Comparisons on concretes within the INSIDER projet

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The European project INSIDER (Improved Nuclear SIte characterization for waste minimization in D&D operations under constrained EnviRonment) aims at further improving the management of contaminated materials in nuclear facilities subject to a decommissioning programme, as well as during post-accidental site remediation and clearance, by proposing a methodology that allows the definition and selection of the most appropriate intervention scenarios producing well-characterized radioactive waste for which storage and disposal routes are clearly identified.

As a step towards this accomplishment, the performance assessment and the uncertainty evaluation of available measurement techniques (methods and tools) is necessary and performed in this project by the means of comparisons of measurement results, in lab and in-situ.

On one hand, in-situ (interteams) comparisons were designed in such a way as to be able to analyse the measurement results either by proficiency test to estimate the performance of the methods/teams, or by analysis of variance to estimate measurement uncertainties and the major contributions to the uncertainty arising from being on site.

On the other hand, interlaboratories comparisons were organised, which involved either certified reference materials ("CIL CRM") or reference materials ("CIL real concretes") produced from concretes from the case study, respectively doped from non irradiated real concrete or taken from the bioshield at two levels of activity (a high and a low level). The analysis of the "CIL CRM" comparisons involved analysis of variance within the NF ISO 21748 standard to incorporate estimated measurement bias in the global uncertainty estimate from all participating laboratories, while the analysis of the "CIL real concrete" involved advanced simulation based tools taking into account excess variance (Dersimonian Laird algorithm or Bayesian approach).

The work presented here is applied to the biological shield of the Belgian Reactor 3 (BR3 - Belgian Nuclear Research Centre, Mol) currently under decommissioning, for which the main goal is to economically optimise the bioshield dismantling strategy using a waste-led approach.