



RETURN BIDS TO:  
RETOURNER LES SOUMISSIONS A:

**Natural Resource Canada**  
**Bid Receiving Unit, Mailroom**  
**588 Booth Street, Room 108**  
**Ottawa, Ontario**  
**K1A 0Y7**  
**Attention: Valerie Holmes**

**INVITATION TO TENDER**  
**APPEL D'OFFRES**

**Tender to: Natural Resources 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.

**Soumission aux: Ressources naturelles 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 at aux annexes ci-jointes, les biens, services et construction énumérés ici et sur toute feuille ci-annexée, au(x) prix indiqué(s).

Issuing Office - Bureau de distribution

**Natural Resources Canada**  
**Finance and Procurement Branch**  
**580 Booth Street**  
**Ottawa, Ontario**  
**K1A 0E4**

<b>Title - Sujet</b> <b>Electrical Construction Services</b>	
<b>Date</b> <b>November 30, 2015</b>	
Solicitation No. - No. de l'invitation <b>NRCan-5000018884</b>	Client Ref. No. - No. de réf du client <b>129144</b>
GETS Reference No. - No de reference de SEAG	
Solicitation Closes - L'invitation prend fin <b>At - à: 02:00 PM</b> <b>On - le: December 15, 2015</b>	Time Zone - Fuseau horaire <b>Eastern Standard Time (EST)</b>
F.O.B. - F.A.B. Plant-Usine <input type="checkbox"/> Destination: X Other - Autre: <input type="checkbox"/>	
Address Inquiries to: - Adresse toute demande de renseignements à : <b>Valerie Holmes - Procurement Specialist</b>	
Téléphone No. - No. de telephone: <b>(343) 292-8371</b>	Fax No. - No de FAX <b>(613) 947-5477</b>
Destination of Goods, Services, and Construction: Destination des biens, services et construction: <b>See herein</b>	
Vendor/Firm Name and Address : Raison sociale et adresse du fournisseur/de l'entrepreneur: Name/Nom : _____ Address/Adresse : _____ _____ Telephone/Téléphone : _____ Facsimile/Télécopieur : _____ Email/Courriel : _____ Procurement Business Number - Achats numero d'entreprise : _____	
Name and Title of person authorized to sign on behalf of the Vendor/Firm: Nom et titre de la personne autorisé à signer au nom du fournisseur/de l'entrepreneur :  Name/Nom : _____  Title/Titre : _____	



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## SPECIAL INSTRUCTIONS TO BIDDERS (SI)

### SI01 Integrity Provisions

At Section GI01 - Integrity Provisions - Bid of SACC Clause R2710T (2015-07-03):

DELETE: in its entirety

### SI02 Bid Documents

1. The following are the bid documents:
  - a) Invitation to Tender - Page 1;
  - b) Special Instructions to Bidders;
  - c) General Instructions - Construction Services - Bid Security Requirements R2710T (2015-07-03);
  - d) Clauses & Conditions identified in "Contract Documents";
  - e) Drawings and Specifications
  - f) Bid and Acceptance Form and related Appendix(s); and
  - g) Any amendment issued prior to solicitation closing

Submission of a bid constitutes acknowledgement that the Bidder has read and agrees to be bound by these documents.

2. General Instructions - Construction Services - Bid Security Requirements R2710T is incorporated by reference and is set out in the Standard Acquisition Clauses and Conditions (SACC) Manual, issued by Public Works and Government Services Canada (PWGSC). The SACC Manual is available on the PWGSC Web site: <https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R>

### SI03 Enquiries During the Solicitation Period

1. Enquiries regarding this bid must be submitted in writing to the Contracting Officer named on the Invitation to Tender - Page 1 as early as possible within the solicitation period. Except for the approval of alternative materials as described in GI15 of R2710T, enquiries should be received no later than **five (5)** calendar days prior to the date set for solicitation closing to allow sufficient time to provide a response. Enquiries received after that time may not result in an answer being provided.
2. To ensure consistency and quality of the information provided to Bidders, the Contracting Officer shall examine the content of the enquiry and shall decide whether or not to issue an amendment.
3. All enquiries and other communications related to this bid sent throughout the solicitation period are to be directed **ONLY** to the Contracting Officer named on the Invitation to Tender - Page 1. Failure to comply with this requirement may result in the bid being declared non-responsive.

### SI04 Mandatory Site Visit

There will be a mandatory site visit on **December 04, 2015** at **10:00 a.m.** Interested Bidders are to meet at NRCan CANMET Energy, located at Bells Corners Complex, 1 Haanel Drive, Building 4, Ottawa, Ontario, K1A 1M1.

The site visit for this project is Mandatory. Bidders are requested to communicate with the Contracting Authority no later than **two (2)** business day(s) before the scheduled visit to confirm attendance and provide the names of the person(s) who will attend. The representative of the Bidder will be required to sign the Site Visit Attendance Sheet at the site visit. Bids submitted by **Bidders who have not signed the attendance sheet will not be accepted.** Bidders who do not attend this Mandatory site visit will not be permitted to bid on this requirement.

