

**RETURN BIDS TO:**  
**RETOURNER LES SOUMISSIONS À:**

**Bid Receiving**  
**PWGSC**  
**33 City Centre Drive**  
**Suite 480**  
**Mississauga**  
**Ontario**  
**L5B 2N5**  
**Bid Fax: (905) 615-2095**

**REQUEST FOR PROPOSAL**  
**DEMANDE DE PROPOSITION**

**Proposal To: Public Works and Government  
Services Canada**

We hereby offer to sell to Her Majesty the Queen in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods, services, and construction listed herein and on any attached sheets at the price(s) set out therefor.

**Proposition aux: Travaux Publics et Services  
Gouvernementaux Canada**

Nous offrons par la présente de vendre à Sa Majesté la Reine du chef du Canada, aux conditions énoncées ou incluses par référence dans la présente et aux annexes ci-jointes, les biens, services et construction énumérés ici sur toute feuille ci-annexée, au(x) prix indiqué(s).

**Comments - Commentaires**

<b>Title - Sujet</b> Testing & Inspection Equipment	
<b>Solicitation No. - N° de l'invitation</b> 23584-130041/A	<b>Date</b> 2012-07-18
<b>Client Reference No. - N° de référence du client</b> 23584-130041	
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$TOR-016-5973	
<b>File No. - N° de dossier</b> TOR-2-35044 (016)	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> <b>on - le 2012-08-28</b>	
<b>Time Zone</b> <b>Fuseau horaire</b> Eastern Daylight Saving Time EDT	
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input checked="" type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Yari, Helen	
<b>Buyer Id - Id de l'acheteur</b> tor016	
<b>Telephone No. - N° de téléphone</b> (905) 615-2081 ( )	<b>FAX No. - N° de FAX</b> (905) 615-2060
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b> DEPARTMENT OF NATURAL RESOURCES 183 LONGWOOD RD SOUTH HAMILTON Ontario L8P0A5 Canada	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

**Vendor/Firm Name and Address**

**Raison sociale et adresse du  
fournisseur/de l'entrepreneur**

**Issuing Office - Bureau de distribution**

Public Works and Government Services Canada  
Ontario Region  
33 City Centre Drive  
Suite 480  
Mississauga  
Ontario  
L5B 2N5

<b>Delivery Required - Livraison exigée</b> 2012-07-03	<b>Delivery Offered - Livraison proposée</b>
<b>Vendor/Firm Name and Address</b> <b>Raison sociale et adresse du fournisseur/de l'entrepreneur</b>	
<b>Telephone No. - N° de téléphone</b> <b>Facsimile No. - N° de télécopieur</b>	
<b>Name and title of person authorized to sign on behalf of Vendor/Firm</b> <b>(type or print)</b> <b>Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b>	
<b>Signature</b>	<b>Date</b>

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## PART 1 - GENERAL INFORMATION

### 1. Security Requirement

There is no security requirement associated with the requirement.

### 2. Requirement

The requirement is detailed under Article 2 of the resulting contract clauses.

### 3. Debriefings

After contract award, bidders may request a debriefing on the results of the bid solicitation process. Bidders should make the request to the Contracting Authority within 15 working days of receipt of the results of the bid solicitation process. The debriefing may be in writing, by telephone or in person.

## PART 2 - BIDDER INSTRUCTIONS

### 1. Standard Instructions, Clauses and Conditions

All instructions, clauses and conditions identified in the bid solicitation by number, date and title are set out in the *Standard Acquisition Clauses and Conditions Manual* (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.

Bidders who submit a bid agree to be bound by the instructions, clauses and conditions of the bid solicitation and accept the clauses and conditions of the resulting contract.

The 2003 (2012-07-11) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

#### 1.1 SACC Manual Clauses

B1000T (2007-11-30) Condition of Material

### 2. Submission of Bids

Bids must be submitted only to Public Works and Government Services Canada (PWGSC) Bid Receiving Unit by the date, time and place indicated on page 1 of the bid solicitation.

**Due to the nature of the bid solicitation, bids transmitted by facsimile to PWGSC will not be accepted.**

### 3. Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than seven (7) calendar days before the bid closing date. Enquiries received after that time may not be answered.

Bidders should reference as accurately as possible the numbered item of the bid solicitation to which the enquiry relates. Care should be taken by bidders to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature must be clearly marked "proprietary" at each relevant item. Items identified as "proprietary" will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the questions or may request that the Bidder do so, so that the proprietary nature of the question is eliminated, and the enquiry can be answered with copies to all bidders. Enquiries not submitted in a form that can be distributed to all bidders may not be answered by Canada.

#### 4. Applicable Laws

Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Ontario.

Bidders may, at their discretion, substitute the applicable laws of a Canadian province or territory of their choice without affecting the validity of their bid, by deleting the name of the Canadian province or territory specified and inserting the name of the Canadian province or territory of their choice. If no change is made, it acknowledges that the applicable laws specified are acceptable to the bidders.

### PART 3 - BID PREPARATION INSTRUCTIONS

#### 1. Bid Preparation Instructions

Canada requests that bidders provide their bid in separately bound sections as follows:

Section I: Technical Bid (3 hard copies)  
Section II: Financial Bid (1 hard copy)  
Section III: Certifications (1 hard copy)

Prices must appear in the financial bid only. No prices must be indicated in any other section of the bid.

Canada requests that bidders follow the format instructions described below in the preparation of their bid:

- (a) use 8.5 x 11 inch (216 mm x 279 mm) paper;
- (b) use a numbering system that corresponds to the bid solicitation.

