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Study on the Near Real Time (NRT) impact of Safeguards measures for the Encapsulation Plant in Finland

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An encapsulation plant is being co-located with the long term spent fuel geological repository under construction in Finland. Here, spent fuel (SF) coming from different temporary storage in the same country will be encapsulated and moved underground for final disposal. The scope of the planned safeguards measures is to verify the characteristics of the declared SF (using the best methods available) prior to their encapsulation, as from that point on the fuel will be inaccessible for future verification. Once this verification is performed, other measures aim to maintain the continuity-of-knowledge of the SF until the entrance to the final repository; no internal tracking of the SF for safeguards purposes is expected inside the repository, due to its inaccessible nature.
Many options have been considered with regard to the SF verification site(s) and the methods used, starting from the most appealing one: the verification at the Encapsulation Plant itself, as it is the closest to the final repository and an obvious common path for all SF. The demanding process nature of the Encapsulation Plant places stringent mear-real-time (NRT) requirements on the Inspectorate to confirm the declared characteristics of the SF, and notify the operators that they may proceed with the encapsulation process. Non-fulfilment of these requirements would lead to extra costs and effort for all involved parties, especially when considering the expected 100 year operational life of the facility. These requirements have led to choose a different location (initially at the encapsulation plant) for the final re-verification of the SF.
This paper describes the study on NRT impact on the different verification options, in terms of the cost, risks, and effort from the standpoints of both the inspectorate and the facilities operator.

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