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**Bid Receiving Public Works and Government
Services Canada/Réception des soumissions
Travaux publics et Services gouvernementaux
Canada**
**1713 Bedford Row
Halifax, N.S./Halifax, (N.É.)
B3J 1T3
Bid Fax: (902) 496-5016**

**REQUEST FOR PRICE AND
AVAILABILITY
DEMANDE DE PRIX ET DE
DISPONIBILITÉ**

This is not a bid solicitation but an inquiry for the purpose of obtaining price and availability information for the goods, services, and construction specified herein. The information requested herein is for budgeting and planning purposes only. Contracts will not be entered into on the basis of suppliers' responses.

Il ne s'agit pas d'une invitation à soumissionner mais d'une demande de renseignements sur les prix et la disponibilité des biens, services et construction spécifiés aux présentes. Les renseignements demandés aux présentes sont nécessaires uniquement à l'établissement du budget et à la planification. Les marchés ne seront pas attribués suite aux réponses des fournisseurs/entrepreneurs.

Comments - Commentaires

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|---|---|
| Title - Sujet ARC FLASH ANALYSIS FOR CCG VESSELS | |
| Solicitation No. - N° de l'invitation F7045-120001/A | Date 2012-08-03 |
| Client Reference No. - N° de référence du client F7045-12-0001 | GETS Ref. No. - N° de réf. de SEAG PW-\$HAL-208-8736 |
| File No. - N° de dossier HAL-2-69108 (208) | CCC No./N° CCC - FMS No./N° VME |
| Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2012-08-31 | Time Zone Fuseau horaire Atlantic Daylight Saving Time ADT |
| F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/> | |
| Address Enquiries to: - Adresser toutes questions à: LeBlanc, JoAnne | Buyer Id - Id de l'acheteur hal208 |
| Telephone No. - N° de téléphone (902) 496-5010 () | FAX No. - N° de FAX (902) 496-5016 |
| Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: DEPARTMENT OF FISHERIES AND OCEANS ITS VESSEL SUPPORT, BOX 1000 50 DISCOVERY DR, LEVEL 6 ATT:S COLP DARTMOUTH NOVA SCOTIA B2Y 4A2 Canada | |

Instructions: See Herein

Instructions: Voir aux présentes

**Vendor/Firm Name and Address
Raison sociale et adresse du
fournisseur/de l'entrepreneur**

| | |
|--|--|
| Delivery Required - Livraison exigée SEE HEREIN | Delivery Offered - Livraison proposée |
| Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l'entrepreneur | |
| Telephone No. - N° de téléphone Facsimile No. - N° de télécopieur | |
| Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie) | |
| Signature | Date |

Solicitation No. - N° de l'invitation

F7045-120001/A

Amd. No. - N° de la modif.

File No. - N° du dossier

HAL-2-69108

Buyer ID - Id de l'acheteur

hal208

Client Ref. No. - N° de réf. du client

F7045-12-0001

CCC No./N° CCC - FMS No/ N° VME

PRICE & AVAILABILITY

REQUEST

FOR

**Technical Engineering Services to perform Arc Flash Analysis
For the Canadian Coast Guard Fleet**

PRICE & AVAILABILITY REQUEST

Request for Price and Availability is used to solicit information and cost, on a product or service. To be used for planning purposes. It is usually used when a manager needs to define a requirement and set a budget. This is only for information purposes and no contract is awarded as a result of this inquiry. The information gathered will be used to determine the procurement process.

This Price & Availability (P&A) request is neither a call for tender nor a Request for Proposal (RFP), and no agreement or contract for the procurement of the requirement stated "above" will be entered into solely as a result of this P&A.

There will be no short-listing of vendors for the purposes of undertaking of any future work, as a result of this P&A.

Similarly, participation in this P&A is not a condition or prerequisite for the participation to any RFP.

Canada will not reimburse expenses of respondents committed to meet this demand for P & D.

Information Requirements:

All costs are to be shown in Canadian dollars. Respondents are requested to provide their best cost estimate of the work scoped in the requirement stated herein..

Respondents are requested to provide all information in response to this P&A inquiry no later than the date indicated on MERX.

All responses to this P&A inquiry and all inquiries during the posting period shall be directed to the Contracting Authority.

