

Sortierung und Freimessung von Schüttgütern mit der NES-Erdmessenanlage

Abstract

As part of the dismantling work resulting from 45 years of nuclear research at the Seibersdorf Research Centre, four above-ground landfills (in the form of embankments) with approx. 8,400 m³ – of partially contaminated material – must be dismantled.

Long-lived activation products (especially Co-60, Am-241), fission products from the experimental set-ups (especially Sr-90, Cs-137) and Ra-226, e.g. from blast furnace slag, are expected.

NES developed and built a Soil Sorting Facility to process the material from the surface landfills. It is used to sort and evaluate fine-grained, free-flowing bulk material (grading curve 0-32 mm) such as soil, gravel, broken concrete and building rubble. For this purpose, the material with a defined bulk thickness is placed on a conveyor belt, measured by means of beta and gamma detectors and automatically sorted on the basis of these measured values. The material is fed into the soil sorting facility in 200-l drums and discharged again in 200-l drums; the throughput is about 1.2 m³ per hour.

The purpose of the facility is to sort the material into uncontaminated or slightly contaminated material and more radioactively contaminated material. At the same time, data is continuously recorded for the drums generated in this way. A data set of radiological measurement data is generated for each drum to enable a subsequent radiological assessment of the individual drums. Ultimately, the aim of the facility is to group as large a proportion of the material as possible into drums containing harmless material and to provide the necessary data for these drums for restricted release. The radioactively contaminated material is separated, collected in separate drums and disposed of as radioactive waste.

The agreement with the comparative methods (ISOCS and drum measuring system) is satisfactory. In sub-areas at low activities, the EMA showed slightly higher values than the comparison methods (conservative). At higher activities, the agreement is within +/- 20 %. The comparison has been performed on Tc-99m, Cs-137 and Am-241.

Additionally, a procedure to deduct the Sr-90 activity of the drums processed from the beta counter readings has been established and validated.

The Soil Sorting Facility (German abbreviation "EMA" for Erdmessenanlage) has been in trial operation since December 2018; a total of

- 2599 drums with mainly Cs-137 and Sr-90,
- 464 drums with low levels of various gamma emitting nuclides,
- 518 drums with Am-241 and
- 36 drums with Tc-99m (as part of initial tests)

have been released or prepared for release during this trial operation up to August 2022.

Of these drums

- 2812 drums contained soil and crushed stone,
- 304 drums contained gravel,
- 482 drums contained broken concrete,
- 19 drums contained building rubble.

In total up to August 2022 3617 drums containing 914 t of material have been released or prepared for release.

