

The proposed SPIRE project: Challenge, Scope and Impact

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2016-10-25

Presentation at IGD-TP Exchange Forum 7
Cordoba
Spain

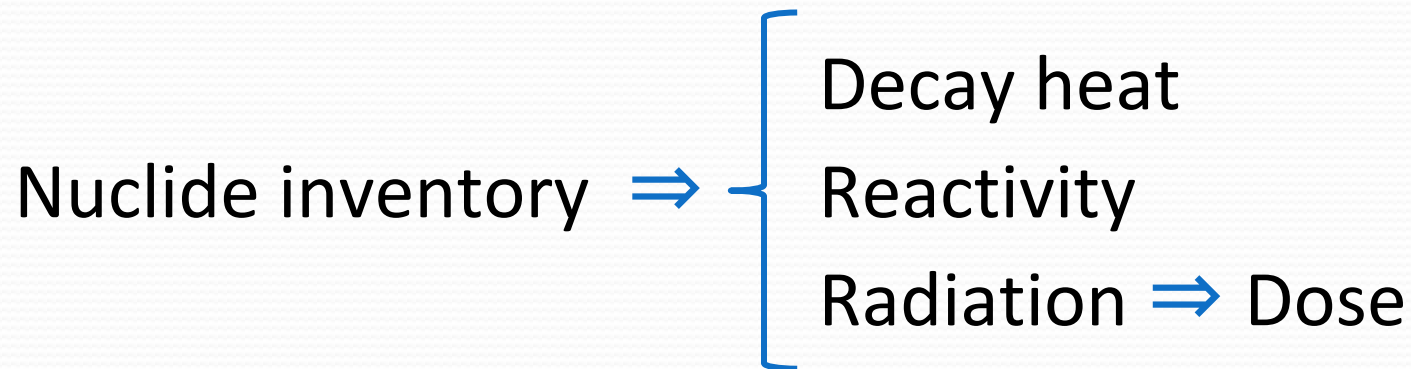


Outline

- CHALLENGE
 - End-user needs
- SCOPE
 - Experiments, Simulations and Uncertainties
 - Work packages
- IMPACT
 - End-user needs
 - Safety margins, economy

CHALLENGE: End-user needs

Safety requirements on barriers for spent nuclear fuel storage/disposal put limits on...



∴ End-users need to know the properties of the SNF with some level of confidence

SCOPE

Main objective:

- Develop experimental and theoretical methods to reduce the uncertainties of observables that are required for a safe, ecological and economical disposal of SNF

SCOPE

Deliverables:

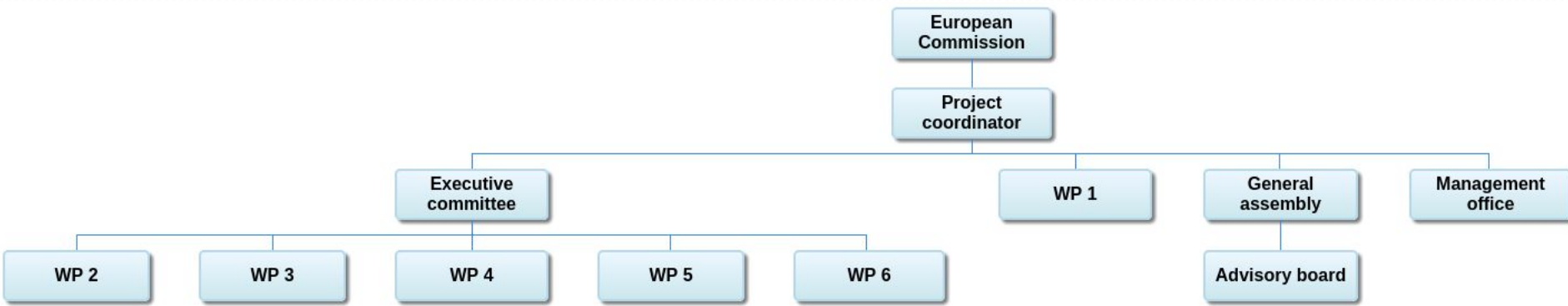
- NDA techniques and instruments for the main observables of interest: Decay heat, Neutron and Gamma-ray emission rates, Reactivity.
- Theoretical models and simulations tools* to predict these observables together with their uncertainties.
- Evaluated uncertainties of the measured and predicted observables.

* Which will be validated through the experimental tasks in the project.






SCOPE: Work packages

WP 1	Project management and coordination
WP 2	Development of novel and refining existing measurement techniques
WP 3	Development of advanced simulation methodologies including uncertainty quantification and propagation
WP 4	Measurement techniques applied on spent fuel
WP 5	Evaluation of results of uncertainty analysis and measurement uncertainties
WP 6	Communication and Competence Building

Organisational Structure



IMPACT

- Optimised packing of canisters 
- Reduced margins to safety limits 
- Smaller repository footprint 
- Optimization of plant operation and maintenance* 
- Ph.D. students in the project ⇒ Competence building for the future 

* E.g., reduced uncertainty on decay heat ⇒ Better estimates of cooling time required before transportation to disposal facility.

SPIRE Partners

- Belgian Nuclear Research Centre (SCK•CEN), Belgium
- European Commission - Joint Research Centre
- LGi Consulting, France
- Paul Scherrer Institut (PSI), Switzerland
- PreussenElektra, Germany
- Swedish Nuclear Fuel and Waste Management Company (SKB)
- UK Atomic Energy Authority (UKAEA), United Kingdom
- Uppsala University, Sweden

Summary

- CHALLENGE:
 - End-users need to know the properties of SNF
- SCOPE:
 - To determine the properties of SNF, incl uncertainty quantification, via experimental techniques and simulations.
- IMPACT:
 - Better information to safety analyses.
 - Economical and environmental benefits.
 - Competence building.