In April 2006, Canada issued a policy directing federal departments and agencies to take the necessary steps to incorporate environmental considerations into the procurement process [Policy on Green Procurement](http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html)

(<http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html>). To assist Canada in reaching its objectives, bidders are encouraged to:

- 1) use 8.5 x 11 inch (216 mm x 279 mm) paper containing fibre certified as originating from a sustainably-managed forest and/or containing minimum 30% recycled content; and
- 2) use an environmentally-preferable format including black and white printing instead of colour printing, printing double sided/duplex, using staples or clips instead of cerlox, duotangs or binders.

#### Section I: Technical Bid

In their technical bid, bidders should explain and demonstrate how they propose to meet the requirements and how they will carry out the Work.

#### Section II: Financial Bid

Bidders must submit their financial bid in accordance with the Basis of Payment. The total amount of Goods and Services Tax (GST) or Harmonized Sales Tax (HST) must be shown separately, if applicable.

##### 1.1 SACC Manual Clauses

C3011T (2010-01-11), Exchange Rate Fluctuation

**Section III: Certifications**

Bidders must submit the certifications required under Part 5.

**PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION****1. Evaluation Procedures**

- (a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.
- (b) An evaluation team composed of representatives of Canada will evaluate the bids.

**1.1 Technical Evaluation****1.1.1 Mandatory Technical Criteria**

A proposal will be deemed non-responsive and will not be given further consideration if it fails to meet the following criteria:

	Mandatory Technical Criteria	Page # of Supporting Documentation
M1.	The Bidder must have designed and manufactured a minimum of two (2) of the same or similar systems within the last 5 years of the bid closing date.  To demonstrate this the Bidder must provide the name of two (2) different clients for which they have designed and manufactured the same or similar system within the last 5 years of bid closing date. Client information must include - Company name, location, contact name, current telephone number and current email address in order to validate the information.	
M2.	Quality Management Systems (QMS) The Bidder must be actively certified to the current version, (and provide proof of certification), to a Quality Management System such as ISO 9001 or equivalent.	
M3.	The Bidders must comply with Annex A, Requirement for Control System for Pipe Lab 500 kN Pipe Test Frame, and Pressurized Vessel. Bidder must submit with their bid supporting technical documents such as: literature, brochures and/or specifications for their proposed system, which clearly demonstrates that their proposed system meets the Requirement.	

**1.2 Financial Evaluation****1.2.1 Mandatory Financial Criteria**

- a) The Bidder must complete and submit with its bid, Annex "B" - Basis of Payment, in Canadian Funds. Pricing must be provided for all firm and Optional Goods and/or Services.
- b) The Bidder must not contain any alteration to the preprinted or pre-typed sections of the Basis of Payment form, or any condition or qualification placed upon their offer.

### 1.2.2 Evaluation of Price

The price of the bid will be evaluated in Canadian dollars, the Goods and Services Tax or the Harmonized Sales Tax excluded, FOB destination, Canadian customs duties and excise taxes included.

The price used in the evaluation will be the aggregate of the Firm Requirement and Optional Goods and/or Services Requirement. See Annex C, Price Evaluation.

## 2. Basis of Selection

### 2.1 Basis of Selection - Mandatory Technical Criteria

A bid must comply with the requirements of the bid solicitation and meet all mandatory technical evaluation criteria to be declared responsive. The responsive bid with the lowest evaluated price will be recommended for award of a contract.

## PART 5 - CERTIFICATIONS

Bidders must provide the required certifications to be awarded a contract. Canada will declare a bid non-responsive if the required certifications are not completed and submitted as requested.

Compliance with the certifications bidders provide to Canada is subject to verification by Canada during the bid evaluation period (before award of a contract) and after award of a contract. The Contracting Authority will have the right to ask for additional information to verify bidders' compliance with the certifications before award of a contract. The bid will be declared non-responsive if any certification made by the Bidder is untrue, whether made knowingly or unknowingly. Failure to comply with the certifications or to comply with the request of the Contracting Authority for additional information will also render the bid non-responsive.

### 1. Code of Conduct Certifications - Consent to a Criminal Record Verification

#### 1.1 Bidders must submit with their bid, by the bid solicitation closing date:

- (a) a complete list of names of all individuals who are currently directors of the Bidder;
- (b) a properly completed and signed form Consent to a Criminal Record Verification (PWGSC-TPSGC 229), for each individual named in the list.  
(<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/formulaires-forms-eng.html>)

### 2. Certifications Precedent to Contract Award

The certifications listed below should be completed and submitted with the bid, but may be submitted afterwards. If any of these required certifications is not completed and submitted as requested, the Contracting Authority will so inform the Bidder and provide the Bidder with a time frame within which to meet the requirement. Failure to comply with the request of the Contracting Authority and meet the requirement within that time period will render the bid non-responsive.

## 2.1 Federal Contractors Program - Certification

### 2.1.1 Federal Contractors Program - \$200,000 or more

1. The Federal Contractors Program (FCP) requires that some suppliers, including a supplier who is a member of a joint venture, bidding for federal government contracts, valued at \$200,000 or more (including all applicable taxes), make a formal commitment to implement employment equity. This is a condition precedent to contract award. If the Bidder, or, if the Bidder is a joint venture and if any member of the joint venture, is subject to the FCP, evidence of its commitment must be provided before the award of the Contract.

Suppliers who have been declared ineligible contractors by Human Resources and Skills Development Canada (HRSDC) are no longer eligible to receive government contracts over the threshold for solicitation of bids as set out in the Government Contracts Regulations. Suppliers may be declared ineligible contractors either as a result of a finding of non-compliance by HRSDC, or following their voluntary withdrawal from the FCP for a reason other than the reduction of their workforce to less than 100 employees. Any bids from ineligible contractors, including a bid from a joint venture that has a member who is an ineligible contractor, will be declared non-responsive.

