"	125° 57' 55.314"	-8° 54' 41.0112"	109
7	PLC-7	9.19	125° 52' 42.6252"	-8° 53' 45.0816"	125° 57' 26.9244"	-8° 55' 22.8612"	109
8	PLC-8	9.24	125° 52' 26.5908"	-8° 54' 31.176"	125° 57' 12.4416"	-8° 56' 9.4884"	109
9	PLC-9	8.58	125° 52' 19.8228"	-8° 55' 20.4564"	125° 56' 45.5964"	-8° 56' 51.8676"	109
10	PLC-10	15.19	125° 52' 51.7332"	-8° 56' 22.3728"	125° 57' 23.7744"	-8° 49' 30.6948"	34
11	PLC-11	16.64	125° 53' 20.1444"	-8° 57' 8.1828"	125° 58' 18.2244"	-8° 49' 37.092"	34
12	PLC-12	16.08	125° 54' 11.016"	-8° 57' 20.034"	125° 58' 58.8216"	-8° 50' 3.9156"	34
13	PLC-13	15.59	125° 54' 59.1912"	-8° 57' 35.9532"	125° 59' 38.4072"	-8° 50' 33.3672"	34
14	BCO-1	8.389	126° 9' 23.778"	-8° 55' 11.0568"	126° 13' 43.5036"	-8° 56' 40.164"	109
15	BCO-2	9.238	126° 8' 13.668"	-8° 55' 38.6004"	126° 12' 59.67"	-8° 57' 16.74"	109
16	BCO-3	9.637	126° 7' 6.6468"	-8° 56' 7.2024"	126° 12' 5.0148"	-8° 57' 49.6008"	109
17	BCO-4	9.288	126° 6' 5.8068"	-8° 56' 37.9212"	126° 10' 53.3496"	-8° 58' 16.6224"	109
18	BCO-5	8.539	126° 5' 11.148"	-8° 57' 10.7604"	126° 9' 35.4996"	-8° 58' 41.5128"	109
19	BCO-6	8.738	126° 4' 7.212"	-8° 57' 40.4136"	126° 8' 37.7448"	-8° 59' 13.3008"	109
20	BCO-7	9.237	126° 3' 4.8204"	-8° 58' 10.5924"	126° 7' 50.808"	-8° 59' 48.8004"	109
21	BCO-8	14.29	126° 3' 13.356"	-8° 58' 24.0492"	126° 10' 15.6864"	-8° 55' 4.2096"	64
22	BCO-9	15.29	126° 3' 56.5848"	-8° 58' 57.6264"	126° 11' 28.4532"	-8° 55' 23.79"	64
23	BCO-10	15.34	126° 4' 50.1528"	-8° 59' 26.3076"	126° 12' 23.508"	-8° 55' 51.7584"	64
24	BCO-11	15.64	126° 5' 52.5876"	-8° 59' 50.7984"	126° 13' 34.806"	-8° 56' 12.03"	64

SCOUTING OF THE SURVEY AREA

The COMPANY requires that the Contractor is fully aware of all local conditions in relation to seismic operations. Contractor should conduct a detailed scouting trip prior to submission of technical & financial Bid proposal of the Project area to address, amongst others, the following issues:

- a) Sufficient base station locations for the survey system, as required.
- b) Hazard Maps.
- c) Operational Risk Assessment

- d) Baseline Environmental assessment of the survey area
- e) Evaluate effects and disturbance of the operation on the local habitats.
- f) Road Maps and location of airstrips
- g) Location of proposed base camp
- h) Local logistics and infrastructure.
- i) Local legal framework, in particular for labour and safety regulations.
- j) Licensing permits and tax requirements

Seismic Objectives

The aim of the 2D seismic program is to upgrade the existing mapping after 2D seismic acquisition. This seismic reflection survey will help to further delineate the structural configurations and shall be used:

- a) To enhance image on reservoir levels for better drilling locations and development of the field.
- b) To Identify and map major and minor faults at shallow / deep exploration targets.
- c) To seek reservoir characterization, Reservoir Monitoring.

SERVICES

Acquisition Technical Design and Actual Production Plan

CONTRACTOR shall provide COMPANY with and perform the following services in accordance with the requirement of COMPANY:

Before field operation, CONTRACTOR shall scout the working area and provide COMPANY with 2D acquisition operation program/design. The program shall be subject to seismic acquisition technique design provided by COMPANY and seismic lines operation schedule required by COMPANY and the program shall be approved by COMPANY Representative;

Provide detailed parameters test scheme, for both source effort and receiver density and actual production plan.

Provide 2D GPS Network Adjustment Report.

Provide security procedure plan.

Work schedule

1. The normal workday shall be not less than Ten (10) hours per day, not including travel time. A reduced workday shall apply as required to allow all CONTRACTOR vehicles and personal to return to camp before dark.
2. Only with HSE department's permission, working time can be extended till later after dark. The normal workweek shall be Seven (7) days per week.
3. All local legal holidays shall be observed. It is acceptable to COMPANY for the CONTRACTOR to work public holidays providing all relevant Timor-Leste legislation and laws are being followed.
4. Survey CONTRACTOR will mobilize the crew(s) consisting of equipment and personnel as defined in EXHIBIT 1, so that they are ready and in position in the assigned work site to commence WORK after receipt of the executed CONTRACT, and written notice from COMPANY on the mobilization.
5. Survey CONTRACTOR will mobilize to the Work Site an Advance Party, consisting of an Area Manager, Party Chief, Senior Surveyor and Junior Surveyor, The Advance Party should be available at the assigned work site within Twenty Eight (28) days after formal Contract award.
6. Survey CONTRACTOR shall arrange and provide at its own expense all applicable personnel, equipment, materials and supplies as described in EXHIBIT 1 herein to satisfy the COMPANY desired high productivity target and safety target.
7. Daily production reports showing progress of the seismic crew for each seismic section shall be presented to COMPANY Representative.
8. All CONTRACTOR Equipment must be supplied on a "fully operated and maintained basis by personnel fully trained in the maintenance and use of the equipment"

9. CONTRACTOR will hold a weekly safety training & meeting for all workers. Copies of the minutes of meeting shall be presented to COMPANY.
10. CONTRACTOR will be responsible for the safe delivery of the original of following items to COMPANY upon completion of each 2D Line and don't allowed any reasons detention. CONTRACTOR shall deliver the original-A first, then deliver the original-B upon the receipt of the original-A portion by COMPANY's E.D. Some deliverables' format may be specified in COMPANY while operation and also don't allowed any reasons detention.

Two (2) Sets of:

- a) Raw recorded correlated and summed shot records. (SEG-D format, 3592E)
- b) Correlated shot records with positioning data in headers (SEG-Y format, hard disk)
- c) Auxiliary data (all support data including SPS files)
- d) Recording observer's report (Automated).
- e) Seismic line survey report and survey data (in hard copy, SEG-P1 format).
- f) Refraction report (monitor, interpretation plot and interpretation summary)
- g) Uphole report (monitor, interpretation plot and interpretation summary)
- h) In-field processing sections (brute stack and PSTM)
- i) Audit reports
- j) Survey Project Report
- k) Parameters experiment analysis report
- l) Monthly reports
- m) Line acceptance log or data delivery list signed by the COMPANY's Representative
- n) Instrument Daily Test Monitor (one set)

Besides, three (3) copies of the following data also should be delivered to COMPANY office:

- a) Project operation design and attached drawing

- b) Summary report of test work, including text, drawings, forms.
- c) Final Summary report of the seismic project
- d) Any other report related to seismic acquisition requested by COMPANY's Representative
- e) Digit disk data with the complete data of all the survey data with SPS format, survey line report, survey project report, test analysis report, daily instrument log, instrument test result, the refraction and up-hole interpretation result, static correction data with SPS format, monthly report, final summary report and any other reports instructed by COMPANY Representative.
 - 1. CONTRACTOR will undertake to make use of the hiring of local to perform various duties and other positions that can be filled in support of the operations.
 - 2. CONTRACTOR, at its own cost, will ensure that suitable environmental clean-up and restoration is completed during and at project's end in a manner as generally outlined in SECTION C except that restoration shall not include restoration of grass, cut trees, or bridges built with culverts over seasonal rivers.
 - 3. CONTRACTOR shall designate personnel to specially be responsible for social relation, damage compensation and security issues. CONTRACTOR shall demonstrate a commitment to good ecological, social and security practices throughout the project. CONTRACTOR will be cognizant and protective of the environment, as well as sensitive to local issues and customs. Offensive behaviour by CONTRACTOR Personnel will be considered grounds for dismissal.
 - 4. COMPANY under mutual agreement of both parties, may take over operation of the CONTRACTOR Equipment at COMPANY's sole expense if, for any reason, financial or otherwise, CONTRACTOR cannot complete the WORK as described herein.
 - 5. CONTRACTOR will ensure that the geophysicist or seismologist provided to support the seismic operations and has sufficient expertise in the use of field processing hardware and software to ensure proper and continued use for data quality control, parameter testing and field processing of all recorded data.

6. CONTRACTOR Personnel shall attend a one-day briefing upon arrival at Work Site.
7. CONTRACTOR shall be responsible for all medical expenses incurred, during and after the seismic survey. International Emergency Medical Evacuation Insurance/Services (SOS/Compass/or equivalent) must be provided at CONTRACTOR's expense for all CONTRACTOR Personnel working on the project. Documentation proving the existence of this coverage must be provided to COMPANY prior to personnel mobilization from CONTRACTOR's base.
8. CONTRACTOR will prepare the organization charts indicating the project reporting structure and relationship of all personnel working on the project and submit to COMPANY Representative for approval prior to commencement of seismic operations.
9. The recording parameters will be finalized after initial experimentation and would be subject to changes from time to time during the survey in order to maintain the optimum quality of data acquired as decided by COMPANY's Representative.
10. All computer software shall be CONTRACTOR owned as per copyright and software protection laws.
11. All personnel, materials, equipment or vehicles supplied by CONTRACTOR shall be under the direct management of CONTRACTOR.
12. All local expenses, wages, etc. must be paid on a timely basis. Local banking arrangements should be established at the earliest time possible and adequate money must be transferred to Timor-Leste so that no delays in payment will occur.
13. COMPANY Representative in seismic crew shall be considered at a higher supervisory level to CONTRACTOR Party Chief. All communication from CONTRACTOR shall go through the COMPANY Representative in the crew.

ADVANCE AND BASIC PARTIES

1. CONTRACTOR shall detail all personnel, acquisition equipment, vehicles and technology & project support services. It will provide in respect of the Advance Party

for scouting, camp construction, establishing survey control points, etc. in the survey area in accordance with COMPANY's requirements in support of the WORK.\

2. CONTRACTOR shall submit the detailed plan and schedule for the mobilization of both the Advance and Basic Parties to COMPANY.
3. CONTRACTOR shall provide COMPANY all necessary documents such as program invoice, commercial invoice, packing list and bill of lading (all originals) relating to the importation of equipment and materials to Timor-Leste for the purpose of expediting the processing of tax exemption and customs clearance.
4. Advance Party

The Advance Party's task is to prepare for the arrival of the Basic Party and to commence WORK which may not require the full complement of personnel and equipment contained in the Basic Party. The Advance Party is to arrive at the site Twenty Eight (28) days after the formal Contract Award. Duties of the Advance Party shall include but not be limited to the following:

- a) Conform the base camp location in an area most suitable to all prospect areas as indicated by COMPANY.
- b) Make public relations visit to local government and regulatory officials, coordinated through COMPANY to get relevant permit for entry of the working area, clearance of base camp and lines and employ of local labour and get some other support if necessary.
- c) Scout the working area for making operation plan, clear road and base camp.
- d) Contact local rent COMPANY for proper facilities rent and local manpower company for labour employment, discuss with COMPANY security and local military for arranging security plan and security preparation.
- e) Accurately establish satellite control points and base lines for use in calibrating survey instruments and electronic measuring devices and for line positioning control net.

5. Basic Party

The Basic Party is to commence WORK when all of the following conditions are fulfilled unless waived in writing by COMPANY:

- a) All personnel listed in the Basic Technical Staff arrived at the Base Camp in Field.
- b) All equipment specified as necessary for the WORK are at the Base Camp and have been inventoried, tested and/or calibrated to the satisfaction of COMPANY, including but not limited to the requirements to geophone testing and so on.
- c) Duties of the Advance Party are performed to COMPANY satisfaction.
- d) Spares and supplies necessary to commence data acquisition are in stock at Base Camp and have been inventoried.
- e) Labour training, safety and operational induction have been implemented.
- f) Accept inspection and audit of COMPANY.
- g) Undertake and perform experimental operation and normal acquisition work as requirement of COMPANY.

DOCUMENTATION AND REPORTING

No.	Data name	Number of submission		Submission data
		Digitization	Paper	
1.	Project operation design and attached drawing	2	4	15 days before project operation
2.	Parameter test Plan, including text, drawings, forms.	2	2	before parameter test.

3.	Raw correlated and summed field data (SEG-D format, 3592E)	2	-	After each 2D line is completed.
4.	Seismic acquisition data (SEG-Y format, hard disk)	2	-	After each 2D line is completed.
5.	Auxiliary data (all swath SPS files)	2	-	After each 2D line is completed.
6.	Recording observer's report	2	4	After each 2D line is completed.
7.	Seismic line survey report and survey data (in hard copy, SEG-P1 format).	2	4	After each 2D line is completed.
8.	Uphole and Refraction reports (monitor, interpretation plot and interpretation summary)	2	4	After each 2D line is completed.
9.	In-field processing sections (brute stack and PSTM)	2	-	After each 2D line is completed.
10.	Audit reports	2	4	After crew set up audit is completed.
11.	Line completed Report	2	4	After each 2D line is completed.
12.	Parameters experiment analysis report	2	4	After Parameters

				test is completed.
13.	Monthly reports	2	4	After each month.
14.	Line acceptance log or data delivery list signed by the COMPANY's Representative	2	1	After each 2D line is completed.
15.	Paper Monitors	2	1	After each 2D line is completed.
16.	Instrument Daily Test Monitor	2	1	After each 2D line is completed.
17.	Final Summary report of the seismic project	2	4	30 days after survey completion
18.	Any other report related to seismic acquisition requested by COMPANY's Representative	2	4	30 days after survey completion
19.	Digit disk data with the complete data of all the survey data with SPS format, survey line report, survey project report, test analysis report, daily instrument log, instrument test result, the refraction and up-hole interpretation result, static correction data with SPS format, monthly report, final summary report and any other reports instructed by COMPANY Representative.	2	-	30 days after survey completion

Data filling requirements:

- a) CONTRACTOR should submit the documents in accordance with the time-table above, and submit the final reports in 15 days after passing the inspection and acceptance.

- b) All the data should be submitted in Mongolian, Chinese and English respectively.
- c) The binding mode of the documents is the adhesive binding with line. COMPANY will provide the data layout form to CONTRACTOR.
- d) For digitization documents without special instructions, Party B shall submit digital data in the form of mobile hard disk and print the contract name, the block name and the name of two parties.
- e) The digital documents should be in PDF and editable form.
- f) All acceptance, periodic, and daily test results and supporting documents become the property of the COMPANY. Unless otherwise specified the documents, tapes, and digital media associated with test procedures and tasks must be sent to the Field Supervisor at the address specified in the Order.

GEODETIC PARAMETERS

Geodetic Parameters to be used during seismic acquisition:

SPHEROID	WGS-84
DATUM	WGS-1984
PROJECTION	UTM Zone 51 S
CENTRAL MERIDIAN (CM)	123 Degrees East
REFERENCE LATITUDE	Equator or 0 degrees North
SCALE FACTOR, K	0.9996
FALSE EASTING	500,000 m
FALSE NORTHING	1,000,000 m
PROJECTION UNITS	Meters

BIDDER'S PERSONNEL AND FIELD EQUIPMENT

Personnel

Following is the list of minimum personnel to be made a part of the agreement for seismic data acquisition, between the Company and Contractor for 2D seismic reflection data acquisition in the Project.

1	Party Chief	01
2	Recording Observer (05 to 15 years experience)	03
3	QC Geophysicists (05 to 15 years experience)	02
4	On-site seismic data processor(05 to 15 years experience)	02
5	HSE Advisor (one for base and one for fly camp)	02
6	Medical Doctor	02
7	Accounts / Admin Assistants	02
7	Surveyors	07
8	Radio Operator	02
9	Recording Field Assistant	02
10	Drilling Technicians	00
11	Vibrator Technicians & Shooting Supervisor	03
12	Vibrator Operators	06
13	Plant Attendant / Electrician	02
14	Mechanics	05
15	Carpenter	01
16	Dozer Operators	As required
17	Line Crew / Line boss	As required
18	Any other as per requirement (cook & bearer)	

Field Equipment

Following is the basic field equipment which will be provided by the Contractor to perform the 2D seismic reflection data acquisition job in the Project.

