

## **Clearance measurements as a tool for waste minimization during decommissioning**

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### **Abstract**

Clearance, exemption or free release of material from regulatory control are three ways of expressing the same thing, minimizing the amount of waste that needs disposal as radioactive waste and therefor preserving a repository as a national asset.

Studsvik Nuclear has utilized the former full body measurement cell as a shielded compartment used for gamma spectroscopy measurements of materials that may be subject to clearance. The cell was moved from its original position by heavy lifting and transport, as it was transported in one piece weighing 53 tonnes.

The facility has basically 4 parts, the cell in which the item is place, the rotating table that rotates the item to get the best possible measurement, the ISOCS that measure the gamma rays and the operator room from which the facility runs. The detector is a BEGe with a relative efficiency of 50 % and is provided by Canberra. Apex is used as software for acquisition, calibration and data storage. The cell can take Berglöfs boxes up to a volume of 1.2m<sup>3</sup> and a weight of 3 tonnes can be rotated on the table. Other standard geometries are drums of 100 or 200 liters.

The shielding improves the background radiation to a level where a measurement time of only 1200 s for a standard object (100L/200L drum, Berglöfs box) is needed. This means a high daily capacity of measurements.

During 2011 measurements have been done on several different materials and together with sampling for alpha emitting nuclides the material has been released from regulatory control and either recycled or disposed of in a standard landfill or a land fill for hazardous waste.

The materials released are copper from cable shredding that was measured, samples and recycled about 14 tonnes, titanium tubes about 35 tonnes also recycled and fiberglass/epoxy that has been released for waste treatment in a non-radioactive treatment facility.

Measurements have also been done of waste with complex geometries.