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## Challenges and advancements in spent fuel safeguards in the European Union

Spent fuel arising from nuclear power plant operation is accumulating and most of it is currently stored until a decision is taken on the strategy for disposal. Safeguards inspectorates are facing a growing challenge to verify large numbers of spent fuel assemblies being loaded into dry storage casks –as a result of reactor shut-down or owing to capacity issues in wet storage pools.

The Euratom community would like to send an open message to the nuclear community, asking them to invest in research for developing processes that have the potential of considerably reducing the ever increasing inspection effort on spent fuel verification, while ensuring comprehensive, transparent documentation for future generations.

Euratom is currently involved in the effort that the whole safeguards community is taking to improve effectiveness and efficiency of inspections, by innovating the verification methods and the data flow infrastructure. In this context, we have defined many building blocks of a new comprehensive concept, involving new instruments (like the Passive Gamma Emission Tomographer –PGET), new and automated approaches in data evaluation (e.g. for FDET measurements) and remote data transmission, controlling measurements, seals and surveillance.

This comprehensive unattended verification concept has considerable potential for optimising the use of human resources and safeguards effectiveness, while maximising the efficiency of verifications in similar installations and at encapsulation plants and geological repositories (EPGRs) where thousands of spent fuel canisters will have to be verified prior to final disposal e.g. in Finland, where these installations will become operational in the next decade.

In this paper, we present the lessons-learned from on-field experiences and the perspective advantages of a comprehensive remotely controlled safeguards approach.

### Which "Key Question" does your Abstract address?

NEW1.2

### Which alternative "Key Question" does your Abstract address? (if any)

NEW1.6

### Topics

NEW1

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