**NOTE:** NRCan only has an empty room at this time to see 3-D design models.



## **SI05 Revision of Bid**

A bid may be revised by letter of facsimile in accordance with GI10 of R2710T. The facsimile number for receipt of revisions is (613) 995-2920.

## **SI06 Bid Results**

1. A public bid opening will be held in the office designated on the Front Page “Invitation to Tender” for the receipt of bids shortly after the set time for solicitation closing.
2. Following solicitation closing, bid results may be obtained by calling (343) 292-8371.

## **SI07 Insufficient Funding**

In the event that the lowest compliant bid exceeds the amount of funding allocated for the Work, Canada in its sole discretion may:

- a) Cancel the solicitation; or
- b) Obtain additional funding and award the Contract to the Bidder submitting the lowest compliant bid; and/or
- c) Negotiate a reduction in the bid price and/or scope of work of not more than 15% with the Bidder submitting the lowest compliant bid. Should an agreement satisfactory to Canada not be reached, Canada shall exercise option a) or b).

## **SI08 Bid Validity Period**

1. Canada reserves the right to seek an extension to the bid validity period prescribed at BA04 of the Bid and Acceptance Form. Upon notification in writing from Canada, Bidders shall have the option to either accept or reject the proposed extension.
2. If the extension referred to in paragraph 1 of SI07 is accepted, in writing, by all those who submitted bids, then Canada shall continue immediately with the evaluation of the bids and its approved processes.
3. If the extension referred to in paragraph 1 of SI07 is not accepted, in writing, by all those who submitted bids then Canada shall, at its sole discretion, either
  - a) Continue to evaluate the bids of those who have accepted the proposed extension and seek the necessary approvals; or
  - b) Cancel the invitation to tender.
4. The provisions expressed herein do not in any manner limit Canada’s right in law or under GI11 of R2710T.

## **SI09 Security Related Requirements**

There is no security requirements associated with this requirement. Contractor will be escorted while on the premises.

## **SI10 Web Sites**

The connection to some of the Web sites in the solicitation documents is established by the use of hyperlinks. The following is a list of the addresses to the Web sites:

Buy and Sell:

<https://www.achatsetventes-buyandsell.gc.ca>



Canadian Economic Sanctions:

<http://www.international.gc.ca/sanctions/index.aspx?lang=eng>

Contractor Performance Evaluation Report (Form PWGSC-TSPGC 2913):

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/2913.pdf>

Bid Bond (form PWGSC-TPSGC 504):

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/504.pdf>

Performance Bond (form PWGSC-TPSGC 505):

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/505.pdf>

Labour and Material Payment Bond (form PWGSC-TPSGC 506):

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/506.pdf>

Standard Acquisition Clauses and Conditions (SACC) Manual:

<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R>

PWGSC, Industrial Security Services:

<http://ssi-iss.tpsgc-pwgsc.gc.ca/index-eng.html>

PWGSC, Code of Conduct and Certifications:

<http://www.tpsgc-pwgsc.gc.ca/app-acq/cndt-cndct/index-eng.html>

PWGSC Consent to a Criminal Record Verification (PWGSC-TPSGC 229):

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/229.pdf>

Construction and Consultant Services Contract Administration forms Real Property Contracting:

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/formulaires-forms-eng.html>



## R2710T GENERAL INSTRUCTIONS - CONSTRUCTION SERVICES - BID SECURITY REQUIREMENTS (GI) (2015-07-03)

The following GI's are included by reference and are available at the following Website:

<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R>

- GI01 Integrity Provisions - Bid
- GI02 Completion of Bid
- GI03 Identity or Legal Capacity of the Bidder
- GI04 Applicable Taxes
- GI05 Capital Development and Redevelopment Charges
- GI06 Registry and pre-qualification of Floating Plant
- GI07 Listing of Subcontractors and Suppliers
- GI08 Bid Security Requirements
- GI09 Submission of Bid
- GI10 Revision of Bid
- GI11 Rejection of Bid
- GI12 Bid Costs
- GI13 Procurement Business Number
- GI14 Compliance with Applicable Laws
- GI15 Approval of Alternative Materials
- GI16 Performance Evaluation
- GI17 Conflict of Interest-Unfair Advantage



## SUPPLEMENTARY CONDITIONS (SC)

### SC01 Security Requirements, Document Safeguarding Location

There is no security requirement applicable to this Contract.

