

Invitation for Quotation

For: Scanning Electron Microscopy with Energy Dispersive X-Ray Spectroscopy (SEM-EDX) Analysis of Caesium Particles

September 2022

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# Invitation for Quotation

**Scanning Electron Microscopy with Energy Dispersive X-Ray Spectroscopy (SEM-EDX) Analysis of Caesium Particles**

You are invited by Defra group Commercial on behalf of Defra, to submit a quotation for the requirement described in the scope of requirement, deliverables, methodology, key timescales, and contract period below.

**Please submit your quotation via email to Adam.Lang@defra.gov.uk on or before the deadline given below:**

|  |  |
| --- | --- |
| **Action** | **Date** |
| Deadline for receipt of Quotation | 30-09-2022 at 23:59 BST |
| Intended date of Contract Award | 10-10-2022 |
| Intended Contract Start Date | 17-10-2022 |
| Intended Contract Duration | 17-10-2022 to 17-01-2023 |

## Glossary

Unless the context otherwise requires the following words and expressions used within this Invitation for Quotation shall have the following meanings (to be interpreted in the singular or plural as the context requires):

|  |  |
| --- | --- |
| **Words/Expression** | **Meaning** |
| “Authority” | Means the Department for Environment, Food and Rural Affairs acting as part of the Crown. |
| “Bravo” | Means the e-tendering system used by the Authority for conducting this procurement which can be found at <http://defra.bravosolution.co.uk>. |
| “Contract” | Means the contract to be entered into by the Authority and the successful Tenderer. |
| “IFQ” | Means this Invitation for Quotation and all related documents published by the Authority and made available to Tenderers. |

## Conditions applying to the IFQ

You should examine your quotation response to the IFQ and related documents ensuring it is complete prior to submitting your completed quotation.

Your quotation must contain sufficient information to enable the Authority to evaluate it fairly and effectively. You should ensure that you have prepared your quotation fully and accurately and that prices quoted are arithmetically correct for the units stated. **Instructions on what information should be included in your quotation are provided in the Technical and Commercial Evaluation guidance document.**

## Acceptance of Quotations

By issuing this IFQ the Authority does not bind itself to accept any quotation and reserves the right not to award a contract to any Tenderer who submits a quotation.

## Costs

The Authority will not reimburse you for any costs and expenses which you incur preparing and submitting your quotation, even if the Authority amends or terminates the procurement process.

## Clarifications

The Authority reserves the right to discuss, confidentially, any aspect of your quotation with you prior to any award of Contract to clarify matters.

## Amendments

The Authority may amend the IFQ at any time prior to the deadline for receipt. If it amends the IFQ the Authority will notify you in writing and may extend the deadline for receipt in order to give you a reasonable time in which to take the amendment into account.

## Conditions of Contract

The terms and conditions attached in the IFQ will be included in any contract awarded as a result of this IFQ process. The Authority will not accept any material changes to these terms and conditions proposed by a Tenderer.

## Scope of Requirement

The Department for Environment, Food and Rural Affairs (Defra) is commissioning scanning electron microscopy with energy dispersive X-ray spectroscopy (SEM-EDX) analysis to characterise caesium (Cs) particles generated during a simulated radiological dispersal event. Defra is the designated Lead Government Department in England for coordinating the recovery from accidental and malicious incidents involving radiation. To that end, Defra facilitates UK access to decontamination capabilities for buildings and infrastructure following an uncontrolled release of radioactivity to the environment. When not recovering from such an event, Defra builds the evidence base to develop policy and operational delivery options for use during an incident.

In this work, the successful Tenderer will use SEM-EDX to determine the physical and chemical characteristics of **non-radioactive** Cs particles in thirty (30) samples provided by Defra. These samples have been collected at various distances from a simulated radiological dispersal incident and variation in Cs particle abundance is expected. Samples of high Cs concentration may require shorter instrument times to locate and identify Cs particles than samples of relatively low Cs concentration. SEM-EDX data will entail Defra to evaluate Cs particle size distribution, morphology, and chemical composition. **Further information on Defra’s requirements is provided in the Deliverables and Methodology Sections below.** The information gained from this work will support the development of targeted decontamination strategies in the event of a real-world radiation incident.

## Deliverables

The deliverables of the project are:

* To produce **a maximum of ten (10)** SEM images of Cs containing particles in each of the 30 samples provided.
* To determine atomic concentrations of key constituents within imagedCs bearing particles. This should be performed by EDX spot analysis.
* To produce a set of EDX elemental maps for **one (1)** Cs particle per sample (i.e. 30 sets of elemental maps in total).
* To comment on the abundance of Cs particles across the thirty (30) samples.

## Methodology

Tenderers are required to submit one quotation response only that fully meets the project deliverables described above. Please see the Technical and Commercial Evaluation guidance document for further information.

