USES OF PHOSPHOGYPSUM IN AGRICULTURE

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Abstract

The processing of mineral raw materials enhanced in natural radionuclides in some paradigmatic industries, called NORM (Naturally Occurring Radionuclide Materials) industries, generates huge amounts of wastes which historically have not deserved commercial attention. On the contrary, generally these wastes have been either released and disseminated into the environment, or disposed in big landfill under control.The tendency to the disposal of the commented by-products have generated a high concern by the presence in them of moderate amounts of natural radionuclides (between 10-100 times higher than typical soils), which have induced historically to erroneous conclusions about its potential radiological impact on the public and the environment. Generally, the current landfills to store the NORM waste have significantly minimized (or are negligible) the health risks and environmental impacts.

A paradigmatic example of NORM waste is the phosphogypsum (PG), the main residue generated in the production of phosphoric acid by the wet-acid method. Up to 2006 more than $6 \cdot 10^9$ tons of PG were produced worldwide containing around 0.5-1 Bqg^{-1} of ^{226}Ra as a main radionuclide. For that, during the last years the valorization of the PG has been a quite active field of research. In fact alternative uses of PG in agriculture, in the construction of buildings, as road basement, in marine applications, in landfills and as bitumen modifier, between others, have been documented, and therefore they will be discussed in the presentation.

In this paper a detailed review of the uses of phosphogypsumin agriculture will be performed trying to cover two objectives:a) todemonstrateits performance in comparison with other alternatives existing in the market, and b) to demonstrate that its environmental and public radiological impact is negligible.

Special emphasis will be devoted to show how the methodology followed to cover both objectiveson the basis in the results obtained in field and laboratory experiments, and an example will be used for that as the case when the PG is used in the remediation of saline and sodic soils to render them productive.