



REQUEST FOR PROPOSALS

Title: Interpretation of Quaternary Sediments and Depth to Bedrock through Data Compilation and Correction of Gamma Logs

Date Issued: Tuesday, January 20, 2015

Solicitation Closes: Monday, February 9, 2015

Enquiries to: Christa Pellett
Project Manager, Geoscience BC

Email: pellett@geosciencebc.com

THE ORGANIZATION

Geoscience BC is an independent, not for profit, geoscience organization with a mandate to attract new mineral and oil and gas investment to British Columbia through geoscience. Geoscience BC works in partnership with industry, academia, government, First Nations, and communities to fund innovative applied geoscience projects.

INTRODUCTION

In anticipation of a subsequent RFP which will look at mapping and characterization of shallow groundwater through airborne electromagnetic geophysics north of the Peace River this RFP is designed to support the interpretation of the EM survey.

Safety and drilling regulations require the upper section of a well bore is cased and cemented before petrophysical logs can be acquired. Most logs cannot be obtained through these cased zones due to attenuation and other interference effects. The gamma log is an exception and can be run through intervals that are cased. Consequently BC regulations require that gamma logs be run from surface to the bottom of the well. Gamma log data therefore are obtained in the cased and uncased portions of the well.

The gamma log provides a unique opportunity to investigate Quaternary and other near-surface formations since it is the only log that is acquired through the shallow cased portion of a well. Gamma logs can be useful for (1) identifying sands and gravels that could be potential ground water aquifers, (2) identifying clay rich sediments that could act as aquitards, i.e. seals, and (3) identifying the contact between the Quaternary sediments and bedrock, thus providing an estimate of the thickness of the Quaternary sediments. Unfortunately the gamma log response in the cased portion of the well is attenuated due to absorption by the casing and cement. Before an interpretation of the gamma log in the cased portion of a well can be carried out corrections to account for this attenuation must be made.

OBJECTIVES

The objective of this study is to generate a map of the Quaternary thickness (depth to bedrock-Quaternary contact) and to identify potential Quaternary ground water aquifers and aquitards within the Montney play regional survey area (see map and UTM coordinates in Appendix 1).

To accomplish this, the first step will be to apply a correction to the gamma logs within the cased zones to account for attenuation affects since the upper cased section of the wells is the section in contact with the Quaternary sediments.

Once all the available wells within the study area have had this correction applied to the cased section, the second step is to use the corrected gamma logs from the cased section of the wells and, when necessary, the uncorrected gamma log from the uncased section of the wells to provide an interpretation of the Quaternary sediments.

The third step is to use these same logs to interpret the depth to the Quaternary-bedrock contact.

TECHNICAL SPECIFICATIONS AND DETAILS

This request for proposal (RFP) is focussed on data compilation and correction of gamma logs, interpretation of the Quaternary sediments and the location of the depth to the bedrock-Quaternary contact.

A) Data compilation

Gamma logs (digital log if available but if there is no digital version on file then a digitized paper record if it is available) within the cased section of all the available wells must be corrected for attenuation affects by using either the Schlumberger graphical approach, the statistical approach of Quartero et al. (2014), or another suitable correction method before interpretation.

The corrected gamma logs must be interpreted by an experienced Quaternary geologist using the magnitude of the gamma values to determine where there are potential aquifers (coarse sands and gravels - low API gamma values) and where there are potential aquitards (clays and silty sands - high API gamma values). The geologist must also interpret the depth to the bedrock-Quaternary contact based on differences in API values between the bedrock and the overlying Quaternary section.

B) Data Presentation and Standards

Geospatial products will be prepared in an ArcGIS interoperable data format with coordinates recorded as latitude and longitude, and as UTM eastings and northings in the NAD83 datum. Project proponents are requested to coordinate with the data custodian, at Geoscience BC, to determine suitability prior to publishing to Geoscience BC's GIS.

C) Deliverable Items

The following items will be delivered to Geoscience BC, Suite 440 – 890 West Pender Street, Vancouver, BC, Canada, V6C 1J9:

1. Monthly progress reports
2. Summary maps showing key results, including:
 - i. the location of all wells used in the study,
 - ii. Quaternary thickness, and
 - iii. the location of potential ground water aquifers (depth to top of potential aquifers should be identified as well)
3. Regular meetings with Geoscience BC's Geothermal Technical Advisory Committee
4. Digital Data - A listing of all wells used in the study (well identifier, UTM coordinates and elevation) must be included. A flag identifying those wells that required the gamma log to be digitized from paper records must be included.
5. A report summarizing the assumptions, uncertainties, methodology, and results. Two (2) print copies and one digital copy in PDF format, which must include the following:
 - i. A report number supplied by Geoscience BC;
 - ii. The name and address of the contractor, the phone and fax numbers of the company and the date of the survey;
 - iii. A table of contents;
 - iv. Details of data compilation and references; and
 - v. A summary of specific problems encountered during compilation and solutions developed.