As part of this work, **Defra will provide the successful Tenderer with 30 samples for SEM-EDX analysis**. These samples are **not radioactive** and consist of adhesive SEM specimen stubs which were pressed directly onto the Cs contaminated areas of interest. The stub caps are Al and the adhesive layer is an organic material. Tenderers should note the following key points when preparing their methodology:

* Individual SEM images which capture multiple Cs particles to a high resolution are desirable, where practically feasible.
* Average Cs particle size is anticipated to be approximately 10 µm.
* It is expected that Cs and chlorine (Cl) are the two major elements in all particles. Minor constituents may include carbon (C), oxygen (O), aluminium (Al), silicon (Si), and titanium (Ti).
* Where possible, Cs particles which also contain minor elements should be prioritised (over “pure” CsCl particles) for EDX elemental mapping characterisation.

**Additional information on the nature of the samples is available on request.**

As part of their submission, Tenderers are required to propose a method to locate and identify Cs enriched particles in the 30 samples provided by Defra. It is worthwhile to note that a previous study characterised Cs particles with SEM-EDX (Lee *et al.,* 2010) and the authors’ approach may be of interest to this project. Here, Cs particles were imaged in both the backscattered electron (BSE) mode and the secondary electron (SE) mode to provide complimentary information. Low magnification BSE images revealed compositional differences (features with a higher atomic number such as Cs appeared brighter), and this permitted rapid location of Cs particles over a large sampling area. In contrast, the SE mode is more sensitive to an individual particle’s surface morphology and was therefore used to produce high magnification images for subsequent analysis. Defra welcomes proposals for established and/or novel methodologies which produce the required deliverables.

## Key Timescales

The key timescales associated with the project are described below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Task / Milestone Number** | **Task** | **Completion Date** | **Payment Schedule** |
| Task 1 | Defra to organise shipment of the SEM samples to the successful Tenderer. | Week 1 | N/A |
| Task 2 | Start-up meeting. Meeting to discuss the proposed project methodology. | Week 1 | N/A |
| Milestone 1 | To complete analysis of samples 1-10. | End of month 1 | 30% payment of total cost |
| Milestone 2 | To complete analysis of samples 11-20. | End of month 2 | 30% payment of total cost |
| Milestone 3 | To complete analysis of samples 21-30.  To compline project data into a short report for Defra. | End of month 3 | 40% payment of total cost |

## Contract Period

Defra would like the project to start on 17th October 2022 with a duration of 3 months until 17th January 2023. **Tenderers who wish to commence the project at an alternate date are welcome to submit a quotation.** However, your preferred contract start date may not be available and you should discuss this with the Authority before providing a quotation.

Tenderers are required to submit a project timetable (i.e. a Gantt chart or similar) as part of their quotation response. The timetable must demonstrate that the three project milestones will be delivered in accordance with the key timescales described above. Please see the Technical and Commercial Evaluation guidance document for further information.

## Prices

Prices must be submitted in £ sterling, exclusive of VAT.

## Quotation Submission

Completed IFQ submissions should be returned to the following email address Adam.Lang@defra.gov.uk by **23:59 BST on 30th September 2022**.

IFQ submissions received after this date will be treated as non-compliant by the Authority.

## Disclosure

All Central Government Departments, their Executive Agencies and Non-Departmental Public Bodies are subject to control and reporting within Government. In particular, they report to the Cabinet Office and HM Treasury for all expenditure. Further the Cabinet Office has a cross-Government role delivering overall Government policy on public procurement, including ensuring value for money and related aspects of good procurement practice.

For these purposes, the Authority may disclose within Government any details contained in your quotation. The information will not be disclosed outside Government during the procurement.

In addition, the Authority is subject to the Freedom of Information Act 2000 and the Environmental Information Regulations 2004, which provide a public right of access to information held by public bodies. In accordance with these two statutes, the Authority may be required to disclose information contained in your quotation to any person who submits a request for information pursuant to those statutes.

By submitting a quotation you consent to these terms as part of the procurement.

## Disclaimers

Whilst the information in this IFQ and any supporting information referred to herein or provided to you by the Authority have been prepared in good faith the Authority does not warrant that this information is comprehensive or that it has been independently verified.

The Authority does not:

* make any representation or warranty (express or implied) as to the accuracy, reasonableness or completeness of the IFQ;
* accept any liability for the information contained in the IFQ or for the fairness, accuracy or completeness of that information; or
* accept any liability for any loss or damage (other than in respect of fraudulent misrepresentation or any other liability which cannot lawfully be excluded) arising as a result of reliance on such information or any subsequent communication.

Any Tenderer considering entering into contractual relationships with the Authority following receipt of the IFQ should make its own investigations and independent assessment of the Authority and its requirements for the goods and/or services and should seek its own professional financial and legal advice.

## References

S. D. Lee, E. G. Snyder, R. Willis, R. Fischer, D. Gates-Anderson, M. Sutton, B. Viani, J. Drake, and J. MacKinney, “Radiological dispersal device outdoor simulation test: Cesium chloride particle characteristics,” Journal of Hazardous Materials, vol. 176, pp. 56–63, 2010.