PUPPOSE:

The Department of Fisheries & Oceans is seeking information, from the supplier community with regards to an upcoming requirement for technical engineering services required to perform arc flash analysis for Coast Guard Fleet to ensure compliance with current industry standards for arc flash hazard identification and protection.

The Coast Guard has multiple vessels of different class, across Canada. These vessels have home ports in the Maritimes ,Quebec, Ontario, Western Canada and British Columbia. For this Price and Availability Request, we are seeking pricing information on basis of an 1100 class vessel. One line Electrical Schematic will be provided in (PDF) file (**Appendix 1**).

It is anticipated that the arc flash analysis will be completed on all Coast Guard Vessels in separate phases as vessels are available over a 3 year period. As potential suppliers are unknown, Canada is seeking information from the industry in order to determine whether a single contract or multiple contracts will best meet this requirement.

STATEMENT OF WORK

The goals of this project are to determine the degree of arc flash hazard that is present throughout the electrical distribution system, identify the appropriate personnel protective equipment (PPE) required at the key points within the system, and make recommendations to reduce the hazard risk category as much as feasible. Contractor services for each vessel shall include, but not be limited to the following:

- Perform field collection of data on the applicable vessels electrical infrastructure.
- Perform the system studies and arc flash analysis.
- Produce the arc flash warning labels and advise on proper installation in the field.
- Identify the proper personal protective equipment (PPE) required at key points within the system.
- Provide recommendations and non-PPE solutions for reducing the hazard risk category, where feasible.
- Provide field training for the engineering personnel on arc flash safety.

Project deliverables for each vessel shall include:

1. System one-line diagrams
2. Power system data
3. Analysis data
4. Short circuit study
5. Coordination study
6. Arc flash study

NOTE: Three documented hard copies and an electronic copy (AutoCAD) of each of items 1-6 shall be provided.

7. Recommendations
8. Provide and install arc-flash hazard warning labels
9. Conduct arc flash and general electrical safety training (1) day per vessel.

Applicable Standards

Five separate industry standards concern the prevention of arc flash incidents:

- OSHA 29 Code of Federal Regulations (CFR) Part 1910 Subpart S
- NFPA 70-2002 National Electrical Code
- NFPA 70E-2004 Standard for Electrical Safety in the Workplace
- IEEE Standard 1584-2002 Guide for Performing Arc Flash Hazard Calculations
- CSA Z462/12

QUALIFICATIONS AND EXPERIENCE

The vendor would be actively engaged in the performance of arc flash analysis, field data collection, field training and the supply of non-PPE solutions to reduce arc flash hazard levels.

The short-circuit, protective device coordination and arc flash hazard analysis studies shall be conducted under the responsible charge and approval of a Registered Professional Electrical Engineer skilled in

performing and interpreting the power system studies. The Registered Professional Electrical Engineer shall have recent experience in performing power system studies.

SCOPE OF SERVICES

Data Collection and verification

The vendor shall conduct on-site data collection to verify existing one-lines (if available) and obtain the power system data necessary to insure accurate modeling in the Short Circuit, Protective Device Coordination and Arc Flash Hazard Analysis Studies as described herein. The field technicians/service engineers will be properly trained in electrical and arc flash safety shall utilize their own PPE and shall comply with CCG safety requirements. Arc Flash Rated clothing will be worn by contractor field personnel at all times when exposed to energized electrical equipment.

Data that is not readily accessible or may not have nameplate data such as conductors, bus way, etc. will be obtained from existing drawings (where available). Data that is available from the owner drawings or databases will be used in the model after such data is field verified, where necessary. Discrepancies found on drawings will be brought to the owner's attention in writing or as a drawing mark-up.

Data collection shall be performed during normal working hours, Monday thru Friday (8:00 am to 4:00pm). CCG will provide a qualified person on a full-time basis to assist in identifying, locating and accessing equipment, opening enclosures and removing equipment covers.

The intent is to collect data without disrupting vessel operations or requiring de-energization or shutdown of equipment where possible. However, collection of some data may require an outage or shutdown of some equipment. For these cases, CCG will be responsible to plan the necessary shutdown and obtain the required data within 7 days of the contractor's request for an outage. In the event that the contractor is prevented from independently collecting information during the site visits, the contractor shall provide detailed data forms to CCG listing any remaining missing data required for the study.

