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Natural Resources Canada
Bianca.moore@nrcan-rncan.gc.ca
Bid Receiving Natural Resources Canada
See herein for bid submission instructions

**Request for Proposal (RFP)
Demande de proposition (DDP)**

Proposal 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.

Comments – Commentaires

Issuing Office – Bureau de distribution

Finance and Procurement Management Branch
Natural Resources Canada
580 Booth Street
Ottawa, ON
K1A 0E4

Title – Sujet Alternative method for CO2 injection in Ontario	
Solicitation No. – No de l’invitation NRCan-5000072499	Date 08 February 2023
Requisition Reference No. - N° de la demande 5000072499	
Solicitation Closes – L’invitation prend fin at – à 02:00 PM (Eastern Standard Time (EST)) on – le 20 March, 2023	
Address Enquiries to: - Adresse toutes questions à: Bianca Moore bianca.moore@nrcan-rncan.gc.ca	
Telephone No. – No de telephone 343-543-4785	
Destination – of Goods and Services: Destination – des biens et services: Natural Resources Canada 580 Booth St Ottawa On K1A 0E4	
Security – Sécurité There are no security requirements associated with this requirement.	
Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l’entrepreneur Telephone No.:- No. de téléphone: Email – Courriel :	
Name and Title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/de l’entrepreneur (taper ou écrire en caractères d’imprimerie)	
_____	_____
Signature	Date



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The Articles contained in this document are mandatory in their entirety, unless otherwise indicated. Acceptance of these Articles, in their entirety, as they appear in this document, is a Mandatory requirement of this RFP.

Suppliers submitting a proposal containing statements implying that their proposal is conditional on modification of these clauses or containing terms and conditions that purport to supersede these clauses or derogate from them will be considered non-responsive.

Bidders with concerns regarding the provisions of the Bid Solicitation document (including the Resulting Contract Clauses) should raise such concerns in accordance with the Enquiries provision of this RFP.



PART 1 - GENERAL INFORMATION

1.1 Introduction

The bid solicitation is divided into seven parts plus attachments and annexes, as follows:

- Part 1 General Information: provides a general description of the requirement;
- Part 2 Bidder Instructions: provides the instructions, clauses and conditions applicable to the bid solicitation;
- Part 3 Bid Preparation Instructions: provides Bidders with instructions on how to prepare their bid;
- Part 4 Evaluation Procedures and Basis of Selection: indicates how the evaluation will be conducted, the evaluation criteria that must be addressed in the bid, and the basis of selection;
- Part 5 Certifications and Additional Information: includes the certifications and additional information to be provided;
- Part 6 Security, Financial and Other Requirements: includes specific requirements that must be addressed by Bidders; and
- Part 7 Resulting Contract Clauses: includes the clauses and conditions that will apply to any resulting contract.

The Annexes include the Statement of Work, the Basis of Payment, the Security Requirements Checklist, and any other annexes.

1.2 Summary

By means of the RFP, Natural Resources Canada (NRCan) is seeking proposals from bidders to provide research that will be applied to a fundamental research project that will determine if the Ex-Situ Dissolution Approach (ESDA) as an alternative method for injecting CO₂ into subsurface. This can be used in Southern Ontario and the numerical and artificial intelligence (AI) models that will be generated from this work can be used by future proponents in Ontario or other regions.

The requirement is subject to the provisions of the: World Trade Organization Agreement on Government Procurement (WTO-AGP), the Canada-Chile Free Trade Agreement (CCFTA), the Canada-Peru Free Trade Agreement (CPFTA), the Canada-Colombia Free Trade Agreement (CCoIFTA), the Canada-Panama Free Trade Agreement (CPanFTA), the Canada-European Union Comprehensive Economic and Trade Agreement (CETA), the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), the Canadian Free Trade Agreement (CFTA), the Canada-Ukraine Free Trade Agreement (CUFTA) and the Canada-Korea Free Trade Agreement (CKFTA).]

The resulting contract will not include deliveries of services within locations within: "Yukon, Northwest Territories, Nunavut, Quebec, or Labrador that are subject to Comprehensive Land Claims Agreements (CLCAs). Any requirements for deliveries of services within locations: Yukon, Northwest Territories, Nunavut, Quebec, or Labrador that are subject to CLCAs will have to be treated as a separate procurement not forming part of the bid solicitation.

1.3 Debriefings

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 from receipt of the results of the bid solicitation process. The debriefing will be done in writing, by email.



PART 2 - BIDDER INSTRUCTIONS

2.1 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) (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](#) (2022-03-29) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

- **In the complete text content (except Section 1 and 3) Delete:** "Public Works and Government Services Canada" and **Insert:** "Natural Resources Canada." **Delete:** "PWGSC" and **Insert:** "NRCan"
- **Section 2:** **Delete:** "Suppliers are required to" and **Insert:** "It is suggested that suppliers"
- **Subsection 1 of Section 8: Delete entirely**
- **Subsection 2 of Section 8: Delete entirely**
- **Under Subsection 2 of Section 20:** Not applicable

Subsection 5.4 of [2003](#), Standard Instructions - Goods or Services - Competitive Requirements, is amended as follows:

Delete: 60 days

Insert: 180 days

2.2 Submission of Bids

Bidders must submit all proposals electronically. Given the current constraints on NRCan's networks, the electronic mail system has a limit of 15MB. Bidders are asked to contact the Contracting Authority to confirm receipt of their bid. NRCan encourages bidders to submit all bids earlier than the closing time in order to ensure sufficient time to be received in NRCan's server.

