

"Towards a sustainable society by adequate measures to reduce impact of NORM"

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1. Introduction

Enhanced concentrations of natural occurring nuclides (NORs) are present in slag and bottom ash from coal-fired power plants, phosphorous slag from thermal phosphorus production, unprocessed slag from primary iron production and lead, copper and tin slags from primary and secondary production. The relative concentrations of NORs depend on the origin of the ores and the used industrial process [1]. On the 5th of December 2013, the Council of the European Union has adopted the new Directive 2013/59/EURATOM (Euratom Basic Safety Standards, EU-BSS) [2]. Several of the mentioned residues have very interesting properties for the cement & concrete industry as alternative raw materials, supplementary cementitious materials, alternative fuel or aggregates [3, 4, 5]. In particular in new types of cement and concrete based on Alkali-Activated Material (AAM) a relatively large fraction of residues could be used [6]. In the ceramic industries slags from various types of metal smelting can be used as aggregates in or in the bond system of clay-based ceramics [7]. For safe use of by-products from a radiological point of view, the EU-BSS requires a radiological screening and further characterisation of building materials that incorporate specific residues from industries that process NORM (Naturally Occurring radioactive materials) considered are among others fly ash, phosphogypsum, phosphorus, tin and copper slag, red mud and residues from steel production, before they can be distributed on the market. The assessment of the impact of the EU-BSS on the reuse of NORM in new types of construction materials is the main topic of the current contribution.

2. Objective

The COST Action Tu1301 NORM4Building (2014-2017) initiated new research on the radiological evaluation of construction material that are currently in the research

stage. The most important objective of the COST action Tu1301 'NORM4Building' is the exchange of multidisciplinary knowledge and experience (radiological, technical, economical, legislative, ecological) to assure safe reuse of NORM residues in new tailor-made sustainable building materials considering the impact on both external gamma exposure of the building occupants and indoor air quality.

For the radiological evaluation of practises a close collaboration was established with the METRONORM project and several Euftrat projects were undertaken that meet both the goals of NORM4Building and METRONORM projects.

3. Results and output

In the course of the NORM4Building project a radiological database on NORM & building materials was developed. The NORM4Building database is available via www.norm4building.org and in the future via the website of the new European NORM Association (ENA). In addition, new measurement protocols and dosimetric tools were developed for a more accurate radiological evaluation of the use of NORM in construction. The new dosimetric tools provide a more realistic radiological screening of the reuse of building materials in addition to the Activity Concentration Index (ACI) that is proposed by the EU-BSS as screening tool.

In the provided presentation, the impact of the new EU-BSS on reuse of by-products in construction is assessed. The discussion will assess the relation sustainability and radiological aspects of safety in reuse on the basis of the results and output from the COST Action NORM4Building. During the discussion focus is given to the results of collaboration between NORM4Building and METRONORM and the contribution of Euftrat projects to the obtained results.

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