A.	RECORDING EQUIPMENT	
	1.	Recording / Instrument Type / Make / Model / Specification providing manufacturer details and capacity for all components (hardware / software), including node harvesting and charging.
	2.	Number of available Geophone nodes . Please provide Technical Literature
	4.	Detail of auxiliary / test equipment for geophone nodal system
	5.	Encoder / Decoder (Shooting Equipment) Equipped with GPS.
B.	SOURCE EQUIPMENT	
		Energy source for the area
	1	Vibrators (At least 05 Nos.), Peak force not less than 60000 lb equipped with DGPS System.
	2	Weight Drop Units (At least 05 Nos.), equipped with DGPS System. Contractor to provide details on units (gravity drop or accelerated/ timing instrumentation)

	3	Dynamite drilling / firing equipment
C.	REFRACTION/UPHOLE LOGGING UNITS	
	1	Up-hole Logging Unit
		24 bit Instrument with Specification, type of geophones & numbers (4.5 HZ) Rig with Capacity(100m)
	2	LVL / Refraction Survey Unit, type of geophones & numbers
		Instrument Specification / Spread Length / Channels
		LVL processing & Statics calculation software
	ON-SITE SEISMIC DATA PROCESSING UNIT AND 2D PLANNING AND DESIGNING SOFTWARE	
	1	Make / Model of Hardware / Plotter
	2	Detail of 2D Processing Software
E.	GPS AND SURVEY EQUIPMENT	
	1.	Make /Model of GPS and other equipment
	2.	Version Number
	3.	Survey Computation Software
F.	Detail of vehicles and other machinery like dozers, tractors and Generators in the crew.	

G.	Radio and Communication equipment & facilities
H.	Experience of working
I.	Miscellaneous equipment etc.

PARAMETERS AND TECHNICAL STANDARDS

General Work Standards

1. **PURPOSE:** The Work Standards set forth below are intended to provide a reasonable minimum standard of reference for CONTRACTOR work performance. COMPANY rejects any data provided by CONTRACTOR for failure to meet the minimum work standards, CONTRACTOR shall re-record the data in a timely manner at no cost to COMPANY.
2. **CONTRACTOR'S OWN WORK STANDARDS:** In the event CONTRACTOR routinely operates under CONTRACTOR work standards which are more stringent than corresponding items herein, the more stringent standards of CONTRACTOR shall apply subject to review and concurrence of COMPANY Representative.
3. **MODIFICATION OF SPECIFICATIONS:** Any alteration or modification of these specifications shall be done only with the approval of COMPANY's Representative. COMPANY's Representative(s) at the Work Site may waive the requirement to re-record all or part of a particular line or VPs interval if doing so is consistent with the overall objectives of the WORK.
4. **COMMUNICATION:** CONTRACTOR shall maintain continuous, effective two-way communication between their base office and their crew and COMPANY.
5. **DATA ACQUISITION:** At all times while survey is under way, CONTRACTOR's operator shall ensure that all instruments are properly calibrated, equipment operating correctly and that all recorded data are readable, accurate, and properly annotated.

6. While COMPANY will normally specify the main seismic and equipment parameters, CONTRACTOR is encouraged to suggest innovations, which it considers, would result in the improvement of data quality and production. CONTRACTOR shall submit recommendation on the improvements for the COMPANY to approve before applying the changes/innovations.
7. CONTRACTOR will be responsible for the daily monitoring of the recorded data and shall immediately inform COMPANY Representative in seismic crew in writing if the data quality fall below the standards specified in this schedule or if the recorded data are technically impaired in any way.

The following standards shall apply to the WORK

1. 2D Recording Parameter - Production Recording

The following is subject to changes to accommodate the parameter tests result.

- Recording

a) Instrument	a) Details of harvester / charging system
b) Sample rate	2ms
c) Record length	6 seconds
d) Low cut filter	Out (or to be confirmed)
e) High cut filter	250Hz (or out to be confirmed)
f) Format	SEG-D
g) Pre-amplifier gain	12 dB (To be confirmed)
h) Recording medium	IBM 3592E cartridge compatible

i) All acquisition & auxiliary equipment

Pass test and have not been repaired

- 2D Geometry

The recommended 2D geometries selectable in this CONTRACT are as following table (Actually the 2D geometry adopted shall conform to that defined or defined in the test approved by COMPANY)

The operational mode on survey margins is roll in and roll out.

Option:	A	B	C	D	E
Geometry (meters)	4500 – 7.5 – SP – 7.5 - 4500	4500-7.5- SP-7.5-4500	4500-5-SP- 5-4500	4500-5-SP- 5-4500	4500-2.5- SP-2.5-4500
Number of live traces:	601	601	901	901	1801
Trace Interval:	15	15	10	10	5
Shot point Interval:	15	30	15	30	30
CMP Spacing	7.5	7.5	5	5	2.5
Nominal Fold (Unique/Total)	150/300	75/150	150/300	75/150	75/150

Note – intention for the 5m receiver spacing option would be for dense traces to be utilised through statics and noise attenuation phases of data processing work flow, before being summed into larger groups ahead of imaging workflow.

Equipment not tested in the Acceptance Tests may be used if tested by the comparable Periodic Test sequence. Equipment or electronic instrumentation will not be used for seismic data acquisition unless it has passed an Acceptance Test or a Periodic Test.

- Source

The CONTRACTOR shall perform all operations and discharge all shots/vibrations at a safe distance, and beyond the minimum distances specified by the Government or COMPANY (pursuant to this CONTRACT), whichever specifies maximum distance from all property owned by third parties, and the CONTRACTOR shall take all reasonable steps to minimize the risk of damage by concussion or otherwise to such property. In the absence of Government prescribed distances, the CONTRACTOR shall operate in accordance with the directions provided by COMPANY.

a)Type	SERCEL or INOVA Vibrator- within five years
b)Hold down weight	62000 lbs (at least) equivalent
c)Maximum Peak force	60000 lbs (at least)
d)Drive Level	70-75% after test
e)No. of vibrator	5 (4 working, 1 spare)
f)Sweep length	16 s after test
g)Sweep frequency	5-96 Hz, after test
h)Sweep type	Linear
i)Taper	300 ms after test
j)Vertical Stack	2-4 after test
k)Vibrator distance	12.5 m
l)Vibrator QC	Sercel VE432/464 QC or equivalente
m)Shot position	Array centered between two receiver stations

Contractor is required to propose a full vibrator test suite including vibrator array size and sweep design.

- LVL (Refraction) Survey

a) Recording system	R-24 or equivalent
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b) Refraction interval	1.5 km average, up to one km for complex area (To be confirmed)
c) Length of spread	120m – 200m (to be confirmed)
d) No of channels	24/48 channels
e) Minimum offset	1-2 m (to be confirmed)
f) Channel interval	1m, 2m, 3m, 5m, 7m, 10m, 10m, 15m, 15m, 20m, 25m, 30m, 25m, 20m, 15m, 15m, 10m, 10m, 7m, 5m, 3m, 2m, 1m respectively (may be changed if not suitable)
g) Recording length	512 ms
h) Sample rate	0.25 s
i) Source	Weight drop on ground
j) No. of shots	2 shots (one on either side of spread)

- Uphole Survey
 - a) Upholes to be acquired to a depth of 100m
 - b) Upholes to be located at all line intersections

The operation method is as design approved by COMPANY.

All the detail parameters shall be decided finally by the test in working site.

- In-field processing section

The In-field processing is the basic processing up to stack for QC in the field operation. COMPANY could add the additional step in special purpose. The Hardware and software should be capable to run such processes as frequency domain analysis, FK, Amplitude spectrum, S/N analysis, Residual static correction and Pre-stack time migration.

CONTRACTOR shall address briefly the surface condition on the section; analyse and explain the reason while poor data section occurs.

EQUIPMENT TESTING BEFORE COMMENCEMENT OF SURVEY

1. COMPANY will observe the tests laid down hereunder and will inspect CONTRACTOR's equipment at mobilization to ensure all equipment are in good condition and functioning in accordance with the manufacturer's specifications. All tests shall be performed in the presence of and verified by COMPANY Representatives.
2. A full set of manufacturer's specified instrument tests, including but not limited to those specified hereunder shall be performed at the following times:
 - a) Before the commencement of the survey.
 - b) At Thirty (30) days intervals throughout the survey (monthly tests).
 - c) On completion of the operation.
 - d) Following instrument failure and subsequent repairs.
 - e) As reasonably requested by COMPANY's Representative.
3. The full set of manufacturer's specified instrument tests
4. All data acquisition nodal units available on the crew shall be tested prior to commencement of the survey. On a weekly basis, 25% of all recording nodes, selected at random, will be retested through the manufacturers specified testing program. Any which fail to meet the manufacturer's specifications shall be withdrawn from use until such time as they have been repaired/replaced and satisfactorily re-tested.
5. All vibrators will be thoroughly tested including: start time calibration; tap tests; hard wire similarities using possible production sweep parameters. Mass and baseplate accelerometers shall be used. Full computer analysis (using a COMPANY approved system) including: Phase; Harmonic Distortion; Fundamental Ground Force; shall be documented and copies of this report, which shall include details of ground conditions, will be available on the crew for the duration of the survey.
6. All vibrator electronics, correlators and stackers should be tested. These tests should include but not be limited to the following, subject to the equipment in use:

- a) Summation of positive and negative sine wave of same frequency (sum-to-zero test).
 - b) Summation of positive sine wave of harmonic frequencies.
 - c) Examination of pilot/test correlation from correlator.
7. If any of these tests are performed automatically, full details should be supplied to COMPANY's Representative.
 8. If the recording crew is equipped with radio line communications, the input noise of the seismic instrument recorded at maximum gain while transmitting should be checked and recorded on the monthly test tape.
 9. The polarity of all systems, including vibrators, recording instruments, geophones, tape deck and camera, should be demonstrated to satisfy the 'SEG' normal polarity. This test should be extensively documented. Copies of this report will be sent immediately to COMPANY's Representative, and the COMPANY's data centre and a copy shall be available on the crew at all times.
 10. As an integral part of the above-mentioned tests, CONTRACTOR shall perform the following manufacturer tests on all nodes prior to commencement of recording:
 11. A hard copy of these test results for each node (marked with a unique number) must be approved by the COMPANY Representative in seismic crew.
 12. Both a hardcopy printout and ASCII file on diskette of all geophone test results from all geophones shall be submitted to COMPANY Representative prior to commencement of recording. All other tests shall be processed on the In-field processing system and similarly submitted to COMPANY Representative prior to commencement of recording.
 13. A complete set of manuals; specification sheets and technical drawings shall be made available in the field office for all instruments, cables, boxes, geophone and other major equipment.
 14. Contractor shall have in place at the work site a periodic/routine maintenance system and personnel to ensure that all cables, receivers, and connecting wire and plugs are electrically and water-bath tested every 30-45 days unless otherwise agreed upon

INSTRUMENT/EQUIPMENT TESTS DURING OPERATIONS

1. The recommended selection of tests from the manufacturer's tests listed above shall be performed and recorded daily throughout the survey including but not limited to:
 - a) Vibrator radio similarities test (daily) and wire line similarities test(weekly)
 - b) Correlator test

“or” Tests as specified by COMPANY Representative on site

2. The daily tests should include a procedure for ensuring that all recording parameters are correct. These include, but are not limited to sample rate, filters, pre-amp settings, record length, sweep parameters and pilot sweep routing, correlation and summing parameters and order, noise suppression etc.:
3. A set of all tests with production parameters should be available in the recording truck to the observer and COMPANY Representative at all times.
4. COMPANY Representative shall be promptly informed of any Equipment breakdown or malfunction as well as operational anomalies, situations out of specifications or which may cause a potential problem.
5. COMPANY Representative shall have the right to request any tests at any time when there is reasonable doubt as to the correct functioning of any Equipment.
6. No research, software or hardware modification is permitted after the acceptance phase of instrument testing without the explicit written approval of the COMPANY
7. Periodic Test series and audits are intended to demonstrate continuing performance to specifications, and may be required weekly, monthly, or at a time-specified cycle by agreement between COMPANY and Contractor at the beginning of the project.

TECHNICAL SPECIFICATIONS

1. Quality Assurance and Quality Control

- a) CONTRACTOR is responsible for ensuring that all equipment is performing to manufacturers' specifications.
- b) All Equipment shall be demonstrably fully operational before commencement of the WORK and shall be maintained in this condition throughout the WORK.
- c) CONTRACTOR shall ensure that the technical specifications and quality standards and procedures as detailed in this document are complied with at all times.
- d) Instrument tests and calibrations shall be in accordance with manufacturers' specifications and/or CONTRACTOR's recommended procedures. In the latter case, CONTRACTOR shall submit its procedures to COMPANY Representative for approval.
- e) Throughout the survey CONTRACTOR shall operate a quality system which conforms to the requirements of SY/T-5314-2016 or standard specified by COMPANY and shall use the system to ensure that quality standards are maintained throughout the WORK.
- f) CONTRACTOR shall ensure that all operational logs and reports are written legibly in good English and correctly annotated.
- g) COMPANY reserves the right to use its own quality control and/or processing systems in addition to any system provided by the CONTRACTOR. The provision of such systems shall not relieve CONTRACTOR of its quality assurance and quality control responsibilities.
- h) CONTRACTOR shall provide all necessary information and assistance relating to interfacing of quality control systems if requested by COMPANY.

DEFECTIVE RECORDING CHANNEL AND DEFECTIVE RECORDS

1. A RECORDING CHANNEL WILL BE CONSIDERED DEFECTIVE IF:

- a) Nodes are not placed in accordance to specification.
- b) Wild, dead, or weak trace.
- c) The node is not operating in accordance with manufacturer's specifications.
- d) A trace showing leakage less than 1 megOhm.
- e) A trace whose polarity is reversed or cannot be determined.
- f) A trace showing unacceptable levels of ambient noise.
- g) A trace showing unacceptable levels of preventable noise generated by the seismic crew (6 dB more than adjacent traces).
- h) It is distorted or has a phase/time shift greater than 1 millisecond.

The minimum binning / fold requirements must be met relevant specification in spite of any bad traces.

All instrument settings, instrument problems, bad traces, missed time breaks, and parity counts are to be logged clearly in the observer's report.

Sensitivity to ambient noise. If the soil conditions or node design are not suitable for node burial, then each node shall be firmly planted vertically with the top at or below ground level.

2. DEFECTIVE RECORDS

- a) Recorded data shall be considered defective if any of the following occur (but not limited to following conditions):
 - i. There are any timing or large time break errors.
 - ii. There is more than two defective recording channels per live line at the start of a day's production or more than 2% of total channels per live line during any day's production.
 - iii. The instrument fails to meet manufacturer's specifications in any way, in particular as evidenced by instrument tests.

- iv. Recording instrument/vibrator electronics settings have not been verified as within specifications;
 - v. Any Vibrator malfunctions;
 - vi. Excessive overdrives, i.e. clipping of seismic data traces.
 - vii. The daily vibrator similarities are not complete and verified as within specifications.
 - viii. The spread of receiver groups recorded differs from the intended spread by more than five percent; The number of receiver groups recorded is fewer than the correct number by more than five percent;
 - ix. For Vibroseis recording, unless otherwise permitted in an Order, any of the following additional criteria define a defective record : The post-sweep attributes have not been recorded on digital media ; The required source location GPS Navigation system has failed ; The Vibroseis point has not recorded a correlated seismic record with filtered reference ;
 - x. Subject to the foregoing, all defective seismic records must be reacquired as soon as reasonably possible after the recording defect or source defect is noticed, unless COMPANY Representative agrees that some defective records cannot or need not be reacquired. Any remedial action must accepted by the COMPANY Representative.
- b) CONTRACTOR must adhere to good geophysical recording practices and not record data while spread is noisy due to rain, wind, vehicle or personnel movement, generator noise, etc.
- i. Whenever CONTRACTOR fails to meet standards or conditions of Defective Recording, CONTRACTOR shall for such time be deemed to have failed to meet technical standards.
 - ii. Any deviation from the above specifications shall receive prior written approval from the COMPANY Representative.
 - iii. No acceptance for misfire/failed VPs (Vibrator malfunctions) in the 2D operation and re-acquiring is a must for any failed VPs. Within 10% of fold reduction in 2D operation, the maximum 3% of defective VPs for anyone line,

and the maximum 2% of defective and skipped VPs for whole project could be accepted by COMPANY.

3. RECORDING SPECIFICATIONS

- a) Pre-project, monthly, weekly and daily instrument checks shall be conducted in accordance with manufacturers' specification and accepted standards of the profession. All tests, together with noise strips, will be recorded on magnetic tape. The results of monthly and weekly tests, including field records, shall be provided promptly to COMPANY for analysis and review. The results of daily tests shall be communicated to COMPANY's Representative(s) on the crew. Any component not meeting specification shall be replaced or repaired and then re-tested before survey continuation.
- b) The source positioning field equipment shall be checked regularly at an interval agreed between COMPANY and CONTRACTOR. Basically, the check consists of comparison of simultaneous, position common (offset corrected) locations taken by various sets of equipment.
- c) Before commencing recording operations, the CONTRACTOR shall check the polarity. This polarity, for velocity detectors is the first arrival of energy or a tap on the underside of a geophone will produce a negative number on tape and a down going deflection on a paper monitor.
- d) CONTRACTOR shall provide a detailed description of the recording system (in English) with particular reference to dynamic range and system response with low cut production filters out.
- e) A detailed description of the operating parameters encoded in the tape header must be provided at survey commencement, every instrument parameter must be reviewed in accordance with the acquisition parameters contained within this document.
- f) Data Recording to Magnetic Tape:

f-1 Seismic data shall be recorded in SEG-D format on IBM compatible 3591E/3592E magnetic tape.

f-2 Correlated summed field data will be recorded to tape. CONTRACTOR recording system or field processing system must be able to facilitate comparisons of field records that have been summed and correlated with a different number of sweeps

f-3 CONTRACTOR shall record all data onto new (previously unused), high quality certified tape cartridges.

f-4 All necessary steps shall be taken to maintain parity error-free recording. All parity errors must be logged.

f-5 At least once weekly (or additionally as requested by COMPANY's Representative), one tape cartridge from those recorded on each transport shall be selected and played back on the other transport (i.e., record on "A" playback, on "B" and vice versa). Playbacks shall be made of records for which monitors had been made during recording. Playbacks shall be filed with their respective monitors. In lieu of this, reading tapes on a separate transport for entry into a processing system is acceptable.

f-6 High capacity (3590) tape reels may contain data from multiple survey lines. Interrupted portions of a survey line should be recorded on a common cartridge.

f-7 Final seismic data delivery to COMPANY should be Hard Disk additionally.