It is the Bidders responsibility to ensure that proposals are sent to the following e-mail address, by the time and date indicated on page 1 of this RFP document.

- Send proposals to this email address: bianca.moore@NRCan-RNCan.gc.ca
- Contact the Contracting Authority Bianca Moore at 343-543-4785 by either telephone call or email for receipt of bid confirmation.

IMPORTANT

It is requested that you write the following information in "Subject" of the e-mail:

[NRCan-5000072499](#)

Due to the nature of the bid solicitation, bids transmitted by mail or facsimile to NRCan will not be accepted.

NRCan will not assume responsibility for proposals directed to any other location.

The onus is on the Bidder to ensure that the proposal is submitted correctly to the above address. Not complying with the above instructions may result in NRCan's inability to ascertain reception date and/or to consider the bid prior to contract award. Therefore, NRCan reserves the right to reject any proposal not complying with these instructions.

2.3 Former Public Servant

Contracts awarded to former public servants (FPS) in receipt of a pension or of a lump sum payment must bear the closest public scrutiny, and reflect fairness in the spending of public funds. In order to comply with Treasury Board policies and directives on contracts awarded to FPSs, bidders must provide the information required below before contract award. If the answer to the questions and, as applicable the information required have not been received by the time the evaluation of bids is completed, Canada will inform the Bidder of a time frame within which to provide the information. Failure to comply with Canada's request and meet the requirement within the prescribed time frame will render the bid non-responsive.

Definitions

For the purposes of this clause, "former public servant" is any former member of a department as defined in the [Financial Administration Act](#), R.S., 1985, c. F-11, a former member of the Canadian Armed Forces or a former member of the Royal Canadian Mounted Police. A former public servant may be:

- a) an individual;
- b) an individual who has incorporated;
- c) a partnership made of former public servants; or
- d) a sole proprietorship or entity where the affected individual has a controlling or major interest in the entity.



"lump sum payment period" means the period measured in weeks of salary, for which payment has been made to facilitate the transition to retirement or to other employment as a result of the implementation of various programs to reduce the size of the Public Service. The lump sum payment period does not include the period of severance pay, which is measured in a like manner.

"pension" means a pension or annual allowance paid under the [Public Service Superannuation Act](#) (PSSA), R.S., 1985, c. P-36, and any increases paid pursuant to the [Supplementary Retirement Benefits Act](#), R.S., 1985, c. S-24 as it affects the PSSA. It does not include pensions payable pursuant to the [Canadian Forces Superannuation Act](#), R.S., 1985, c. C-17, the [Defence Services Pension Continuation Act](#), 1970, c. D-3, the [Royal Canadian Mounted Police Pension Continuation Act](#), 1970, c. R-10, and the [Royal Canadian Mounted Police Superannuation Act](#), R.S., 1985, c. R-11, the [Members of Parliament Retiring Allowances Act](#), R.S. 1985, c. M-5, and that portion of pension payable to the [Canada Pension Plan Act](#), R.S., 1985, c. C-8.

Former Public Servant in Receipt of a Pension

As per the above definitions, is the Bidder a FPS in receipt of a pension? Yes () No ()

If so, the Bidder must provide the following information, for all FPSs in receipt of a pension, as applicable:

- a) name of former public servant;
- b) date of termination of employment or retirement from the Public Service.

By providing this information, Bidders agree that the successful Bidder's status, with respect to being a former public servant in receipt of a pension, will be reported on departmental websites as part of the published proactive disclosure reports in accordance with [Contracting Policy Notice: 2019-01](#) and the [Guidelines on the Proactive Disclosure of Contracts](#).

Work Force Adjustment Directive

Is the Bidder a FPS who received a lump sum payment pursuant to the terms of the Work Force Adjustment Directive? Yes () No ()

If so, the Bidder must provide the following information:

- a) name of former public servant;
- b) conditions of the lump sum payment incentive;
- c) date of termination of employment;
- d) amount of lump sum payment;
- e) rate of pay on which lump sum payment is based;
- f) period of lump sum payment including start date, end date and number of weeks;
- g) number and amount (professional fees) of other contracts subject to the restrictions of a work force adjustment program.

2.4 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than five (5) 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 question(s) or may request that the Bidder do so, so that the proprietary nature of the question(s) is eliminated and the enquiry can be answered to all Bidders. Enquiries not submitted in a form that can be distributed to all Bidders may not be answered by Canada.

2.5 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.

2.6 Improvement of Requirement During Solicitation Period

Should bidders consider that the specifications or Statement of Work contained in the bid solicitation could be improved technically or technologically, bidders are invited to make suggestions, in writing, to the Contracting Authority named in the bid solicitation. Bidders must clearly outline the suggested improvement as well as the reason for the suggestion. Suggestions that do not restrict the level of competition nor favour a particular bidder will be given consideration provided they are submitted to the Contracting Authority at least five (5) days before the bid closing date. Canada will have the right to accept or reject any or all suggestions.