2. If the Bidder does not fall within the exceptions enumerated in 3.(a) or (b) below, or does not have a valid certificate number confirming its adherence to the FCP, the Bidder must fax (819-953-8768) a copy of the signed form LAB 1168, Certificate of Commitment to Implement Employment Equity, to the Labour Branch of HRSDC.
3. The Bidder, or, if the Bidder is a joint venture the member of the joint venture, certifies its status with the FCP, as follows:

The Bidder or the member of the joint venture

- (a) ( ) is not subject to the FCP, having a workforce of less than 100 full-time or part-time permanent employees, or temporary employees having worked 12 weeks or more in Canada;
- (b) ( ) is not subject to the FCP, being a regulated employer under the Employment Equity Act, S.C. 1995, c. 44;
- (c) ( ) is subject to the requirements of the FCP, having a workforce of 100 or more full-time or part-time permanent employees, or temporary employees having worked 12 weeks or more in Canada, but has not previously obtained a certificate number from HRSDC (having not bid on requirements of \$200,000 or more), in which case a duly signed certificate of commitment is attached;
- (d) ( ) is subject to the FCP, and has a valid certificate number as follows: \_\_\_\_\_ (e.g. has not been declared an ineligible contractor by HRSDC.)

Further information on the FCP is available on the HRSDC Web site

## **PART 6 - RESULTING CONTRACT CLAUSES**

### **1. Security Requirement**

There is no security requirement associated with the requirement.

### **2. Requirement**

The Contractor must provide the items detailed under the Requirement at Annex "A" for Natural Resource Canada (NRC) CANMET-Materials Technology Laboratory (MTL), located in Hamilton, Ontario.

#### **2.1 Optional Goods and/or Services**

The Contractor grants to Canada the irrevocable option to acquire the goods, services or both described at Annex A, Requirement and Annex B, Basis of Payment of the Contract under the same conditions and at the prices and/or rates stated in the Contract. The option may only be exercised by the Contracting Authority and will be evidenced, for administrative purposes only, through a contract amendment.

The Contracting Authority may exercise the option at any time before the expiry of the Contract by sending a written notice to the Contractor.

### **3. Standard Clauses and Conditions**

All clauses and conditions identified in the Contract by number, date and title are set out in the *Standard Acquisition Clauses and Conditions Manual* (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.

#### **3.1 General Conditions**

2010A (2012-07-16), General Conditions - Goods (Medium Complexity), apply to and form part of the Contract.

### **4. Term of Contract**

#### **4.1 Period of the Contract**

The period of the Contract is from date of Contract to 31 March 2016 inclusive.

#### **4.2 Delivery Date**

All deliverables under the Firm Requirement must be received on or before 31 March 2013.

#### **4.3 Inspection and Acceptance**

The Project Authority is the Inspection Authority. All reports, deliverable items, documents, goods and all services rendered under the Contract are subject to inspection by the Inspection Authority or representative. Should any report, document, good or service not be in accordance with the Requirements at Annex A and to the satisfaction of the Inspection Authority, as submitted, the Inspection Authority will have the right to reject it or require its correction at the sole expense of the Contractor before recommending payment.



#### 4.4 Shipping Instructions - FOB Destination

Goods must be consigned and delivered to the destination specified in the contract:

FOB Destination NRCAN CANMET-Materials Technology Laboratory, 183 Longwood Road, South, Hamilton, Ontario L8P 0A5 including all delivery charges and customs duties and taxes.

### 5. Authorities

#### 5.1 Contracting Authority

The Contracting Authority for the Contract is:

Helen Yari  
Public Works and Government Services Canada  
Ontario Region - Acquisition  
33 City Centre Drive Suite 480C  
Mississauga, Ontario L5B 2N5  
Telephone: (905) 615-2061  
Facsimile: (905) 615-2060  
E-mail address: helen.yari@pwgsc.gc.ca

The Contracting Authority is responsible for the management of the Contract and any changes to the Contract must be authorized in writing by the Contracting Authority. The Contractor must not perform work in excess of or outside the scope of the Contract based on verbal or written requests or instructions from anybody other than the Contracting Authority.

#### 5.2 Project Authority

The Project Authority for the Contract is: *(To be inserted at time of award)*

Name: \_\_\_\_\_ Title: \_\_\_\_\_  
Organization: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone : \_\_\_\_\_  
Facsimile: \_\_\_\_\_  
E-mail address: \_\_\_\_\_

The Project Authority is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all matters concerning the technical content of the Work under the Contract. Technical matters may be discussed with the Project Authority, however the Project Authority has no authority to authorize changes to the scope of the Work. Changes to the scope of the Work can only be made through a contract amendment issued by the Contracting Authority.

#### 5.3 Contractor's Representative

The Contractor's Representative for the Contract is: *(To be completed by the Bidder)*

Name: \_\_\_\_\_ Title: \_\_\_\_\_  
Organization: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone : \_\_\_\_\_  
Facsimile: \_\_\_\_\_  
E-mail address: \_\_\_\_\_

## 6. Payment

### 6.1 Basis of Payment - Firm Price, Firm Unit Price(s) or Firm LOT Price(s)

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid a firm lot prices, as specified in Annex "B" for a cost of \$ \_\_\_\_\_ Customs duties included and Goods and Services Tax or Harmonized Sales Tax is extra, if applicable.

Canada will not pay the Contractor for any design changes, modifications or interpretations of the Work, unless they have been approved, in writing, by the Contracting Authority before their incorporation into the Work.

### 6.2 Limitation of Price

SACC Manual Clause C6000C (2011-05-16)

### 6.3 Milestone Payments

1. Canada will make milestone payments in accordance with the Schedule of Milestones identified on Appendix 1 of Annex B as detailed in the Contract and the payment provisions of the Contract, up to 90 percent of the amount claimed and approved by Canada if:
  - (a) an accurate and complete claim for payment using form PWGSC-TPSGC 1111, Claim for Progress Payment, and any other document required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
  - (b) the total amount for all milestone payments paid by Canada does not exceed 90 percent of the total amount to be paid under the Contract;
  - (c) all the certificates appearing on form PWGSC-TPSGC 1111 have been signed by the respective authorized representatives;
  - (d) all work associated with the milestone and as applicable any deliverable required have been completed and accepted by Canada.
2. The balance of the amount payable will be paid in accordance with the payment provisions of the Contract upon completion and delivery of all Work required under the Contract if the Work has been accepted by Canada and a final claim for the payment is submitted.