### SC02 Insurance Terms

#### 1. Insurance Contracts

- (a) The Contractor must, at the Contractor's expense, obtain and maintain insurance contracts in accordance with the requirements of the Certificate of Insurance. Coverage must be placed with an Insurer licensed to carry out business in Canada.
- (b) Compliance with the insurance requirements does not release the Contractor from or reduce its liability under the Contract. The Contractor is responsible for deciding if additional insurance coverage is necessary to fulfill its obligation under the Contract and to ensure compliance with any applicable law. Any additional insurance coverage is at the Contractor's expense, and for its own benefit and protection.

#### 2. Period of Insurance

- (a) The policies required in the Certificate of Insurance must be in force from the date of contract award and be maintained throughout the duration of the Contract.
- (b) The Contractor must be responsible to provide and maintain coverage for Products/Completed Operations hazards on its Commercial General Liability insurance policy, for a period of six (6) years beyond the date of the Certificate of Substantial Performance.

#### 3. Proof of Insurance

- (a) Before commencement of the Work, and no later than thirty (30) days after acceptance of its bid, the Contractor must deposit with Canada a Certificate of Insurance on the form attached herein, at Annex "A".
- (b) Upon request by Canada, the Contractor must provide originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the Certificate of Insurance.

#### 4. Insurance Proceeds

In the event of a claim, the Contractor must, without delay, do such things and execute such documents as are necessary to effect payment of the proceeds.

#### 5. Deductible

The payment of monies up to the deductible amount made in satisfaction of a claim must be borne by the Contractor.



## CONTRACT DOCUMENTS (CD)

1. The following are the contract documents:
  - a) Contract Page when Signed by Canada;
  - b) Duly completed Bid and Acceptance Form and any Appendices attached thereto;
  - c) Drawings and Specifications;
  - d) General Conditions and Clauses

GC1 - General Provisions - Construction Services	R2810D	(2015-07-09)
GC2 - Administration of the Contract	R2820D	(2015-02-25)
GC3 - Execution and Control of the Work	R2830D	(2015-02-25)
GC4 - Protective Measures	R2840D	(2015-02-25)
GC5 - Terms of Payment	R2850D	(2015-02-25)
GC6 - Delays and Changes in the Work	R2860D	(2013-04-25)
GC7 - Default, Suspension or Termination of Contract	R2870D	(2008-05-12)
GC8 - Dispute Resolution	R2880D	(2015-04-01)
GC9 - Contract Security	R2890D	(2014-06-26)
GC10 - Insurance	R2990D	(2008-05-12)
Allowable Costs for Contract Changes Under GC6.4.1	R2950D	(2015-02-25)
  - e) Any amendment issued or any allowable bid revision received before the date and time set for solicitation;
  - f) Any amendment incorporated by mutual agreement between Canada and the Contractor before acceptance of the bid; and
  - g) Any amendment or variation of the contract documents that is made in accordance with the General Conditions.
2. Any document identified by title, number and date above are incorporated by reference and are set out in the Standard Acquisition Clauses and Conditions (SACC) Manual, issued by Public Works and Government Services Canada (PWGSC). The SACC Manual is available on the PWGSC Web Site:  
<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>
3. The language of the contract documents is the language of the Bid and Acceptance Form submitted.



## BID AND ACCEPTANCE FORM (BA)

### BA01 Identification

Electrical Construction Services

### BA02 Business Name and Address of Bidder

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_ PBN: \_\_\_\_\_

### BA03 The Offer

The Bidder offers to Canada to perform and complete the Work for the above named project in accordance with the Bid Documents for the Total Bid Amount of:

\$\_\_\_\_\_ excluding GST/HST  
(amount in numbers)

### BA04 Bid Validity Period

The bid shall not be withdrawn for a period of thirty (30) days following the date of solicitation closing.

### BA05 Acceptance and Contract

Upon acceptance of the Contractor's offer by Canada, a binding Contract shall be formed between Canada and the Contractor. The documents forming the Contract shall be the contract documents identified in Contract Documents (CD).

### BA06 Construction Time

The Contractor shall perform and complete the Work within three (3) months from the date of notification of acceptance of the offer.

### BA07 Signature

\_\_\_\_\_  
Name and Title of person authorized to sign on behalf of the Bidder (Type or print)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date



## APPENDIX “1” - STATEMENT OF REQUIREMENT

### 1. Introduction

Natural Resources Canada (NRCan) - Canmet ENERGY is installing an oxygen fired pressurized fluid bed combustor (OXY-PFBC) in Building 4 of the Bells Corners Complex in Ottawa, Ontario.

The Pressurized Fluidized Bed Combustor is a combination of high efficiency combustion for low-grade fuels with reduced emissions of sulphur and nitrogen oxides. This specialized pilot-scale circulating fluidized-bed combustor can be used to study corrosion, erosion and the fate of trace metals in feedstocks.

### 2. Description of Requirements

As part of this project, all electrical and control components to support the facility require installation. This requirement is for the installation of all electrical, control and instrumentation components for the operation of this pilot facility.

With your submittal, please provide three (3) references for similar installations with have been completed by your company.