2.7 Basis for Canada's Ownership of Intellectual Property

Natural Resources Canada has determined that any intellectual property rights arising from the performance of the Work under the resulting contract will belong to Canada, on the following reasons: as set out in the [Policy on Title to Intellectual Property Arising Under Crown Procurement Contracts](#)

1. Where the main purpose of the Crown Procurement Contract, or the deliverables contracted for, is:
 - To generate knowledge and information for public dissemination.

2.8 Bid Challenge and Recourse Mechanisms

- (a) Several mechanisms are available to potential suppliers to challenge aspects of the procurement process up to and including contract award.
- (b) Canada encourages suppliers to first bring their concerns to the attention of the Contracting Authority. Canada's [Buy and Sell](#) website, under the heading "[Bid Challenge and Recourse Mechanisms](#)" contains information on potential complaint bodies such as:
 - Office of the Procurement Ombudsman (OPO)
 - Canadian International Trade Tribunal (CITT)
- (c) Suppliers should note that there are **strict deadlines** for filing complaints, and the time periods vary depending on the complaint body in question. Suppliers should therefore act quickly when they want to challenge any aspect of the procurement process.



PART 3 - BID PREPARATION INSTRUCTIONS

3.1 Bid Preparation Instructions

Canada requests that the Bidder submits its bid in separately bound sections as follows:

Section I: Technical Bid (1 electronic copy)

Section II: Financial Bid (1 electronic copy) [in a separate file and document](#)

Section III: Certifications (1 electronic copy)

Section IV: Additional Information (1 electronic copy)

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

Section I: Technical Bid

In their technical bid, Bidders should demonstrate their understanding of the requirements contained in the bid solicitation and explain how they will meet these requirements. Bidders should demonstrate their capability and describe their approach in a thorough, concise and clear manner for carrying out the work.

The technical bid should address clearly and in sufficient depth the points that are subject to the evaluation criteria against which the bid will be evaluated. Simply repeating the statement contained in the bid solicitation is not sufficient. In order to facilitate the evaluation of the bid, Canada requests that Bidders address and present topics in the order of the evaluation criteria under the same headings. To avoid duplication, Bidders may refer to different sections of their bids by identifying the specific paragraph and page number where the subject topic has already been addressed.

Section II: Financial Bid

Bidders must submit their financial bid in accordance with the Pricing Schedule in Basis of Payment in Annex B.

3.1.2 Exchange Rate Fluctuation

[C3011T](#) (2013-11-06) Exchange Rate Fluctuation

Section III: Certifications

Bidders must submit the certifications and additional information required under Part 5.



PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

4.1 Evaluation Procedures

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

4.1.1 Technical Evaluation

Mandatory and point rated technical evaluation criteria are included in Appendix 1 – Evaluation Criteria.

4.2 Basis of Selection

4.2.1 Highest Combined Rating of Technical Merit (70%) and Price (30%)

1. To be declared responsive, a bid must:
 - a. Comply with all the requirements of the bid solicitation; and
 - b. meet all mandatory criteria; and
 - a. obtain the required minimum of 60 points overall for the technical evaluation criteria which are subject to point rating. The rating is performed on a scale of 99 points.
2. Bids not meeting (a) or (b) or (c) will be declared non-responsive.
3. The selection will be based on the highest responsive combined rating of technical merit and price. The ratio will be 70 % for the technical merit and 30 % for the price.
4. To establish the technical merit score, the overall technical score for each responsive bid will be determined as follows: total number of points obtained / maximum number of points available multiplied by the ratio of 70 %.
5. To establish the pricing score, each responsive bid will be prorated against the lowest evaluated price and the ratio of 30 %.
6. For each responsive bid, the technical merit score and the pricing score will be added to determine its combined rating.
7. Neither the responsive bid obtaining the highest technical score nor the one with the lowest evaluated price will necessarily be accepted. The responsive bid with the highest combined rating of technical merit and price will be recommended for award of a contract.

The table below illustrates an example where all three bids are responsive and the selection of the contractor is determined by a 70/30 ratio of technical merit and price, respectively. The total available points equal 135 and the lowest evaluated price is \$45,000 (45).

Basis of Selection - Highest Combined Rating Technical Merit (70%) and Price (30%)				
		Bidder 1	Bidder 2	Bidder 3
Overall Technical Score		115/135	89/135	92/135
Bid Evaluated Price		\$55,000.00	\$50,000.00	\$45,000.00
Calculations	Technical Merit Score	$115/135 \times 70 = 59.63$	$89/135 \times 70 = 46.15$	$92/135 \times 70 = 47.70$
	Pricing Score	$45/55 \times 30 = 24.55$	$45/50 \times 30 = 27$	$45/45 \times 30 = 30$
Combined Rating		84.18	73.15	77.70
Overall Rating		1st	3rd	2nd



PART 5 – CERTIFICATIONS AND ADDITIONAL INFORMATION

Bidders must provide the required certifications and additional information to be awarded a contract.

The certifications provided by Bidders to Canada are subject to verification by Canada at all times. Unless specified otherwise, Canada will declare a bid non-responsive, or will declare a contractor in default if any certification made by the Bidder is found to be untrue, whether made knowingly or unknowingly, during the bid evaluation period or during the contract period.