## 7. Invoicing Instructions

### 7.1 Invoicing Instructions - Progress Payment Claim

1. The Contractor must submit a claim for payment using form PWGSC-TPSGC 1111, Claim for Progress Payment.

Each claim must show:

- (a) all information required on form PWGSC-TPSGC 1111;
  - (b) all applicable information detailed under the section entitled "Invoice Submission" of the general conditions;
  - (c) the description and value of the milestone claimed as detailed in the Contract;
  - (d) holdback of 10%.
2. The Goods and Services Tax or Harmonized Sales Tax (GST/HST), as applicable, must be calculated on the total amount of the claim before the holdback is applied. At the time the

holdback is claimed, there will be no GST/HST payable as it was claimed and payable under the previous claims for progress payments.

3. The Contractor must prepare and certify one original and two (2) copies of the claim on form PWGSC-TPSGC 1111, and forward it to the Contracting Authority identified under the section entitled "Authorities" of the Contract for appropriate certification.

The Contracting Authority will then forward the original and one (1) copy of the claim to the Technical Authority for certification after inspection and acceptance of the Work takes place and onward submission to the Payment Office for the remaining certification and payment action.

4. The Contractor must not submit claims until all work identified in the claim is completed.

## 8. Certifications

- 8.1 Compliance with the certifications provided by the Contractor in its bid is a condition of the Contract and subject to verification by Canada during the term of the Contract. If the Contractor does not comply with any certification or it is determined that any certification made by the Contractor in its bid is untrue, whether made knowingly or unknowingly, Canada has the right, pursuant to the default provision of the Contract, to terminate the Contract for default.

## 9. Applicable Laws

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Ontario.

## 10. Priority of Documents

If there is a discrepancy between the wording of any documents that appear on the list, the wording of the document that first appears on the list has priority over the wording of any document that subsequently appears on the list.

- (a) The Articles of Agreement;
- (b) The General Conditions 2010A (2012-07-16), General Conditions, Goods (Medium Complexity);
- (d) Annex A, Requirement;
- (e) Annex B, Basis of Payment
- (f) the Contractor's bid dated \_\_\_\_\_ as clarified on \_\_\_\_\_ " **or** ", as amended on \_\_\_\_\_ " (if applicable).

## 11. Insurance Requirement

- 11.1 **SACC Manual Clauses** G1005C (2008-05-12) Insurance

## 12. SACC Manual Clauses

- SACC Manual Clause B1501C (2006-06-16) Electrical Equipment

## ANNEX "A"

### REQUIREMENT

#### Control System for Pipe Lab 500 kN Pipe Test Frame, and Pressurized Vessel

##### 1. Purpose of this Procurement

The purpose of this procurement is to provide a control system capable of simultaneous fatigue testing for fatigue crack growth, of a 500 kN fatigue test frame and a pressurized vessel. The feedback and control signal for the test item in the 500 kN Fatigue test frame will be a Direct Current Potential Drop, (DCPD), signal, which will be monitoring the growth of a fatigue crack. The feedback signal for the pressurized pipe will be the pressure of the fluid inside of the pipe.

##### 2. Equipment Requirements

The equipment must provide:

- 2.1 a control system for simultaneous control of a 500 kN, (110 Kip), servo-hydraulic testing frame and a Pressure Vessel with a separate pressurization system side
- 2.2 a separate pressurization system for the Pressure Vessel, capable of 3,000 psi, (20.7 MPa), on the "input" pressure, (Hydraulic Power Unit, (HPU) side), and a variable pressure from 0 to 2,200 psi, (0 – 15.2 MPa), on the "output" pressure side, (Pressure Vessel side).
- 2.3 a software package for fatigue control of servo systems, including a 500 kN servo-hydraulic testing frame and a Pressurized Vessel
- 2.4 the 500 kN testing frame will require load and position control transducers and calibrations for these sensors
  - i. the actuator is MTS #B366731-01 with 2 - 15 gpm MTS / MOOG servo valves
  - ii. the load cell is an MTS Model 661.23A-02, S/N. 1902, with a rated capacity of 500 kN, (110 Kip)
- 2.5 a properly sized hydraulic power unit to provide hydraulic power supply to the 500 kN testing frame and the pressure vessel with an associated pressurization system,
- 2.6 interface with and control, with a MTS 500 kN servo-hydraulic testing frame. The 500 kN load frame is fitted with a 500 kN load cell, 2 - 15 gpm MTS / MOOG Series 76 servo valve.
- 2.7 interface with and control to a Pressure Vessel for pressure cycling and fatigue crack growth
- 2.8 The Contractor must provide the equipment hardware, software, hardware installation / interfacing, system commissioning, calibrations, training, manuals & drawings, for the controller, Pressurization System, and software for this equipment. The Contractor must upgrade the existing load frame with all of the procured test equipment, software, and accessories to ensure compatibility, and functionality. Training must be supplied for all of the software modules and the set-up of the test equipment and accessories.