4. NODE SPECIFICATIONS

- a) Prior to the commencement of the survey and on COMPANY's request CONTRACTOR shall submit to COMPANY the complete manufacturer's specifications describing the node parameters including the type of geophone, frequency response curves, coil and damping resistor, the geophone sensitivity, total geophone string resistance and marked with a unique number, the type of connector(s) and all data available on the cable in use. Date of manufacture of equipment will also be indicated.
- b) Throughout the field recording operations, CONTRACTOR shall provide regular and thorough geophone .
- c) All equipment should be checked in rotation at least once per month. A clear and legible logbook of geophone and cable rotations and listing repairs undertaken should be maintained in the recording workshop. The results of these tests, which shall include full immersion leakage test, polarity and distortion tests, shall be made available for

inspection by COMPANY's Representative in seismic crew. COMPANY requires rigorous adherence to these specifications before the acceptance of Basic Party.

- d) Prior to the start of the seismic survey, all the geophone strings and cables shall be numbered and tested. Any geophone not conforming to manufacturer's specifications must be replaced. If required, random strings of geophone will be selected by COMPANY Representative in seismic crew for testing.
- e) All geophone shall be tested upon insertion into the spreads. No geophone, which fails this test, shall be deployed until repaired and subsequently passing this test.
- f) CONTRACTOR shall provide information on the sensitivity of the geophone sensors quoted in appropriate units.
- g) Location of geophones

1) CONTRACTOR's field supervisors shall ensure that all geophone plants achieve proper coupling with the ground. Either spike or flat bases may be used, as appropriate for the condition of the ground. Geophones shall be buried to minimize wind noise.

2) All receiver groups shall be fully operational before recording of each day.

3) In the case of 2D recording, receiver stations shall be located with the following hierarchy:

- If receiver points have to be offset for obstacle(s), the moving distance of Offset receiver point at cross-line shall not more than 5m, otherwise, the offset shall be confirmed by COMPANY's Representative
- Skid/move receiver points in such a manner as to minimize the distance between the staked and planned location.

5. VIBRATORS SPECIFICATIONS

After servicing (hydraulic, mechanical and electronic) a vibrator being used on the survey, all the parameters will be carefully checked before resuming production.

1. Operating Specifications

- i. CONTRACTOR shall provide to COMPANY a minimum of Four (4) plus One (1) spares fully mechanically, hydraulically and electronically operationally sound vibrators, as specified according to this CONTRACT.
- ii. A complement of One (1) spare units must be maintained on the line to ensure that no reduction in the overall energy source parameters and configuration occur through vibrator breakdown and lack of an operational replacement. COMPANY will not accept any production where CONTRACTOR cannot provide the agreed number of vibrators for normal production. Only in exceptional cases with the written approval COMPANY's Representative can the crew continue production for a limited time with One (1) less vibrator, if data quality permits. The number of sweeps shall be increased accordingly.
- iii. The number of vibrators specified for production data acquisition must be fully operational at the start of each day's production. Thereafter, production may continue for a limited period of 30 minutes, provided that the number of sweeps is increased proportionally. The product of the number of vibrators times the square root of the number of sweeps must be the same as if all vibrators were on line.
- iv. All vibrators provided by CONTRACTOR shall operate with a peak force output of not less than Eighty percent (80%).
- v. CONTRACTOR shall ensure that maximum required drive levels are used. Excessive drive level settings which may result in pad de-coupling, thus producing distortion and harmonics should be avoided, if ground conditions dictate lower drive level settings CONTRACTOR shall inform COMPANY's Representative whenever drive levels from standard settings should be altered.
- vi. Each vibrator shall be fully equipped with Pelton Vib Pro, Sercel VE-432/464 or similar electronics package with the latest software version releases from the manufacturers.
- vii. CONTRACTOR will ensure that sufficient spare parts are available at all times to maintain a full set of vibrator electronics in all vibrators contracted to COMPANY.

- viii. The main control unit will be installed in the recording truck and will act as the master control unit for the energy source system. Mobile systems shall be installed in each of the vibrator units.
- ix. All ID numbers and control system codes must be documented and presented to COMPANY's Representative at the start of the program.
- x. Vibrators and electronic systems shall be capable of providing a suite of options including but not limited to non-linear and linear sweeps, up and down sweeps, sweep scaling.
- xi. Constant monitoring in the recording truck for phase, distortion, RMS and maximum amplitude values, amplitude spectrum and other prime sweep attributes within the sweep control unit shall be performed by CONTRACTOR. This shall be shown on a separate monitor and controlled through an independent computer.
- xii. CONTRACTOR shall make available at the completion of each work day, a diskette and supporting hard copy print outs of attributes that CONTRACTOR and COMPANY determines best, to indicate the acceptance of the source performance for that day. After each day's production, the source QA data on diskette and in an acceptable format to COMPANY, and be made available to COMPANY's Representative for analysis.
- xiii. COMPANY preferentially requires CONTRACTOR energy source logging system to provide historical end of day hard copy attributes of accelerometer output, phase error, total distortion percentage, fundamental ground force and ground viscosity / stiffness. CONTRACTOR shall regardless provide the necessary hard copy evidence to ensure overall quality assurance guarantees for the source array.
- xiv. During production, operations with the source array must be clearly logged and documented by the observer on observer logs. Pertinent information to be reported will be any failures that occur during sweep, failure of units to sweep or for any other reason that the full source system does not meet operational specifications.

- xv. For 2D seismic programs, the energy source array shall be centered at the midpoint between two receiver station stakes. The proposed source array will likely be an in-line type array. Final desired array patterns and dimensions will be determined during start up parameter testing. CONTRACTOR shall make best effort to select the most efficient parameters and to get the confirm from the Representative as to not limit recording productivity. To avoid unnecessary skips, it will be acceptable for the CONTRACTOR to offer reduced arrays in areas of difficult access.
- xvi. A valid QC, Pelton or similar COMPANY approved hardware and software package will be made available throughout the conduct of the program by CONTRACTOR, to enable independent detached analysis of vibrators. All vibrator analysis will be performed by CONTRACTOR provided VIB QC software.
- xvii. CONTRACTOR shall equip each vibrator with a DGPS system, to monitor positioning of each unit and improve overall survey accuracy. These units shall be operational at all times. In the event of signal blockage preventing downloading of GPS data, a maximum of One (1) hour of data may be acquired prior to cessation of production, in order to rectify the cause of the problem. Within the dense forest area, if practical, GPS mode shall be acceptable.
- xviii. CONTRACTOR shall provide all equipment that is required to perform daily, weekly and monthly tests on the vibrators and electronics as specified herein.
- xix. CONTRACTOR will adhere to the following vibrator specifications, unless CONTRACTOR's own specifications are more stringent:
- Sweep will be in a raw mode rather than a filtered mode
 - The use of an Auto Drive level is not acceptable.
 - Start time error: +100 microseconds from the Pilot sweep excluding various delays due to Radio transmission
 - Maximum phase locking: ± 10 degrees in raw mode over the duration of the sweep not applicable in Kalman filter mode.
 - Average phase locking: ± 3 degrees
 - Force envelope: 6 dB from end of start taper to start of end taper

- Harmonics: Post correlation harmonic component amplitude less than -40 dB from correlation –wavelet peak.
- Avg. distortion 2.5%
- Max distortion 50%
- Min. drive level 175% - or as dictated by ground conditions
- Start taper length 300 msec
- End taper length 300 msec

Notwithstanding the above, final vibrator specifications will be determined following discussion and technical audit, when undertaken by COMPANY.

- xx. Real time monitoring of each sweep/VP will be undertaken, to evaluate the reaction of all production vibrators to changing ground conditions, which may be instrumental and the cause of error messages, emanating from the source units. Assessment of each unit, relative to other operational units, will determine the tolerance of COMPANY and COMPANY's Representative acceptance of such error message flagging, drop in drive levels and higher distortion levels.
- xxi. If, during the course of the day, a vibrator is identified to have more than two VP stations with "out of specification" flagged or non-flagged errors, then CONTRACTOR shall remove unit from active duty to determine causation and subsequently rectify faults, prior to unit returning back to active duty.
- xxii. At all times the observer will closely monitor the performance of each vibrator during production.
- xxiii. Each vibrator shall be positioned to maintain spacing within 20% of that specified unless contouring or obstacle avoidance procedures are required.
- xxiv. An interval of 250 msec after the initial sweep taper shall be allowed for the vibrator to come into phase requirements. The instantaneous phase difference after this "grace period" between any vibrator control signal and the pilot sweep shall not exceed 5 degrees for frequencies of less than 20Hz an instantaneous time error of 1 msec shall be acceptable. Due consideration will be given to the change in terrain, for example, when the vibrator units move from hard packed trails to cross country operations.

- xxv. On systems with amplitude control the maximum relative amplitude variation between pilot spectrum and ground force spectrum will not exceed \pm (plus or minus) 15% over same time window defined above.
- xxvi. Maximum absolute amplitude difference between ground force spectra from any pair of vibrators located on similar surface terrain will not exceed \pm (plus or minus) 15% over same time window as defined above.
- xxvii. After compensation for radio transmission delays and multiplexer delays, maximum time difference between the vibrator reference sweep and the correlation pilot will not exceed manufacturer's specified start time accuracy.
- xxviii. Harmonic distortion exceeding a threshold of 50% as indicated by vibrator QC system will be reported immediately to COMPANY's Representative.
- xxix. Any vibrator operating with consistently higher, (10% plus), distortion than other units on similar ground (indicated through reduced drive/scale factor) will be thoroughly investigated until cause is known.
- xxx. Where communication response between the source units and recording truck or vice versa, is affected by geographical, topographical or other forms of interference, which prevents the downloading of vibrator performance data at the end of every source station, CONTRACTOR shall endeavor to rectify communication problems within Fifteen (15) source points. If problem persist, CONTRACTOR shall take whatever necessary action is needed to re-establish communications between source units and the recording truck prior to continuing production. CONTRACTOR must ensure that vibrator performance continues to meet specifications during the time of communication signal loss.
- xxxi. Vibrators will be maintained to manufacturer's operating specification in particular with regard to items affecting geophysical performance:
- Correct pressure in high and low pressure hydraulic systems. (Pressure gauges for high and low systems should be visible from inside vehicle cab)
 - Hydraulic leaks should be kept to a minimum.
 - Correct pressure in baseplate isolation airbags.
 - Correct pressure in nitrogen bladders.

- Baseplate lift chains will be maintained at correct tension.
 - No excessive slackness in baseplate tie rods and bushings.
 - Reaction mass centering within ± 1 cm (in stationary position).
 - No visible cracking or bending of the baseplate or stilt structure.
 - No excessive leakage from mass or lift cylinder seals.
 - If available, baseplate mats will be used on all vibrators for operating on highways or other paved road surfaces.
- xxxii. Move-up delay times will be set to ensure no late starts during a pattern. In changing terrain delay time will be adjusted as necessary. However, excessive delays will be investigated.
- xxxiii. In the event that all units miss a sweep during the acquisition of any VP point during the course of the Program, then that VP point shall be re-acquired in full.
- xxxiv. All missed sweeps will be, where practical to do so, investigated by the source mechanic or supervisor.
- xxxv. In the event one vibrator misses 25% or more of the sweeps in a pattern, the VP will be re-swept.
- xxxvi. On occasions where a single sweep has to be missed by a vibrator unit, due to operational reasons, caused by the indigenous presence of local infrastructure, every effort shall be undertaken by CONTRACTOR to reposition the vibrator, to prevent such a sweep loss. CONTRACTOR shall log occasions when the above has to be implemented.
- xxxvii. Servicing and maintenance diaries will be kept for all vibrators. These shall be made available to COMPANY's Representative, as required for inspection and control purposes.
- xxxviii. If the recording crew is equipped with radio line communications, the input noise of the seismic instrument recorded at maximum gain while transmitting has to be checked and recorded on the monthly test tape.

- xxxix. CONTRACTOR shall also provide all the necessary cabling, independent base plate and mass accelerometers to perform start up and weekly wire line tests. The provision of analysis software must be a part of the energy source technical support package.
- xl. Start-up technical audit and inspection tests shall be conducted at the discretion of COMPANY Representative on all vibrator units.

2. Vibrators Specific Tests

Before production begins, CONTRACTOR shall provide the procedures for daily and/or monthly tests (manufacturers' and CONTRACTOR standards) specific to this equipment (vibrators, their electronics, the correlator stacker, etc.), as well as the equipment used for quality control.

1. Checks prior to survey start

i. Similarity tests

- Conformity checks on the polarity of the acquisition chain: reference correlation signal, reference vibrator signal and ground force signal.
- Zero time homogeneity and repeatability tests (recording instrument, encoder and vibrators).
- Sweep acquisition for each vibrator. These signals will be recorded uncorrelated and will be later correlated with the reference sweep. The reference sweep will be the one used for correlation during the entire survey period.
- The correlated signal peaks will be delayed by the time difference between the end of vibration and the end of recording.
- Sweep acquisitions will be performed by cable and by radio. They will be recorded on auxiliary or seismic channels.
- Sweep acquisition of all vibrators operating simultaneously, uncorrelated then correlated, operation repeated to obtain a VP-equivalent stack.
- Uncorrelated and correlated documents will be supplied to PCOSB.

ii. Correlator - Stacker Tests

- Stacking function tests.
- Correlation function tests (polarity, minimum phase or zero phase correlation).

- Calibration before stack checks
 - Stack amplitude variation checks
 - Gain recovery checks.
 - Noise elimination system checks.
 - Weighting checks on the noise elimination windows.
 - Amplitude variation checks.
- iii. Other tests
- For comparison, the base plate signal and the ground force signal will be used for the correlation.
 - Mechanic and hydraulic controls (hoses, tires, air bag, base plate, hydraulic pressure during vibration, etc.) will be made before start of production.

Daily Operational Tests

Radio similarities on all functioning units shall be carried out prior to the start of production each day of operations being conducted with the vibrators.

A final set of radio similarities shall be recorded within the last hour of data acquisition production on all operating vibrators.

When a replacement (substitute) vibrator is brought onto line a. radio similarity shall be performed on the vibrator before it starts production.

If work is interrupted for longer than 1 hour, similarity checks shall be run on all operating vibrators.

Any vibrator that fails radio similarities will not be acceptable to COMPANY for use in production. CONTRACTOR shall not be permitted to use any unit until rectification of fault or faults to the satisfaction of COMPANY's representative.

All similarity tests shall be displayed on paper monitors and also stored as a hard copy on diskette, with identifiable labeling for subsequent analysis and evaluation.

Hardwire Similarities Tests (weekly test)

Hardwire tests using an appropriate harnessing cable, peripheral equipment and recording system shall be conducted simultaneously on all contracted vibrators at one-week intervals throughout the term of the contract.

When a vibrator has been removed from the line for any major mechanical (pumps, rams, mass, etc.) or electrical (including electronic) component change, a hardwire similarity must be performed, before the unit in question returns to an operationally acceptable status.

COMPANY's Representative may also approve CONTRACTOR to perform radio similarity, as vibrator acceptance, prior to unit being placed in production, under mitigating circumstances.

All hardwire similarities shall be processed on the day of the tests on a ProMax or equivalent field processing system to verify vibrator integrity. All necessary hardcopy displays shall be produced to support confirmation of equipment status.

Any vibrator that fails hardwire similarities will not be acceptable to COMPANY for use in production. CONTRACTOR shall not be permitted to use any unit until rectification of fault or faults to the satisfaction of COMPANY's Representative.

Monthly Tests

Independent tests using independent accelerometers and an external system such as a Mountain Systems Vibrator QC systems or proprietary equivalent shall be recorded and processed.

The tests carried out at the beginning of the survey will be repeated at the end of the project.

Source Offsetting Methodology

Source Points shall be located on the source point flags laid out by the survey crew. All source points offset by more than Five (5) meters from their flagged location shall be resurveyed. All makeup source points shall be surveyed as normal source points. The daily production report shall include the source point numbers of all offset and makeup shots.

Every effort shall be made to make up VP's skipped due to safe distance standards or physical obstruction.

In the case of 2D recording, VP's shall be located with the following hierarchy:

- a) Source locations can be offset from the pre-plotted location up to a radial distance of one of the CDP intervals as long as the actual location is surveyed.

b) If larger offset are necessary in the direction vertical to the receiver lines, the maximum distance not to exceed half of the nominal source spacing or according to actually condition to determine.

c) If the previous procedure is not possible, then the sources should be offset to designate locations only with COMPANY's Representative written Approval.