### 3. Site Controls / Responsibilities

1. The chosen Contractor will be working within Natural Resources Canada Bells Corners Complex - Building 4.
2. Notice of project and any additional permitting for the project will be completed by NRCan.
3. All work completed by the Contractor must be completed in compliance with all applicable regulations and standards, using best practices, safety programs and security programs.
4. The Contractor will coordinate all work plans with the NRCan Project Lead.
5. The Contractor will plan all work, and provide a detailed schedule to the NRCan Project Lead prior to work starting.
6. All site permitting and site planning (hot work permits, fenced off construction areas, etc.) will be approved by the NRCan Project Lead. The Contractor will work with NRCan to plan all permitting.
7. All construction delineation will be at the expense of the Contractor.

### 4. Codes and Standards

The Contractor must ensure that all work is completed using all applicable current Canadian and Ontario codes, standards and current best practices.

All Canada Occupational Health & Safety Regulations (SOR/86-304) apply at this facility.

### 5. Scope / Supply of Work

#### 5.1 General Items

1. The site will be installation-ready for the Contractor. All demolition of previous equipment will be completed prior to commencement of this work.
2. The Contractor is to install all electrical components and provide all power and control wiring to the installed components and instrumentation as per the provided engineering drawings (Appendix “A”).
3. All instruments, control cabinets, junction box cabinets, solenoid cabinets and VFD’s will be provided by



NRCAN.

4. The control cabinet is pre-existing with only minor modifications required within the cabinet. All required modifications are noted as a revision on the engineering drawings.
5. All junction boxes will be provided to the Contractor pre-assembled by NRCAN, with the exception of the VSD cabinet, which will be assembled and wired by the Contractor.
6. All solenoid cabinets will be provided to the Contractor pre-assembled by NRCAN.
7. All thermocouple jack boxes will be provided to the Contractor pre-assembled.
8. The Contractor must supply all labour, materials, tools, construction/mobile equipment, lifting equipment, scaffolding, and other accessories and commodities necessary to complete the scope of work listed.
9. The Contractor must complete all required testing, inspection and certifications for all work, compliant with the applicable standards and current best practices.
10. All equipment and instrumentation is to be grounded as per CEC standards.
11. All materials supplied by the Contractor must have CSA (or equivalent) approval. The Contractor shall identify any non CSA compliant (or equivalent) materials supplied by NRCAN, prior to installation. ESA permitting and inspection for work performed will be the responsibility of the Contractor.
12. All applicable codes, standards and regulations are to be followed.
13. The Contractor is to allow for one (1) person for three (3) weeks of commissioning support. The Contractor is to assist in verification of all connections and support any changes that are required.
14. The Contractor is to provide a completion package at the end of construction with all recorded changes and provide mark-ups for As-Built drawings.

## **5.2 Equipment Installation**

The Contractor is to install the following electrical equipment and wires, as per engineering drawings and vendor specifications. Refer to the attachments of this document for detailed engineering documentation.

### **5.2.1 Cabinet Installation**

Install all pre-assembled cabinets required for the project. These include:

- Analog Junction Box Cabinet: PFBC-AJB-01
- Digital Junction Box Cabinet: PFBC-DJB-01
- Thermocouple Junction Box Cabinet: PFBC-TCJB-01
- Solenoid Cabinets: PFBC-SJB=-01 to 10
- Thermocouple Jack Boxes

The Main Control Cabinet PFBC-CC-01 already exists and is in the required location.

A main variable speed drive cabinet PFBC-VSD-01 is also required for this project. The cabinet will be provided, however installation of components and wiring for this cabinet will be required by the Contractor as per drawings: E-PFBC-BCC4-033 and E-PFB-BCC3-351.

The placement for the cabinets in the 1<sup>st</sup> floor is shown in wall layout drawings E-PFBC-BCC4-023.

Note that the main control cabinet and VSD cabinets are installed and are not required to be moved. The main control cabinet is on the 2<sup>nd</sup> floor outside the operator control room and the VSD cabinet is located on the 1<sup>st</sup> floor



and is shown in the wall layout drawing E-PFBC-BCC4-033.

### 5.2.2 Cabinet Assembly and Wiring

The required cabinets will be pre-assembled with all internal wiring completed. The following drawings are provided for reference purposes only showing the layout and wiring of the cabinet assemblies required for this project.

