

## Radiological characterization in chemical industries

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### **Abstract**

The recent EURATOM-BSS (Basic Safety Standards) establishes criteria for the protection of general public and workers against ionizing radiation. The new EU Directive pays special attention to keep the exposure to radon gas under certain reference levels. In addition to this Directive, each EU member states have their own legislation on this matter. On 2011 Spain issued a Royal Decree that establishes radiological criteria for the protection against natural radiation. This Decree focuses on the exposure to radon gas and gamma radiation and enlists a series of activities of special interest.

Some chemical companies use to have zirconium as a component of their raw materials. Zirconium has a larger amount of isotopes from the  $^{238}\text{U}$  decay chain than  $^{232}\text{Th}$  decay chain. Hence, it may lead to an increase on the exposure to radon gas.

We present in this work the results of a radiological characterization carried out in a chemical company located in Northern Spain whose main activity is the production of coating materials. We have performed two types of characterizations: the measurement of exposure of workers to external gamma dose rate and the determination of their exposure to radon gas. With this aim, we considered three exposure situations: pallets storage room, pallets' transportation and addition of raw material to the hopper.

In all situations our results reveal that the dose due natural radiation is below the limit of  $1 \text{ mSv y}^{-1}$ . We have considered the results of gamma spectrometry in dust samples and the activity gamma concentrations of  $^{238}\text{U}$  and  $^{226}\text{Ra}$  is  $4000 \text{ Bq kg}^{-1}$  and  $1400 \text{ Bq kg}^{-1}$  respectively. The measured radon levels in the studied areas are below the reference value of  $600 \text{ Bq m}^{-3}$  in all cases. We concluded the work proposing some recommendations to reduce the radiation to lower values.