GEODETIC SURVEY SPECIFICATION

1. Introduction

The procedures and specifications described in this document are intended to ensure high quality data, by specifying a reasonable minimum standard of performance normally expected from a seismic CONTRACTOR, and shall apply to all techniques and equipment engaged in the WORK. Any failure by CONTRACTOR to implement, achieve or maintain these procedures, specifications or standards will constitute a default under the TERMS & CONDITIONS.

In the event of conflict between CONTRACTOR's Land Data Acquisition Procedures and COMPANY specified procedures, COMPANY procedures will prevail, except where CONTRACTOR's procedures are more stringent and agreed by COMPANY. It is the responsibility of CONTRACTOR to ensure that all procedural issues are fully discussed with COMPANY and understood by contractor prior to commencement of the WORK.

Wherever significant deviations from specified procedures are required the revised procedures and consequences shall be fully discussed with COMPANY.

CONTRACTOR is required to provide information concerning all equipment, hardware, software, configuration, and the spares complement as detailed in various sections of these specifications as part of the tender.

COMPANY shall provide CONTRACTOR with co-ordinates of the survey area in sufficient time for CONTRACTOR to produce a pre-plot map.

The spheroid, datum and map projection and data presentation methods to be used for the WORK shall be confirmed by COMPANY.

CONTRACTOR shall be responsible for producing a pre-plot map, at a scale appropriate for the size of the survey and showing all lines in relation to the survey area prior to mobilization.

Unless specified elsewhere in this document, the spares complement shall be sufficient to maintain and support operations throughout the duration of the Work.

STANDARD GEODETIC PARAMETERS

GEODETIC PARAMETERS TO BE USED DURING DATA ACQUISITION	
SPHEROID	WGS-84
DATUM	WGS-1984
PROJECTION	UTM Zone 51 S
CENTRAL MERIDIAN (CM)	123 Degrees East
REFERENCE LATITUDE	Equator or 0 degrees North
SCALE FACTOR, K	0.9996
FALSE EASTING	500,000 m
FALSE NORTHING	1,000,000 m
PROJECTION UNITS	Meters
SPHEROID	WGS-84
DATUM	WGS-1984

2. Quality Assurance and Quality Control

CONTRACTOR is responsible for ensuring that all equipment is performing to manufacturers' specifications.

All Equipment shall be demonstrably fully operational before commencement of the WORK and shall be maintained in this condition throughout the WORK.

CONTRACTOR shall ensure that the technical specifications and quality standards and procedures as detailed in this document are complied with at all times.

Instrument tests and calibrations shall be in accordance with manufacturers' specifications and/or CONTRACTOR's recommended procedures. In the latter case, CONTRACTOR shall submit its procedures to COMPANY for approval.

Throughout the survey CONTRACTOR shall operate a Quality System which conforms to the requirements of SY/T-5314 or standard specified by COMPANY and shall use the system to ensure that quality standards are maintained throughout the WORK.

CONTRACTOR shall ensure that all operational logs and reports are written legibly and correctly annotated in English.

COMPANY reserves the right to use its own quality control and/or processing systems in addition to any system provided by the CONTRACTOR. The provision of such systems shall not relieve CONTRACTOR of its quality assurance and quality control responsibilities.

CONTRACTOR shall provide all necessary information and assistance relating to interfacing of quality control systems if requested by COMPANY.

CONTRACTOR shall, using good survey practice and high-precision surveying instruments, be responsible for providing proper survey control required to undertake the WORK.

CONTRACTOR is expected to use good judgment in recommending changes to the actual locations of the seismic lines in order to minimize logistics and access problems while complying as closely as possible to COMPANY's program map. Line location shall be finally determined by COMPANY Representative. Following procedures shall be observed:

3. Line Clearance, Positioning and Surveying
 - a) Survey Organization and Supervision

The positioning and survey of all source and receiver positions and all line, access, helipad (if required) and other clearing activities will be under the responsibility of CONTRACTOR. The execution and quality control of these operations is CONTRACTOR's responsibility.

b) Station Numbering Convention

For 2D a system of assigning an unique number to every source and receiver point shall be provided by COMPANY.

c) Surveying Equipment

- i. All surveying equipment should be in good repair and adjustment. In the case of surveying equipment older than two years, a statement from a manufacturer's authorized service center indicating that the instrument has been fully serviced and calibrated within the last 12 months must be produced at COMPANY's request.
- ii. Surveying equipment will normally comprise some or all of the following, according to the methods of survey to be adopted:
- iii. GPS Geodetic receivers, Trimble, Ashtec, Leica or Sercel DGPS portable manpack receivers with data logger/controller and pole mounted antenna

DGPS receivers mounted on vibrator trucks and/or other vehicles with data logger/controller

Theodolites with mounted EDM & hand held data logger

Total stations with inbuilt EDM and data logging

PC's with suitable I/O devices and software

Hand held GPS receivers

Compasses, ranging poles, tapes

- iv. All theodolites or total stations should be tested for collimation error and vertical circle index error on a weekly basis. Glass circles and reading micrometer should be free of fungus and be easily readable. Digital displays should be complete and fully switchable.
- v. All EDM equipment should be checked monthly against a measured baseline. The azimuth of this baseline should also be known. Any chains, tapes or wires used should be checked weekly against EDM measured distance.

- vi. All GPS receiver should be checked before use against each other by setting each one with its own antenna in short baseline array, recording data for up to 30 minutes and processing the results to determine consistency one with another in respect of the taped array layout. GPS measured baselines should agree with taped baselines within 1 cm.
- vii. All compasses must be checked for magnetic variation by pointing on predetermined azimuths in all four quadrants. The results shall be presented to COMPANY

Representative prior to being used in the survey. Compasses shall be compared monthly with the measured baseline azimuth.

- viii. All checks and maintenance of any survey equipment shall be logged.

d) Surveying Control

- i. CONTRACTOR shall establish a network of positioning control points for the survey using static Differential GPS methods. The survey origin or datum point for the GPS control network shall be specified by the COMPANY. In the event that no such point or points is conveniently available, CONTRACTOR will be required to establish two points within the survey area by static GPS observations on the points over 36 hours and processing the data in conjunction with data obtained over the Internet from the nearest two or three IS GPS tracking stations.
- ii. The proposed locations of the GPS surveying control points shall be approved by the COMPANY and survey observations taken and reduced by CONTRACTOR prior to line surveying operations commencing or, exceptionally, as the surveying of the seismic line network proceeds. The GPS control point sites ultimately chosen and approved shall be in suitably cleared spaces to allow a clear, unobstructed view of the sky for good satellite signal reception. Together the GPS control stations selected should form a well-conditioned network.

- iii. These GPS control stations will provide the surveying control in all three dimensions for the entire survey and for subsequent COMPANY operations so all such stations established should be marked by sufficiently stable steel and concrete monuments, the design of which shall be approved by the COMPANY, to allow a life expectancy of at least 10 years. A minimum of 2 witness points shall be established at each station. COMPANY may require CONTRACTOR to provide surveying ties in both horizontal and vertical to any existing survey control for comparison purposes.
- iv. All GPS control points will be established by simultaneous static differential GPS observations at either end of each baseline in the network and be post-processed using recognized software. Three dimensional position solutions shall be computed from pairs of matched data sets.
- v. Measured DGPS baselines will be adjusted in a network covering the whole survey area and co-ordinates derived relative to the fundamental datum point within the network.
- vi. Each converged DGPS data set shall yield baseline solutions with a standard deviation of less than 0.2 meter (CEO) horizontally and 0.25 meter vertically.
- vii. Geoidal elevations shall be computed using the OSU91A geoid model or alternative model mutually agreed upon and geoid heights determined from the surveyed ellipsoidal values.
- viii. All positions from the reduced satellite observations shall be reduced for any offset from GPS antenna to marker. However it is preferable that the antenna be always mounted exactly over the station marker.
- ix. CONTRACTOR shall submit an interim report covering the GPS control survey work to COMPANY within 15 days of completion of observations. This report should include the following:

- Description of the survey including method, equipment (including receiver models), chronological record of events, existing master station(s) used in the survey, survey history of the master station, survey network observed.
- Detailed account of the final processing including software package and release used, and final 2D results reduced to the top of the monument in both geographic and UTM grid co-ordinates on the local datum.
- Confirmation of all geodetic parameters used during processing including a detailed account and worked example of how the transformation to local datum was made.
- An estimate of accuracy of the derived coordinates in all three dimensions including the method of determining accuracy. A control network diagram with the a posteriori error ellipses should be provided.
- A detailed station description of each GPS point showing its location and approach diagram, the date established, a monument description, a photograph, the geographic and UTM grid coordinates reduced to top of monument in the local datum, the geodetic parameters, name of local datum, antenna position during observations, survey team and surveyor responsible.

e) Survey Operations

- i. Before commencing the line survey, suitable GPS base stations shall be identified within, or close to the survey area. All such stations shall be part of a static GPS network, which shall incorporate at least two stations from the master coordinate list.
- ii. This control survey shall achieve an internal accuracy of better than 0.2 m horizontally and 0.25m vertically. Sufficient redundancy must be incorporated in the control survey to prove that the accuracy has been achieved. All new control points established must be permanently monument and uniquely numbered.
- iii. The survey must close vertically to better 0.2 times the square root of the traverse distance in kilometers, or 1 meter, whichever is less, (conventional surveys using GPS control).

- iv. All survey procedures and equipment must conform to at least those approved by COMPANY before the start-up. The FGCC (Federal Geodetic Control Committee) or GSC (Geodetic Survey of Canada) GPS survey standards and specifications are preferred.
- v. All line ends and corner points/bending points shall be marked with an easily recoverable permanent marker (e.g. steel bar in concrete), which shall be uniquely numbered.
- vi. All seismic lines and topographical features (e.g. rivers, fences, roads, existing wells, existing seismic markers seismic intersections and existing control stations) crossed will be tied and noted on the change notes and survey notes. Even if data collectors are used, this information is still required.
- vii. Offsets shall be measured to all skidded or offset stations. These stations shall be summarized in specific skid/offset sheets. They must be confirmed with the drill logs and observer logs before submission. It should be clear whether the offset location was determined by a measure offset from a GPS observed point, or was surveyed by GPS.
- viii. No single leg or radial GPS observations are acceptable.

If source and receiver stations are to be positioned by RTGPS (Real Time Differential) then a detailed description of the equipment, software and how quality control will be achieved, need to be submitted prior to starting the survey to COMPANY. The desired three-dimensional positioning accuracy should be Order C (2-1) with a base error of 2.0 cm and a line-length dependent error of 20ppm/1:50000 based at a 95% confidence level.

- ix. L1 GPS receivers are acceptable but dual frequency receivers capable of measuring P(Y)- codes, C/A-codes , L1, L2 carrier and navigation messages are preferred.
- x. A minimum of three GPS receivers with eight or more independent or parallel (non-sequenced) channels, observing simultaneously, will be

- used for all observation sessions. A minimum of one-hour raw data shall be recorded at each site, this depends on the baseline length.
- x. Real time differential GPS observations shall be conducted with the elevation masks at the base and rover stations set to 10 degrees, the maximum PDOP shall be 5.0 and the measure sync time 1.0 sec.
 - xi. For real time differential observations, the minimum number of GPS epochs observed shall be 5.
 - xii. Real time kinematics (RTK) GPS observations shall be conducted with the elevation masks set to 13 degrees, the maximum PDOP shall be 5.0 and the measure sync time 1.0 sec.
 - xiii. For real time kinematics (RTK) observations, the minimum number of GPS epochs observed shall be 5.
 - xiv. No satellites that are deemed unhealthy by the GPS control segment are to be used in navigation, layout or post processing.
 - xv. If the RTK reference station start up or modify the parameter configurations, before start the new point survey sufficient check points shall be surveyed on the known stations, the discrepancy between twice survey on the check points shall be within 0.2m horizontally and 0.25m vertically.
 - xvi. CONTRACTOR shall be responsible for all line clearance and such clearance shall be kept to the absolute minimum required to safely conduct efficient operations.
 - xvii. CONTRACTOR shall bear sole responsibility for any and all costs associated with damage claims arising from any activity of CONTRACTOR including line clearance unless it is both strictly necessary for the performance of the WORK and in accordance with all other terms and conditions of the CONTRACT.
 - xviii. The contractor shall setout source and receiver points such that the difference between real time observed and planned coordinates are less than 1 meter.
 - xix. Planned locations may have to be moved depending on terrain conditions where the source array could not be laid out for safety

reason, obstacle, or elevation difference is exceed one half wavelength of the dominant high frequency energy in the near-surface layer (about 2m).

f) Setting Out Source and Receiver Stations

- i. Source and receiver stations shall be set out and marked such that their surveyed positions are within 1m of their pre-plot positions.
- ii. All surveyed stations shall be marked with a unique number so as to be easily recognized and identified (wooden pegs for example) but any metal or plastic used (pin flags for example) shall be removed on completion of the Work.
- iii. A sketch map will be generated for the survey area showing details such as:
 - Topographic features.
 - General terrain and vegetation type.
 - Cultivation or crops of any nature.
 - Proximity of buildings and villages.
 - Locations, width and depth of all rivers and streams;
 - Locations of helipads on or near the line, if applicable;
 - Positions and condition of any roads or footpaths crossing the line;
 - Permanent mark locations on the line;
 - Stations at which a full-length source or receiver array will exceed a 2 m elevation change within the array.
- iv. In addition a detailed sketch map shall be produced for each source swath showing access routes between individual source points, sequence in which they should be recorded, charge size or drive level restrictions, etc.
- v. A copy will be given to the recording crew and shooters/lead vibrator driver as well as to COMPANY Representative. The originals of these

detailed swath sketches shall be submitted to COMPANY at the completion of the survey.

g) Real-time DGPS Positioning

- i. For setting out by GPS Real Time Kinematic (RTK) methods, On The Fly (OTF) wavelength ambiguity resolution will be needed, in turn necessitating continuous VHF or HF radio contact between a GPS reference station and the field observers.
- ii. CONTRACTOR shall ensure that the GPS reference station and any required differential correction radio relay stations are chosen such that the mobile GPS units are always able to receive data transmitted from the base station. Mobile station data uncorrected by data transmitted from the base station is not acceptable.
- iii. The line station co-ordinates need to be preprogrammed into the data handling unit prior to beginning the day's work and the points set out sequentially along the line as the work proceeds. Positions delivered by the mobile GPS unit should be checked against a GPS control point other than the base station at the start, during, and end of each day's operations. Any discrepancy in excess of 0.5m will require the cause to be identified and any work completed since the last valid check repeated. In addition each mobile GPS unit will re-measure at least 3 points (usually by repeating in the morning the last 3 points of the previous day) and the planimetric and vertical differences between such repeats will be systematically recorded and analyzed as a measure of repeatability. If any of these differences is in excess of 0.5m then reasons should be provided and COMPANY supervisor will decide if the day's positioning data are acceptable.

h) Surveying Computations

- i. All observations mentioned above shall be computed and both the raw data and results stored on diskette. Recorded raw data from traverse surveying shall be played out in a conventional field book format so that it may be interpreted to identify any errors and omissions. All land survey computations shall be performed using COMPANY approved software on a personal computer in base camp.
- ii. All data shall be input to survey computers by means of data loggers used in the field unless otherwise agreed by COMPANY in writing in which case each value shall be verified manually on a hardcopy printout. Regardless of input procedure, all the observations mentioned in paragraph 6.5 herein, must be incorporated in the survey calculations except where the data are known to be in error.
- iii. The computed results shall be contained in disk files denoted with a "P" for provisional or "F" for final where the line has been adjusted for acceptable error. Line names within each file shall be identical with both the COMPANY assigned name and that contained in the observer's log sheets.

All data shall be submitted to COMPANY with all co-ordinate and elevation data in meters shown to Two (2) decimal places.

- iv. CONTRACTOR shall submit to COMPANY all survey results regardless of their status, on a regular monthly basis. CONTRACTOR shall ensure that provisional survey co-ordinate and elevation data for each line are submitted to COMPANY at the same time as the seismic data along with diagrams of all line intersections existing at the time. A second set of such data should be kept on site until completion of the project.
- v. All final survey co-ordinate and elevation data shall be submitted no later than Ten (10) days after completion the Work.

4. Survey Reporting

- a) CONTRACTOR shall annotate all positional data and hardcopy coordinate listings with the specified geodetic and grid parameters including datum and projection.
- b) CONTRACTOR shall submit copies of land surveying data including but not limited to maps, diskettes and diagrams on a regular monthly basis and on specific request by COMPANY.
- c) CONTRACTOR shall submit to COMPANY within Thirty (30) days of completion of survey a detailed description of all surveying activities. This should form a separate element of the final operations report and should include, but not be limited to:
 - d) Details of all survey equipment used during the survey including make, serial numbers.
 - e) Details of the calibration method and results for each set of survey equipment.
 - f) A general account of how the control and line surveying was performed, both technically and logistically.
 - g) A detailed account of how the control survey was adjusted, how the line surveying was tied to the GPS network and which points were used to control the survey co-ordinates.
 - h) A list of all sun observations taken for azimuth control.
 - i) A listing of all control point stations employed during the survey. This should include station descriptions with survey history, geodetic datum, geographic and UTM co-ordinates, elevations, GPS antenna heights, photographs, access diagram and description and also a statement of their estimated accuracy.
 - j) An appendix containing all the control point station descriptions.
 - k) A list of co-ordinates established by the survey of other significant points such as wells, old survey or permanent markers, oil seeps etc.
 - l) A statement of all geodetic parameters, projections, datum used during the survey including any datum shifts and transformation parameters used to derive the results.