The Contracting Authority will have the right to ask for additional information to verify the Bidder’s certifications. Failure to comply and to cooperate with any request or requirement imposed by the Contracting Authority will render the bid non-responsive or constitute a default under the Contract.

5.1 Certifications Required with the Bid

Bidders must submit the following duly completed certifications as part of their bid.

5.1.1 Integrity Provisions - Declaration of Convicted Offences

In accordance with the Integrity Provisions of the Standard Instructions, all bidders must provide with their bid, if applicable, the Integrity declaration form available on the [Forms for the Integrity Regime](http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html) website (http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html), to be given further consideration in the procurement process.

5.2 Certifications Precedent to Contract Award and Additional Information

The certifications and additional information listed below should be submitted with the bid but may be submitted afterwards. If any of these required certifications or additional information is not completed and submitted as requested, the Contracting Authority will inform the Bidder of a time frame within which to provide the information. Failure to provide the certifications or the additional information listed below within the time frame specified will render the bid non-responsive.

5.2.1 Integrity Provisions – Required Documentation

In accordance with the section titled Information to be provided when bidding, contracting or entering into a real property agreement of the [Ineligibility and Suspension Policy](http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html) (http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html), the Bidder must provide the required documentation, as applicable, to be given further consideration in the procurement process.

- Bidders who are incorporated, including those bidding as a joint venture, must provide a complete list of names of all individuals who are currently directors of the Bidder or, in the case of a private company, the owners of the company.
- Bidders bidding as sole proprietorship, as well as those bidding as a joint venture, must provide the name of the owner(s).
- Bidders bidding as partnerships do not need to provide lists of names.

Name of Bidder: _____

OR

Name of each member of the joint venture:

- Member 1: _____
- Member 2: _____
- Member 3: _____
- Member 4: _____

Identification of the administrators/owners:

SURNAME	NAME	TITLE



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5.2.2 Federal Contractors Program for Employment Equity - Bid Certification

By submitting a bid, the Bidder certifies that the Bidder, and any of the Bidder's members if the Bidder is a Joint Venture, is not named on the Federal Contractors Program (FCP) for employment equity "FCP Limited Eligibility to Bid" list available at the bottom of the page of the [Employment and Social Development Canada \(ESDC\) - Labour's](#) website.

Canada will have the right to declare a bid non-responsive if the Bidder, or any member of the Bidder if the Bidder is a Joint Venture, appears on the "FCP Limited Eligibility to Bid list at the time of contract award.

5.2.3 Education and Experience

SACC Manual clause [A3010T](#) (2010-08-16) Education and Experience.



PART 6 – SECURITY, FINANCIAL AND OTHER REQUIREMENTS

6.1 Security Requirements

There are no security requirements associated with this procurement.



PART 7 - RESULTING CONTRACT CLAUSES

The following clauses and conditions apply to and form part of any contract resulting from the bid solicitation.

7.1 Statement of Work

The Contractor must perform the Work in accordance with the Statement of Work at Annex A and the Contractor's technical bid entitled _____, dated _____. *(to be completed at contract award)*

7.2 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) (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.

7.3 General Conditions

[2035](#) (2022-12-01), General Conditions - Higher Complexity - Services, apply to and form part of the Contract. (replace references to Public Works and Government Services Canada (PWGSC) with Natural Resources Canada (NRCan).

7.2.2 Supplemental General Conditions

The following clauses apply to and form part of this contract:

[4007](#) (2022-12-01), Canada to Own Intellectual Property Rights in Foreground Information

7.3 Security Requirements

There is no security requirement applicable to the Contract.

7.4 Term of Contract

7.4.1 Period of the Contract

The period of the Contract is from date of Contract to March 31, 2025 Inclusive.

7.4.2 Comprehensive Land Claims Agreements (CLCAs)

The Contract is not subject to any Comprehensive Land Claims Agreements.

7.5 Authorities

7.5.1 Contracting Authority

The Contracting Authority for the Contract is:

Name: Bianca Moore
Title: Procurement Specialist
Natural Resources Canada (NRCan)
Procurement Services Unit
Address: 580 Booth Street, Ottawa, ON K1A 0E4
Telephone: 343-543-4785
E-mail address: bianca.moore@nrcan-rncan.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.

7.5.2 Project or Technical Authority *(to be provided at contract award)*

The Project Authority for the Contract is:

Name: _____
Title: _____
Organization: _____
Address: _____

Telephone: ____ - ____ - ____
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.

7.5.3 Contractor's Representative (to be provided at contract award)

Name: _____
Title: _____
Organization: _____
Address: _____
Telephone: ____-____-____
E-mail address: _____

7.6 Proactive Disclosure of Contracts with Former Public Servants

By providing information on its status, with respect to being a former public servant in receipt of a Public Service Superannuation Act (PSSA) pension, the Contractor has agreed that this information will be reported on departmental websites as part of the published proactive disclosure reports, in accordance with Contracting Policy Notice: 2019-01 of the Treasury Board Secretariat of Canada.

7.7 Payment

7.7.1 Basis of Payment – Firm Price

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid a firm price, as specified in Annex B for a cost of \$ _____ insert the amount at contract award. Customs duties are included, and Applicable Taxes are extra.

