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Planning

Research into a measurement technique for UF3 and UF4 ratios in Uranium Fuel Salts

National Nuclear Laboratory

F01: Prior information notice
Prior information only
Notice identifier: 2022/S 000-010934
Procurement identifier (OCID): ocds-h6vhtk-033154
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Section I: Contracting authority

I.1) Name and addresses

National Nuclear Laboratory

Warrington

CA20 1PG

Contact

David Kirkbride

Email

david.kirkbride@uknnl.com

Country

United Kingdom

NUTS code

UKD61 - Warrington

Internet address(es)

Main address

https://www.nnl.co.uk/

Buyer's address

https://sharedsystems.eu-supply.com/ctm/Company/CompanyInformation/Index/3510

I.3) Communication

The procurement documents are available for unrestricted and full direct access, free of charge, at

https://sharedsystems.eu-supply.com/app/rfq/rwlentrance_s.asp?PID=15711&B=SELLAFIELD

Additional information can be obtained from the above-mentioned address

I.4) Type of the contracting authority

Body governed by public law

I.5) Main activity

Other activity

Nuclear Research

Section II: Object

II.1) Scope of the procurement

II.1.1) Title

Research into a measurement technique for UF3 and UF4 ratios in Uranium Fuel Salts

II.1.2) Main CPV code

- 73300000 - Design and execution of research and development

II.1.3) Type of contract

Services

II.1.4) Short description

Terrestrial Energy are currently looking to establish a supply of Uranium based fuel salts for its Integrated Molten Salt Reactor (IMSR) testing programme and to support this establishment work NNL and Westinghouse are proposing to undertake a testing programme on Uranium based fuel salt materials to support the manufacture of this fuel at the NNL Preston laboratory. NNL and Westinghouse have agreed an analytical specification for the manufactured fuel to meet the requested specification requirements of Terrestrial Energy. However, there is a gap in the combined analytical capability, for the determination of the ratio of UF3 to UF4 material in any given sample of fuel salt to be tested. NNL are therefore looking to procure services for this element of the scope.

II.1.6) Information about lots

This contract is divided into lots: No

II.2) Description

II.2.2) Additional CPV code(s)

- 09340000 - Nuclear fuels
- 24950000 - Specialised chemical products
- 73300000 - Design and execution of research and development
- 09341000 - Uranium

- 38432000 - Analysis apparatus

II.2.3) Place of performance

NUTS codes

- UKD61 - Warrington

II.2.4) Description of the procurement

Terrestrial Energy are currently looking to establish a supply of Uranium based fuel salts for its Integrated Molten Salt Reactor (IMSR) testing programme and to support this establishment work NNL and Westinghouse are proposing to undertake a testing programme on Uranium based fuel salt materials to support the manufacture of this fuel at the NNL Preston laboratory. NNL and Westinghouse have agreed an analytical specification for the manufactured fuel to meet the requested specification requirements of Terrestrial Energy. However there is a gap in the combined analytical capability for the determination of the ratio of UF3 to UF4 material in any given sample of fuel salt to be tested. The ratio of these compounds within the fuel salt composition needs to be measurable to ensure compliance with the acceptance specification of Terrestrial Energy (target UF4/UF3 ratios in the range 50/1 – 154/1 have been specified for similar fuel salts produced for test reactors) and thus a technique needs to be developed and trialled on similar Fuel salt compositions to ensure that this technique is demonstrable and can be performed in a short timescale on multiple samples within the NNL Preston laboratory. There are no current commercial-off-the-shelf (COTS) technologies or instrumentation available to meet this analytical requirement. However, both electrochemical and spectrophotometric methods have been used to measure UF4/UF3 ratios in fuel salts produced for test reactors and it is therefore anticipated that further development of these techniques will likely provide a solution to this analytical challenge.

Determination of the composition of molten fuel salts will likely be integral to development of the MSR technologies moving forward and any technological developments will be of keen interest to reactor vendors. It is anticipated therefore that this work could unlock further commercial opportunities to industrialise the analytical techniques and methods.

The works contract for this scope will be formed of the following stages:

• Definition of an appropriate technique for measuring UF3/UF4 ratio’s in fuel salt samples to meet TEI specifications (to be confirmed although - target UF4/UF3 ratios in the range 50/1 – 154/1 have been specified for similar fuel salts produced for test reactors)

• Conduct a research and development phase to provide the evidence of the techniques success on fuel salt samples.

• Trial the developed technique on fuel salt samples within the NNL Preston laboratory alongside NNL staff, for proof of concept and applicability to testing in a laboratory environment.

• Write up of a research paper demonstrating the R&D development of the technique and its applicability to fuel salt samples.

The overall scope of work for this contract must be complete within 12 months to support the wider project timescales.

II.2.14) Additional information

If you have the experience/ capability required to deliver this scope of work and are interested in this procurement please respond to this PIN notice by close of play on Tuesday 10th May.

Within your confirmation of interest please also detail your capability/ experience of delivering services of this nature (i.e. via Case Studies etc).

II.3) Estimated date of publication of contract notice

16 May 2022

Section IV. Procedure

IV.1) Description

IV.1.8) Information about the Government Procurement Agreement (GPA)

The procurement is covered by the Government Procurement Agreement: Yes