Introduction to INSIDER benchmark

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Scope of the benchmark exercises

Why an INSIDER benchmark exercise?

The overall **concept** of the INSIDER project is to develop an integrated methodology, identifying and implementing statistical approaches, coupled with analysis and measurement results obtained by existing or under development techniques and methods that will achieve the characterisation of the contaminated material of a facility to meet the evaluation objectives while optimizing costs and deadlines.

The overall **objective** of INSIDER is to organize a common validation in the entire D&D process, based on three main use cases.

Purpose of the benchmark is to **validate** the INSIDER concept under **real conditions** derived from ongoing D&D programmes.

Definition of benchmark exercises

INSIDER use cases

Three major use cases have been identified by the INSIDER project for benchmarking the technologies:

- **UC1:** decommissioning of a back/end of fuel cycle and/or research facility
- **UC2:** decommissioning of a nuclear reactor
- **UC3:** post-accident remediation of a site

Selection of benchmark exercises

INSIDER use cases

Three suitable facilities have been selected:

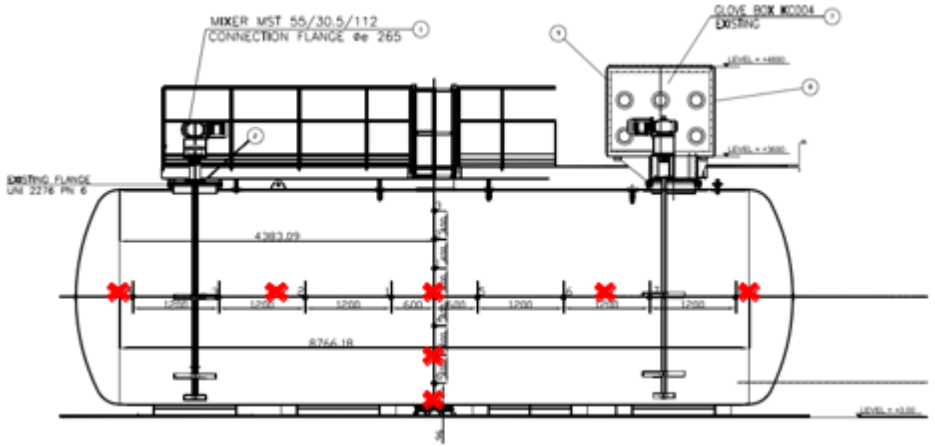
- **UC1:** Liquid waste storage facility at JRC in Ispra
- **UC2:** Biological shield of reactor BR3 at SCKCEN in Mol
- **UC3:** contaminated soil at CEA site

UC1 case – Liquid waste storage TFF

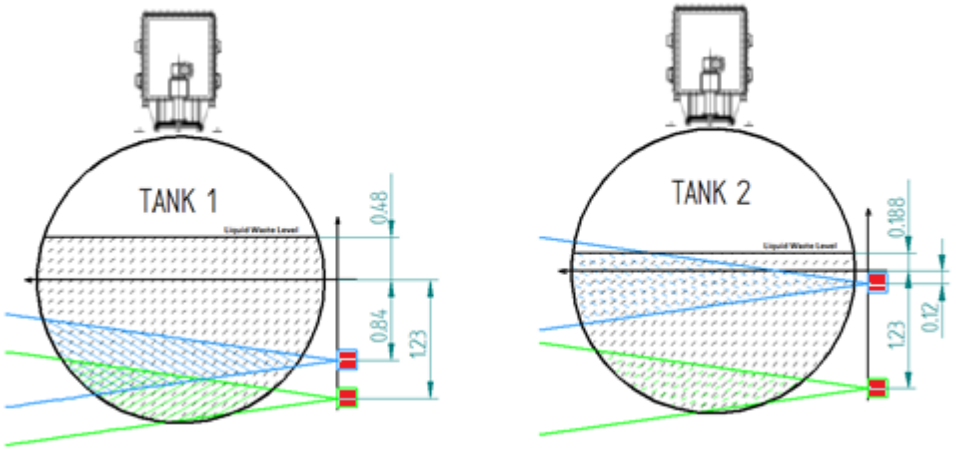
- Purpose: to define radiological properties of the liquid waste in two tanks at the TFF facility of JRC site
- Step 1: sampling strategy defined using available data from a previous characterization campaign, complemented by the INSIDER campaign
- Step 2: on site measurements of dose rate profiles and gamma spectrometry
- Step 3: sample taking (only 1 tank) and shipping for laboratory analyses