### 3. General System Requirements

- 3.1 The system must automatically shut down in the event of hydraulic pressure loss.
- 3.2 The Equipment must maintain operation if connection to the computer network is lost.
- 3.3 The Equipment must withstand power fluctuations and power noise without any impact to its performance or life.
- 3.4 The Equipment must gracefully shutdown without any hazard to the operators, facilities, or itself, in the event of a utility, (i.e. supplied Electrical Power), disruptions or failures.
- 3.5 The servo-hydraulic control system must independently control both the 500 kN testing frame and the Pressurization System / Pressure Vessel simultaneously
  - a. The Pressure Vessel component must have a Pressurization System, which is capable of attenuating the HPU nominal 3,000 psi operating pressure to supply pressures from 0 to 2,200 psi to the Pressure Vessel at frequencies up to at least 15 complete cycles per hour.
  - b. The Pressure Vessel will be controlled in pressure control, with pressures ranging from 0 to 2,200 psi, (0 to 15.2 MPa)
    - i. The Pressure Vessel will contain a variable volume of Hydraulic Fluid of up to a maximum of 1,000 litres, (264 gal US).
  - c.. The 500 kN testing frame will be controlled in either load or stroke control and operate at frequencies up to at least 10 Hz with a displacement of  $\pm 1.0$  mm, ( $\pm 0.04$  inches).
- 3.6 The system must have a UPS to maintain power to the computer and the test machine controller in the event of a power outage.

### 4. Digital Servo-Controller Specifications

- 4.1 Provides real-time closed loop servo control to 2 servo valves
  - a. 2 Stage valve driver
  - b. Servo control tuning, PIDF with forward loop filter
  - c. Servo control data rate update must be at least 5kHz
  - d. The control loops can be tuned manually
  - e. The control loops can be tuned automatically
  - f. Servo control closed loop must have at least PIDF control tuning
- 4.2 The closed loop PID control must operate at a continuous update rate of at least 5 kHz
- 4.3 Provides control channels including at least the following:
  - a. Load,
  - b. Pressure
  - c. Displacement,
  - d. Calculated channel or variable, such as: true-strain, true-stress, and other variables
- 4.4 Auto control loop shaping capability
- 4.5 The controller must provide for at least 4 temperature thermocouple inputs

- 4.6 The system controller must have a transducer Self Identification feature that will recognize and transfer transducer specific calibration details to the controller.
- 4.7 The transducer Self Identification feature must be compatible with the Self ID Standard, IEEE 1451.4
- 4.8 The system controller must have the capability to use calculated channels as the real-time control loop. The calculated channel may be signals from a transducer conditioner or an ancillary A/D input device.
- 4.9 The system controller must utilize a data retention feature, which will capture test data on target channels in the event of a system failure; triggered by HPU power interruption, a system interlock initiation via error limits, loss of feedback loop etc.
- 4.10 The data retention feature must retain pre and post system interrupts for a period of at least 60 seconds duration.
- 4.11 The controllers must provide adaptive control at a relatively high frequency to the controlling channel of the testing machine. Load, position, strain sensors, and a calculated channel must be capable of system control.
- 4.12 The controllers must provide continuous synchronous data acquisition at a rate of at least 5 kHz on all sensor channels with at least 18-bit resolution.

## **5. Program Generation Specifications**

- 5.1 The fully digital controller must be capable of generating the following Program Generation Waveforms Profiles:
  - a. True Sine
  - b. Square
  - c. Haversine
  - d. Ramp
  - e. Random
  - f. Sine-Sweep
  - g. Triangle
- 5.2 The fully digital controller must incorporate advanced adaptive compensation techniques to maintain and improve the tracking accuracy of programmed profiles
- 5.3 The programming function blocks must incorporate a "drag and drop" editing feature, to enhance and facilitate the building of testing profiles.
- 5.4 The waveform internal resolution must be at least 32 bit
- 5.5 Soft start / stop for all hydraulic functions must be provided
- 5.6 Transducer conditioning for strain gauge load cells and LVDT displacement transducers.
- 5.7 A function generator to control servo-valves.
- 5.8 Control loops which can be tuned manually or automatically

## **6. Digital Controller and Signal Processing Specifications**

- 6.1 Temperature drift must be less than 30 ppm/deg Celsius
- 6.2 Digital resolution must be at least 18 bit
- 6.3 The maximum system update rate must be at least 5 kHz with one channel of control
- 6.4 Internal data sampling rate must be at least 120 kHz.
- 6.5 The system controller must be capable of employing adaptive compensation to ensure optimized control of the testing conditions, including:
  - a. Amplitude phase control
  - b. Peak – Valley – Phase control
  - c. Frequency compensation

## **7. Computer, Data Acquisition and Application Software Specifications**

- 7.1 The 500 kN Test Frame and Pressure Vessel is to be operated using Contractor supplied software on a standard IBM type / compatible PC computer. The software must operate under Microsoft Windows 7. The software is a fully compatible Microsoft Windows application - this means that data may be transferred easily from the control and data manipulation software to other Windows programs such as word processors, spreadsheets, and graphics packages
- 7.2 Provides a software interface for reconfiguring the controller
- 7.3 Allows the user to define, save and execute simple test procedures using Sine, Square wave, Haversine, Ramp, Random, Sine-Sweep, and Triangular waveforms.
- 7.4 Data acquisition rate of at least 5 kHz across all channels simultaneously.
- 7.5 Data logging capability for at least 8 auxiliary channels, (temperature, DC inputs, AC devices such as LVDT's, strain gauged devices such as load cells), at a rate of at least 5 kHz.
- 7.6 The Contractor must ensure that any supplied computer is capable of accessing the local LAN.
- 7.7 In the event that a new version of the software is available within one year of the final commissioning of the original purchase, the new version will be provided at no extra cost.
- 7.8 The software must continuously diagnose the Equipment, and warn the user when Equipment malfunctions.
- 7.9 The run time displays are be freely configurable prior to the commencement of testing.
- 7.10 The test variable definitions and test variable calculations must be available to the user for modification without having to access the software source code.
- 7.11 The test flow, test sequencing and the testing logic are available to the test designer for modification without having to access the software source code or third party software.
- 7.12 The supplied software / hardware must contain a module to run Direct Current Potential Drop, (DCPD), crack growth tests to measure crack length.

