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Towards a '3S toolbox' for providing safety, security and safeguards at geological disposal of high-level radioactive waste and spent fuel

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Safety, security and safeguards aspects regarding the geological disposal of high-level radioactive waste and spent fuel are usually addressed separately. Thus, apparently different methods and techniques exist for each of the three "S's". However, by identifying both synergies in overlapping methods or techniques and differences in the requirements with respect to safety, security and safeguards, advantage of inherent synergies and conflicting requirements can be taken at the same time. [1]
The paper identifies methods and technologies (a '3S toolbox') that would be best suited for the holistic consideration of safety, security and safeguards provisions. Such a toolbox could include, first, measurement techniques for spent fuel verification already at the encapsulation plant. Second, a set of measures based on remote monitoring, nuclear measurements, containment and surveillance for application at the encapsulation plant, the geological repository and transfers between both. Third, measures for detecting unauthorized activities, e.g. the analysis of open source information including satellite imagery, geophysical monitoring and environmental sampling.

[1] Niemeyer, I., Deissmann, G., Bosbach, D., Bridging nuclear safety, security and safeguards at geological disposal of high-level radioactive waste and spent nuclear fuel, In: International Conference on the Safety of Radioactive Waste Management, IAEA-CN-242, 21-25 November 2016, Vienna, Austria, Book of Paper, Session 3d, p.20-24.

Summary

Primary author(s) : Dr NIEMEYER, Irmgard (Forschungszentrum Jülich GmbH)

Presenter(s) : Dr NIEMEYER, Irmgard (Forschungszentrum Jülich GmbH)

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