

**Invitation for Proposals**

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**HYDRAULIC PLANT LIFE INTEREST GROUP (HPLIG)**

**CEATI PROJECT No. HPLIG-2010-03**

**HYDRO UNIT STATOR CORE AND ROTOR POLE REPLACEMENT /  
REFURBISHMENT CRITERIA**

CEATI International Inc. (CEATI) invites the submission of proposals to perform research work on the following topic:

**TITLE**

*Hydro Unit Stator Core and Rotor Pole Replacement / Refurbishment Criteria*

**INTRODUCTION**

The average age of most utility hydro assets is approaching sixty years. Although not strictly a time based factor, some rotor poles and stator cores are coming to the end of their useful reliable life. Factors such as high temperature, operational history, stopping and starting, eddy currents, and physical damage contribute to the loss of electrical performance and potential sudden failures. When a stator winding is being replaced it is an optimal time to also replace/refurbish the rotor poles or stator core. Plant managers need to have confidence that the core and rotor poles will last at least as long as the new stator winding (typically 25-35years).

**PROJECT OBJECTIVES**

The objective of this project will be to develop a set of criteria that can be used to undertake a critical technical condition assessment of stator cores and rotor poles, to enable a rational estimate of performance degradation and useful remaining life.

The rotor poles and stator core assessment should be subdivided into two tiers. Tier 1 will use data that is readily available or normally gathered and recorded during routine maintenance and inspections. Most plant personnel should be able to perform this assessment and the results of tier 1 will be used to determine if additional evaluation is required –the tier 2 stage. Tier 2 will be a more advanced assessment that would require specialized tests and a technical expert to perform and review. The type of specialized tests, when to perform these tests, the test levels to use, and the criteria to evaluate the test results should be included.

In addition, a risk management methodology will be developed to provide an outline of the decision making process required to support the necessary asset investment required to undertake a rotor pole and stator core replacement or refurbishment prior to failure.

**SCOPE OF THE STUDY**

The scope of this study will be focused on large Francis, propeller and pump storage units. A typical range would be roughly 10 MW – 400 MW at a line voltage rating of 6.9 kV or greater. The HPLIG database of units will be used to further refine the scope of the study in terms of unit demographics and unit manufacturers.

**POTENTIAL BENEFITS**

The failure of a stator core or rotor poles can incur significant equipment replacement and production loss costs. These costs are multiplied in the event the failure closely follows the

replacement of the stator winding. The major benefit of this project will be to allow for the development of a long term asset replacement program.

### **PROJECT STAGING**

Although not a specific requirement, this project may be best performed in more than one stage. Such stages are to be clearly identified and laid out in tasks such that they can be used to monitor accomplishments, to identify project decision points, or preferred invoicing benchmarks. As an example, it may be desirable to undertake a survey of participating utilities to gain knowledge of core and rotor replacements that have been undertaken across the industry.

The staging and or milestones for the project should be identified as tasks against which budget milestones may also be indentified.

### **DELIVERABLES**

The expected deliverables of this project include, but are not limited to:

- A comprehensive technical report outlining the failure causes and mechanisms of rotor poles and stator cores.
- A guide of the technical criteria that would support the replacement of stator cores and rotors.
- A guide to the risk management methodology that outlines the decision making process.

The successful proponent is expected to prepare a ready-to-publish report on the results of the investigation and present the results to funding consortium members. The completed report must be submitted for CEATI approval in editable, electronic format (Microsoft Word). In addition, the platform and version should be specified for any software or programs to be developed.

Progress reports will also be required on either a quarterly or milestone basis - normally these are scheduled to coincide with the completion of the identified tasks.

The successful proponent is also expected to provide the following:

- A ten to fifteen (10-15) slide Power Point Presentation. This should be composed of three main sections:

1. The factors motivating the initiation of the work;
2. A description of the main findings;
3. Summary of the conclusions and recommendations for future research.

- Contents for the Project's Technical Brief. This is a summary of the report (between 1,000 and 1,500 words), which is published separately by CEATI. Proponents are not responsible for the preparation of a ready-to-print Technical Brief, but solely to provide the contents for the following 4 sections: Background, Summary, Conclusions and Recommendations.

1. The Report Background section should be short (approximately 200 words) and should detail the reasons the work was conducted.

2. The Summary section should be approximately 700 words. It must provide a general description of the work program.
3. The Conclusions section should be about 150 words and should provide a general outline of the key results (do not include specifics).
4. The Recommendations section should be about 200 words and should include a description of the potential applications of the results.

Please note that all reporting must be submitted in English. If written English is not the author's strong suit, it is recommended that a technical writer be hired to review the document prior to submission.

### **BUDGET AND SCHEDULE**

The proposal must contain a schedule and a quote of required remuneration for the work in US or Canadian dollars. All prices shall be presumed to be in Canadian dollars (CAD) unless explicitly specified otherwise in the proposal. Proponents' responses to this section must include a full breakdown of the budget and schedule, including an indication of rates and hours and the task allocation for the key personnel by task and must correspond to any phases or milestones outlined above. (Please refer to the Proposal Template for more information).

It is expected that this project can be completed (draft final report submitted for review and approval) within 10 months of initiation.

The proposal must include the names and qualifications of the key individuals who will be involved, as well as the name of the accountable manager.

**CEATI is not bound to accept any proposal but any selection will take into account technical merit, qualifications, price and schedule. A proposal may be accepted in whole or in part. A commitment to proceed with the first phase of a multi-phase project does not automatically imply that the work of the subsequent phases will be undertaken.**

### **ALTERNATIVE WORKS**

Proponents shall generally follow the above description of work, but are encouraged to offer alternative works if these alternatives will meet the objectives and provide a better end product to the utilities sponsoring this work. Alternatives shall be fully described including logistics explaining why the alternate works are being offered and the benefits to be realized by the funding utilities. Where alternatives are proposed, separate budgets shall be calculated for each alternative.

### **SUBMISSION OF PROPOSALS**

The consideration of proposals received will be limited to those who indicate their intent to employ a suitable experienced project team and who possess proper facilities to perform the work. Receipt of this "IFP" does not necessarily constitute a prior determination by CEATI that your organization has the requisite experience and facilities.

The proposal must be properly completed and executed in accordance with the CEATI guidelines available at <http://www.ceati.com/guidelines.php>, and shall be submitted to CEATI as an attachment in Microsoft Word at the following website: [www.ceati.com/private/submissions](http://www.ceati.com/private/submissions). Be sure to indicate project number “**HPLIG-2010-03**” on the submission form. For assistance, please contact us at 514-866-5377 x 236.

**CLOSING DATE FOR RECEIPT OF PROPOSALS**

**Thursday, March 18<sup>th</sup>, 2010, 4:00 pm EST**