- a. The DCPD crack growth module must conform with the current most recent ASTM E647 Standard, "Test Method for Measurement of Fatigue Crack Growth Rates" for the measurement of crack length, and reporting of test parameters
  - b. The DCPD module must report: load / displacement, crack length / cycles,
  - c. The module to run DCPD crack growth tension tests must analyze the resulting data, and provide reports of the results.
- 7.13 The software modules must have a "drag and drop" test sequence construction / structure capability to permit the creation of a test sequence.
- 7.14 The software modules must have built-in templates, which are freely customizable by the operator for testing configuration.
- 7.15 Real time validation of all input parameters during the creation of the test design is provided in the application software

## **8. System Operator Panel or Handset Specifications**

- 8.1 A system control operator panel or handset must be provided, which will provide:
- a. speed sensitive actuator control for precise positioning
  - b. control of the hydraulic manifold and pump
  - c. start, stop, and pause the test program
- 8.2 The system control operator panel or handset must provide the capability to control the actuator for efficient sample insertion and set-up.
- 8.3 The system control operator panel or handset must be able to reset interlocks.

## **9. Hydraulic Power Unit, (HPU), Specification**

- 9.1 The HPU must be supplied with an oil to cooling water heat exchanger.
- 9.2 The HPU must be shipped empty of hydraulic fluid.
- 9.3 The sound pressure level for the HPU must not exceed 65 dB(A), as measured in the general proximity of the unit.
- 9.4 The HPU must be provided with all the required hydraulic hoses, and pressure monitoring capability.
- 9.5 The HPU must have a maximum hydraulic pressure of at least 3,000 psig.
- 9.6 The HPU system flow rate must be approximately 20 gpm (75.7 l/min).
- 9.7 The HPU Motor size must be approximately 40 hp (30 kW).
- 9.8 The load frame hydraulic pressure must be gradually applied to the maximum system pressure to ensure that, as the load frame initiates in a "soft start" mode.



## **10. UPS and Power-Line Conditioning Specification**

- 10.1 A UPS and incoming power conditioner must be supplied for the computer equipment and the system controller.
- a. The UPS must be sized to provide adequate electrical power for a period of at least 15 minutes after loss of input power, and have input power-loss detect output and low battery alarm output. Both outputs should be wired to the servo controller. The servo controller should be configured to take appropriate actions for safe shut-down of the hydraulic equipment being controlled.
  - b. The UPS and power line conditioner must have a warranty of at least 3 years for all components including the batteries.
  - c. The batteries for the UPS and power line conditioner must be "hot-swappable".
- 10.2 All supplied electrical equipment must meet the site service delivery voltages with any necessary transformers supplied by the Contractor.

## **11. Calibration and Verification Specifications**

- 11.1 The transducer (sensors or actuators) identification, calibration, correction data, and manufacturer-related information must be available in a Transducer Electronic Data Sheet (TEDS) format, which meets the IEEE 1451.4 standard for smart transducer interface.
- 11.2 The 500kN test frame load cell, and the load frame position sensor must be calibrated in accordance with the reporting and traceability requirements of ISO/IEC 17025, by qualified field service personnel.
- 11.3 The testing equipment and accessories, requiring calibration, (i.e. load cells, pressure transducers, testing frame displacement sensors, etc.) must be field calibrated at the equipment destination / installation location.
- 11.4 The calibration service provider must be accredited to perform calibrations to the ISO/IEC 17025 Standard, and the calibration activity must be covered in the provider's Scope of Accreditation.
- 11.5 Calibration of Equipment Requirements:
- a. All calibrations are to be provided by an accredited calibration service provider, which is accredited to, ISO/IEC 17025-2005, General requirements for the competence of calibration and testing laboratories, and the calibration and measurement system must be within the Scope of Accreditation of the provider. The measurements must be traceable to the International System of Units (SI), to a relevant primary standard through a demonstrated and competent unbroken chain of comparisons. The calibration report must conform to the reporting requirements of the 17025 Standard for calibration labs, including the Statement of Uncertainty of Measurement.
  - b. The calibration service provider must include with the calibration report, the evidence of Accreditation, by a recognized Accrediting Body, and the Scope of Accreditation, for all artifacts and standards used in the calibration.

## 12. Quality Management Systems (QMS)

12.1 The Contractor must be certified to the current version, to a Quality Management System such as ISO 9001 or equivalent.

### 12.2 QMS Background

A quality management system, (QMS), is the part of the overall management system that ensures that you can meet or exceed customer expectations for quality in products and services. A QMS includes the development of a formalized quality policy, as well as a planning phase outlining the structures, responsibilities, and procedures for quality within an organization. It also includes the verification of those procedures and a focus on continual improvement of the system. A QMS allows the organization to take control of the quality of its products and services. It allows putting a plan in place for consistency, allowing an organization to determine when corrective actions are needed. QMS are quality and productivity tools, and therefore benefit the whole organization. Benefits can also extend to the supply chain if applied throughout, improving product quality and the relationships between suppliers, clients, and end customers

## 13. Training:

13.1 The Contractor must provide training for at least 5 personnel in English, and / or French, if and as required.

13.2 The Contractor must provide training for:

- a. the installation of equipment and equipment start-up
- b. use of the equipment, standard operating procedures, and safety training
- c. maintenance, system calibrations and trouble shooting of the equipment and software
- d. all of the software modules including System Controller, DCPD, transducer conditioning, function generator with compensation control
- e. DCPD module specific training must be supplied for the connections, operation, software template configuration and modifications, and data collection
- f. system control software, to ensure safe and competent operation of the testing equipment and to ensure a complete appreciation of all the attributes and complete and competent navigation around each of the procured modules

## 14. Manuals and Equipment Drawings:

14.1 The Contractor is to provide to NRCAN with Manuals & Equipment Drawings:

- a. The Contractor is to provide to NRCAN, two (2) hard copies and two (2) electronic copies, in MS Word or PDF format, of the manuals which must include, but not limited to:
  - i. Installation and startup manuals
  - ii. Calibration Procedure
  - iii. User Manuals
  - iv. Maintenance, Troubleshooting & Parts manual
  - v. Procedure to place the system into a safe and reliable shutdown state
  - vi. Emergency procedures

14.2 Manuals must be provided to NRCAN in both English and French.

14.3 The Contractor is to provide to NRCAN, electronic copies, in AutoCAD or PDF format, of the system schematics, layouts, and equipment detail drawings.