UC1 case – Liquid waste storage TFF

In-situ campaign



Points for dose rate profiles



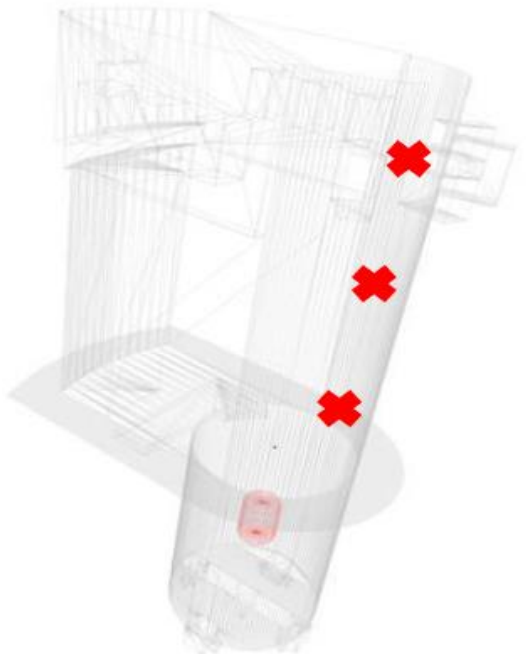
Positions for gamma measurements

UC2 case – Bio-shield of BR3

- Purpose: Create a 3D activity concentration distribution map; quantify and localise the different end-stage volumes; economically optimise volumes in view of a waste-led approach
- Step 1: sampling strategy defined using available data from previous characterization campaign, complemented by the INSIDER campaign
- Step 2: on site measurements of dose rate profiles, total gamma and gamma spectrometry in three selected points
- Step 3: sample taking (2 drills), preparation at NPL and shipping for laboratory analyses