ONE-LINE DIAGRAM

The vendor will provide an updated one-line diagram for each CCG Vessel; (22"x 34"). A one-line diagram of the electrical distribution system will be developed for the power systems using the latest version of SKM, Etap, Powersmart or other credited software to establish the computer model of the power system. The one-line will support the system evaluation and analysis.

At a minimum the one-line diagram will show the vessels electrical power system starting at the vessel's generation system including the incoming utility service, through the medium-voltage and/or low-voltage switchgear and distribution system, the distribution substations down to, and including, the 480V MCCs, the 480V panels and the 208V panels that are supplied by a transformer rated 125kVA or greater. The study shall include any emergency electrical system over 208 volts.

The one-line diagram will be generated by the power system analysis software and shall include all electrical equipment for which arc flash calculations are performed. At a minimum the one-line diagrams will show the identification and ratings of electrical equipment covered in this study, such as: transformers, cables, motors (>50HP), circuit breakers, protective relays, fuses, current transformers, etc., where applicable.

The drawing will include protective device information and arc flash label information. All equipment and buses shall be identified using CCG plant specific naming conventions.

SHORT CIRCUIT STUDY

The magnitudes of short circuit current shall be determined by calculation; electrical equipment ratings are selected based upon the calculation results.

A Short Circuit Study shall be conducted to determine the maximum duty that the system protective devices, cables, transformers, and interconnections will be subjected to in the event of three phase faults. The portion of the system included in the study will be that represented by the composite one-line diagram described under one-line diagram.

Input data shall include the utility short circuit contribution, resistance and reactance components of the branch impedances, the X/R ratios, motor and generator contributions, base quantities selected, and other source impedances. All motors greater than 50HP will be modeled individually per standards. All remaining motors will be modeled as a lump sum.

Power system engineers shall calculate the maximum available fault current at each significant location in the system. The short circuit tabulations shall include symmetrical fault currents and X/R ratios, for both momentary and interrupting conditions. For each fault location, the total duty on the bus, as well as the individual contribution from each connected branch, shall be included with its respective X/R ratio.

All short circuit calculations will be made in accordance with the latest standards adopted by the American National Standards Institute (ANSI), IEEE (Red Book), and the National Electrical Code (NEC), CSA Z462 Regulations.

At the conclusion of the Short Circuit Study, vendor will submit the following as part of the vendor's recommendations.

- Fault current calculation summary listing momentary and interrupting duties with their respective X/R ratios;
- Complete fault current magnitudes, including individual branch current contributions, for each bus in the electrical distribution system.

PROTECTIVE DEVICE EVALUATION

Based upon the results of the short circuit calculations, each protective device will be analyzed to compare the calculated interrupting and momentary duties and the corresponding rating of the device. If the study reveals problems, the study will recommend changes to improve system performance.

At the conclusion of the Protective Device Evaluation, the vendor will submit the following as part of the vendor's recommendations.

- Complete tabulation of circuit breaker, fuse and other protective device momentary and interrupting ratings versus calculated short circuit duties for every protective device in the scope of the Short Circuit Analysis,
- Tabulated summaries listing circuit breaker, fuse and other protective device interrupting and momentary duties in percent of their respective ratings,

- Recommendations for changes, replacement or retrofit of over-dutied protective devices.

PROTECTIVE DEVICE COORDINATION STUDY

Using the required software, power system engineers shall plot time-current coordination curves showing phase and ground-fault protective device time-current characteristics. The curves shall illustrate the coordination among the devices shown on the system one-line diagram. The coordination curves shall include, as a minimum, the following:

1. Appropriate NEC and ANSI protection criteria for equipment.
2. Magnetizing inrush points of transformers.
3. A simplified one-line diagram identifying the devices plotted.
4. Short-circuit current levels used for coordination.
5. Motor starting characteristics, where applicable.

The coordination analysis shall derive coordinated settings for each 480V unit substation's secondary main and feeder breakers as identified on the system one-line diagram. Coordination shall proceed upstream until final coordination is achieved with the utility protective device.