Drawings	Drawing No.
<b>Layout Drawings</b>	
Control Cabinet Assembly Layout Drawings	E-PFBC-BCC4-020
Analog Junction Box Exterior Layout	E-PFBC-BCC4-024
Digital Junction Box Exterior Layout	E-PFBC-BCC4-025
Thermocouple Junction Box Exterior Layout	E-PFBC-BCC4-026
Analog Junction Box Interior Layout	E-PFBC-BCC4-027
Digital Junction Box Interior Layout	E-PFBC-BCC4-028
Thermocouple Junction Box Interior Layout	E-PFBC-BCC4-029
Analog Junction Box Terminal Block Layout	E-PFBC-BCC4-030
Digital Junction Box Terminal Block Layout	E-PFBC-BCC4-031
VFD Cabinet Assembly Interior Layout	E-PFBC-BCC4-033
Solenoid Cabinet 1 Layout	E-PFBC-BCC4-035
Solenoid Cabinet 2 Layout	E-PFBC-BCC4-036
Solenoid Cabinet 3 Layout	E-PFBC-BCC4-037
Solenoid Cabinet 4 Layout	E-PFBC-BCC4-038
Solenoid Cabinet 4B Layout	E-PFBC-BCC4-039
Solenoid Cabinet 5 Layout	E-PFBC-BCC4-040
Solenoid Cabinet 5B Layout	E-PFBC-BCC4-041
Solenoid Cabinet 6 Layout	E-PFBC-BCC4-042
Solenoid Cabinet 7 Layout	E-PFBC-BCC4-043
Solenoid Cabinet 7B Layout	E-PFBC-BCC4-044
<b>Wiring Drawings</b>	
Control Cabinet AC Power Wiring Distribution	E-PFBC-BCC4-050
Control Cabinet DC Power Wiring Distribution	E-PFBC-BCC4-051
Analog Junction Box AC Power Distribution	E-PFBC-BCC4-053
Analog Junction Box DC Power Distribution	E-PFBC-BCC4-054
Digital Junction Box AC Power Distribution	E-PFBC-BCC4-055
Digital Junction Box DC Power Distribution	E-PFBC-BCC4-056
Thermocouple Junction Box AC Power Distribution	E-PFBC-BCC4-057
Thermocouple Junction Box DC Power Distribution	E-PFBC-BCC4-058
Solenoid Cabinet 1 Wiring Diagram	E-PFBC-BCC4-075
Solenoid Cabinet 2 Wiring Diagram	E-PFBC-BCC4-076
Solenoid Cabinet 3 Wiring Diagram	E-PFBC-BCC4-077
Solenoid Cabinet 4 Wiring Diagram	E-PFBC-BCC4-078
Solenoid Cabinet 4B Wiring Diagram	E-PFBC-BCC4-079
Solenoid Cabinet 5 Wiring Diagram	E-PFBC-BCC4-080
Solenoid Cabinet 5B Wiring Diagram	E-PFBC-BCC4-081
Solenoid Cabinet 6 Wiring Diagram	E-PFBC-BCC4-082
Solenoid Cabinet 6B Wiring Diagram	E-PFBC-BCC4-083
Solenoid Cabinet 7 Wiring Diagram	E-PFBC-BCC4-084

### 5.2.3 Cable Tray Installation

1. Install and route all cable trays as per drawings E-PFBC-BCC4-500 and 501.
2. Document E-PFBC-BCC4-502 is a Bill of Materials (BOM) for the main runs of cable tray. This is a guide only as to the required material. It is the responsibility of the Contractor to confirm all required parts and



quantities.

3. Wall penetrations are required at 4 locations. The Contractor is responsible for these wall penetrations.
4. Fire stops for the wall penetrations will be required and is the responsibility of the Contractor.
5. The cable tray layout drawings show approximate placement of tray. The Contractor may propose alternate arrangements subject to approval.
6. Runs of smaller sized tray or rigid conduit to group individual instruments and electrical loads are the responsibility of the Contractor, and are not included in the quantities on the cable tray BOM.
7. Horizontal cable tray in the project bays shall be supported using wall brackets rather than ceiling hangers where possible. This is particularly true in areas where there are removable floor sections or high ceilings. All cable tray supports and mounting hardware is the responsibility of the Contractor. Support brackets are to be structural stamped or pre-built.
8. Cable tray is not to be installed in above areas with removable floor grating. Ceiling hung or wall brackets are acceptable in these areas.
9. Existing hangers in the first floor hallway can be used to support the 12" tray, provided all clearances are suitable.
10. Many sections of cable tray will contain control and instrumentation cable as well as power cable. Cable tray dividers and placement are the responsibility of the Contractor. All power cable has been de-rated for less than 25% cable spacing.
11. The largest cable for this project is 500MCM. The Contractor is responsible for supply and installation of all cable tray bonding.
12. The exact placement of outdoor equipment will be determined by time of installation. Contractor is responsible for cable tray or conduit for the main cable tray or pipe rack to the outdoor equipment. Exact quantities to be determined at time of construction. Presently, we estimate approximately 20 - 40 feet of 12" wide cable tray for this application.