Final deliverables must be received by Geoscience BC no later than December 31, 2015.

CONTENT OF PROPOSAL

The proposal **should** contain:

1. A summary of the proponent's relevant past project work, including any previous projects completed for Geoscience BC.
2. A timeline for the project, including an undertaking to start the project in a timely manner with monthly reporting of the status of the project.
3. A price for the project in Canadian dollars. This will be an all-inclusive price, including all personnel, administrative, compilation and final reporting costs.
4. A commitment to work with Geoscience BC on community outreach and engagement activities in local communities in the vicinity of the project.

The submission of standard business development or promotional materials published corporate profiles, annual reports, standard marketing or sales brochures and other like materials is discouraged.

Each Proponent is solely responsible for conducting their own independent research, due diligence, and any other work or investigation, and seeking any independent advice necessary for the preparation of the Proposal. Nothing in this RFP is intended to relieve the Proponents from forming their own opinions and conclusions with respect to the matters addressed in this RFP.

CONFIRMATION OF INTEREST

Each Proponent who intends to submit a Proposal in response to this RFP shall confirm its intention and provide a single point of contact, phone number, fax number and e-mail address to Christa Pellett at Geoscience BC.

Contact:	Christa Pellett
E-Mail:	<i>pellett@geosciencebc.com</i>

SUBMISSION OF PROPOSALS

Proposals will be accepted in the form of an electronic submission in PDF format to **pellett@geosciencebc.com** by the time and date indicated on page 1 of this RFP document. Proposals submitted in response to this RFP will not be returned, and will be kept confidential. Original Proposals submitted after this deadline will not be accepted. Each Proponent shall be responsible for the timely delivery of its Original Proposal. All components of a proposal must be received by the submission deadline.

Geoscience BC may extend the Submission Deadline by issuing an Addendum prior to the Submission Deadline. Proponents who have confirmed their intention to submit a Proposal will be advised directly of any extension to the Submission Deadline.

ENQUIRIES / TIME EXTENSION TO THE RFP CLOSING DATE

All enquiries and other communications related to this RFP throughout the solicitation period shall be directed in writing only, by email, to Christa Pellett.

To ensure the equality of information among Proponents, answers to enquiries which are relevant to the quality of the proposals will be communicated to all proponents who have confirmed their interest in submitting a proposal. Such enquiries must be received at least two (2) working days before the

submission deadline. A request for a time extension to the RFP submission deadline WILL NOT be considered.

VALIDITY OF PROPOSAL

Any cost estimates associated with the proposals must remain valid for acceptance for a period of not less than ninety (90) days after the submission deadline of the RFP. After the RFP closing date, no amendments to the proposal will be accepted. However, during the evaluation the Technical Authority may require clarification from or conduct interviews with the Proponents.

AMENDMENT OF PROPOSAL

A Proponent may amend its Proposal prior to the Submission Deadline by withdrawing its original Proposal and submitting a revised Proposal.

Geoscience BC may, in its sole discretion, seek clarification of any matter in a Proposal in any manner it considers appropriate including investigating the abilities and experience of a Proponent, seeking information from other parties about a Proponent, requiring Proponents to submit supplementary documentation and seeking a Proponent's acknowledgement of Geoscience BC's interpretation of the Proponent's Proposal.

APPLICABLE LAWS

Any contracts subsequently negotiated and awarded with respect to this RFP shall be interpreted and governed, and the relations between the Parties determined, by the laws in force in the province of British Columbia and the parties attorn to the jurisdiction of the British Columbia courts.

RIGHTS OF GEOSCIENCE BC

Geoscience BC reserves the right to:

- a) Reject any or all proposals received in response to this RFP
- b) Enter into negotiations with one or more Bidders on any or all aspects of its proposal;
- c) Accept any proposal in whole or in part;
- d) Cancel and/or reissue this requirement at any time;
- e) Award one or more contracts;
- f) Verify any or all information provided with respect to this requirement;
- g) Award contracts without competition for follow-on-work if any, to the successful Proponent for this requirement;
- h) Reduce or increase the overall RFP scope by up to 20%.

INFORMATION PROVIDED BY GEOSCIENCE BC

No representation or warranty, expressed or implied, is made and no responsibility of any kind is accepted by Geoscience BC, or its advisors, employees, consultants or agents, for the completeness or accuracy of any information contained in the RFP Documents or that is provided during the RFP process or contract negotiation process, or under a contract that may be entered into, if any.

CHANGES TO THE RFP DOCUMENTS

Geoscience BC may, prior to the Submission Deadline, without liability, cost or penalty, alter the Submission Deadline and amend or supplement the RFP Documents by Addenda only. No other communications of any kind whatsoever will modify the RFP Documents.