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.

7.7.2 Method of Payment

Milestone Payments

Canada will make milestone payments in accordance with the Schedule of Milestones detailed in the Contract and the payment provisions of the Contract if:

- a. an accurate and complete claim for payment, and any other document required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
b. all work associated with the milestone and as applicable any deliverable required has been completed and accepted by Canada.

7.8 Invoicing Instructions

Invoices shall be submitted using the following method:

E-mail:
Invoicing-Facturation@nrcan-rncan.gc.ca
Note: Attach "PDF" file. No other formats will be accepted

Please do not submit invoices using more than one method as this will not expedite payment.

Invoices and all documents relating to a contract must be submitted on the Contractor's own form and shall bear the Contract number: 5000072499

Invoicing Instructions to suppliers: http://www.nrcan.gc.ca/procurement/3485

7.9 Certifications and Additional Information

7.9.1 Compliance

Unless specified otherwise, the continuous compliance with the certifications provided by the Contractor in its bid or precedent to contract award, and the ongoing cooperation in providing additional information are conditions of the Contract and failure to comply will constitute the Contractor in default. Certifications are subject to verification by Canada during the entire period of the Contract.



7.10 Applicable Laws

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

7.11 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 supplemental general conditions [4007](#) (2022-12-01) – Canada to Own Intellectual Property Rights in Foreground Information;
- (c) the general conditions [2035](#) (2022-12-01), General Conditions - Higher Complexity - Services, apply to and form part of the Contract.
- (d) Annex A, Statement of Work;
- (e) Annex B, Basis of Payment;
- (f) the Contractor's bid dated _____, (*insert date of bid*) (*If the bid was clarified or amended, insert at the time of contract award:* ", as clarified on _____ " **or** ", as amended on _____ " *and insert date(s) of clarification(s) or amendment(s)*).

7.12 Foreign Nationals (Canadian Contractor **OR** Foreign Contractor)

SACC Manual clause [A2000C](#) (2006-06-16) Foreign Nationals (Canadian Contractor)

OR

SACC Manual clause [A2001C](#) (2006-06-16) Foreign Nationals (Foreign Contractor)

7.13 Insurance

SACC Manual clause [G1005C](#) (2016-01-28) Insurance - No Specific Requirement

7.14 Dispute Resolution

The parties agree to maintain open and honest communication about the Work throughout and after the performance of the contract.

- (a) The parties agree to consult and co-operate with each other in the furtherance of the contract and promptly notify the other party or parties and attempt to resolve problems or differences that may arise.
- (b) If the parties cannot resolve a dispute through consultation and cooperation, the parties agree to consult a neutral third party offering alternative dispute resolution services to attempt to address the dispute.
- (c) Options of alternative dispute resolution services can be found on Canada's Buy and Sell website under the heading "[Dispute Resolution](#)".



ANNEX A - STATEMENT OF WORK

1.0 TITLE

Experimental and Modeling Studies to Assess Ex-Situ CO₂ Storage in Southern Ontario Aquifers.

2.0 BACKGROUND

Sequestration of CO₂ into underground formations is considered as one of the promising techniques to mitigate the effects of CO₂ emissions into the atmosphere and lessen the growing effects of the global warming. Southern Ontario has significant point sources emitting CO₂ including chemical, cement, and steel production industries that are suitable candidates for geological CO₂ sequestration. The current practice for geological CO₂ storage is to inject CO₂ as a single free phase plume into the target formation and rely on in-situ mineralization of CO₂. However, the density of the injected CO₂ is typically 10–40% less dense than the resident brine; thus, density-driven flow will result in CO₂ flowing upward by buoyancy forces, accumulating at the top of the formation, and it can leak through fractures or through abandoned wells to the surface [1,2]. The slow rate for the free phase CO₂ to dissolve into the formation brine means the free phase CO₂ plume will exist for centuries to millennia. This storage approach has significant challenges in southern Ontario, including:

The target aquifer is the Cambrian sandstone aquifer which has a limited extent and thickness at depths where CO₂ can be injected as a supercritical fluid which means less CO₂ can be injected in the free phase, Numerous users of the Cambrian aquifer will spatially and temporally impact the pressure distribution in the aquifer making it hard to maintain the free phase CO₂ plume in its intended location, Short distances to neighboring states may require the plume remain in place unless agreements are in place, There are poorly completed boreholes and abandoned boreholes in the Cambrian aquifer and through the overlying cap rocks that create leakage pathways for free phase CO₂ to move to surface, Injecting free-phase CO₂ will raise the formation pressure potentially impacting the overlying rocks or reactivating faults, and

High population density in southern Ontario and the surrounding states is a risk for leaking CO₂ to have significant consequences.

