

## **ADVANCE CONTRACT AWARD NOTICE (ACAN)**

NRCan - 5000055269

### **1. Advance Contract Award Notice**

An ACAN is a public notice indicating to the supplier community that a department or agency intends to award a contract for goods, services or construction to a pre-identified supplier, thereby allowing other suppliers to signal their interest in bidding, by submitting a statement of capabilities. If no supplier submits a statement of capabilities that meets the requirements set out in the ACAN, on or before the closing date stated in the ACAN, the contracting officer may then proceed with the award to the pre-identified supplier.

### **2. Definition of the requirement**

The Department of Natural Resources Canada (NRCan) has a requirement to provide technical service to clearly determine (1) the aggressive agents (including inorganic corrodants and organic acids) in crude bio-oil feedstocks produced from different raw agriculture and forest biomass via thermochemical conversion pathways; and (2) the amounts of major toxic compounds (such as H<sub>2</sub>S) very likely generated during the co-refining processes of crude bio-oils and fossil fuel intermediates (such as vacuum gas oil). This service shall help an NRCan research group on the development and deployment of new innovative co-refining technology for advancing the application of clean and renewable bioenergy products at Canadian energy sector. As the co-refining technology is still under the state of a newly introduced concept, it urgently needs to be well understood from the crude bio-oils storage to the dual feeds mixing to the co-processing before the technology can be widely accepted and implemented by the industry.

Thus, the work will involve at least the following: (1) conducting comprehensive literature review on the technologies which are being developed by different research groups for co-processing bio-oils with petroleum intermediate feedstocks and significant knowledge gaps; (2) determining the toxicity and corrosivity of crude bio-oils during storage and transportation; (3) developing innovative reliable solutions to mitigate the aging and instability problems occurred during the storage and transportation of crude bio-oils; (4) developing new cost-effective solutions to solve the immiscibility problem between the bio-oils and fossil fuel feedstocks; and (5) identifying the toxicity and corrosivity of the blends of crude bio-oils and fossil fuel feedstocks under simulated co-refining conditions at refining plants.

Note that:

- (1) To address the toxicity and corrosivity of crude bio-oils during storage and transportation, the properties (such as total acid number (TAN), major organic acids and the amounts of S and Cl elements) of the crude bio-oils produced from at least two different raw biomass sources (for example, agriculture and forest biomass) must be analyzed. Moreover, under the

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simulated storage and transportation conditions (at temperature up to 80 °C), the gaseous and liquid samples generated from the crude bio-oils must be collected and characterized;

- (2) To address the aging/instability problems during the storage and transportation of crude bio-oils, the bio-oils produced from at least two different raw biomass sources must be used for aging tests. The tests must use each type of bio-oil and their mixtures and be conducted at related operating temperature range (i.e., from room temperature to 80 °C) for various time periods (up to 6 month duration). After a certain designed aging period, the properties (including viscosity, TAN and chemical composition) of the crude bio-oils must be analyzed. The gases produced under the above simulated storage and transportation conditions must also be collected and analyzed. Furthermore, new reliable solutions to mitigate the aging and instability problems occurred during the storage and transportation of crude bio-oils shall be proposed to NRCAN for further validation.
- (3) To address the immiscibility between crude bio-oils and fossil fuel feedstocks, at least mechanical blending process with the assistance of applicable solvents (such as low carbon alcohols) must be well investigated. The optimum fractions of crude bio-oil, fossil fuel feedstock and solvent for the formation of a homogeneous single phase must be determined. Also, the properties (including TAN, boiling range distribution, and elemental composition) of at least one produced homogeneous mixture must be analyzed. Furthermore, the most cost-effective solutions to solve the immiscibility problem between crude bio-oils and fossil fuel feedstocks shall be proposed to NRCAN for further validation.
- (4) To address the toxicity and corrosivity of the blends of crude bio-oils and fossil fuel feedstocks under simulated co-refining conditions at refining plants, the blends must be made with different amounts (5, 10, 15 and 20 wt.%) of crude bio-oils which are miscible with fossil fuel feedstocks and solvents. The test must be done at pre-determined optimal feed transferring and simulated co-refining conditions (i.e., in the temperature range of 150-350 °C and the fluid velocity range of 50-200 rpm). Note that during the above processes, the generated gaseous and liquid samples must be collected and characterized to analyze the process toxicity and corrosivity.

