

## Questions and Responses

Posted December 18, 2019

### **Q.1 What are the assessment criteria for the tender? If a specific system is in place (scoring technical, commercial etc) can this be shared?**

The proposal and model delivery will be scored as follows: (A) Ability to support the reconstruction, visualization and understanding of critical source rock context and insights for offshore Nova Scotia (70%) -- with the note that a winning proposal can include extra levels of sophistication at extra cost if there is a clearly related uplift anticipated in evaluating candidate source rock context; (B) Ability to deliver the model on a standard platform (e.g., GPlates, ESRI-based) and to disclose model elements in an accessible format for further use (20%) -- with the note that a winning proposal could be based on a non-standard platform and format and could exclude the disclosure of model elements, as long as the technical advantages of the non-standard approach are explained and compelling; and (C) Competitive time and value proposition (10%) -- with the note that we are not looking, in general, for a quick or cheap project if it compromises the results, but if two proposals appear similar time and cost differences may make the difference for 10% of the total score.

Each proposal will be scored and ranked independently by three evaluators and the final decision will be based on the winning total score and rank when the three evaluations are considered together.

### **Q.2 What is the anticipated time-frame for the project duration?**

The anticipated project duration is not firm; the top priority is for respondents to provide a schedule that best reflects the work needed to meet the objectives. However, it is anticipated that the project will be completed within 2 to 8 months from startup.

### **Q.3 Will withholding tax be due on the project and if so at what level will it be set?**

OERA will pay the contracted value. Respondents are responsible for remitting applicable taxes. OERA has not in the past withheld taxes.

### **Q.4 Will petrophysical logs be made available from Nova Scotia (and if possible, from Morocco) so that petrophysical source rock screening can be deployed?**

Petrophysical logs can be made available for offshore Nova Scotia if confidentiality periods have expired (for recent wells this includes Cheshire and Monterey Jack, but excludes Aspy). Note that penetrations of the Lower Jurassic are mostly absent from offshore Nova Scotia.

### **Q.5 Will stack or pre-stack seismic data (2d, 3d) be made available to allow AVO assessment to be performed on potential source rock horizons? cf Loseth et al. (2011) Geology 39(12).**

Attempts to use stack or pre-stack seismic data to detect source rock presence after Loseth et al. (2011) or others is an intriguing proposition, but is not expected for this RFP either for reasons of data accessibility, cost, or time. It has been tried for shelf data near the Sable Offshore Project with limited success.

For good reasons, a respondent may recommend the incorporation of this approach as a part of a proposal. If so, it is recommended that it be included as an optional add-on to the main tectonic and paleogeographic update. Analysis built on this type of approach would also be welcome for the second RFP that will be issued in early 2020 that targets new, innovative projects (see below, Dec. 10). With some exceptions, if providers are under contract with the OERA and necessary data sharing and confidentiality clauses are included, then all seismic data filed with the regulator from offshore Nova Scotia can be shared under contract and used for analysis. In general, this data is post-stack data.

**Q.6 Will a stratigraphic framework be provided (linking Nova Scotia lithostrat to chronostrat) allowing regional data to be linked into the AOI? How many risk maps are envisaged i.e. are they anticipated at the Stage level or something else?**

Yes, a stratigraphic framework will be provided. OERA will provide an updated database and correlation of Nova Scotian and Moroccan bio- and chrono-stratigraphy as part of the recent palinspastic restoration of four trans-Atlantic cross-sections undertaken in collaboration with ONHYM. These results and update will be released to the public over the next few weeks once approved by relevant stakeholders.

Yes, risk maps are envisaged at the Stage level; or, they are envisaged at slightly narrower or broader time bands as relevant to capture the common period of a proposed source rock candidate. At least two risk maps are envisaged (one for known Upper Jurassic source rock, one for speculative Lower Jurassic source rock), but potentially as many as 4 or 5, if the candidacy of a Middle Jurassic source rock or a Triassic candidate can be included as well.

