

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



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NORM Triggering Radiation Detectors

In the last twenty years in Slovenia the system to detect orphan sources [1] in scrap materials has been developed after the very first melting of ^{60}Co source in stainless steel factory resulting in about 70 tons of contaminated materials. The radiation detector systems detecting enhanced dose rates have been or are still used by customs officers and metal recycling industry undertakings just to mention main users of such systems. The detectors are triggered either by NORM or artificial radionuclides in cargo or passengers. When triggered regulatory authority is informed and an investigation follows.

From 2002 the Slovenian Nuclear Safety Administration (SNSA) has been managing the database of all interventions where inspection activities are required including interventions related to triggering of radiation detectors. Around 230 interventions are given in this database enabling not only analysis of events but also standardised regulatory approach how to manage interventions including those where NORM triggered detectors. Detectors were also triggered by NORM during SNSA inspections related to a search for orphan sources.

Based on experiences typical cases when radiation detectors were triggered by NORM can be identified as well as some peculiar uses of NORM. The experiences include NORM in:

- building materials, either raw material such as zircon sands or construction products such as bricks,
- rubbles from industrial facilities contaminated by NORM,
- industrial objects, such as owns, pipes or filters where NORM was deposited,
- minerals including radioactive geological samples,
- objects containing ^{226}Ra paint, e.g. at compasses, gyroscopes and other instruments,
- sands with NORM used as a weight in post cashier,
- products, such as lens or metal objects containing thorium,
- museum items such as dishes or decorative items containing uranium.

Detectors also detected DU used for collimators and abandoned in scrap. In all case investigation took place and activity concentrations of radionuclides were determined when necessary. A control over materials was assured, e.g. by managing radioactive waste and material was released to be used without any restrictions. Decontamination took place when necessary. In 2020 SNSA also noted that some new peculiar users of NORM occurred all over the world, i.e. NORM present in personal pendants.

The SNSA together with other stakeholders established an effective system to manage NORM triggering radiation detectors. In line with the EU BSS [2] further strengthening of the control related to orphan sources is foreseen, i.e. at significant nodal transit points, leading to new regulatory experiences.

[1] IAEA, SSG-19, National Strategy for Regaining Control over Orphan Sources and Improving Control over Vulnerable Sources, IAEA, Vienna, 2011

[2] Council Directive of 5 December 2013 laying down Basic Safety Standards for Protection against the Dangers arising from Exposure to Ionising Radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom, Official Journal of the European Union L-13 of 17/01/2014, 2014

Primary author: Dr JANZEKOVIC, Helena (Slovenian Nuclear Safety Administration)

Presenter: Dr JANZEKOVIC, Helena (Slovenian Nuclear Safety Administration)

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