- m) A summary of all completed lines during the survey.
- n) A chronological log of the main surveying and positioning activities.
- o) Names of key survey staff involved in the WORK.
- p) A discussion of any problems encountered during the survey including periods of instability, equipment failure, poor coverage, or malfunction for other reasons, re-shoots, mis-ties in the land survey, re-surveys, recommendations for future surveys etc.
- q) A final SEG-P1 formatted digital file of the seismic lines surveyed on a predetermined media,
- r) A final detailed survey report, (Five (5) paper copies and on a COMPANY approved digital format),
- s) Program map, (paper copies and on a COMPANY approved digital format,)
- t) Original GPS log sheets, survey notes or any other reports that describe, for example, corrections to antenna heights, processing summaries, problems that occurred during survey,
- u) Description of the control survey to establish the GPS base stations coordinates, including control points used, map of the control network, network data and adjustment results. Specific attention should be paid to describing the definition of the height datum, including the geoid model and values used,
- v) Minimally and fully constrained adjustments (paper and digital outputs),
- w) Skid and offset reports, geodetic datum and projection information, and
- x) Horizontal geodetic datum, transformation parameters and how they were determined, vertical datum, geoid model and projection information, and survey sketch's including for all line surveys:

1. GPS base station,
2. Check points used and ties to them,
3. Vertical and horizontal mistie values for GPS traversing if performed,

4. GPS receiver recording parameters,
5. GPS processing parameters,
6. Datum in which the survey was performed,
7. When any datum shift was applied in the survey process, if applicable,
8. Fly lines and loop ties,
9. Quality control reports (e.g. pre-plot versus post plot).

5. Maps

- a) CONTRACTOR shall submit to COMPANY the following maps plotted on within 15 days of the completion of survey:
- b) Final post-plot shot point and receiver point location maps at 1:25,000 scale showing VP/SP plotted at intervals of 10 and annotated at every 50 as well as the first and last SP/VP of each line.
- c) A survey marker location map at 1:25,000 scale showing all new control points and permanent markers established during the survey, all found and resurveyed old survey markers, and all reference and relay stations used for DGPS surveying operations.
- d) An integrated horizontal and vertical closure map at 1:25,000 scale showing the co-ordinate and elevation differences, the direction of the difference and the traverse distance of each traverse segment. Each traverse shall include the calculated horizontal accuracy expressed as a ratio. This map should be updated daily and be available for inspection by COMPANY Representative on request.
- e) CONTRACTOR shall maintain an up to date logistics map at all times during the survey.
- f) All maps produced shall show the following:
 - Both the UTM and geographic graticule.

- Shot points at specified frequencies.
 - Line numbers clearly marked on each map.
 - A title block showing the name of COMPANY, name of CONTRACTOR, the name of the block, the actual map title, the date of the WORK and the date of the drawing.
 - A map scale ratio and bar scale in kilometers.
 - The type of grid projection, ellipsoid parameters, and geodetic and vertical datum.
 - A statement of whether the map is final or provisional.
 - An index sketch showing the survey area in relation to national boundaries, the topography and adjacent blocks.
-
- All of the above maps shall be kept updated on a daily basis. CONTRACTOR shall submit hard copies of the above maps to COMPANY at any time during the WORK on request.

1.3) RTDGPS Survey of Vibrator Positions

GPS receivers shall be used to record the actual positions and monitor the vibrator positions on each source swath. The antenna must be set at the highest part of and in the same position on the center line of each vehicle, preferably above the vibrator pad, though if this is not possible the offset from the antenna to this point shall be recorded.

The conditions pertaining to radio communication of GPS corrections from reference station to the receiving antenna on the truck shall apply.

A mean real time GPS position from the individual vibrators' positions shall be recorded at each vibrator point and all such data archived at the end of each day's operations as the final VP co-ordinates.

PART B – PROCESSING 2D SEISMIC

1.0 PROCESSING OBJECTIVE:

The geological objective of 2D seismic processing project is to apply modern processing to produce PSTM and PSDM dataset that is suitable for use in exploration and identifying key prospects. Primary objective is to map structures that reside between 500m and 1km depth. Key leads are in gentle anticlinal structures bounded by faults. Secondary objective is identifying new prospects in deeper exploration depths between 1km and 2km depth.

Main technical objectives of seismic processing objectives for Pualaca Basin and Beaco Basin:

- Deliver early out and final products to aid geological objectives.
- Produce best possible detailed velocity model to aid in seismic interpretation and well design
- Amplitude preservation for reliable AVO (Amplitude Versus Offset) studies
- Optimum gather denoise, demultiple and event alignment to maximize the angle range that can be utilized for AVO studies
- High quality image for structural mapping, fault integrity and thin sand resolution

Expected issues for processing are:

1. Statics in weathering layer in unconsolidated near surface and in elevated terrain
2. Crooked line processing
3. Noise content

2.0 PROCESSING STRATEGY:

The processing shall be conducted as described in this ITB document and Service Agreement.

The processing of acquired data shall be performed in a seismic processing center at contractor designated place with full facilities. The processing center should be capable of providing pre stack and post stack time and depth migration. The personnel assigned to the

project must have proven ability and processing experience of 2D broadband marine seismic data processing as described in this ITB document.

The Bidder shall provide the location of its processing center and complete details of installed hardware and software proposed to be used for the project.

The Bidder shall list out the QC schedule at different stages of processing to Company representative.

On completion of processing, the awarded bidder shall make a presentation at TIMOR GAP PUALACA Block Unipessoal, Lda.'s office in Dili, with results of final processing. Adequate facilities to carry out QC of velocity analysis and other parameters shall be available to the processing team.

3.0 SCHEDULE OF SERVICES

Contractor processing is to follow the timelines as defined in the Table 1

The commencement of processing of each basin is expected to be immediately after acquisition completion of respective basin.

Contractor is to deliver the final processed data, intermediate QC stages and processing tests as appropriate addressed to the Company Representative at TIMOR GAP PUALACA Block Unipessoal, Lda.'s office in Dili or to an alternate location advised by the Company Representative.

Table 1

Product	Duration
Fast Track Post Stack Time Migration	1 month from completion of acquisition
PSTM	3 months from completion of acquisition
PSDM	5 months from completion of acquisition

4.0 GENERAL INFORMATION

The Processing Flow/Sequence below is designed to include all relevant processing required to meet the processing objectives. The final processing sequence/order may vary depending

on test results. Application details (e.g. number of passes, domain applications, algorithm choice, required interpolations, etc.) are inclusive and shall be applied in order to obtain optimum results.

Notwithstanding anything herein to the contrary, the final decision on any changes to the processing flow rests with Company.

Processing is to be carried out in 4ms sample rate throughout. Acquired receiver spatial sampling is to be retained till completion of all pre-migration noise attenuation before decimating to 20m.

5.0 PROPOSED SCOPE OF WORK FOR FAST TRACK POSTM, PSTM AND PSDM

Stage 1: Pre-Processing

1. Reformat from field format to internal format
2. Inventory of field support documentation
3. Geometry QC and verification of navigation/seismic merge
 - i. Trace edits, polarity reversals (as needed)
 - ii. Geometry QC and polarity QC
4. Min-phase conversion (for zero-phase correlated Vibroseis)
5. True Amplitude Recovery
6. First breaks picking, review and QC
7. Statics correction (compare uphole model (if available), refraction and tomographic solutions)
 - i. Floating datum will need to be smoothed appropriately to the migration method i.e. less smoothing for PSDM than PSTM ('imaging statics' will be different between PSTM and PSDM)
8. Preliminary velocity analysis (0.5km)
9. Fast Track PoSTM - Post Stack Time Migration
10. Pre-deconvolution noise attenuation
11. Surface consistent deconvolution

12. Surface consistent amplitude correction
13. Post-deconvolution noise attenuation:
 - i. Anomalous amplitude attenuation (in shot, receiver and CMP domain)
14. Reflection residual statics pass 1
15. Velocity analysis (0.25km)
16. Reflection residual statics pass 2
17. Residual noise attenuation (if required)
18. Residual surface consistent amplitude correction
19. Inverse Q (phase only)
20. Pre-migration demultiple (if required)

Stage 2: Pre-Stack Time Migration

21. Anisotropic Velocity analysis for PreSTM (0.25km)
 - i. Velocity field smoothing
22. Anisotropic Kirchhoff Pre-Stack Time Migration

Stage 3: PSTM Post-Migration Processing

23. Final velocity analysis (0.25 km manual or 50m auto-picked)
24. Gather Flattening (multi-pass/iterative inclusive of required pre-conditioning)
25. Inverse Q (amplitude only)
26. Post-migration residual noise attenuation (if required)
27. Post-migration demultiple (if required)
28. Mute
29. Stack
 - i. x5 Raw Angle Stacks (Full, Near, Mid, Far and Ultra Far) – input from step 22
 - ii. x5 Final Angle Stacks (Full, Near, Mid, Far and Ultra Far) – input from step 27
30. Post stack enhancements

Stage 4: PSDM Velocity Model Building

- i. Near surface model from refraction/tomographic solution to be incorporated into initial model

31. High resolution Velocity model Building
 - i. Incorporating Anisotropic (from available velocity, well and geology information)
 - ii. 3-4 tomography updates
 - iii. Velocity and seismic tie in the line intersections
32. Anisotropic Kirchhoff Pre-Stack Depth Migration

Stage 5: PSDM Post-Migration Processing

33. Final velocity analysis (0.25 km manual or 50m auto-picked)
34. Trim statics
35. Inverse Q (amplitude only)
36. Post-migration residual noise attenuation (if required)
37. Post-migration demultiple (if required)
38. Mute
39. Stack
 - i. x5 Raw Angle Stacks (Full, Near, Mid, Far and Ultra Far) – input from step 33
 - ii. x5 Final Angle Stacks (Full, Near, Mid, Far and Ultra Far) – input from step 38
40. Post stack enhancements

6.0 PROCESSING SEQUENCE TESTING

Contractor must perform parameter and sequence tests approved by the Company on selected data sufficient to establish processing sequences and parameters.

Testing refers to experimentation for an optimised processing sequence. Testing may include a particular process, its inclusion or exclusion from the processing sequence, and its position in the sequence relative to other processes. Testing to assess the impact of the variation of individual parameters of a process or some combination of several parameter variations may be required. The objective of all testing shall be to develop an optimum final processing sequence.

All testing undertaken shall be thorough and to, at least, minimum industry standard. All reasonable data analysis, parameter selection and testing, up to a maximum of 10% of the total data volume, may be required by the Company.

During project execution, the Contractor shall recommend appropriate data analyses, test sequences, processing parameters and stacking velocities to the Company. The analyses, tests, final parameters and velocities will be mutually agreed but will be at the Company's ultimate discretion.

Test results shall be delivered to the Company as Microsoft PowerPoint presentations in the form of a Technical Note, providing details of the tests performed, parameters tested together with contractors' recommendations. SEG-Y files may be required by the Company for its own data testing. Technical Notes shall include, but are not limited to, shot gathers and CMP gathers, stacks, amplitude spectra time slices and RMS amplitude maps.

7.0 QUALITY CONTROL

Quality control procedures and quality products are to be generated by the Contractor in the carrying out of the Contractor's Quality Management Plan.

Contractor shall provide Company with copies of all QC products and all major tests in SEG-Y format to be delivered either via Cloud upload, via FTP/web, upon completion of all Deliverables and as part of completion of Services.

Quality control is conducted at each Testing and Production stage throughout the life of the project with the main objectives being:

- Preservation of primary energy and increased S/N
- Maintain the broad bandwidth of the acquired data
- Determination on the effectiveness of a processing sequence

QC products can be provided in either SEG-Y , either through ftp or on temporary USB disks. Final imaging results can be provided in Petrel ZGY or SEG-Y format, if required. Contractor shall provide Company with copies of all QC products and all major tests in standard SEG-Y

format to be delivered either via FTP/web or via transportable flash/hard disks as is most convenient to Contractor.

8.0 DELIVERABLES

Deliverables are listed in Table 2 below and shall be included in the Contractor’s rates. The specification for SEG-Y tape header formats and instructions to be agreed with Company. A sample of each type of product to be provided to Company for approval.

Table 2

Stage	Product	Copies	Media	Format
Pre-Stack	Statics solution	2	USB disk and 3592	SEG-Y
Pre-Stack	Pre-processed CMPs before migration	2	USB disk and 3592	SEG-Y
PSTM	Raw Prestack migrated gathers	2	USB disk and 3592	SEG-Y
PSTM	Final Prestack migrated gathers	2	USB disk and 3592	SEG-Y
PSTM	Raw and Enhanced Full stacks	2	USB disk and 3592	SEG-Y
PSTM	Raw and Enhanced Angle stacks (up to 4 angle ranges)	2	USB disk and 3592	SEG-Y
PSTM	Pre-migration velocity model(s)	2	USB disk and 3592	SEG-Y
PSTM	Final migration velocity model(s)	2	USB disk and 3592	SEG-Y
PSTM	Final Stacking velocity model(s)	2	USB disk and 3592	SEG-Y
PSDM	Raw Prestack migrated gathers in Time and Depth	2	USB disk and 3592	SEG-Y
PSDM	Final Prestack migrated gathers in Time and Depth	2	USB disk and 3592	SEG-Y
PSDM	Raw and Enhanced Full stacks in Time and Depth	2	USB disk and 3592	SEG-Y

PSDM	Raw and Enhanced Angle stacks (up to 4 angle ranges) in Time and Depth	2	USB disk and 3592	SEG-Y
PSDM	Final migration velocity model(s) in Time and Depth	2	USB disk and 3592	SEG-Y
PSDM	Final Stacking velocity model(s) in Time and Depth	2	USB disk and 3592	SEG-Y
	Final processing report (including links to all processing presentations)	4	USB disk and FTP or other file	PDF

9.0 PROJECT EXECUTION PLAN

The format and degree of detail required for the Project Execution Plan (PEP) will be agreed between Company and Contractor and must, as a minimum include the following information:

- Contractor premises, location where the Services are to be carried out.
- Administration.
- Planning including contingency planning (including time, resources and cost).
- Resource allocation (personnel, equipment, materials, including sub-contractors) in the form of a Project Team and Organisation Chart.
- Contract Program (Scheduling) – implementing a Critical Path to include milestone dates, start and completion dates.
- Processing, Deliverables, and Data Delivery.
- Reporting and Meetings.
- Quality Control.
- Testing.
- Audit Program.
- Storage and security of Company Issued Materials and Deliverables (including document and data control);
- Customer services – support services and communication planning.
- All other requirements set out in the Scope or which Company otherwise directs.
- Key Performance Indicators [to be agreed between Company and Contractor and inserted in Contract upon award]. At a high level these are:
 - Quality / Technical

- Milestones / Timing
- Problems / Solutions
- Budget
- Project Management
- The PEP is to be agreed between the Company Representative and the Contractor.
- The PEP may only be varied during the Term of Contract, by written agreement between the Company Representative and the Contractor, to take account of variations in scope or processing sequence from that originally assumed when deriving the original PEP.
- Contractor's performance against the PEP will be monitored in accordance with agreed KPI's.
- The PEP must be approved by Company prior to Commencement of the Services.

10.0 REPORTING

The Contractor is responsible for reporting project progress to the Company (Progress Report). The Progress Report must be submitted to the Company's Representative every week on agreed day. The Progress Report shall be for a period covering the previous week and must contain the following information:

- Project Status Summary to:
 - List all major processing steps with number of kilometres processed through each step in the past week.
 - Include a comparison with the previous week's production.
 - Percent progress for the week, current percent completion and forecast percent for the upcoming week to ensure that the Completion Date can be adhered to. A narrative description of all activities undertaken and either in progress or completed during the week. This is to be added to each week so that a full history of all comments is maintained in the report.
- The estimated completion date for any tasks, activity, milestones affecting the Critical Path the Contractor anticipates will be completed later than scheduled.

- Activities rescheduled or re-estimated in the current report, with justification.
- Activities added or deleted in the current report, with justification and details of any anticipated slippages or problems which may affect milestone dates, critical path and/or completion dates, together with remedial action intended by the Contractor.
- A summary of delays experienced to date which lie outside of the Scope of Work affecting the Critical Path and the Project Execution Plan.
- Activities due for completion since the previous report but not yet completed, with justification.
- A record of key decisions made that affects the Critical Path, Quality and any other obligations under the Contract.
- A complete list of the Processing Sequence and parameters confirmed up to and including the date of the Weekly Report.
- A list of actions to be undertaken by the Contractor with expected completion dates.
- A list of all data receipts and despatches to/from the Company in accordance with Company Issued Materials
- Project Schedule to be updated weekly to accurately reflect progress and overall schedule.