**Q.7 Will the work that has been done by Martin Fowler and others jointly between Nova Scotia and ONHYM (Morocco) be made available to the study?**

Yes, if permitted by confidentiality restrictions. With regards to data and results from Morocco, ONHYM has final authority for any new disclosure and use of data and results. However, the goal is that the data and results produced by Martin Fowler will be released to the public in the next few weeks once approved by relevant stakeholders. This will be discussed with the successful proponent at the kick-off meeting.

**Q.8 Looking for clarification on the review and survey done by Dr. Andy Bishop. What format it this in (report and GIS points/ polygons)? Is it possible to get a Table of Contents?**

Dr. Andy Bishop will need to actively liaise with the paleogeography effort in the New Year to ensure that the Lias review results are effectively incorporated. Dr. Bishop's review is a high-level assessment of regional and global Lias source rock reports for the purpose of comparison with the northern Central Atlantic. There will be short summaries of literature by basin, but a spreadsheet or GIS layer of data by location is not a deliverable. This can be discussed with the successful proponent at the kick-off meeting.

**Q. 9 Will you be able to supply any information (maps etc) of salt body (diapirs, salt walls etc) locations?**

The OERA is working closely with the CNSOPB who is in the process of developing new, updated maps of salt body locations offshore Nova Scotia. The degree to which updated maps will be finished and available for use in this current project will be discussed with the successful proponent at the kick-off meeting.

Posted December 16, 2019

**Q: In what format are the 2D structural reconstructions from Beicip-Franlab available? For example, are they available in MOVE format?**

A: The 2D restorations were prepared using LithoTect software by Landmark. This software allows exports in a variety of formats including ASCII to support integration with further workflows.

**Q: What specific time steps did Beicip-Franlab use for the restorations?**

Beicip-Franlab used 0, 23, 50, 66, 94, 101, 130, 145, 163, 183, and 200 Ma for the restorations. These times were selected based on when related seismic horizons were picked for the latest syn-rift and early post-rift.

Posted December 12, 2019

**Q: Given the Christmas and New Year Holidays, would you consider extending the deadline to January 13, 2020.**

A: Yes, we will extend the deadline. Proposals will be due Monday, January 13, 2020 at 4:00PM Eastern Time, 5:00PM, Atlantic Time.

Posted December 10, 2019

**Q:**

**Is it possible to extend the Tectonics RFP submission date beyond January 2020 to give more time for academic participants to coordinate collaboration? Will preference be given to collaborators with Canadian status?**

A:

Competitors considering bids for the current RFP (i.e., targeting a relatively short duration, state-of-the-art update of what is known today) are herein made aware of a related RFP (i.e., targeting innovative advances towards a new state-of-the-art understanding over a 2 year period) to be issued early in the New Year. Although documentation for the second RFP will not be ready for a few more weeks, an advance description is provided here to help potential respondents decide if their capabilities or responses are best suited for the first or second competition.

The first, current RFP targets a state-of-the-art understanding of what is presently known or inferred about the tectonic and paleogeographic setting of Nova Scotia's syn-rift and early post-rift source rock potential. The purpose of this RFP is to obtain a prompt review of recent hydrocarbon exploration results and future prospects in their regional geological context. Proposals will be evaluated solely on their technical aspects.

The second, forthcoming RFP will target innovative advances towards a new understanding of the tectonic and paleogeographic setting of Nova Scotia's offshore Mesozoic basins and petroleum potential. It is expected that more than one project may be funded, which may target different aspects of this broad subject (e.g., source rock presence and preservation, crustal architecture, ocean connectivity, sediment-salt interactions, geological variation both along-strike and across conjugate margins, etc.). The second RFP will allow for longer duration projects, starting by September, 2020 and finishing by September, 2022. The competition will be open to consultants, academics, or collaborations. However, the proposed

timelines are designed to allow for possible opportunities for graduate and post-doctorate researchers to be involved. Ideally, the second RFP process will begin in early January, 2020 and close in March, 2020 to permit the development of robust proposals and allow successful proponents to advertise student opportunities to start in September, 2020 as applicable.