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### **3. Criteria for assessment of the Statement of Capabilities (Minimum Essential Requirements)**

The potential supplier must have (1) sufficient industry experience of various operations to understand the industrial needs, (2) in-depth knowledge of chemical processes as well as testing and analytical facilities to accurately identify the chemistry and toxicity, and (3) corrosion background to design suitable testing matrix to better support our project delivery.

Solid evidence must be provided to demonstrate their ability and capabilities detailed below:

Any interested supplier must demonstrate by way of a statement of capabilities that it meets the following requirements:

- Experience The appointed team must have 10+ years' experience in the field of analyzing highly aggressive industrial chemical processes. The interested supplier must provide evidence such as related projects and/or scientific publications completed in the past ten years;
- Knowledge and understanding of The interested supplier must provide at least three contract examples completed in past five years to demonstrate their in-depth knowledge of various chemical processes operated in toxic and aggressive environments , analytical chemistry and corrosion engineering, which can be used for generating creative and practical ideas in project design, predicting potential safety risks on lab operation, providing prompt and effective solutions to emerged problems, and making insightful recommendations to future work;
- Academic qualifications At least one technical staff in the appointed working team must have PhD or MSC degree in chemical engineering, or a related field about petroleum refining from a recognized Canadian University;
- Facilities The interested supplier must have related testing facilities (such as high temperature high pressure chemical reactors and autoclaves) that can be used to conduct the required tests under the optimal feed transferring and simulated co-refining conditions at elevated temperatures. Also the interested supplier must at least have the following analytical equipment for analyzing the gases and liquids generated from the storage, transportation and co-refining processes.

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<b>Products analyses</b>	<b>Analytical equipment</b>
Acidity	Total acid number titrator or equivalent
Viscosity	Viscometer or equivalent
Water content	Karl Fischer Titrator or equivalent
Gaseous products distribution	Gas chromatograph (GC) or equivalent
Liquid products distribution	Gas chromatography – Mass spectrometer (GCMS) or equivalent

- Professional designation, accreditation, and/or certification At least one technical staff in the appointed working team must be a registered professional engineer.

#### **4. Applicability of the trade agreement(s) to the procurement**

This procurement is subject to the following trade agreement(s):

- Canada-Korea Free Trade Agreement (CKFTA)

#### **5. Justification for the Pre-Identified Supplier**

The supplier mentioned in section 11 below is the only known supplier that meets the mandatory criteria set out in section 3 above.

Should Canada receive a statement of capabilities from a supplier that contains sufficient information to indicate that it meets the requirements set forth in this ACAN, a competitive process will be triggered with a technical and financial evaluation methodology of the bids proposed by the potential bidders.

#### **6. Government Contracts Regulations Exception(s)**

The following exception(s) to the *Government Contracts Regulations* is (are) invoked for this procurement under subsection 6(d) - "only one person is capable of performing the work").

The identified supplier, Kemetco Research Inc., is the only one able to meet all of the criteria identified in paragraph 3 above.

#### **7. Exclusions and/or Limited Tendering Reasons**

The following exclusion(s) and/or limited tendering reasons are invoked under the:

- Canada-Korea Free Trade Agreement – Article 14.3, Under the Revised GPA - Article XIII, 1 (b) (iii).

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### **8. Ownership of Intellectual Property**

Canada intends to retain ownership of any Foreground Intellectual Property arising out of the proposed contract on the basis that the main purpose of the contract is to generate knowledge and information for public dissemination.

### **9. Period of the proposed contract or delivery date**

The proposed contract is for a period of 3 years, from the contract date to March 31, 2023.

### **10. Cost estimate of the proposed contract**

The estimated value of the contract is below 95,000.00 (GST/HST extra).

### **11. Name and address of the pre-identified supplier**

Kemetco Research Inc.  
#150 - 13260 Delf Place  
Richmond, BC, V6V 2A2 Canada

### **12. Suppliers' right to submit a statement of capabilities**

Suppliers who consider themselves fully qualified and available to provide the goods, services or construction services described in the ACAN may submit a statement of capabilities in writing to the contact person identified in this notice on or before the closing date of this notice. The statement of capabilities must clearly demonstrate how the supplier meets the advertised requirements.

### **13. Closing date for a submission of a statement of capabilities**

The closing date and time for accepting statements of capabilities is November 25, 2020 at 2:00 p.m. EST).

### **14. Contract Authority**

Marie-Josée Michaud  
Procurement Officer  
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Quebec, QC G1V 4C7  
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