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Initial nuclear state characterization in view of decommissioning: Statistical approach guideline and web tool

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Abstract

The **INSIDER project** (2017-2021) developed and validated a new and improved integrated characterization methodology and strategy during nuclear decommissioning and dismantling operations (D&D) of nuclear power plants, post-accidental land remediation or nuclear facilities under constrained environments (1).

One of the important outcomes of this EU horizon 2020 project is **a statistical approach guideline and web tool** (2). The complete initial characterization process can be rather complex: in some cases massive data coming from various sources (on-site and lab measurements, destructive and nondestructive measurements) are being generated, while in other cases only very limited data is available. The tool intends to guide the expert in handling the problem definition and applying a strategy based on **data analysis and sampling design**. The aim of the statistical approach guideline is not to provide the non-specialist with a comprehensive mode of operation for the complete process of initial nuclear state characterization in view of decommissioning.

Analyzing the state-of-the art statistical techniques for preliminary analysis and data processing resulted in the development of a draft strategy and guide. Consequently, this preparatory guidance was **implemented into four different use cases**: a liquid waste storage facility, a biological shield from a pressurized water reactor, a post-accidental site remediation and graphite from a gas graphite reactor. Return of experience from implementing the strategy in those use cases, supplemented with the results from interlaboratory comparison exercises on samples and on-site benchmarking exercises, lead to the adjustment and finalization of the statistical guideline.

The paper will further explain the scope of the statistical approach guideline and show the **use of tool**. It will as well summarize the **lessons learnt** from its implementation into the four use cases. It is obvious that the implementation of a proper data analysis sampling design strategy simplifies and optimizes the decisions making process concerning the selection of the different D&D scenario options.

Acknowledgments

References

(1) The INSIDER project, http://insider-h2020.eu/

(2) The INSIDER Data analysis & sampling design strategy, https://insider-h2020.sckcen.be/