**15. Technical Requirements Electrical Requirements**

15.1 The equipment must be suitable for use with power supply of:

- 60 Hz
- 600V/ 3 phase
- 208V 1 phase
- 208V 3 phase
- 120V 1 phase
- Equipment tolerance: +/- 10%
- UPS and line conditioner for all computers and electronic equipment

**16. Equipment Certifications**

16.1 NRCan requires that equipment be CSA certified. Standard equipment will typically be certified in its entirety and have a visible CSA marking. Custom built equipment will require that all individual components are CSA certified such that the system's bill of materials (BOM) and schematics can be reviewed by a certifying inspector for compliance with Ontario's Electrical Safety Authority (ESA), CSA, and ULC. The supplier must address all the corrective actions mandated by this auditing body and/or by the pre-start health and safety review, at no additional cost

**17. Installation Certification**

17.1 The Contractor is required to arrange and provide installation certifications for the following items; CSA, Ontario Electrical Safety Authority (ESA) for electrical installation work, Technical Standards & Safety Authority (TSSA) for any gas or high pressure or high temperature work.

**18. Calibration Certification**

18.1 The contractor must provide calibration and certification of calibration of the equipment as installed at the Hamilton Facility. Wherever possible, all calibrations are to be provided by an accredited calibration service provider, which is accredited to, ISO/IEC 17025-2005, General requirements for the competence of calibration and testing laboratories, and the calibration and measurement system must be within the Scope of Accreditation of the provider. The measurements must be traceable to the International System of Units (SI), to a relevant primary standard through a demonstrated and competent unbroken chain of comparisons. The calibration report must conform to the reporting requirements of the 17025 Standard for calibration labs, including the Statement of Uncertainty of Measurement.

18.2 The calibration service provider must include with the calibration report, the evidence of Accreditation, by a recognized Accrediting Body, and the Scope of Accreditation, for all artefacts and standards used in the calibration.

**19. Occupational Health & Safety and Environment**

19.1 The supplier must make sufficient documentation available as deemed necessary to properly conduct these audits and/or the pre-start health and safety review and/or establish the exemption from the pre-start health and safety review requirements. This may include, but is not limited to:

- Electrical schematics
- Pneumatic schematics

- Hydraulic schematics
- Specifications for safety-related components used in the safety system
- Declarations of conformity of safety-related components and systems to the applicable standards

19.2 LOTO procedure in CANMET-MTL must be followed when required

19.3 All personal protective equipment in use by the Contractor must comply with CAN/CSA Z94.1-4, CSA Z195 and CSA Z259 standards

19.4 Do not enter restricted area if it is marked or sign posted as restricted

## 20. Warranty, Service, Support & Updates

20.1 The Contractor must provide **1-year parts and labour warranty** on the entire equipment. Warranty will begin on the day that the equipment is accepted as fully tested and operational to the satisfaction of NRCAN at CANMET-MTL.

20.2 Equipment must include technical support as either: regional technical support; technical phone support; or support via the Internet. Communication must begin within **72 hours** of the initial request for support.

20.3 The system provided must have spare parts and service support available for a minimum of **five (5) years** after purchase.

20.4 The Contractor must provide all software updates and new releases to NRCAN at CANMET-MTL the purchaser for a period of **one (1) year** following acceptance, at no additional cost.

Note: The word "updates" means all enhancements, extensions or other modifications to the software. The word "releases" means enhancements or modifications to the software or new modules or supplementary modules that function in conjunction with the software, that represent the next generation of software, and which the Contractor has decided to make available to its customers usually for an additional charge.

## 21. Optional Requirements

21.1 The Contractor must provide options to purchase the following:

- a. HPU Health Monitoring System with the following specification:
  - i. The control panel must contain at least a remote start, stop, and an e-stop control of the HPU.
  - ii. Lighted indication must be provided for: Filter Dirty, Over Temperature, Low Level, Motor Running, and Power on
  - iii. The Hydraulic System Real Time Remote Monitoring System must provide periodic trend analysis of performance, utilization, and health state of the monitored system parameters via a service provider-hosted secure web portal access.
  - iv. Data collected and transmitted through secure internet data transfer method must be limited to raw machine health and consumption data with local visualizations provided of immediate-mode data values.

- v. The Hydraulic System Real Time Remote Monitoring System is able to detect, communicate and diagnose in-use faults and report them.
  - vi. The Hydraulic System Real Time Remote Monitoring System is able to generate trends for fluid condition, rates of degradations and provide alarms through e-mail.
  - vii. The system is capable of collecting performance data in real time for HPU system parameters such as:
    - . Water Saturation Levels.
    - . Fluid particles, size and distribution.
    - . Energy Consumption.
    - . Pump/Motor utilization.
  - viii. The system must collect data in real time for crucial HPU system parameters, including but not limited to:
    - . Fluid temperature.
    - . Flow.
    - . Pressure.
    - . Fluid level.
    - . Filter condition.
- b. Additional Optional Requirements:
- i. Calibration service in accordance with ISO 17025 requirements, list & pricing
  - ii. Extension of the Standard Warranty by an additional 2 Years.
  - iii. Preventative Maintenance Service agreement (details and pricing).