11.0 KEY SUCCESS FACTORS FOR PROCESSING CENTRE, CONTRACTOR PERSONNEL AND PROJECT SCHEDULE

Company's Key Drivers for this project are as follows:

- Contractor to propose a processing centre owned by Contractor.
- Contractor to propose Technical Supervisor with suitable qualifications and experience. Must be able to demonstrate thorough knowledge and successful experience in PSTM and PSDM processing.
- Contractor to propose Processing Geophysicist with suitable qualifications and experience in PSTM. Must be able to demonstrate thorough knowledge and successful experience in PSTM.

- Contractor to propose Processing Geophysicist with suitable qualifications and experience in PSDM. Must be able to demonstrate thorough knowledge and successful experience in PSDM.
- Contractor has proposed sufficient resources (personnel, equipment, materials, including sub-contractors) to complete the base scope within timeline required in the Project Schedule.
- Contractor to provide established on-site or virtual dedicated and functional processing/ QC centre for Company or Company's representative to perform QA/QC.

12.0 KEY PERSONNEL AND LOCATION

Submit CV's for proposed Key Personnel and CV's for any other proposed personnel. Proposed Key Personnel must align with Organisation Chart.

If Team Leader or PSDM team is not located in Dili, advise how the project is to be managed such that Company achieves the desired outcomes in terms of quality and turnaround.

13.0 COMPANY DATA

The Contractor will establish a suitable secure area which will have a 'dry-storage' capacity and be totally secure. Access to this area will be restricted.

All Company supplied materials will be returned at the end of services.

In the event that the Company requires further processing to be performed, either pre-stack and/or post stack, in order to generate products provided in Table 2, the Contractor shall maintain all appropriate intermediate and final datasets for a minimum period of three months after completion of the Services.

After the three months period has expired Contractor will send written instruction to Company that unless instructions are received to the contrary all intermediate datasets will be backed up and deleted from disk storage.

PART C – INTERPRETATION OF 2D SEISMIC

1.0 PRIMARY OBJECTIVES

The primary objectives of the work to be carried out under this Project can be summarized as:

- Play and prospect assessment of the area of interest in PSC Pualaca Block
- Interpretation of the fully processed seismic volume (PSDM in depth & time, PSTM)
- Play Assessment and Prospects identification
- Prospect Ranking and Resource Estimation
- Probabilistic estimation of the success volumes (risked) and the chance of success of the prospects (POS)

2.0 AVAILABLE DATA

- PSDM gather and stack (near, mid, far, ultra far, full stack,)
- PSTM (gather and near, mid, far, ultra far, full stack,)
- Any available well data
- Data Coverage – 267 length kilometers (LKM)

3.0 SCOPE OF WORK TO BE PERFORMED BY CONTRACTOR TO PRODUCE INTERPRETATION DELIVERABLES

Item	Scope
1	Seismic interpretation

	<ul style="list-style-type: none"> • Interpretation and mapping of all key horizons in the PSC area. • Time and depth structure map with faults • Mapping for potential reservoir, source and seal analysis • Specific output from this analysis should be included in the final report and also in a format that can be loaded into TIMOR GAP standard software interpretation package. <p>Seismic Amplitude Analysis</p> <ul style="list-style-type: none"> • Amplitude analysis on 2D lines will be performed • Due to the absence of suitable well control for calibration, the Extended Elastic Impedance method (Whitcombe et al, 2002) is particularly required for this study. Alternate methods can be suggested and agreed upon
2	<p>Reservoir assessment:</p> <ul style="list-style-type: none"> • Without any well data in the vicinity of the survey we will perform a regional study and collect potential petrophysical properties in the area of interest •
3	<p>Play assessment:</p> <ul style="list-style-type: none"> • Identification of the working hydrocarbon system (hydrocarbon generation, timing, expulsion, migration, accumulation and preservation) • Deliver temperature, pressure and petroleum property predictions for the play • Identify and understand the key uncertainties related to the essential petroleum system elements and processes required for the petroleum system to succeed • Evaluate how the key uncertainties can be reduced • Identify and evaluate the risk related to the petroleum system elements • Offer a decision support system based on the understanding of the key uncertainties and risk • Map the exploration Chance of Success (COS) of the basin in the area of interest, Common Play Element maps (CPE) for the relevant plays

	<ul style="list-style-type: none"> • Generate Common Volume Element maps (CVE) for the number of and size distribution of potential prospects • Build the play analysis and calculate the Play Yet-To Find (YTF) resources. The YTF resource estimate will include postulated accumulations, leads and assessed prospects • Aggregate the total YTF in the area of interest for the relevant Plays <p>Specific output from this analysis should be included in the final report and also in a format (industry standard) that can be loaded into TIMOR GAP standard software interpretation package.</p>
4	<p>Prospect Assessment:</p> <ul style="list-style-type: none"> • Identify the different reservoirs, compartments in the prospect (segment) • Build the volume, fluid model including parameter correlations for each Segment • Estimate Chance of Success for each geological risk factor for each segment • Build a probabilistic prospect model using the identified segments • Model risk dependencies, potential leak and correlations between segments • Report COS and success volume distribution for the prospect • Aggregate the assessed prospects to give the total resource distribution of the assessed prospects <p>The key input to the prospect model will be the structural depth maps, uncertainty ranges for reservoir, seismic and basin modelling. Based on the interpreted geological model a stochastic prospect model will be generated. The output will be overall prospect COS and success volume distribution. For multi reservoir prospects the output will also include scenario COS and volume distribution.</p>
5	<p>Economic Evaluation:</p> <ul style="list-style-type: none"> • Prospects ranking and Leads portfolio • Estimate of Un-risked and Risked reserves of the prospects and leads

6	<p>Well Planning</p> <ul style="list-style-type: none"> • Well Planning for identified prospects • Well Schematic and Predicted Stratigraphy
7	<p>Competency Building and Training:</p> <ul style="list-style-type: none"> • Two weeks of training and knowledge transfer are required for the TIMOR GAP team in Dili
8	<p>Temporary software license:</p> <ul style="list-style-type: none"> • Free of charge Software license(s) needs to be provided for the duration of the project • Cost of software licenses are out of the scope • Partial results to be transferred to TIMOR GAP for continuous monitoring and review
9	<p>Meetings and follow up:</p> <ul style="list-style-type: none"> • 2 meetings at TIMOR GAP office in Dili, Timor-Leste and 1 meeting at contractor's office • Progress report every 2 weeks • Project milestone report and presentations on a monthly basis • Final project presentation
10	<p>Local content:</p> <ul style="list-style-type: none"> • Training program for TIMOR GAP geoscientists

4.0 CONTRACTOR PERSONNEL

Geophysicist / Seismic Interpreter

Bidder/Principal must be able to provide team structure and staff to undertake workflow as outlined by TIMOR GAP Pualaca Block tender proposal document. Seismic interpreter must have:

- Over ten (10) years' experience with the similar projects.
- Over five (5) years' experience using industry standard software
- Experience for fold thrust belt and geological expertise in the region
- Competency building and training to TIMOR GAP PUALACA Block team

Petrophysicist

Bidder or Principal must be able to provide team structure and staff to undertake workflow as outlined by TIMOR GAP PUALACA Block tender proposal document. Petrophysicist must have:

- Over ten (10) years' experience with the similar projects.
- Familiar with regional petrophysical formation and reservoirs
- Competency building and training to TIMOR GAP PUALACA Block team

Interpreter Geologist

Bidder or Principal must be able to provide team structure and staff to undertake workflow as outlined by TIMOR GAP PUALACA Block tender proposal document. Geologist must have:

- Over twenty (20) years' experience in the region
- Familiar with regional geology, in particularly fold thrust belt.
- Able to integrate structural interpretation, amplitude analysis and geological studies

- Well planning document for drilling team including but not limited to geological prognosis, formation evaluation program, pore pressure prediction, review of the relevant offset well with TIMOR GAP PUALACA Block team.
- Competency building and training to TIMOR GAP PUALACA Block team

5.0 DELIVERABLES

1. Seismic interpretation – Complete Project (IHS Kingdom/Petrel Format /Navigator Format/ industry standard format), All horizons and faults in ASCII format, TWT Maps/Depth Maps (Image Format) and Grids in ASCII
2. Play assessment and Reservoir Distribution – Maps
3. Prospect assessment- Maps, Risking parameters in tabular format
4. Economic Evaluation of Prospects – Tabular Format
5. Well planning – Well Schematic
6. Report – Comprehensive report containing all the above

The final report will be in 3 hardcopies and one DVD/ External HD.

6.0 TIME SCHEDULE

The TG Pualaca Block 2D Seismic Data Interpretation Project is estimated to be completed within 3 (three) months after deliver of the final stacks. The Bidder's proposed turnaround schedule shall be reflected in the final executed agreement.

7.0 CONTRACTOR'S EQUIPMENT

The Contractor, at its own expense, shall provide or supply all necessary computer hardware, software and associated equipment and all other apparatus necessary to carry out interpretation services. However, if any additional equipment and other accessories are required after commencement of the interpretation operations for performance of scope of work under the Agreement, the Contractor shall arrange the same at its own cost.

All Contractor Items shall be of internationally recognized industry standards. The Company shall have the right to inspect all such Contractor Items and other goods on or before commencement of interpretation operations to ensure compliance with Company's standards of quality and safety.

PART D – PRELIMINARY WELL DESIGN

1.0 PRIMARY OBJECTIVES

COMPANY plans to drill an exploration well in Pualaca Block upon the successful completion of seismic acquisition and interpretation to prove identified resources.

CONTRACTOR is to provide COMPANY a Preliminary Well Design for an exploration well based on data gathered from earlier phases of the project, to enable initial project pricing approvals and for potential future tendering for project design and execution.

CONTRACTOR shall utilize relevant industry and internationally recognized well design standards and best practices in preparation of the deliverables. All local government regulations shall be adhered to in the well design process.

2.0 SCOPE

Scope of Work to Be Performed by CONTRACTOR To Produce Preliminary Well Design Deliverables;

Item	Scope
1	Well and Target Identification <ul style="list-style-type: none">In conjunction with COMPANY, identify preliminary well location and targets based off seismic and interpretation
2	Offset Well Analysis

	<ul style="list-style-type: none"> • Review of DDRs, EOWRs and Interpretation of any nearby offset wells (up to 3 wells) • Summarise well construction risks
3	<p>Develop Preliminary Well Architecture and Design</p> <ul style="list-style-type: none"> • Formation evaluation • Kick tolerance analysis • Casing setting depth • Production string requirements • Preliminary casing sizing and load cases • Well control considerations • Mud weight specification • Preliminary rig sizing • Data Acquisition requirements • BHA and drill bit requirements • Identify key drilling risks
4	<p>Develop Well Montage</p> <ul style="list-style-type: none"> • Well Schematic • Predicted Stratigraphy • Preliminary well montage
5	<p>Prepare Preliminary operations plan and timing</p> <ul style="list-style-type: none"> • High Level Operations plan • Preliminary Time vs Depth Curve estimate
6	<p>Project AFE</p> <ul style="list-style-type: none"> • Prepare initial project AFE for appraisal well

7	Competency Building and Training: <ul style="list-style-type: none">• Two weeks of training and knowledge transfer are required for the TIMOR GAP team in Dili
8	Meetings and follow up: <ul style="list-style-type: none">• 2 meetings at TIMOR GAP office in Dili, Timor-Leste and 1 meeting at contractor's office• Progress report every 2 weeks• Project milestone report and presentations on a monthly basis• Final project presentation•
9	Local content: <ul style="list-style-type: none">• Training program for TIMOR GAP drilling and well engineers•

3.0 CONTRACTOR PERSONNEL

Well Engineer / Drilling Engineer

CONTRACTOR must be able to provide team structure and staff to undertake workflow as outlined by TIMOR GAP Pualaca Block tender proposal document. Well Engineer must have:

- Over ten (10) years' industry experience
- Over five (5) years' demonstrable experience in well design and operations

CONTRACTOR shall provide COMPANY the name and CV with summary of experience and qualifications of the personnel.

4.0 DELIVERABLES

1. Preliminary Well Design Report
2. Preliminary Well Montage
3. High Level Operations plan
4. Preliminary Time vs Depth Curve estimate
5. Preliminary project AFE

5.0 TIME SCHEDULE

CONTRACTOR to provide time schedule to complete scope and deliverables. The CONTRACTOR'S proposed turnaround schedule shall be reflected in the final executed agreement.

6.0 CONTRACTOR'S EQUIPMENT AND SOFTWARE

The CONTRACTOR, at its own expense, shall provide or supply all necessary computer hardware, software and associated equipment and all other apparatus necessary to carry out well design services. All Contractor designs shall be of internationally recognized industry standards.

PART E - REQUIREMENTS PRIOR TO COMMENCEMENT OF WORK

1.0 PROJECT EXECUTION PLAN

On award of a contract, the SURVEY CONTRACTOR shall prepare a Project Execution Plan (PEP) for review and approval by COMPANY. The PEP shall include curriculum vitae (CVs), schedules, QA/QC plans, safety policies and work procedures, organisation chart of key personnel, list of responsibilities of key personnel, number of survey teams, list of equipment and activities, work procedures, calculations and drawings (if any) to fully describe the proposed methods required for the performance of the Surveys, in compliance with the requirements detailed in this requisition and referenced survey specifications. These documents shall be submitted to the COMPANY at least fifteen (15) working days prior to mobilization. All amendments required by the COMPANY shall be implemented prior to the commencement of the mobilization.

2.0 WORK PROCEDURES

SURVEY CONTRACTOR shall prepare detailed procedures for each of the four (4) survey investigations based on Scope of work and all testing to be undertaken. These procedures shall detail the methodology for execution, testing and reporting.

The procedures shall be subject to COMPANY review and acceptance (prior to commencement of the work) and shall comply with COMPANY specifications and requirements for quality and performance.

Procedures shall include a complete list of documents / drawings to be issued during survey activities.

3.0 SCOUTING OF THE SURVEY AREA

SURVEY CONTRACTOR is fully responsibility of all local conditions in relation to seismic operations. SURVEY CONTRACTOR should conduct a detailed scouting trip

prior to submission of technical & financial Bid proposal of the Project area to address, amongst others as described in the scope of work.

4.0 READINESS REVIEW

Prior to commencement of the work, SURVEY CONTRACTOR shall conduct a readiness review meeting with COMPANY and demonstrate that the personnel are knowledgeable of and prepared for the work. The documentation relevant to this work scope will be reviewed during this meeting.

5.0 ACCESS AND ENTRY TO THE SITE

SURVEY CONTRACTOR is responsible for all permitting, authorizations, liaison, and communication with relevant statutory boards and Local Governments bodies, agencies, stakeholder's engagement and relevant parties to secure and obtain approval for the WORK up to the success completion of the WORK.

Access to the work site shall be the responsibility of the SURVEY CONTRACTOR. SURVEY CONTRACTOR shall give a minimum of one week notice to the COMPANY, prior to entering the site to perform the WORK. COMPANY shall notify the SURVEY CONTRACTOR when the area can be accessed. SURVEY CONTRACTOR shall not be entitled to charge for standing time for any delay to the works resulting from delays in this notification.

SURVEY CONTRACTOR is encouraged to conduct a site visit to gain an understanding of the area to be surveyed and its associated constraints.

6.0 EQUIPMENT

SURVEY CONTRACTOR shall provide details of equipment, tools, plant, materials, transport, etc. prior to the WORK commencement and shall ensure the completion of the works to the standards within the stipulated time frame.

7.0 WORK PROGRAMME

SURVEY CONTRACTOR shall submit a comprehensive work programme from the date of the order to commence the WORK to the Contract Completion Date, indicating the works for approval by the COMPANY prior to the award of the contract. The

schedule of work shall be prepared and presented in Microsoft Project format by the SURVEY CONTRACTOR and shall be submitted in both hardcopy and electronic file formats to the COMPANY.

The WORK shall be performed in accordance with the SURVEY CONTRACTOR's programme as approved by the COMPANY. SURVEY CONTRACTOR shall adhere to the approved work programme unless any deviation there from being approved or directed by the COMPANY. SURVEY CONTRACTOR shall review progress of the WORK regularly to ensure adherence of work programme and to remedy any delays likely to occur in the WORK.

It is a requirement for the survey to be completed within a 6-month period. SURVEY CONTRACTOR shall programme the WORK to ensure that sufficient manpower resources, plants, equipment and laboratory apparatus are provided to complete the WORK within this period.

8.0 RESOURCES, PERSONNEL & RESPONSIBILITIES

MANAGEMENT

SURVEY CONTRACTOR shall nominate a Project Manager who shall be in charge of whole project on both technical and administrative levels; he/she shall be the SURVEY CONTRACTOR Representative. If he cannot be technically involved, the Project Manager shall nominate a Geophysicist to be responsible for the whole acquisition, processing, interpretation and well design work. The Project Manager and/or Geophysicist shall be fully experienced in seismic data acquisition, processing interpretation and well design. COMPANY shall nominate a QA/QC specialist who shall be in charge QA/QC of whole project on technical level; he/she shall be the COMPANY Representative

The Project Manager and Geophysicist shall remain assigned by SURVEY CONTRACTOR to the project during the whole duration of the project. The Project Manager, Geophysicist and Party Chief shall be entirely familiar with the Contract. The project manager is responsible for the overall planning, coordination, and execution of the seismic survey project. This includes developing project timelines,

budgets, and resource plans, as well as managing project risks, communicating with stakeholders, and ensuring that the project is completed on time and within budget.

