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Grey Monazite in Central Spain: NORM mining implications

In Central Spain it is located a quite surficial alluvial deposit with grey-monazite nodules containing high levels of light rare earths. These nodules are in the field at concentrations (2.5-3 kg/m³) that makes interesting their commercial exploitation

The grey-monazites contain also radionuclides from the uranium and thorium series at levels higher than 1 Bq/g, being then necessary to perform a preoperational evaluation of the operational, public and environmental radiological impact associated to: a) the mining activities to be carried out, and b) to the physical isolation and concentration of the grey-monazite nodules in a physical-separation plant to be constructed in the vicinity of the mining area. No chemical treatment of the isolated monazites for the rare-earth extraction and purification will be performed in the area.

The results of this evaluation and the derived conclusions will form the core of this presentation. Quite limited operational (< 1 mSv/y) and negligible public and environmental radiological impact can be expected from the mentioned activities. The peculiarity that the U and Th-series radionuclides are inside quite inert/refractory nodules with null transfer to the surrounding environmental compartments, the size of these nodules (0.5 –1.5 mm) that avoid their resuspension and a possible impact through the inhalation route, and the high automatization planned in physical-isolation plant, explains the conclusions obtained. In addition, a quite sustainable mining program with the restoration of the mined zones with the material previously extracted, just after the removal of the monazite nodules give added value to the project.

In spite of these facts and conclusions, the project is nowadays stopped mainly due to social pressure. Although the analyzed case is a typical example where the association of high levels of U and Th, do not correspond to high radiological impact, this association is difficult to be understood by the population.

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