**ANNEX "B"****BASIS OF PAYMENT**

The firm LOT prices herein are an all inclusive prices, in accordance with Annex A, Requirement, in Canadian funds. Delivery is at destination (NRC, CANMET-MTL, 183 Longwood Road, South, Hamilton, Ontario L8P 0A5) and the Contractor is responsible for all delivery charges, administration, costs and risks of transport and customs clearance, including the payment of customs duties and taxes.

The total amount of Goods and Services Tax or Harmonized Sales Tax is to be shown separately, if applicable.

**1. Firm Requirement**

<b>Item No.</b>	<b>Description</b>	<b>Quantity</b>	<b>Firm LOT Price</b>
1.1	Control System for Pipe Lab 500 kN Pipe Test Frame, and Pressurized Vessel in accordance with Annex A - Requirement (excluding 21. Optional Requirements) The system will consist of  1) 20 gpm Hydraulic Power Unit, (HPU); 2) Pressure Intensifier to supply 0 - 2,200 psi to the enclosed pipe pressure vessel for corrosion crack growth; 3) Direct Control Potential Drop (DCPD) system module to monitor fatigue crack growth with the 500 kN fatigue test frame; 4) Hydraulic control system to provide closed-loop control for pre-cracking of pipe segments in the 500 kN fatigue test frame.	1 LOT	\$_____
	GST / HST Extra (if applicable)		\$_____
	TOTAL		\$_____

**2. Optional Requirement**

**Optional Goods/Services** - During the period of the contract, from date of contract to 31 March 2016, NRC, CANMET-MTL may purchase the following:

Canada reserves the right to verify the prices at the time of exercising the option. The pricing for the optional years shall be the lesser of either, whichever is more beneficial to Canada:

- i) the prices detailed herein below; or
- ii) the Contractor's published price list, in effect at the time the option is exercised, less a discount of \_\_\_\_%.

## 2. Optional Requirement (cont'd)

Item No.	Description	Estimated Quantity	LOT Price
2.1	HPU Health Monitoring System in accordance with item a. under 21. Optional Requirements of Annex A - Requirement.	1 LOT	\$_____
2.2	Extended Standard Warranty for 2 years for entire equipment (from expiry date of 1 year parts and labour warranty, which started on the day that the equipment was fully operational and accepted by the Inspection Authority.	1 LOT	\$_____
2.3	Preventative Maintenance (PM) Service Agreement - Firm lot price per year as per recommended PM Agreement detailed herein for all equipment.	1 LOT	\$_____
2.4	Spare Parts and Consumable Parts - As per attached list and associated pricing.		
2.5	Calibration Service in accordance with ISO 17025 requirements as per attached list and associated pricing.		

## 3. Delivery dates:

3.1 Firm Requirement: The Contractor must complete all deliverables under the Firm Requirement (1.) on or prior to 31 March 2013.

3.2 Optional Goods/Services: Delivery of the Optional Goods/Services must be completed within \_\_\_\_\_ weeks from the date the option is exercised.

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**APPENDIX 1 OF ANNEX B**
**Schedule of Milestones and Payments**

The schedule of milestones for which payments will be made in accordance with the Contract is as follows:

<b>Milestone No.</b>	<b>Description or "Deliverable"</b>	<b>Payment</b>	<b>Delivery Date</b>
1	100% Delivery of Items (All components)	70% of Contract Value	Before 31 March 2013 Proposed completion date: _____
2	Installation and Commissioning 100% completed	20% of Contract Value	Before 31 March 2013 Proposed completion date: _____
3	Calibration, Certifications, Final Acceptance and Training	Holdback Payment 10% of Contract Value	Before 31 March 2013 Proposed completion date: _____



**ANNEX C****PRICE EVALUATION**

The prices proposed on Annex B - Basis of Payment will be used herein for price evaluation purposes. Not all items on Annex B will be used herein for price evaluation. The price used in the evaluation will be the aggregate price based on the proposed unit pricing x the quantities for the firm and optional requirements. The pricing herein excludes GST/HST.

**1. Firm Requirement**

Item No.	Description	Estimated Quantity	Firm Unit Price	Extended Price
1.1	Control System for Pipe Lab 500 kN Pipe Test Frame, and Pressurized Vessel in accordance with Annex A - Requirement (excluding 21. Optional Requirements) The system will consist of  1) 20 gpm Hydraulic Power Unit, (HPU); 2) Pressure Intensifier to supply 0 - 2,200 psi to the enclosed pipe pressure vessel for corrosion crack growth; 3) Direct Control Potential Drop (DCPD) system module to monitor fatigue crack growth with the 500 kN fatigue test frame; 4) Hydraulic control system to provide closed-loop control for pre-cracking of pipe segments in the 500 kN fatigue test frame.	1 LOT	\$ _____	\$ _____

**2. Optional Requirements**

**Optional Goods/Services** - During the period of the contract, from date of contract to 31 March 2016, NRC may purchase at various times the following:

Item No.	Description	Estimated Quantity	Unit Price	Extended Price
2.1	HPU Health Monitoring System in accordance with item a. under 21. Optional Requirements of Annex A - Requirement.	1 LOT	\$ _____	\$ _____
2.2	Extended Standard Warranty for 2 years for entire equipment (from expiry date of 1 year parts and labour warranty, which started on the day that the equipment was fully operational and accepted by the Inspection Authority.	1 LOT	\$ _____	\$ _____
2.3	Preventative Maintenance (PM) Service Agreement - Firm lot price per year as per recommended PM Agreement detailed herein for all equipment.	2 LOT	\$ _____	\$ _____
<b>AGGREGATE PRICE</b>				\$ _____