

## ADVANCE CONTRACT AWARD NOTICE (ACAN)

### 1. Advance Contract Award Notice (ACAN)

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 professional service to identify: (1) the optimum operating conditions, and the toxicity and chemistry of thermal cracking processes; (2) the optimum operating conditions, and the toxicity and chemistry of catalytic thermal cracking processes; and (3) the cost-effective hydrogen donors in promoting the quality of liquid products from thermal cracking process. This service shall help an NRCan research group on the safe operation of corrosion tests in bitumen partial upgrading environments and the successful development of innovative materials technology solutions for the cost-effective construction of the core components at Canadian bitumen partial refining plants.

The work will involve the following:

**Task #1:** to identify the optimum operating conditions, and the toxicity and chemistry of thermal cracking processes. The thermal cracking tests must be conducted under partial upgrading conditions (e.g., in the temperature range of 390-430 °C) to reduce the viscosity and density of raw bitumen for meeting existing pipeline transportation standards while maintaining the liquid yield. Besides temperature, the effect of upgrading duration (i.e., 30, 60 and 90 minutes respectively) must be investigated to obtain an optimal operating condition under which carbon deposition and hydrocarbons cracking shall be minimized. For each condition, at least three repeat tests must be completed to confirm the consistence of testing results. The toxicity and chemistry in the process under the investigated conditions must be determined by analyzing the gaseous and liquid products produced during the upgrading. Inorganic and organic gas products (including CO, CO<sub>2</sub>, H<sub>2</sub>S, CH<sub>4</sub>, C<sub>2</sub> and C<sub>3</sub>) must be identified and quantified. The acidity and viscosity of liquid products must be also measured. The components in liquid products are needed to be characterized. H/C ratio needs to be determined as an indication of the liquid produces quality.

**Task #2:** to identify the optimum operating conditions, and the toxicity and chemistry of catalytic thermal cracking processes. The cracking tests must be conducted under partial upgrading conditions. Same operating variables (including temperature, duration and cyclic operation) as those in non-catalytic

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thermal cracking study mentioned above must be well tested. The toxicity and chemistry in the catalytic cracking process under the investigated conditions must be studied by analyzing the gaseous and liquid products produced during the upgrading. Inorganic and organic gas products (including CO, CO<sub>2</sub>, H<sub>2</sub>S, CH<sub>4</sub>, C<sub>2</sub> and C<sub>3</sub>) must be identified and quantified. The acidity and viscosity of liquid products must be also measured. The components in liquid products are needed to be characterized. H/C ratio needs to be determined as an indication of the liquid products quality. In addition, the effect of catalysts including conventional cracking catalysts (such as zeolites and Ni/Al<sub>2</sub>O<sub>3</sub>) and newly developed catalysts (such as carbon-based catalysts) on the conversion must be determined. Focus shall be on the improvement of yield and quality of liquid products compared to the non-catalytic thermal cracking process in a cost-competitive manner.

**Task #3:** to identify cost-effective hydrogen donors in promoting the quality of liquid products from thermal cracking process. In order to reduce the olefin content and improve the quality of produced liquid products, hydrogen addition can be performed with the addition of novel hydrogen donors, which replaces the expensive traditional hydrotreating process. The tests with the usage of hydrogen donor (such as tetralin) must be carried out under the optimal condition obtained in thermal cracking tests from Task #1. Varied blending ratios of hydrogen donor to bitumen (up to 30 wt%) must also be tested to determine the threshold level of hydrogen donor content.

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

The potential supplier must provide at least three examples to demonstrate their knowledge and experience of petroleum refining using catalytic and non-catalytic thermal conversion techniques, and solid facility evidence for performing catalytic and non-catalytic thermal cracking tests and accurately identifying the process chemistry and toxicity.

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

- **Experience** The appointed team leader must have 10+ years' experience in processing petroleum streams at high temperatures and high pressures, as well as exploring process chemical mechanism. The interested supplier must provide solid evidence such as related projects and/or scientific publications completed in the past ten years;
- **In-depth knowledge and understanding of** upgrading heavy oils using catalytic and non-catalytic techniques, 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

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- work. At least three project examples completed in the past 10 years must be provided to demonstrate the supplier's knowledge in this area;
- **Academic qualifications** The appointed team leader must possess PhD degree from a recognized university in chemical engineering, or a related field about petroleum refining;
  - **Professional designation, accreditation, and/or certification** The appointed team leader must be a registered professional engineer;
  - **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 bitumen partial upgrading tests under the required conditions. Also the interested supplier must at least have the following analytical equipment for analyzing the gases and liquids generated from the required partial upgrading processes:

<b>Products analyses</b>	<b>Analytical equipment</b>
Liquid products acidity	Total acid number titrator or equivalent
Liquid products viscosity	Viscometer or equivalent
Gaseous products composition	Gas chromatography (GC) or equivalent
Liquid products composition	Gas chromatography – Mass spectrometer (GCMS) or equivalent

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

This procurement is not subject to any trade agreement.

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

The supplier mentioned in section 10 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 invoked for this procurement under subsection:

subsection 6(d) - "only one person is capable of performing the work").

The identified supplier, Western University, is the only one able to meet all of the criteria identified in paragraph 3 above

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### **7. 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.

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

The proposed contract is for two one-year periods, from December 14<sup>th</sup> 2020 to March 31<sup>st</sup> 2022.

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

The Maximum value of the contract is \$ 56,500.00 (Taxes included).

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

Western University  
1151 Richmond Street  
London Ontario  
N6A 5B9

### **11. 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.

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

The closing date and time for accepting statements of capabilities is December 4<sup>th</sup> 2020 at 2:00 p.m. EST).

### **13. Inquiries and submission of statements of capabilities**

Inquiries and statements of capabilities are to be directed to:

Caroline Demers  
1055, rue du PEPS  
Québec QC, G1V 4C7  
CANADA  
Courriel : [caroline.demers3@canada.ca](mailto:caroline.demers3@canada.ca)