UC2 case – Bio-shield of BR3

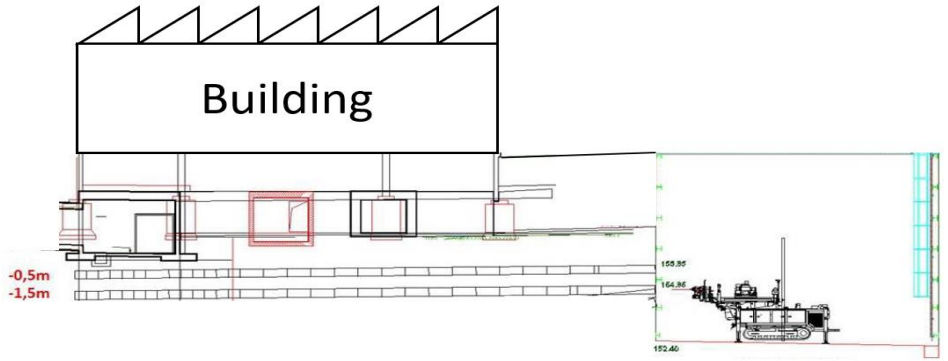
In-situ campaign

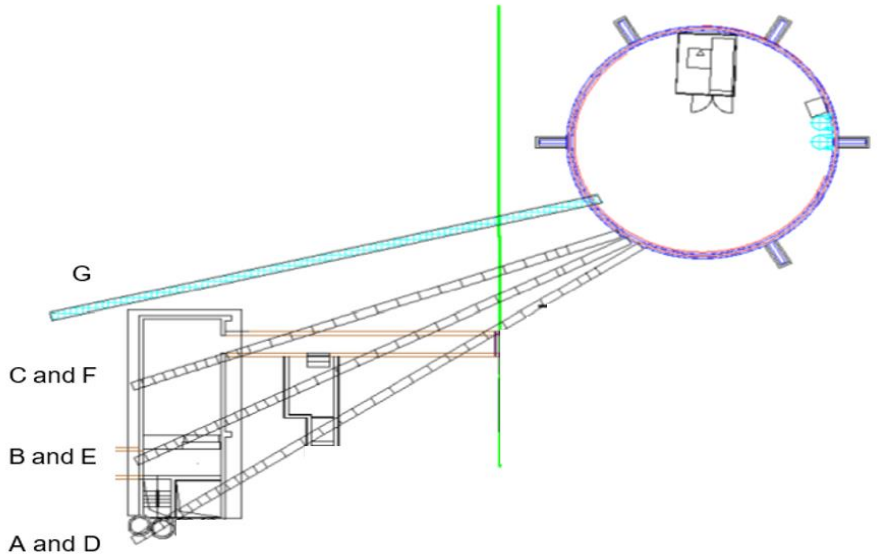


- Dose rate and total gamma in 3 points
- Gamma spectrometry in bottom position for
  - Depth where Ba-133 ≤ 0.1 Bq/g;
  - Depth where Eu-152 ≤ 0.1 Bq/g;
  - Depth where Σ(Ba-133/0.1 + Eu-152/0.1) ≤ 1;
  - Activity ratio Eu-152/Eu-154; and
  - Cs-137 surface activity concentration (in Bq/cm^2).

UC3a case – Contaminated soil

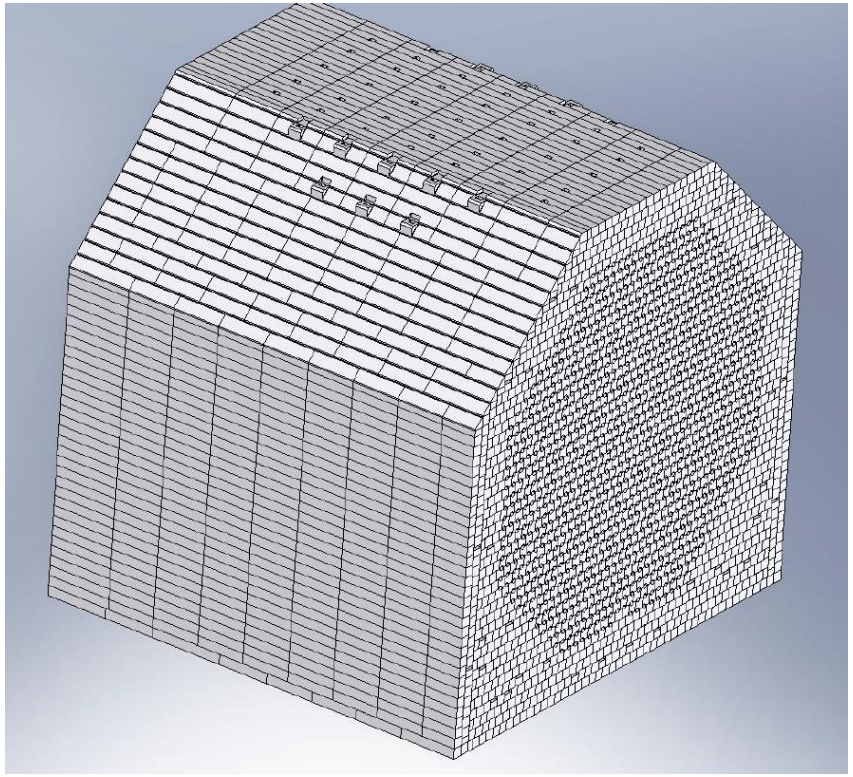
- Purpose: a global estimation of the average activity concentration and total activity of radionuclides in the soil of the affected area and an estimation of mass/volume of soil classified according to the different waste categories; a 3D distribution map of activity concentration and waste segregation, allowing to plan the remediation actions and to estimate the cost of the intervention
- Step 1: sampling strategy defined using available data from previous campaigns





UC3b case – Activated graphite

- Purpose: radiological inventory for the graphite volume
- Step 1: sampling strategy defined using available data from previous campaigns



THANK YOU