The Ex-Situ Dissolution Approach (ESDA) is an alternative method for injecting CO₂ into the subsurface. The process includes producing the brine from a saline aquifer, sparging CO₂ into the brine in a pipeline with enough length to maintain mixing for CO₂ dissolution, and then reinjecting the CO₂-saturated brine into the aquifer [1,2]. ESDA reduces the risk of the buoyancy-driven leakage of CO₂, due to the fact that CO₂-saturated brine has a slightly greater density than the brine at in situ conditions. In this case, a CO₂-rich phase will never exist in the saline aquifer. Unlike other CO₂ sequestration techniques, it is possible to sequester notable amounts of CO₂ in shallow and deep saline aquifers through this method, which allows more CO₂ storage compared to storing the CO₂ as a supercritical phase [1,2]. The ESDA also reduces pressure buildup for CO₂ injection wells, lowering the risk for over-pressuring the aquifer and causing leakage. In addition, the ESDA does not create a separate plume that may move depending on subsurface pressures.

S. Zendehboudi, A. Khan, S. Carlisle, Y. Leonenko. Ex Situ Dissolution of CO₂: A New Engineering Methodology Based on Mass-Transfer Perspective for Enhancement of CO₂ Sequestration. *Energy & fuels* 25 (7), 3323-3333, 2011.
S. Zendehboudi, Y. Leonenko, A. Shafiei, M. Soltani, I. Chatzis. Modeling of CO₂ droplets shrinkage in ex situ dissolution approach with application to geological sequestration: Analytical solutions and feasibility study. *Chemical engineering journal* 197, 448-458, 2012.

3.0 OBJECTIVES

The research will be an applied fundamental research project that will determine if the ESDA is an alternative technique that can be used in Southern Ontario and the numerical and artificial intelligence (AI) models that will be generated from this work can be used by future proponents in Ontario or other region.

4.0 PROJECT REQUIREMENTS

4.1 Tasks, Deliverables, Milestones and Schedule

The main tasks of the proposed research are described below:

The fundamental CO₂ dissolution mechanisms, transport phenomena, and geochemical reactions for ex-situ injection of CO₂ into the deep Cambrian aquifer, as well as the relatively shallow Guelph formation and Salina Units in Ontario will be investigated. This research phase will include a systematic experimental study to determine the pressure drop of two-phase flow, size of CO₂ droplets, mass transfer coefficient of CO₂ into the formation waters, as well as the final densities of the CO₂-saturated waters.

Once the experimental work is completed, CO₂ injection into one or more of these formations will be modeled using ECLIPSE or CMG or an alternate modeling software program. Different designs for CO₂ injection will be examined to optimize the injection spots and the injection rates such that higher dissolution efficiency and storage capacity are attained. With the aid of a proper mathematical model, it will be possible to study the contribution of the interaction mechanisms and breakage/coalescence processes to the size of CO₂ droplets and hydrodynamic behaviors of the mixture flow in porous media.



Finally, the project will develop smart connectionist techniques such as artificial neural networks to select appropriate strategies for the CO₂ storage in these underground formations. A semi-quantitative hierarchy system also will be developed for the factors affecting CO₂ sequestration process through a comprehensive sensitivity analysis. Using the outputs from this phase of study, economic feasibility of the ex-situ and in-situ will be investigated, as well.

Deliverables:

The proposed research is expected to be completed in two years. Over the research project, the deliverables are as follows:

- Brief monthly reports on the project progress.
- Quarterly comprehensive reports including identification of potential risks and challenges to the project.
- Friendly-user modeling codes at the end of project.
- One annual report at the end of the first year detailing methods, results, interpretation of the results, and recommended future steps
- A final report detailing methods, results, interpretation of the results, and recommended future steps. This report will also provide a decision on the applicability of ESDA to Southern Ontario.

Milestones

Tasks	ESTIMATED DELIVERABLES
Task 1 - Design experimental plan to determine the pressure drop of two-phase flow, size of CO ₂ droplets, mass transfer coefficient of CO ₂ into the formation waters, as well as the final densities of the CO ₂ -saturated waters.	April 2023
Task 2 - First annual report detailing methods, results, interpretation of the results, and recommended future steps	April 2024
Task 3 - Second Annual Report - detailing methods, results, interpretation of the results, and recommended future steps. This report will also provide a decision on the applicability of ESDA to Southern Ontario. Provide report and user friendly modelling codes.	April 2025

**** All dates in the above table are estimates. Contractor and Technical Authority can discuss and adjust timelines after contract award.**

4.2 Reporting Requirements

Monthly meetings between the contractor and the Project Authority will be conducted to discuss progress, budget, challenges and risks to the overall project. Discussions regarding the creation and production of annual and final reports will also occur during these meetings.

4.3 Method and Source of Acceptance

All deliverables and services rendered under any contract are subject to inspection by the Project Authority. The Project Authority shall have the right to reject any deliverables that are not considered satisfactory, or require their correction before payment will be authorized.

6.0 Contractor's Obligations

In addition to the obligations outlined in Section 2 of this Statement of Work, the Contractor shall:

- 1) return all materials belonging to NRCan upon completion of the Contract;
- 2) Submit all written reports in hard copy and electronic Microsoft Office Word format;
- 3) attend meeting with stakeholders, if necessary;
- 4) participate in teleconferences, as needed;
- 5) attend meeting at NRCan sites, if required; and/or,
- 6) maintain all documentation in a secure area

NRCan's [Scientific Integrity Policy](#):

In satisfying the requirements of this agreement, the Recipient is encouraged to comply with the provisions and intent of the NRCan Scientific Integrity Policy (SIP) and to discharge its contractual obligations in support of research, science, or related activities in a manner consistent with all relevant NRCan SIP provisions. For more information on the Scientific Integrity Policy, please visit the NRCan website at: <https://www.nrcan.gc.ca/scientific-integrity/21665#a20>



ANNEX B - BASIS OF PAYMENT

(To be inserted at contract award)



APPENDIX 1 - EVALUATION CRITERIA

Bidders are advised that only listing experience without providing any supporting data to describe responsibilities, duties and relevance to the criteria will not be considered demonstrated for the purpose of this evaluation.