Posted December 9, 2019

- 1. Can you provide more details on the format of the plate model that you require. Specifically, would you want:**
  - a. Rigid terrane polygons and rotation parameters**
  - b. The above, plus dynamic polyline plate boundaries**
  - c. A deformable solution, likely comprising deforming, topological networks**
  - d. Would you prefer the model to be delivered in GPlates format (not an essential question, but note that option c could only be delivered in GPlates format)**

The priority for this RFP are proposals that will deliver critical insight for the presence, preservation, and depositional environment of candidate source rocks offshore Nova Scotia and neighbouring regions in a cost-competitive, fixed price proposal within the time-frame required. We have not put out this RFP with the intent to require reconstruction methods that are necessarily compatible with the GPlates software, while recognizing at the same time that some proposals may target this platform. If necessary, proposals should clarify cost advantages (or premiums) and software format advantages (or limitations) for a proposed delivery of the model that includes both: (i) the disclosure to and use by the client of model elements (e.g., rotation parameters, reconstructed elements, etc.), and (ii) the level-of-implementation-sophistication differences (e.g., topological networks > dynamic polylines > rigid-only).

As guidance, the proposal and model delivery will be weighted as follows:

(A) Ability to support the reconstruction, visualization and understanding of critical source rock context and insights for offshore Nova Scotia (70%)\*

(B) Ability to deliver the model on a standard platform (e.g., GPlates, ESRI-based) and to disclose model elements in an accessible format for further use (20%)\*\*.

\*A winning proposal will not include extra levels of sophistication at extra cost, if there is not a related uplift anticipated in evaluating candidate source rock context.

\*\*A winning proposal could be based on a non-standard platform and format and could exclude the disclosure of model elements, as long as the technical advantages of the non-standard approach are explained and compelling.

- 1. Do you require depositional environments etc for all time slices in the Jurassic or would you want to focus on specific intervals related to source rocks. If so, which time slices and how many?**

The base reconstruction model should span the syn-rift to early post-rift evolution of the region (e.g., ca. 240-140 Ma) with a step resolution of 1-5 Ma or whatever is justified by successive changes in the main tectonics stages (when changes in rotation or deformation parameters are interpreted). Focused work on

depositional environments can be restricted to those time slices relevant for evaluating the presence and preservation of candidate source rocks. For example, understanding the regional extent of predicted anoxic conditions at given time slices is highly relevant, as is understanding the regional impact of erosion or salt migration on removing or restricting the deposition of source rocks. However, we do not want to define up front in the RFP the specific time slices that should be addressed. Identifying, reconstructing, and visualizing the key time slices is the main purpose of the project itself: What are the candidate syn-rift and early post-drift source rock intervals and why? What are the key events, salt motions, or erosional events that have affected distribution and preservation?

Service providers are welcome to submit a recommended list of focused time slices that should be included in the project, if that helps to provide cost certainty. Confirming the targeted set of intervals will be facilitated during project startup which is when the regional source rock compilation by Dr. Bishop and the Nova Scotia-Morocco palinspastic project results can be integrated.

**2. Is the project cost estimate to be based on Time & Materials or Fixed Cost?**

This is a fixed cost project however we recognize that some post-proposal discussions will be required to fix the final scope of work. Given this, final costs may not be identical to those presented in the proposal.

**3. Risk maps – we assume these should delivered digitally – do you use ArcGIS or ArcGIS Pro?**

Risk maps can be delivered as ArcGIS map projects with preset stylesheets.

**4. Do we need to submit the RFP Response in hard copy as well as uploading it to the portal?**

The digital version alone is sufficient.