COSTS OF PROPOSAL

The Proponent shall bear all costs and expenses with respect to the preparation and submission of its

Proposal and any other activity pertaining to its Proposal, including its participation in the RFP process and contract negotiation, if any. Geoscience BC shall not be liable to pay any such costs/expenses regardless of the conduct or the outcome of the RFP process.

CONFIDENTIALITY

Geoscience BC and its partners will take all reasonable precautions to maintain the confidentiality of the information submitted by the Proponents, subject to any disclosure required by law. Geoscience BC reserves the right, however, to disclose the Proposal to employees, servants, agents, advisors and consultants of Geoscience BC and its partners and affiliates for the purpose of assisting Geoscience BC in evaluating the Proposal. The employees, servants, agents, advisors and consultants of Geoscience BC and its partners and affiliates will not be liable for any damages resulting from any disclosure before, during or after the issuance of this RFP and the submission of a Proposal.

Proponents will take all reasonable precautions to maintain the confidentiality of any information provided by Geoscience BC, subject to any disclosure required by law. Proponents reserve the right, however, to disclose the Proposal to employees, the servants, agents, advisors and consultants of the Proponent and its affiliates for the purpose of assisting the Proponent in preparing the Proposal.

NO PUBLIC STATEMENTS

Recipients of and Proponents to this RFP shall not issue any public statement or news release pertaining to this RFP without the prior written consent of Geoscience BC.

ABSENCE OF CONTRACTUAL OBLIGATIONS DURING RFP PROCESS

- (a) Geoscience BC shall have no obligation to enter into a contract with a Proponent in respect of the provision of Services that are the subject of this RFP. Geoscience BC shall only have obligations to a Proponent if it decides to execute a written agreement with a Proponent and such obligations shall be in accordance with the terms and conditions of that agreement as finalized between Geoscience BC and the Proponent.

- (b) Geoscience BC may, in its sole discretion, for any reason and at any time, take any action in respect of the Proposals it receives including:
 - (i) Entering into further discussions or clarification meetings with one or more of the Proponents;
 - (ii) Entering into any contract or contract negotiations with one or more of the Proponents;
 - (iii) Inviting any of the Proponents to participate in another competitive process to carry out the Services;
 - (iv) Requesting one or more of the Proponents to supplement and resubmit their Proposal;
 - (v) Accepting or rejecting any Proposal;
 - (vi) Annulling this RFP process and rejecting all Proposals; or
 - (vii) Annulling this RFP process and commencing a new process;

at any time without incurring any liability to any Proponent and without any obligation to inform Proponents of the reasons for Geoscience BC's actions. Nothing in this subsection or elsewhere in the RFP Documents shall impact or affect the validity of (a) and (b).

FURTHER INFORMATION, CLARIFICATION AND CONTACT INFORMATION

Requests for further information, clarification or for any other purpose related to this RFP are to be made by e-mail to:

Christa Pellett
E-Mail: pellett@geosciencebc.com

- (a) Proponents are responsible for seeking any clarification that they require well in advance (at least 2 working days) of the Submission Deadline. Geoscience BC shall not be responsible for any misunderstanding of the RFP Documents.
- (b) For all purposes related to this RFP, Proponents shall not contact or attempt to contact:
 - (i) Any Geoscience BC officer, employee, subcontractor, agent, representative, consultant or volunteer with respect to this RFP, **other than the Geoscience BC contact set out in subsection (a) above; and**
 - (ii) Any other prospective Proponent except for the purpose of discussing the possibility of submitting a Proposal as a Joint Venture.

METHOD OF SELECTION

Geoscience BC shall, in its sole discretion, use any evaluation criteria (whether subjective or objective), it deems suitable to evaluate the Proposals. In the event that Geoscience BC selects a Proponent for the provision of the Services, Geoscience BC will notify each Proponent in writing, and Geoscience BC's method of selecting the Proponents will remain confidential to Geoscience BC.

AGREEMENTS

Geoscience BC will confirm the business arrangement in the form of a Project Agreement to be drafted after selection of the successful Proponent(s).

REFERENCES

Quatero E.M., Bechtel, D., Leier, A.L., and Bentley L.R. (2014): Gamma-ray normalization of shallow well-log data with applications to the Paleocene Paskapoo Formation, Alberta; Canadian Journal of Earth Sciences, 51(5): 452-465, 10.1139/cjes-2013-0148

APPENDIX 1: PROJECT COORDINATES

Position	CoordSys	X	Y
LowerLeft	NAD83_UTMz10	566524	6218217
LowerRight	NAD83_UTMz10	618136	6257086
UpperLeft	NAD83_UTMz10	481368	6331223
UpperRight	NAD83_UTMz10	533119	6370221