#### **5.2.4 Disconnects**

1. Supply and install a new fusible 600V, 100 A disconnect suitable for supplying the VSD cabinet. The Contractor is also to supply and install the corresponding fuses. This disconnect is to be mounted in the vicinity of the existing 600V splitter (10-215-4003).
2. Drawings E-PFBC-BCC4-350 shows the new disconnect.
3. Supply and install of motor and equipment local disconnects. There are twelve motors 2HP or less, two motors 2HP or less, two motors 5-7.5HP, one 20HP, and one 60HP that require disconnects. Some disconnects may be provided by the third party equipment suppliers. Contractor shall supply and install all local disconnects.
4. Drawings E-PFBC-BCC4-351 to 352 are the single lines for the VSDs and compressors.

#### **5.2.5 Power Wiring**

1. Install and connect all required power wiring.
2. Single line diagrams E-PFBC-BCC4-350, 351 and 352 shows all required connections.
3. Cable schedule E-PFBC-BCC4-510 provides a list of the cables required for the power wiring and is provided in Appendix "A". The list provides suggested manufacturer, part number, type, size and connection points



for the power cabling. Alternative cables can be used, provided they have equivalent specifications. The Contractor may propose alternative wiring solutions, which are then subject to approval. For all alternative solutions, shop drawings must be submitted for approval.

4. All cable lengths are estimates and are to be verified by Contractor. In many cases the longest cable length has been estimated and applied to all loads.
5. Supply and affix cable tags as indicated on drawings and cable schedule.
6. Power wiring is required for:
  - Third party equipment - Linde MCC, Compressors, etc.
  - Pumps and motors and/or their respective starters, drivers, controllers, etc.
  - Analog, Digital and Thermocouple Junction Boxes

#### **5.2.6 Power for Analog, Digital and Thermocouple Junction Boxes**

1. Power for the Analog, Digital and Thermocouple Junction Boxes will be provided by a UPS. This UPS will be provided to the Contractor by NRCan.
2. Drawings E-PFBC-BCC4-049, 053 and 055 show the power wiring and distribution for Analog, Digital and Thermocouple Junction Boxes.
3. A small Power Junction Box (PJB) will be required for terminal blocks used for the connection of the UPS power to the power distribution in PFBC-TCJB-01 as indicated on drawing E-PFBC-BCC4-049.

#### **5.2.7 Motors and VFDs**

1. A 3<sup>rd</sup> party supplied VSD is to be installed in an area near to the location of motor MO-303-001 (Recycle Gas Compressor). Drawings E-PFBC-BCC4-404 shows a typical schematic for the 60HP load. Actual schematics will be available at time of construction. The Contractor is responsible for wiring to and from the VSD. Refer to single line diagram E-PFBC-BCC4-351.
2. Several 3<sup>rd</sup> party supplied motor starter/contactors are to be installed in locations through-out the project bays near to their respective loads. Drawings E-PFBC-BCC4-401 to 411 shows typical schematics for these loads. Actual schematics will be available at time of construction. The Contractor is responsible for wiring to and from each of these starters/contactors. Refer to single line diagram E-PFBC-BCC4-351.
3. The Contractor is to supply and install feeds to 3<sup>rd</sup> party controllers. The Contractor is also to supply and install feeds from the controllers to their respective motors. Refer to single line diagram E-PFBC-BCC4-351.
4. The Contractor is to supply and install feeds to 3<sup>rd</sup> party control panels. Refer to single line diagram E-PFBC-BCC4-351. Connections from these control panels to the motors are not the responsibility of the Contractor.
5. One VSD and three motor starters, supplied by NRCan are to be installed in the VSD cabinet that is located on the 1<sup>st</sup> floor as per layout drawings E-PFBC-BCC4-023 and 033. All power and control wiring for the VSD and motor starters installed in this cabinet will be the responsibility of the Contractor. Power distribution to 3<sup>rd</sup> party supplied starters, drives, controllers and control panels as mentioned in the preceding paragraphs will be done via this cabinet as shown on single line E-PFBC-BCC4-351. The Contractor is responsible for installation of the touch-safe fuse bus as shown on the cabinet layout drawings, as well as all wiring to and from this cabinet.
6. VSD and motor starters shall be wired as shown on schematics drawings E-PFBC-BCC4-401 to 411.
7. The Contractor shall not be responsible for placement and/or coupling of motors. Motors will be in place and only the electrical power and control wiring will be the responsibility of this contract.



