

International Conference on the Management of Naturally Occurring Radioactive Materials (NORM) in Industry

VIRTUAL EVENT

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Assessment of natural radioactivity and radiation hazards of the Portland cements produced with NORM industrial wastes in Spain

Blast-furnace slags and coal fly ash are very important cement constituents in many countries. Blast-furnace slags are a residue of the iron making. When the molten iron slag is quenched in water, ground-granulated blast-furnace slag is obtained, which is a glassy and reactive material. Coal ashes are produced in coal-fired power plants in the electricity generation. They are fine spherical particles which are collected by cyclone or electrostatic separators. Management of both types of wastes remains a major environmental problem worldwide. Natural radioactivity in ground-granulated blast-furnace slag and coal fly ash Portland cements produced in Spain was determined by gamma spectrometry. Then, the radiological hazard of both types of Portland cement was inferred by the activity concentration index, I , absorbed dose rate, D_{ext} , and annual effective dose, E_p . The results indicated that the activity concentrations of ^{226}Ra , ^{232}Th and ^{40}K ranged from 15.7 to 88.3 Bq kg⁻¹, from 13 to 81 Bq kg⁻¹, and from 150 to 508 Bq kg⁻¹, respectively. The annual effective dose falls within 0.2 mSv to 0.9 mSv (coal fly ash-cement) and 0.2 mSv to 0.6 mSv (ground-granulated blast-furnace slag-cement) ($\leq 1\text{mSv}$, threshold criterion). In addition, preliminary results on radioactivity in clinker kilns performed in several Portland cement factories will be provided.

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