The Bidder should provide complete details as to where, when (month and year) and how (through which activities/ responsibilities) the stated qualifications/experience were obtained. Experience gained during formal education shall not be considered work experience. All criteria for work experience shall be obtained in a legitimate work environment as opposed to an educational setting. Co-op terms are considered work experience provided they are related to the required services.

Bidders are also advised that the month(s) of experience listed for a project whose time frame overlaps that of another referenced project will only be counted once. For example: project one time frame is July 2001 to December 2001; project two time frame is October 2001 to January 2002; the total months of experience for these two project references is seven (7) months.

1. Technical Criteria

1.1 Mandatory Evaluation Criteria

The Mandatory Criteria listed below will be evaluated on a simple pass/fail basis. Proposals which fail to meet the mandatory criteria will be deemed non-responsive.

Criterion ID	Mandatory Criteria	Pass/Fail	Comments/Observations Please provide comments on reasons why a company failed, if applicable. Use additional sheets if necessary.
M1	<p>The Bidder MUST provide three (3) summaries of projects investigating alternative methodologies for injecting CO₂ into the subsurface for CCUS. The minimum documentation required for each reference includes:</p> <ul style="list-style-type: none"> ○ Company name of client ○ Name and phone number of client contact ○ Brief (suggested around 300 word) description of work undertaken including an overview of the methodology used ○ Timing and duration of project <p>One of the projects MUST have produced a peer-reviewed publication.</p>		
M2	<p>The Project Manager MUST have a minimum of two (2) years experience investigating alternative methods for injecting CO₂ into the subsurface. This experience must be shown in a submitted resume.</p>		



1.2 Evaluation of rated criteria

The criteria contained herein will be used by NRCan to evaluate each proposal that has met all of the mandatory criteria.

Proposals must achieve the stated minimum points required overall for the rated criteria to be assessed as responsive under the point rated technical criteria section; proposals not meeting the minimum required points will be deemed non-responsive.

Proposals will be evaluated based on the following criteria:

Criterion ID	Point Rated Technical Criteria	Points Breakdown	Max Points	Bidder's Score	Evaluators are to clearly detail how/why a Bidder did not receive full marks. Additional Sheets may be used.
R1	<p>The Bidder should provide three (3) project summaries of projects investigating alternative methodologies for injecting CO₂ into the subsurface for CCUS.</p> <p>Points are assigned against the following:</p> <p>a) Up to 5 points per project for demonstrating experience designing and conducting laboratory experiments for alternative methods of injecting CO₂ into the subsurface for CCUS.</p> <p>b) Up to 5 points per project if the work resulted in peer-reviewed publications.</p> <p>c) Up to 4 points per project for similarity/applicability of cited projects to NRCan's requirement.</p> <p>14 points per project, 3 projects, 42 points maximum.</p>	<p>a) 5 points per each project bidder provides in-depth discussion of studies on alternative injection strategies.</p> <p>b) 5 points per each peer-reviewed international journal publication. 2 points for a peer reviewed report/other publication.</p> <p>c) Max. 4 points per project. 4 points for methods focused on shallow CO₂ injection, or injection strategy that bidder shows relevant to shallow systems. 2 points for alternative injection strategies either offshore or in deep systems.</p>	42		



<p>R2</p>	<p>The Bidder should provide a project and task schedule that assigns resources and timelines to meet the requirements as per the Statement of Work.</p> <p>Points are assigned against the following:</p> <p>a) The degree to which the schedule has included the steps indicated in the Statement of Work (max 5 points).</p> <p>b) The degree to which the Bidder has planned communication, identified risks and effectively assigned resources to complete each identified task (max 3 points).</p> <p>c) The degree to which the Bidder will share results, models, spreadsheets with NRCAN (max 2 points).</p> <p>10 points maximum.</p>	<p>a) 1 point for scheduling each of the deliverables listed in the SOW. 5 total.</p> <p>b) 1 point for a clear communication approach. 1 point for identification of project risks. 1 point for clear plan to assign resources to complete the project on time.</p> <p>c) 2 points for indicating all data (raw, refined, photos, calculations, spreadsheets etc.) will be shared. 0 points if bidder will not share all data, interpretations etc.</p>	<p>10</p>		
<p>R3</p>	<p>The Bidder should provide a detailed approach for the laboratory work to determine the fundamental CO₂ dissolution mechanisms, transport phenomena, and geochemical reactions for ex-situ injection of CO₂ into brine/groundwater., as per the Statement of Work.</p> <p>Points are assigned against the following:</p> <p>Up to 6 points for describing a logical plan. 2 points max. for each of the components – 1) CO₂ dissolution mechanisms, 2) transport phenomena and 3) geochemical reactions.</p> <p>Up to 3 points for identifying and describing the dissolution mechanisms, transport phenomena and geochemical reaction the experiments will address.</p>	<p>a) 2 points for detailed description of experimental work, 1 point if the description lacks clarity, 0 points for poor or omitted plan.</p> <p>b) 1 point for a identifying and describing the dissolution mechanisms, the transport phenomena and the geochemical reactions.</p> <p>c) 2 points for describing each of the 3 applicable areas.</p>	<p>15</p>		