### 5.2.8 Third Party Equipment

1. Aside from 3<sup>rd</sup> party supplied motor starters, drives, controllers and control panels, there are two feeds required for 3<sup>rd</sup> party equipment. The Contractor shall supply and install feeds to the Linde MCC (to be located on the 2<sup>nd</sup> floor approximately 15ft distance or 30ft cable length from the 600V splitter), and to the compressor room distribution point (to be located just outside the building).
2. The Linde MCC shall be fed from an existing 600V, 200A disconnect located near the 600V splitter (10-215-4003). The Contractor is responsible for the supply and installation of the cable, including connection at both ends. Documentation will be provided at time of construction. Refer to single line E-PFBC-BCC4-350. The Contractor is not responsible for the installation of the Linde MCC or the supply and installation of feeds from it.
3. Two 100HP compressors will be located in a container(s) outside of the building, along with ancillary control and equipment. The Contractor is responsible to supply and install a single power feed to a distribution point located in the container. Refer to single line E-PFBC-BCC4-352. Due to the gauge of the wiring (3C#500MCM), the Contractor may be required to supply and install a junction box or upsizing lugs / hardware at both ends of the cable. The Contractor may propose alternatives, subject to approval

### 5.2.9 Solenoid Cabinets

Solenoid cabinets are provided for all pneumatically actuated valves within the process. These cabinets will be supplied and pre-assembled by NRCan.

1. Install solenoid cabinets in locations as per location drawing FPBC-P0002114.001-6-014-5 to 5 (Appendix "A").
2. Contractor to terminate cables and tubing to the solenoid cabinets as per engineering drawings E-PFBC-BCC4-035 to 044.
3. Solenoid valve grouping and wiring as per solenoid cabinet drawings E-PFBC-BCC4-075 to 084.

### 5.2.10 Instrumentation

All instrumentation for the Oxy-PFBC is shown on Piping and Instrumentation Drawings PFBC -P-002114.001-0-00-1 to PFBC-P-002114.001-5-02-2.

1. A list of all instrumentation is included in Equipment List E-PFBC-BCC4-001.
2. All instrumentation will be provided by NRCan and installed by the piping Contractor.
3. Contractor to wire to all the instruments as per provided engineering drawings provided in Appendix "A".

### 5.2.11 Instrumentation Input/Output (I/O) Wiring

1. List E-PFBC-BCC4-001 indicates all required inputs and outputs (I/O) and is provided in the attached Appendix "A".
2. Analog inputs require a 249W resistor when associated with a HART transmitter. Placement and wiring of the resistor is indicated on wiring drawings E-PFBC-BCC4-101 to 113.
3. The majority of the I/O modules are pre-existing in the control cabinet. I/O point wiring within the Control Cabinet are pre-wired to terminal strips within the control cabinet with the following exceptions where internal wiring has been modified from the existing control cabinet - all modifications are shown by a revision cloud on the associated drawings:

I/O Card N2 - M5 - drawing E-PFBC-BCC4-104



I/O Card N3 - M8 - drawing E-PFBC-BCC4-105

Power wiring to control cabinet TBs 171 and 172 - drawing E-PFBC-BCC4-204

Power wiring to control cabinet TBs 321 and 322 - drawing E-PFBC-BCC4-223

4. A hand markup of the existing control cabinet drawings is provided to show the modifications that are required (Appendix "B")
5. The I/O are then wired with multi-conductor cables from the terminal strips within the control cabinet on the 2<sup>nd</sup> floor to the junction box cabinets located on the 1<sup>st</sup> floor. The individual I/O points are then wired from the terminal strips in the junction boxes to field devices. Detailed wiring is shown on the following drawings:
  - Analog Input Wiring: E-PFBC-BCC4-101 to 113
  - Analog Output Wiring: E-PFBC-BCC4-120 to 125
  - Digital Input Wiring: E-PFBC-BCC4-201 to 205
  - Digital Output Wiring: E-PFBC-BCC4-220 to 226
6. New I/O cards are located in the junction box cabinets on the 1<sup>st</sup> floor. Internal wiring from the I/O modules to terminal blocks is included with the cabinet and is not the responsibility of the Contractor.
7. All I/O points from the junction boxes to the field devices are to be wired individually, with the exception of thermocouples (see items 11 and 12 below) and solenoids which are wired with multi-conductor cable to solenoid junction boxes. The required wire/cable types are indicated on the wiring drawings and on the provided Field Cable Schedule E-PFBC-BCC4-514 (Appendix "A").
8. All wires for the individual I/O points are to be labelled at both ends of the cable with the instrument tags as indicated on the wiring drawings.
9. Thermocouple I/O cards are located in the thermocouple junction box located on the 1st floor. The I/O cards are wired to thermocouple jack panel boxes which are located in the process bays as per location drawing PFBC-O-002114.001-6-04 -1 to 5. Detailed wiring for the thermocouple I/O cards and jack panels are shown in E-PFBC-BCC4-301 to 312. All thermocouple instrument tags are to be labelled on the jack panels.
10. Temperature TE-5111 to TE-5115 and TE-3162 is to be direct wired from the I/O cards to the thermocouples. No wiring through jack panels required. This wiring is shown on drawing E-PFBC-BCC4-313.
11. Cable lists E-PFBC-BCC4-511, 512, 513 provides the required multi-conductor cables. These lists provide the cable type, estimated distance required, and suggested cable manufacturer and part number. Alternative cable manufacturer and models can be used provided they are equivalent to the specified cables. Note that with the exception of the multi-conductor cables for the thermocouples, all other multi-conductor cables are to be labelled by colour.
12. All multi-conductor cables are to be labelled on each end with the cable identification number.
13. Cable list E-PFBC-BCC4-514, 515 and 516 provides the list for the individual I/O field points. This list provides the cable type, estimated distance required. The cable is to be labelled as indicated on the cable list, and all wires for the field instruments are to be labelled with the I/O at both ends of the wire.
14. The Glycol System will be located outdoors behind Building 4. Contractor is responsible for all I/O wiring to this system. The Contractor is to follow pipe rack in the area for routing of the wiring. This will be defined prior to construction and installation.
15. All cable lengths are estimates and shall be verified by the Contractor.