The Party Chief shall be a qualified Geophysicist Specialist. During the operations, the party chief shall act as sole SURVEY CONTRACTOR Representative and shall sign the Daily Work Sheets. The party chief is the leader of the seismic survey crew and is responsible for ensuring that the field operations are carried out safely, efficiently, and in accordance with the project plan. This includes overseeing the deployment and maintenance of seismic equipment, managing the survey crew, and liaising with landowners and local communities.

The COMPANY Quality Assurance / Quality Control (QA/QC) specialist is responsible for ensuring that the data acquired during the seismic survey is of the highest quality and meets industry standards. This includes monitoring and auditing the survey data acquisition, processing, interpretation and well design activities to ensure that they are carried out according to the project specifications, as well as developing and implementing quality control procedures to identify and correct any issues that may arise. The QA/QC specialist is also responsible for preparing and reviewing final data deliverables to ensure that they meet the project requirements and are fit for purpose.

TECHNICAL STAFF

All technical staff employed by the SURVEY CONTRACTOR shall be suitably qualified and experienced to execute the WORK. SURVEY CONTRACTOR shall have a full time Geophysicist at site with at least 6 years of relevant experience present full time on site to manage the fieldwork, prepared, check and verified all 2D Seismic acquisition, processing, interpretation and well planning. Seismic acquisition, processing and interpretation shall be carried out by geophysicist with at least 3 years of relevant experience. SURVEY CONTRACTOR shall also have a Licensed Surveyor with at least 10 years of relevant experience full time on site to carry out setting out and as-built survey of site investigation locations particularly in Timor-Leste region. Data acquisition processing, interpretation and well planning shall be carried out by technicians with at least 3 years of relevant experience.

ON SITE (SEISMIC ACQUISITION)

The SURVEY CONTRACTOR survey crew shall consist nominally of the following personnel as a minimum:

No	List of Personnel	Qt
1	Party Chief	1
2	Geophysics Specialist (QA/QC)	2
2	Recording Observer (5–15-year experience)	3
3	On Site Seismic Data Processor(5–15-year experience)	2
4	HSE Advisor (one for the base & one for the fly camp)	2
5	Medical doctor	2
6	Surveyor	7
7	Account or admin assistant	2
8	Radio Operator	2
9	Recording field Assistant	2
10	Drilling technician	As required
11	Vibrator technician and shooting supervisor	
12	Vibrator Operators	6
13	Plant Attendant / Electrician	2
14	Mechanics	5
15	Carpenter	1
16	Dozer Operators	As required

	<p style="text-align: center;">INVITATION FOR BID</p>	<p style="text-align: center;">TIMOR GAP PUALACA BLOCK</p>
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<p style="text-align: center;">17</p>	<p>Any other as per requirement (cooks & Helpers)</p>	<p>As required</p>
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SURVEY CONTRACTOR RESPONSIBILITY

SURVEY CONTRACTOR shall be fully responsible for the execution of the surveys and for the quality of data collected and post processed. The surveys shall be performed in accordance with industry standards, guidelines and best practice.

COMPANY will deploy a Survey Specialist to perform QA/QC of equipment, calibrations, data acquisition in field and data processing.

As part of the Project Execution Plan, a complete hazard identification and risk assessment (HIRA) shall be provided by the SURVEY CONTRACTOR. The procedure for evacuating injured personnel shall be included in this safety plan.

The COMPANY's general safety instructions will be supplied to the SURVEY CONTRACTOR who shall read them critically, and point out any incompatibility there may be with his own safety plan.

All questions concerning the safety of all survey personnel present during the field works at the survey site shall be SURVEY CONTRACTOR's responsibility. The SURVEY CONTRACTOR's responsibility includes briefing any sub-contractors on the safety procedures for the different equipment and tasks.

Before commencement of the survey works, a pre-job/kick-off meeting shall be organized by the COMPANY and SURVEY CONTRACTOR. This meeting shall be attended by the COMPANY, the SURVEY CONTRACTOR and the sub-contractors, and any other parties involved in the survey works, including the COMPANY site manager and safety manager, and local authority (if required). The purpose of this meeting shall be to review the scope of the survey works to be carried out, and to identify any other activities involved at or off the site. Minutes of the meeting shall be drawn up and signed by both the COMPANY and SURVEY CONTRACTOR.

In adverse weather conditions, SURVEY CONTRACTOR may be required to cease the survey operations, when it is considered that such adverse conditions may affect



INVITATION FOR BID

**TIMOR GAP PUALACA
BLOCK**

the safety of survey personnel and equipment, or the quality of the site works. Such adverse conditions shall be defined in common agreement between the SURVEY CONTRACTOR and COMPANY.

9.0 EXECUTION OF WORKS

MANAGEMENT

The SURVEY CONTRACTOR shall provide all management, supervision, labour, tools, equipment and materials necessary for the SURVEY CONTRACTOR's performance of the work. The SURVEY CONTRACTOR shall provide, maintain and be responsible for all management of the SURVEY CONTRACTOR's personnel and resources used for the execution of this scope of works.

The SURVEY CONTRACTOR shall comply with the Contract Schedule and Key Dates; and shall inform the COMPANY of any deviations due to technical or non-technical issues. Any adjustments to the Contract Schedule and Key Dates shall be discussed with the COMPANY and adequate evidence and reasoning shall be provided.

The SURVEY CONTRACTOR shall appoint a fully qualified, experienced and competent Project Manager who shall have the necessary responsibility for executing the work. The SURVEY CONTRACTOR's Project Manager shall be the formal focal point for all communications and project management related matters and shall be fully authorised with regards to the execution of this scope of works.

SURVEY CONTRACTOR shall provide, maintain and be responsible for management and control of all resources and personnel. SURVEY CONTRACTOR shall co-ordinate and interface daily on work activities and progress with the COMPANY.

Prior to commencement of the work, SURVEY CONTRACTOR shall conduct a readiness review meeting with COMPANY and demonstrate that the personnel are knowledgeable of and prepared for the work. The documentation relevant to this work scope will be reviewed during this meeting.

SURVEY CONTRACTOR shall submit a Project Execution Plan for review and approval by COMPANY, at least two weeks prior to commencement of field activities.

The Project Execution Plan should include curriculum vitae (CVs), schedules, QA/QC plans, safety policies and procedures, organisation chart of key personnel, list of

responsibilities of key personnel, number of survey teams, list of equipment and activities, work procedures, calculations and drawings (if any) to fully describe the proposed methods required for the performance of the Surveys, in compliance with the requirements detailed in this document.

SURVEY CONTRACTOR's schedule shall provide details of number of crew, mobilization dates, duration in weeks for field work and demobilization date. SURVEY CONTRACTOR shall complete all work as per the schedule and dates presented in contract agreement. Upon COMPANY's instructions or slippage of schedule, SURVEY CONTRACTOR shall mobilize additional personnel to expedite the work.

SURVEY CONTRACTOR shall prepare daily and weekly progress reports as well as photographs as a part of its scope of work.

CONSUMABLES

SURVEY CONTRACTOR shall provide all consumables necessary for the proper, safe and timely completion of the work.

MOBILISATION

Mobilisation shall include the supply, transportation, installation and maintenance of the SURVEY CONTRACTOR's temporary facilities, utility systems and connection to the existing utilities if available, including all required materials, construction equipment and tools, measuring sampling and survey equipment, temporary construction materials, consumables, expendables, supplies, fuels and lubricants necessary for the completion of the WORK.

SURVEY CONTRACTOR is responsible for acquiring all necessary permits for execution of the WORK. SURVEY CONTRACTOR is responsible to investigate the site thoroughly to familiarise himself with the conditions which may affect the WORK. Access to the site is the responsibility of the SURVEY CONTRACTOR.

EXECUTION

All surveys shall be performed in accordance with industry standards, guidelines and best practice. In addition, Calibration procedures and reports / sheets for all positioning systems and sensors shall be submitted to COMPANY for approval. No uncalibrated equipment or equipment components shall be used during operations.

DEMobilISATION

On completion of the WORK, and before COMPANY issues the completion certificate, upon release by the COMPANY for demobilization, the SURVEY CONTRACTOR shall carry out complete site clearance and clean-up, dismantling and removal of the SURVEY CONTRACTOR's temporary facilities, plants, surplus materials, garbage and other associated debris, including removal of underground piping / cabling forming part of the SURVEY CONTRACTOR's temporary facilities if any. All plant, surplus materials and other obstruction, debris, rubbish, staging and other temporary works shall be disposed to an approved disposal area. SURVEY CONTRACTOR shall reinstate the temporary facility area to its original state to the COMPANY's satisfaction, otherwise all associated cost that relates with the reinstatement works shall be back charged to the SURVEY CONTRACTOR.

CARE OF WORKS AND CONTAMINATED GROUND

SURVEY CONTRACTOR shall give particular attention to avoid damage to the site, environments and any existing utilities at the work site including overhead electricity, telephone mains and all brackets, posts and fittings in connection therewith. Special care is to be taken for all underground electrical and telephone cables, water mains, drains and other underground services, which are to be marked on the work site plan during the progress of the works.

Before commencing any works, SURVEY CONTRACTOR or his representative shall accompany the COMPANY on a work site inspection in order to consider any circumstances which may indicate the presence of underground cables, water or other service pipes at or in the vicinity of the works. Thereafter, SURVEY CONTRACTOR shall carry out the works in such manner and sequence as direct by the COMPANY. If during execution of the WORK, SURVEY CONTRACTOR's workmen uncover any cables, water or other service pipes, works shall be stopped immediately and shall not be again started until the matter has been reported to the COMPANY who will issue whatever directions he deems appropriate.

If evidence of contaminated or hazardous ground is encountered, SURVEY CONTRACTOR shall stop work and inform the COMPANY immediately to have an agreed revised method of working appropriate to the nature and level of contamination encountered, including possible disposal of contaminated material.

A method statement indicating the safety procedures to be followed during the investigation of contaminated or hazardous ground shall be provided by SURVEY CONTRACTOR prior to commencement of the investigation in the contaminated or hazardous ground for approval by the COMPANY.

TIME OF COMPLETION

It is crucial that works in each of the quotation are fully completed within the completion period approved by the COMPANY to enable the project to proceed without delay. SURVEY CONTRACTOR shall provide adequate plant, equipment and accessories, material and labour to ensure the timely completion of the works.

SURVEY CONTRACTOR shall submit a comprehensive detailed work programme to the COMPANY for approval prior to the award of the contract. SURVEY CONTRACTOR shall submit a daily progress report of the works to the COMPANY. Format of daily report shall be submitted for review and approved by the COMPANY.

WATCHING AND LIGHTING

SURVEY CONTRACTOR shall in relation with the Works provide and maintain at his own cost all lights, guards, fencing and watching when and where necessary or as required by the COMPANY, or by any competent statutory body or other authority for the protection of the WORK or for the convenience and safety of the public.

TEMPORARY WORKS

Subject to the prior written consent and approval of the COMPANY where the work site is located, SURVEY CONTRACTOR shall provide all plant and other equipment for temporary works required for the expeditious and proper execution and completion of the WORK, and the arrangements shall be such that damaged or destroyed plant or temporary works can be made good or replaced forthwith so that no delay in the WORK will occur. SURVEY CONTRACTOR shall be solely responsible for the suitability, safety and security of all plant and temporary works and shall take all precautions to ensure that the same are fully secured and made safe for as long as may be necessary against all risks of damage thereto by water and wind action or otherwise.

SURVEY CONTRACTOR shall manage and perform the work in accordance with applicable local laws and regulations.

TEMPORARY ACCESS

Subject to the prior written consent and approval of the COMPANY where the work site is located, SURVEY CONTRACTOR shall provide all temporary roads and gangways required for the execution of the WORK. SURVEY CONTRACTOR shall provide at all times during the progress of the WORK, proper means of access and the necessary attendance for inspection of the WORK by the COMPANY's representatives as directed.

SURVEY CONTRACTOR'S WORKING AREA

SURVEY CONTRACTOR shall maintain cleanliness and tidiness in the working areas and other temporary works to the satisfaction of the COMPANY and upon completion of work at each site, shall remove all plant, surplus materials and other obstructions, rubbish, debris, staging and other temporary works, leaving the sites reinstated in a condition to the satisfaction of the COMPANY. Failing of removal, clearance and reinstatement by the SURVEY CONTRACTOR, the COMPANY shall instruct a third party to carry out the aforesaid works at the expense of the SURVEY CONTRACTOR. SURVEY CONTRACTOR shall inform the COMPANY prior to the removal of plant from the site.

WORKERS ACCOMODATION

No living accommodation is allowed at the WORKSITE. SURVEY CONTRACTOR to commute all workers to WORKSITE based on daily basis.

WATER SUPPLY

SURVEY CONTRACTOR shall make his own arrangement for water supply that he requires on the site and shall comply with all the safety regulations connected with the installation and use.

ELECTRICAL POWER SUPPLY

SURVEY CONTRACTOR shall make his own arrangement for electrical power supply that he requires on the site and shall comply with all the safety regulations connected with the installation and use of such utility.

STORAGE FACILITY

SURVEY CONTRACTOR shall make his own arrangement for all machineries, instruments, accessories, miscellaneous items etc.

WASTE DISPOSAL

On completion of the WORKS, and before issuance of the certificate of completion, SURVEY CONTRACTOR shall clear away and remove from the WORKSITE all plants, surplus materials, rubbish, temporary buildings, temporary works and other associated debris. All plant, surplus materials and other obstruction, debris, rubbish, staging and other temporary works shall be disposed to an approved disposal area. SURVEY CONTRACTOR shall reinstate the site to COMPANY's satisfaction, otherwise all associated cost required for the reinstatement works shall be back charged to CONTRACTOR accordingly.

PROTECTION OF EXISTING FACILITIES

SURVEY CONTRACTOR shall take care to avoid damage to the following which includes, but not limited to, existing structures and underground services during the progress of work. SURVEY CONTRACTOR shall make good any damage to the satisfaction of the COMPANY.

DATA PROPRIETARY

All data, maps, reports, images, records and other information obtained from the site shall belong to the COMPANY.

10. SERVICES TO COMPANY

SURVEY CONTRACTOR shall provide the following services to COMPANY Representative(s) throughout the course of the WORK within the Lump Sum Price for the base scope of work.

SURVEY CONTRACTOR PREMISES

SURVEY CONTRACTOR shall grant the nominated COMPANY Representative free access to its premises to witness pre-mobilisation inspection, testing and calibration of its survey equipment and facilitate any assistance needed during this activity.

SURVEY AREA

SURVEY CONTRACTOR shall grant the nominated COMPANY Representatives free access to its site facilities and base camp during field activities to witness survey operations and data premises. It is anticipated that SURVEY CONTRACTOR will establish a base camp either in the vicinity of the survey area. Moreover, it is anticipated that SURVEY CONTRACTOR will establish a temporary facility on the site such as a tent or similar.

11. HEALTH, SAFETY, ENVIRONMENT AND QUALITY

Health and safety are of paramount importance. Safety issues and potential hazards shall be identified and addressed through forward planning, and steps taken to eliminate or minimise exposure to each hazard by a combination of good management, project specific procedures and the application of standard risk assessments and task risk assessments.

SURVEY CONTRACTOR shall comply with all regulations and procedures relating to health and safety requirements laid down by the Statutory Authorities. Project specific procedures and COMPANY requirements will be issued upon Contract Award.

SURVEY CONTRACTOR is required to submit their safety plan to COMPANY, for each project or different area within a project, before mobilisation and including Emergency Response Plan (ERP) procedures from the worksite. Such planning shall explicitly involve the structures and facilities of COMPANY where appropriate (vicinity of worksite).

All accidents will be investigated, even if not resulting in lost time injury. The accident reports should be forwarded to COMPANY 's Representative within 24 hours. An accident investigation form shall be included in appendix to SURVEY CONTRACTOR's safety plan.

COMPANY has the right to instruct the SURVEY CONTRACTOR to stop the work or remove individuals acting in an unsafe manner as determined by the COMPANY.

QUALITY ASSURANCE

The technical documentation to be supplied by the SURVEY CONTRACTOR shall allow the quality of the geophysical services to be assessed by COMPANY representative.

A survey pre-job or kick-off meeting (KOM) shall be held before the mobilisation of equipment and personnel to the work site. In addition to the COMPANY's and SURVEY CONTRACTOR's Representatives, this meeting shall be attended by the Project Manager, Party Chief, and by any other parties possibly involved in the survey works (logistic manager and HSE manager as a minimum).

COMPLIANCE

Compliance by SURVEY CONTRACTOR with this specification shall not relieve him of his responsibilities to supply services and survey equipment suited to meet the specified requirements and/or local codes governing health and safety.

All technical deviations to the Specifications and attachments shall be obtained by the SURVEY CONTRACTOR only through a concession request format. Concession requests require COMPANY review and approval prior to implementation of the proposed changes. No technical deviations are allowed unless approved in writing by COMPANY.

