EMRP Call 2013 – Energy and Environment

Selected Research Topic number: **SRT-v19**
Version: 1.0

Title: Metrology for decommissioning nuclear facilities

Abstract

Many of the nuclear facilities operational in EU countries are in the decommissioning phase with more following in the near future. Decommissioning costs are huge but can be significantly reduced by traceable on-site measurement methods and subsequent waste management. Development of innovative metrology techniques, improved methods and measurement facilities will support on-site decommissioning.

Conformity with the Work Programme

This Call for JRPs conforms to the EMRP Outline 2008, section on “Grand Challenges” related to Energy and Environment on pages 8, 10 and 24.

Keywords

Decommissioning, nuclear facility, ionising radiation, free release, radioactive waste repository.

Background to the Metrological Challenges

Worldwide, about 90 commercial reactors and 45 experimental reactors have been retired from operation while about 60 reactors are undergoing decommissioning. Thousands of tons of solid waste materials will have to be disposed efficiently without contaminating the environment with artificial radionuclides. The total decommissioning costs can be significantly reduced by the use of standardised traceable measurement methods for on-site measurements and subsequent waste management.

Scientific and Technological Objectives

Proposers should address the objectives stated below, which are based on the PRT submissions. Proposers may identify amendments to the objectives or choose to address a subset of them in order to maximise the overall impact, or address budgetary or scientific / technical constraints, but the reasons for this should be clearly stated in the JRP-Protocol.

The JRP shall focus on traceable on-site measurement methods of decommissioning nuclear sites and subsequent waste management.

The specific objectives are:

1. To develop methods for the radionuclide characterisation of different types of solid materials present on decommissioning sites. This should include development of novel measurement techniques that improve the mapping of activation and contamination inside nuclear facilities, determination of statistically valid sampling methods for representative samples for radiochemical analysis, and development of automated radiochemical analysis procedures.
2. To design a measurement facility for segregation of waste into streams (repository or possible free release), based on high sensitivity detectors (e.g. scintillators) and develop measurement and calibration procedures for the operation of this facility.
3. To develop and implement free release measurement technologies and develop tools and techniques for scanning of wastes with heterogeneous density distribution.
4. To develop measurements in radioactive waste repositories and improve monitoring methods during decommissioning.
5. To develop reference materials and standard sources for calibration, validation and testing of devices, instruments and procedures developed in the above objectives.

These objectives will require large-scale approaches that are beyond the capabilities of single National Metrology Institutes and Designated Institutes. To enhance the impact of the R&D work, the involvement of the user community such as industry, and standardisation and regulatory bodies, as appropriate, is strongly recommended.

Proposers should establish the current state of the art, and explain how their proposed project goes beyond this. In particular, proposers should outline the achievements of the EMRP project ENV09 and how their proposal will build on those.

EURAMET expects the average size of JRPs in this call to be between 3.0 to 3.5 M€, and has defined an upper limit of 5 M€ for any project. The available budget for integral Research Excellence Grants is 30 months of effort.

Potential Impact

Proposals must demonstrate adequate and appropriate participation/links to the “end user” community. This may be through the inclusion of unfunded JRP-Partners or collaborators, or by including links to industrial/policy advisory committees, standards committees or other bodies. Evidence of support from the “end user” community (e.g. letters of support) is encouraged.

You should detail how your JRP results are going to:

- underpin and develop European and international regulation or feed into the development of urgent documentary standards through appropriate standards bodies, respectively.
- transfer knowledge to the environmental sector.
- transfer knowledge to nuclear facilities

You should detail other impacts of your proposed JRP as detailed in the document “Guide 4: Writing a Joint Research Project”

You should also detail how your approach to realising the objectives will further the aim of the EMRP to develop a coherent approach at the European level in the field of metrology and includes the best available contributions from across the metrology community. Specifically the opportunities for:

- improvement of the efficiency of use of available resources to better meet metrological needs and to assure the traceability of national standards
- the metrology capacity of Member States and countries associated with the Seventh Framework Programme whose metrology programmes are at an early stage of development to be increased
- outside researchers & research organisations other than NMIs and DIs to be involved in the work

Time-scale

The project should be of up to 3 years duration.