EMRP Call 2012 – Open Excellence, Industry and SI Broader Scope

Selected Research Topic number: **SRT-i13**
Version: 1.0

Title: Metrology for processing materials with high natural radioactivity

Abstract

Naturally occurring radionuclides are present in many natural resources. Industrial activities that exploit these resources may lead to enhanced potential for exposure to NORM 'Naturally Occurring Radioactive Materials' in products, by-products, residues and wastes. Uncontrolled levels of radioactivity associated with NORM can pose an unacceptable economic burden to industry.

This SRT calls for the development of new measurement capabilities for NORM industry applications, to improve significantly the industrial processing of NORM resources / TENORM (technologically enhanced NORM) residues and to assist competitive technology throughout the industry.

Conformity with the Work Programme

This Call for JRPs conforms to the EMRP Outline 2008, section on "Grand Challenges" related to Industry & Fundamental Metrology on pages 8 and 10.

Keywords

Smelting Industry, Building Material Industry, Waterworks, Recycling Industry, NORM, TENORM, natural radionuclides, radionuclide metrology, ionising radiation, natural radiation sources

Background to the Metrological Challenges

There is a lack of knowledge of NORM compared to artificial radionuclides in the affected industries, due in part to the lack of accurate and traceable measurement methods in particular for in-situ application. In many countries, industries that use NORM raw materials and/or produce NORM wastes have not been subject to radiological monitoring controls. Consequently, there is a general lack of awareness and knowledge of radiological hazard and of optimised manufacturing processes ensuring end and by-products as well as waste streams of low NORM content. Only recently, data on radionuclide concentrations in raw materials, residues, waste streams and industrial products have started to be a source of concern for workers and populations. Therefore, there is a strong need to improve metrological capabilities and nuclear data quality of relevant natural radionuclides, as well as to ensure the production and use of adequate reference materials for the NORM industries, leading to accurate, reliable and comparable measurements.

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 the development of new measurement capabilities for naturally occurring radioactive materials (NORM) and technologically enhanced NORM (TENORM) which occur in the industrial processing of products, residues and waste.

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The specific objectives are:

1. To develop measurement systems, methods and techniques including in-situ systems which support innovative industrial processing of resources containing naturally occurring radioactive material
2. To design traceable measurement procedures (as input to e.g. CEN/ CENELEC standards) for industrial NORM raw material, products, by-products, residues, and waste
3. To develop and establish traceable metrological reference materials of NORM and TENORM needed for calibration purposes
4. To improve nuclear data of natural radionuclides of concern (radionuclides of the ^{238}U, ^{235}U and ^{232}Th decay chains, ^{138}La, ^{40}K, etc.), as required for the above-mentioned objectives
5. To test developed systems, standards and reference materials in industrial processing situations

Proposers shall give priority to work that meets documented industrial needs and include measures to support transfer into industry by cooperation and by standardisation. An active involvement of industrial stakeholders is expected in order to align the project with their needs.

Proposers should establish the current state of the art, and explain how their proposed project goes beyond this.

The total eligible cost of any proposal received for this SRT is expected to be around the 2.7 M€ guideline for proposals in this call. The available budget for integral Research Excellence Grants is 42 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:

- feed into the development of urgent documentary standards through appropriate standards bodies
- transfer knowledge to the NORM industries.

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.