For medium-voltage or low-voltage motor starters involved in the coordination of upstream devices, the coordination plots shall show the existing starter fuses or MCP and the existing motor overload setting (if available) so that coordination with upstream devices can be evaluated. The study shall not derive new protection settings for multi-function motor protective relays. If existing motor protective relay overload settings appear to be improper, the involved motors shall be identified and additional investigation shall be recommended. The vendor will submit the following as part of the vendor's recommendations.

- Time-current coordination curves containing the information described above,
- Tabulations of existing and recommended protective device settings identified by location, equipment number, function number and adjustable range, and
- Recommendations for replacement devices when the study determines those existing devices do not provide proper protection or coordination.

ARC FLASH HAZARD ANALYSIS

The vendor will perform the arc flash hazard analysis in accordance with all the guidelines of NFPA 70E and IEEE 1584, CSA Z462.

The arc flash analysis shall include each medium and low voltage system location within the scope of the IEEE STD 1584TM-2002 standard, however, labels will be provided for locations labeled as hazard risk category zero. For all other system locations, the arc flash calculation software determines the available fault currents for each location and the clearing time of the device protecting that location. From this data, the potential incident energy is calculated for each location. Arc flash computations shall include both line and load side of main breaker calculations, where necessary.

At the conclusion of the Arc Flash Hazard Analysis, the vendor will submit the following for each circuit condition and arc location analyzed:

- Arcing fault magnitude
- Device clearing time
- Duration of arc
- Arc flash boundary
- Working distance
- Incident energy
- Recommendations for new equipment and/or system changes necessary to reduce the calculated arc flash energy level below 40 cal/cm², where possible.

REPORTS

The vendor will provide a complete report for all system studies in both electronic (in AutoCAD) format on compact disk media and bound, hard copy document form. The report(s) will include the results of the short circuit, coordination, device evaluation, arc flash studies, the coordination curves and all input data, recommendations for changes to settings or equipment, and conclusions. The report will contain, at a minimum, the following information:

- An introduction describing the background, objectives and scope of the study.
- Philosophy and basis of analysis.
- Executive summary with clear, concise conclusions and recommendations.
- Coordination plots and protective device curves.
- Tables comparing short circuit duties and protective device ratings.
- Identification of all locations and equipment pertaining to the arc flash hazard assessment.
- Equipment and cable data used for short circuit analysis.
- Equipment data used for protective device characteristics.
- Equipment data used for arc flash study.
- Existing connections of all power equipment and possible alternative connections.
- One-line diagram illustrating the scope of the studies.
- The hazard/risk category for the calculated incident energy level.
- The flash protection boundary for the equipment evaluated.
- Recommendations for reducing arc flash energy levels and enhancing worker safety.
- The vendor will prepare a draft Arc Flash Study Report that contains the one-line diagram, results from the Short Circuit Study, and recommendations for reducing arc flash hazard category where appropriate. Three (3) copies of the draft will be submitted to CCG for review.
- The vendor will incorporate CCG review comments on the draft submittal and submit three (3) copies of the final Arc Flash Study Report to CCG.

ARC FLASH LABELS

Arc flash hazard warning labels shall be provided as required for the following items.

- One label for each low-voltage panel board
- One label for each motor control center
- One label for each low-voltage switchboard
- One label for each low- and/or medium-voltage switchgear
- One label for medium-voltage switches
- One label for medium-voltage switches
- One label for each low-voltage disconnect switch shown on the customer's one-line.

All labels will be based on recommended over current device settings and/or sizes. Labels will be provided after the results of the analysis have been presented to the customer and any system changes, upgrades or modifications have been incorporated into the system.

Labels will be 3.5 inches x 5 inches, thermal transfer type label, of high adhesion polyester for each work location analyzed and will be machine printed, with no field markings. The label shall have an orange header with the wording, "WARNING, ARC FLASH HAZARD", and shall include the following information:

1. Location designation
2. Nominal voltage
3. Flash protection boundary
4. Hazard risk category
5. Incident energy
6. Working distance
7. Engineering report number, revision number and issue date.

ELECTRICAL AND ARC FLASH SAFETY TRAINING

1. The vendor will provide an eight-hour training program on arc flash safety and general electrical safety on each CCG vessels, at the vessels location. The vendor will be responsible to provide any training equipment such as laptop computer, demonstration software and/or multimedia projector, as might be required to conduct the training. One classroom reference manual shall be provided for each attendee, a total of six (6) manuals.