	<p>Up to 6 points for describing representative groundwater horizons and properties.</p> <p>15 points maximum.</p>				
R4	<p>The Bidder should clearly demonstrate their proposed approach for modeling the micro-scale processes and the macro-scale processes.</p> <p>Points are assigned against the following:</p> <p>Up to 4 points for the description of the model(s) and why it/they can be used for this work.</p> <p>Up to 4 points for describing the macro scale modelling approach and why it is applicable.</p> <p>Up to 4 points for describing the micro scale modelling approach and why it is applicable.</p> <p>Up to 4 points for describing how micro-scale and macro-scale models will be integrated..</p> <p>16 points maximum.</p>	<p>a) 1 point for identifying the macro scale model, 1 point for describing why it can be used. 1 point for identifying the microscale model. 1 point for describing why it can be used.</p> <p>b) 1 point for modeling approach. 1 point for applicability. 1 point for challenges. 1 point for how the model results can be used.</p> <p>c) 1 point for modeling approach. 1 point for applicability. 1 point for challenges. 1 point for how the model results can be used.</p> <p>d) 1 point for how the model results from the micro model are used for the macro model. 1 point for description of scaling effects. 1 point for description of potential errors. 1 point for utility of results.</p>	32		
R5	<p>The Bidder should clearly demonstrate their proposed approach for the using AI to optimize CO₂ injection into the</p>	<p>a) 1 point for identifying the AI approach. 1 point for the equations/model</p>	13		



	<p>subsurface using alternative CO₂ injection techniques.</p> <p>Points are assigned against the following:</p> <p>a) The description of the AI approach (max 3 points).</p> <p>b) The description of how the AI approach will be integrated into the laboratory results and numerical modelling to optimize CO₂ injection masses (max 10 points).</p> <p>13 points maximum.</p>	<p>. 1 point for the data needed for the equations/model</p> <p>. b) Lab Results 5 points if the experimental plan generates the necessary data required for the AI. 2 points if more than 50% of data required by the model is described by the experimental plan and 0 points if less than 50% of the required data are described by the experimental plan. Modelling 5 points if the modeling results are used in the AI approach. 0 points if not.</p>			
R6	<p>Diversity and Inclusion</p> <p>The Bidders should demonstrate the following corporate activities they have implemented to promote anti-racism and diversity within their organisation:</p> <p>a. The bidder has internally published policies or commitments on anti-racism and inclusiveness</p> <p>b. The bidder has publicly available organisational commitments to a diverse workforce</p> <p>c. The bidder's employees are mandated to take mandatory training on anti-racism</p> <p>d. The bidder's employees are mandated to take unconscious bias training</p> <p>e. The bidder has developed internal staffing and/or recruitment strategy(ies) to increase representation of underrepresented groups in their workforce.</p> <p>The bidder should provide details of the following activities.</p> <p>For activities described in a. and b. (Policy and commitments), the bidder</p>	<p>0 pts = the bidder does not address.</p> <p>1 pts = The bidder has provided information on the existence of the activity but does not provide sufficient detail or supporting documents.</p> <p>3 pts =The bidder has fully described the activity and provided supporting documents as evidence.</p> <p>Total of 3 points</p>	3		



	<p>should provide copies of policy or commitment documents including their effective date.</p> <p>For activities described in c. and d. (training), the bidder should provide the name of the course and the service provider; if developed internally, a copy of the course outline.</p> <p>For activities described in e. (staffing), the bidder should provide copies of job posting, or other staffing/recruitment documents demonstrating compliance with the rated criteria.</p>				
Total Points Available			99		
Minimum Score Required			60		
Bidder's Score					



APPENDIX 2 - FINANCIAL BID PRESENTATION SHEET

1. Firm Price - Milestone Payments

Bidder tendered all-inclusive firm price to perform the work is in Canadian funds, applicable taxes excluded. Any Travel and Living Expenses and other miscellaneous expenses must be included in the firm price.

The bidder must complete the schedule below indicating the firm proposed amounts for each step according to the indicated percentages:

Milestone #	Description of Milestone	Firm Price (Applicable Taxes Excluded)
1	Task 1 – Design experimental plan to determine the pressure drop of two-phase flow, size of CO2 droplets, mass transfer coefficient of CO2 into the formation waters, as well as the final densities of the CO2-saturated waters.	\$ _____ (50%)
2	Task 2 – First annual report detailing methods, results, interpretation of the results, and recommended future steps	\$ _____ (25%)
3	Task 3 – Second Annual Report - detailing methods, results, interpretation of the results, and recommended future steps. This report will also provide a decision on the applicability of ESDA to Southern Ontario	\$ _____ (25%)
Total Firm Price for Financial Proposal Evaluation:		\$ _____