

## **Metrology for processing materials with high natural radioactivity**

Franz-Josef Maringer,<sup>1</sup> Pierino de Felice<sup>2</sup>, Virginia Peyres<sup>3</sup>, Teresa Crespo<sup>3</sup>

<sup>1</sup> *BEV/PTP Physikalisch-Technischer Pruefdienst des Bundesamt fuer Eich- und Vermessungswesen. Arltgasse 35, AT-1160 Vienna, Austria.*

<sup>2</sup> *ENEA Agenzia Nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile. Via Anguillarese, 301 - S.M. Galeria I-00123 Roma, Italy.*

<sup>3</sup> *CIEMAT Centro de investigaciones energeticas, medioambientales y tecnológicas. Avda. Complutense 40, 28040, Madrid, Spain.*

Tel. + 43 1 21110-6372 ; Fax + 43 1 21110-6000 ; [franz-josef.maringer@bev.gv.at](mailto:franz-josef.maringer@bev.gv.at)

### **Abstract**

Naturally occurring radionuclides are present in many natural resources. Industrial activities that exploit these resources may lead to enhanced potential for exposure to Naturally Occurring Radioactive Materials (NORM) or Technologically Enhanced NORM (TENORM) in products, by-products, residues and wastes. Industries working with raw materials containing naturally occurring radioactive materials (NORM industries) produce large amounts of waste. To ensure correct and accurate measurement of this waste, all measurement systems must be calibrated in a traceable way with calibration standards and reference materials that are adapted in an appropriate manner to the real composition and geometry of measured materials.

The European Joint Research Project MetroNORM – ‘*Metrology for processing materials with high natural radioactivity*’, contract identifier ND57, will address this problem by developing new traceable, accurate and standardised measurement methods and systems, emphasizing in-situ applications. Its major scientific and technical objectives are to accelerate industrial innovation by development of new measurement capabilities for NORM industry applications, to improve significantly the industrial processing of NORM/TENORM resources residues, and to assist competitive technology throughout the industry.

The project is structured in five working packages, whose objectives are the following:

- Specification of reference materials and standard sources for laboratory use and in-situ measurement instruments on the basis of selection and evaluation of NORM raw materials.
- Development of an in-situ measurement system and of a sampling device for laboratory analysis.

- Identification and development of NORM-RN key-measurement methods; standardisation of measurement procedures for laboratory analysis and for in-situ measurements on industrial sites.
- Improvements of emission intensities in  $^{238}\text{U}$  and  $^{235}\text{U}$  series; study of  $^{138}\text{La}$  decay; study of particular problems appearing in NORM key-materials.
- Specification of verification criteria for measurement procedures and measurement devices developed in his JRP and to select end user sites for verification; on-site / in-situ verification of measurement systems and procedures.

Twelve National Metrology Institutes and two other research institutes cooperate on this project, under coordination of BEV/PTP. The presentation will focus on the project structure and the expected results in terms of new reference materials and methods as well as the possible impact on recommendations and future standards.

#### *Acknowledgement*

This Joint Research Project MetroNORM is funded by the European Metrology Research Programme (EMRP, [www.emrponline.eu](http://www.emrponline.eu)) undertaken by several EU Member States and financially supported by the European Commission through Article 169 of the European Treaty.