### **5.2.12 Profibus Cabling**

All Profibus cabling between junction boxes and control modules are to be installed as per drawing E-PFBC-BCC4-021 and 022.

Cable is to be provided by Contractor and terminal ends will be provided by NRCan.

## **6. Installation and Construction**

The construction and installation of the electrical and instrumentation portion of this project is scheduled to begin Mid-February 2016 with an anticipated completion date of June 1, 2016.



## APPENDIX “2” - DEPARTMENTAL REPRESENTATIVES’S AUTHORITY

Contracting Authority is:

Name: **Valerie Holmes**  
Title: Procurement Specialist  
Department: Natural Resources Canada  
Division: Finance and Procurement Branch  
Telephone: (343) 292-8371  
Email: [Valerie.holmes@nrcan-rncan.gc.ca](mailto:Valerie.holmes@nrcan-rncan.gc.ca)

To be provided at time of Contract Award:

Technical Authority is:

Name:  
Title:  
Department: Natural Resources Canada  
Division: Canmet ENERGY  
Telephone:  
Email



## ANNEX "A" - CERTIFICATE OF INSURANCE

Note: Not required at solicitation closing

## CERTIFICATE OF INSURANCE



Description and Location of Work <b>Bells Corners Complex, 1 Haanel Drive, Building 4, Ottawa, Ontario, K1A 1M1</b>	Contract No.
	Project No. NRCan-5000018884

Name of Insurer, Broker or Agent	Address (No., Street)	City	Province	Postal Code
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Name of Insured (Contractor)	Address (No., Street)	City	Province	Postal Code
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Additional Insured Her Majesty the Queen in Right of Canada as represented by the Minister of Natural Resources Canada
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Type of Insurance	Insurer Name and Policy Number	Inception Date D / M / Y	Expiry Date D / M / Y	Limits of Liability		
				Per Occurrence	Annual General Aggregate	Completed Operations Aggregate
<b>Commercial General Liability</b>				\$	\$	\$
<b>Umbrella/Excess Liability</b>				\$	\$	\$

I certify that the above policies were issued by insurers in the course of their Insurance business in Canada, are currently in force and include the applicable insurance coverage's stated on page 2 of this Certificate of Insurance, including advance notice of cancellation / reduction in coverage.

<input type="text"/>	<input type="text"/>
Name of person authorized to sign on behalf of Insurer(s) (Officer, Agent, Broker)	Telephone number
<input type="text"/>	<input type="text"/>
Signature	Date D / M / Y



## GENERAL

The insurance policies required on page 1 of the Certificate of Insurance must be in force and must include the insurance coverage listed under the corresponding type of insurance on this page.

The policies must insure the Contractor and must include Her Majesty the Queen in Right of Canada as represented by the Minister of Public Works and Government Services as an additional Insured.

The insurance policies must be endorsed to provide Canada with not less than thirty (30) day's notice in writing in advance of a cancellation of insurance or any reduction in coverage.

WITHOUT INCREASING THE LIMIT OF LIABILITY, THE POLICIES MUST PROTECT ALL INSURED PARTIES TO THE FULL EXTENT OF COVERAGE PROVIDED. FURTHER, THE POLICIES MUST APPLY TO EACH INSURED IN THE SAME MANNER AND TO THE SAME EXTENT AS IF A SEPARATE POLICY HAD BEEN ISSUED TO EACH.

## COMMERCIAL GENERAL LIABILITY

The insurance coverage provided must not be substantially less than that provided by the latest edition of IBC Form 2100.

The policy must either include or be endorsed to include coverage for the following exposures or hazards if the Work is subject thereto:

- (a) Blasting.
- (b) Pile driving and caisson work.
- (c) Underpinning.
- (d) Removal or weakening of support of any structure or land whether such support be natural or otherwise if the work is performed by the insured contractor.

The policy must have the following minimum limits:

- (a) **\$5,000,000** Each Occurrence Limit;
- (b) **\$10,000,000** General Aggregate Limit per policy year if the policy contains a General Aggregate; and
- (c) **\$5,000,000** Products/Completed Operations Aggregate Limit.

Umbrella or excess liability insurance may be used to achieve the required limits.