12. BIDDER'S TECHNICAL SUBMISSION

BIDDER shall refer to IFB for bid requirements. The proposal from BIDDER is expected to be delivered to COMPANY within the bidding period stipulated in IFB. And structured as follows:

Section	Category
PART 1	BIDDER's Details
PART 2	BIDDER's Capability & Experience
PART 3	Survey Execution Plan
PART 4	Project Schedule and Manpower
PART 5	Project Organisation and Key Personnel
PART 6	Quality Assurance

PART 1 – BIDDER'S DETAILS

BIDDER shall provide the following:

Reference	Bid Requirement
1.1	Names and type of organisation (e.g. private company, partnership Consortium, Joint Venture, Alliance, etc.) that is proposed for the execution of the Survey Campaign, together with current status of organisation including copies of certification, dates of registration/incorporation, etc. For joint ventures, consortia or other partnerships Articles of association including statements of joint and several liability.
1.2	Power of Attorney for the BIDDER's signatory confirming authority on behalf of BIDDER's entity/organisation.
1.3	A chart of the corporate organisation structure to be implemented to perform the Integrated 2D Seismic Survey including proposed subcontractors including all office locations in which the BIDDER is intending to execute the various elements of the work.
1.4	<p>A list of any sub-contractors or third-party consultants that are proposed to be used in the execution of the Integrated 2D Seismic Survey. The list shall provide the following:</p> <ul style="list-style-type: none"> Subcontractor's name and address A description of scope of work / services to be provided and where the subcontractor's services would be performed Where and when that subcontractor has been used before on the BIDDER's (significant) projects; BIDDER's previous experience with that subcontractor and BIDDER's evaluation of their QA system; Letter of commitment from proposed subcontractor for any major element of the scope of work.
1.5	A description as to how the BIDDER would demonstrate to TIMOR GAP PUALACA BLOCK throughout the project that they and their

Reference	Bid Requirement
	subcontractors are performing to TIMOR GAP PUALACA BLOCK's expectations.
1.6	In the event of an award, BIDDER shall provide evidence of Insurances required in accordance with the Terms and Conditions provided in this IFB documentation.

PART 2 – CAPABILITY & EXPERIENCE

BIDDER shall provide the following:

Reference	Bid Requirement
2.1	List of previous surveys conducted relevant to the scope of this IFB including: Project resume or project profile, Project name and name of client Site location Date of work and duration Contract value Scope of work Scope of work sub-contracted out, with names of sub-contractors provided, Client contact details such that TIMOR GAP PUALACA BLOCK can verify project particulars.
2.2	List of previous surveys including survey conducted in Timor-Leste including: Project resume or project profile, Project name and name of client

Reference	Bid Requirement
	<p>Site location</p> <p>Date of work and duration</p> <p>Contract value</p> <p>Scope of work</p> <p>Scope of work sub-contracted out, with names of sub-contractors provided,</p> <p>Client contact details such that TIMOR GAP PUALACA BLOCK can verify project particulars.</p>
2.3	Description of BIDDER capabilities to perform survey scope including, but not limited to:
2.4	Description of BIDDER organisation including headcount, management structure, specialist technical personnel, field personnel and support staff.
2.5	Description of BIDDER equipment, processing centre and facilities.
2.6	List and description of BIDDER survey equipment and facilities.
2.7	BIDDER shall identify survey equipment, facilities and services which need to be outsourced.

PART 3 – SURVEY EXECUTION PLAN

BIDDER shall provide the following:

Reference	Bid Requirement
3.1	A full and detailed description of the BIDDER’s Proposals for the execution of the Integrated 2D Seismic Survey scope, giving TIMOR

Reference	Bid Requirement
	GAP PUALACA BLOCK a complete understanding of the services to be provided.
3.2	Details of all survey activities to be carried out. No pricing information is to be included in the technical proposal. A priced list with quantities shall be provided in the Commercial proposal.
3.3	A comprehensive list of survey equipment proposed with technical details. BIDDER shall identify any equipment to be outsourced.
3.4	Mobilisation plan.
3.5	Outline method statements for survey and positioning works.
3.6	A list of study deliverables.
3.7	A list of technical software to be utilised during the execution of the work. BIDDER shall identify software licences currently held by its organisation.
3.8	List of technical qualifications to the IFB including TIMOR GAP PUALACA BLOCK survey specifications.
3.9	SURVEY CONTRACTOR shall indicate any operational restrictions expected due to the location of the worksite.
3.10	Confirmation that at Contract Award, SURVEY CONTRACTOR shall comply with supply of documentation required in TIMOR GAP PUALACA BLOCK survey specifications.

PART 4 – SURVEY SCHEDULE

BIDDER shall provide the following:

Reference	Question
4.1	A schedule for the Integrated 2D Seismic Survey including milestones and resource plan.

PART 5 – SURVEY ORGANISATION & KEY PERSONNEL

BIDDER shall provide the following:

Reference	Bid Requirement
5.1	A project organisation chart to show: <ul style="list-style-type: none">• Project manager, key personnel and all specialists required for the survey;• Identify names of the proposed key personnel;• Location for each resource;• Clearly identify any resources to be subcontracted or outsourced (contract hire).
5.2	Nominations for the following key personnel.
5.3	BIDDER shall provide the following for each nominated key personnel: <ul style="list-style-type: none">• A profile briefing on suitability for the role• Curriculum Vitae• Employment or contract status with BIDDER• Availability during proposed timescale for the study

PART 6 – QUALITY ASSURANCE

BIDDER shall provide the following:

Reference	Question
6.1	A statement addressing the BIDDER's quality policy, objectives and commitments to quality.
6.2	A copy of the quality philosophy / policy and procedures index from the BIDDER's quality manual.
6.3	Certification details (e.g. ISO 9001:2015 etc) including the most recent accreditation audit results.

13. BIDDER'S COMMERCIAL PROPOSAL

The commercial proposal shall include details and costing of proposed survey equipment, personnel and documentation. It shall also include outline planning of activities with estimated durations of:

- a. Documentation and Procedures
- b. Mobilisation / demobilisation
- c. Survey works
- d. Reporting and Deliverables

Details shall be presented in table format.

PART 8.1 – LUMP SUM FEES

BIDDER shall prepare lump sum fees the performance of the scope of work in United States Dollars in the following formats:-

- Summary Pricing form provided in Appendix D1.
- Detailed Pricing form provided in Appendix D2.

The subtotals presented in the pricing forms shall be inclusive of Timor-Leste Withholding Tax if applicable.

PART 8.2 – SCHEDULE OF RATES

BIDDER shall provide a schedule of rates in the following format.

- Schedule of Rates form provided in Appendix D3.

The rates shall be valid for any additional work agreed during the execution of the Metinaro Survey Campaign.

PART 8.3 – PAYMENT SCHEDULE

BIDDER shall propose a payment schedule in the following format:-

- Payment schedule form provided in Appendix D4.



INVITATION FOR BID

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Appendix A - IFB FORM AND ACKNOWLEDGEMENT

IFB FORM OF ACKNOWLEDGEMENT

To Be Prepared on BIDDER's Official Letterhead

Form of Acknowledgement

TIMOR GAP PUALACA BLOCK Unip.Lda.
Level 3, Timor Plaza, Suite 301 – 314
Rua Presidente Nicolao Lobato, Comoro,
Dili, Timor-Leste

ATTN: GM Procurement & Logistic

TIMOR GAP PUALACA BLOCK, Integrated 2D Seismic Survey

We acknowledge receipt of your IFB documentation on the above subject dated* for the provision of Integrated 2D Seismic Survey + services for the above work.

We acknowledge and accept the obligations of secrecy and confidentiality as defined in Section 2, Clause 7, "Confidentiality Agreement and Acknowledgement Letter".

(---EITHER---)

We propose to respond to your invitation and will submit our Technical and Commercial Proposals for the provision of LNG Import Terminal Feasibility Study and services.

(---OR---)

It is not our intention to submit a proposal and we return your IFB documents herewith.

(---The following paragraph is for Bidding Partnerships or Consortia only---)

We propose to submit our Tender in the name of* joint venture or partnership or consortia (---BIDDER to state which---), the Parent Companies of which have agreed to be jointly and severally liable for the full performance of this work.

We propose to submit our Bid in

(---EITHER---)

Hard copy format, delivered to TIMOR GAP PUALACA BLOCK's offices in Timor-Leste.

(---OR---)



INVITATION FOR BID

TIMOR GAP PUALACA BLOCK

Electronic format and request that TIMOR GAP PUALACA BLOCK provide details of the web based system to be used for uploading Bid Documentation.

We understand that TIMOR GAP PUALACA BLOCK is under no obligation to accept any Proposal and that all of our costs incurred in preparation of the Proposal are to our own account.

Our contact during the Bidding period will be:

..... *

Email Address:

..... *

Telephone Number:

..... *

Yours sincerely,

Signed:

..... *

Name and Position:

..... *

Registered company or consortium name:

..... *

Company Business Number:

..... *

Date:

..... *

* denotes BIDDER to Complete



INVITATION FOR BID

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Appendix B - PROPOSAL RESPONSE FORM

PROPOSAL RESPONSE FORM

Date: *

RE: IFB for the Provision of Integrated 2D Seismic Survey

To: TIMOR GAP PUALACA BLOCK Unip.Lda.

Level 3, Timor Plaza, Suite 301 – 314
Rua Presidente Nicolao Lobato, Comoro,
Dili, Timor-Leste

.....(---Insert BIDDER Name---) has read the Invitation
for Bid relating to the work and hereby confirms:-

1. We have examined the Scope of Work and Reference Documents for the provision of the services and hereby agree to furnish all labour, tools, equipment, supervision, and services not specifically stated as being furnished by TIMOR GAP PUALACA BLOCK, to perform the subject work in accordance with these documents.
2. Receipt is acknowledged on the following Notices issued by TIMOR GAP PUALACA BLOCK in respect to the Invitation for Bid. The content of these Notices has been carefully examined and their effect incorporated into the Proposal.

Notice. No.	Date	Subject

3. The work will be performed under the terms and conditions noted under Clause (26.4) with amendments and supplements as agreed with TIMOR GAP PUALACA BLOCK through the clarification process and attached to this Proposal.
4. All applicable taxes are included in this bid.
5. We confirm that our Proposal is not conditional upon the availability of labour, staff, equipment, materials or anything that we will be required to supply under the Contract.

6. We have completed the schedules of questions contained within the Datasheet and Chapter 14 which comprises the Technical Submission requirements.
7. We have completed the schedules of questions contained within Chapter 15 which comprises the Commercial Submission requirements.
8. Work shall commence within (---Completed by BIDDER---) calendar days after award of contract.
9. All work must be covered under the contract. It is understood that all extra work must be approved in writing via a Change Order signed by a TIMOR GAP PUALACA BLOCK representative.

Signed:

.....*

Name and Position:

.....*

Registered company or consortium name:

.....*

Date:

.....

*

* denotes BIDDER to Complete



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Appendix C - PROPOSAL EVALUATION CRITERIA

Preliminary Examination

Only BIDDERS who pass this preliminary examination will be accepted for the subsequent technical and commercial evaluations.

	Essential Criteria	Comply (Y/N)	Accept for Technical Evaluation (Y/N)
	Technical and Commercial Proposal are submitted in two separated packages (using either sealed envelopes or web-based system).		
	Provide an authenticated copy of its currently valid Business Registration Certificate from country of domicile.		

BIDDERS who fail to comply with any of the above essential criteria will be rejected and disqualified for technical evaluation.

Technical Evaluation

Only BIDDERS who pass the initial PASS/FAIL technical evaluation criteria will be accepted for the subsequent technical rating evaluations and commercial evaluations.

	Technical Evaluation Criteria	Comply (Y/N)	Accept for Further Evaluation (Y/N)
	Established organisation with a track record in delivering geophysical and geotechnical surveys for onshore and offshore (nearshore) sites including the interpretation of survey results.		

The technical rating evaluations will be based on the following criteria.

	Technical Evaluation Criteria	Weight (W)	Ratings (0-100%) (R)	Technical Score (W x R)
	Demonstrable experience in conducting integrated 2D seismic survey which included seismic acquisition, processing, interpretation and well design			
	Demonstrable capacity and resources to undertake the work within the required survey schedule			
	Demonstrable understanding of the scope of services and a clear survey plan for project execution in line with TIMOR GAP PUALACA BLOCK objectives identified in the integrated 2D seismic survey			
	Demonstrable organisation and human resource skill sets to undertake the services. Experience of proposed Key Personnel.			
	Demonstrable commitment to Quality Assurance			

The technical rating evaluation will be evaluated as follows:

$$Ts = W \times R$$

Notes:

Ts = Technical Rating Score

W = Weight

R = Rating

RATING SCALE

EXCELLENT	100%	Feature evaluated substantially exceeds the sub – criteria requirements
VERY GOOD	90%	Feature evaluated exceeds the sub – criteria requirements
ABOVE AVERAGE	80%	Feature evaluated fully meets the sub – criteria requirements
AVERAGE	70%	Feature evaluated proposed adequately meets the sub – criteria requirements
BELOW AVERAGE	50%	Feature evaluated has significant deficiencies against sub – criteria requirements, with probable negative effects on assignment implementation
NON COMPLIANT	0%	Feature evaluated does not comply with the sub – criteria requirements and does not provide enough information to permit a higher rating

*Minimum passing score of technical proposal is 70 points out of 100 points. Bids which are technically compliant and pass the minimum passing score will be recommended for commercial evaluation and bids which do not meet the technical requirement threshold will be automatically disqualified/rejected.

Commercial Evaluation

Only BIDDERS who pass the initial PASS/FAIL technical evaluation criteria will be accepted for the subsequent commercial rating evaluations.

	Commercial Evaluation Criteria	Comply (Y/N)	Accept for Further Evaluation (Y/N)
	Confirmation of acceptance of Integrated 2D Seismic Survey		

The Lowest Evaluated Commercial Proposal (**LCP**) will be given the **maximum commercial proposal score (Cs) of 100 points**. The commercial proposal scores of the other Commercial Proposals will be evaluated as follows:

$$CPs = \frac{LCP}{BCP} \times 100$$

Notes:

CPs = Commercial Proposal Score

LCP = Lowest Commercial Proposal

BCP = BIDDER Commercial Proposal (commercial proposal of the evaluated BIDDER)

The combined of Technical and Commercial scores will be evaluated as follows:

$$CS = (Ts \times T\%) + (CPs \times CP\%)$$

CS = Combined Score

Ts = Technical Rating Score

CPs = Commercial Proposal Score

T% = Technical Rating Distribution Weight (70%)

CP% = Commercial Proposal Distribution Weight (30%)

Local Content Evaluation

Only BIDDERS who pass the initial PASS/FAIL technical evaluation criteria will be accepted for the subsequent technical rating evaluations and commercial evaluations.

The Local Content evaluations will be based on the following criteria.

No	Local Content Criteria	Weight (W)	Rating s (0-100%) (R)	Local Content Score (W x R)
1	Local Workforce: The percentage of the workforce that is should be from the local community. This includes skilled and unskilled labour.	20		
2	Local Goods and Services: The percentage of goods and services used in the survey are sourced locally. This includes equipment, materials, transportation, accommodation, and food.	15		
3	Local Suppliers and Contractors: The suppliers and contractors used in the survey that are locally owned and operated in the country.	15		
4	Local Training and Development: The provision of training and development opportunities to the local workforce, including skills training, apprenticeships, and mentoring programs.	15		
5	Local Content Plan: The existence of a detailed plan outlining how local content will be maximized throughout the project lifecycle.	10		
6	Social and Environmental Responsibility: The commitment to social and environmental responsibility, including the promotion of local	10		

	community development and the protection of the environment.			
7	Technology Transfer: The transfer of technology and knowledge to the local workforce and suppliers to increase local capacity and capabilities.	10		
8	Compliance with Local Regulations: Compliance with local regulations and laws governing local content requirements and standards.	5		

The Local Content rating evaluation will be evaluated as follows:

LCs=W x R

Notes:

LCs = Local Content Rating Score

W = Weight

R = Rating

RATING SCALE

EXCELLENT	100%	Feature evaluated substantially exceeds the sub – criteria requirements
VERY GOOD	90%	Feature evaluated exceeds the sub – criteria requirements
ABOVE AVERAGE	80%	Feature evaluated fully meets the sub – criteria requirements
AVERAGE	70%	Feature evaluated proposed adequately meets the sub – criteria requirements
BELOW AVERAGE	50%	Feature evaluated has significant deficiencies against sub – criteria requirements, with probable negative effects on assignment implementation

NON
COMPLIANT

0%

Feature evaluated does not comply with the sub –
criteria requirements and does not provide enough
information to permit a higher rating

*Minimum passing score of Local Content Proposal is 70 points out of 100 points. Bids which are technically compliant and pass the minimum passing score will be recommended for commercial evaluation and bids which do not meet the technical requirement threshold will be automatically disqualified/rejected.

Appendix D - PRICING AND COMPENSATION



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Table D1 – Lump Sum Pricing Summary



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Table D2 – Project Base Scope Lump Sum

Table D3 – Unit Rates for Additional Work

Table D4 – Payment Terms

Milestone	Payment %	Payment Condition
Kick Off Meeting and Issue of Survey Plan	10%	Terms of payment shall be net 30 days from receipt of invoice.
Mobilisation of Resources PUALACA block area	*	Upon acceptance by TIMOR GAP PUALACA BLOCK Site Representative

* BIDDER shall propose % payment for milestone.

Terms of payment shall be net 30 days from receipt of invoice.



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Appendix E – BIDDER CLARIFICATION REQUEST FORM



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