## ABSTRACT

- Overview of radionuclide production and distribution in Metallic radioactive waste generated at different nuclear reactors
- Pre-dismantling classification of metallic waste using modelling
- Detail classification of metallic waste during dismantling using experimental measurements
- Optimized classification DTM radionuclides and Nuclide Vectors (NV) determination for waste stream.

### INTRODUCTION

- CLASSIFICATION: Quantification of specified radionuclides to comply with disposal requirements and disposal site performance objectives.
- The aim of classification of the metallic radioactive waste (MRW) is changing together with MRW activity:
  - the higher activity RW (HLW, ILW) needs classification related to radioprotection and best packaging concept
  - LLW (engineered near surface facilities -> near surface landfill
  - VLLW (near surface landfill -> clearance) needs decontamination and declassification afterwards
  - all waste need optimization of the sorting and waste management procedures

# The largest volumes of waste from the dismantling of nuclear installations are - VLLW and LLW.

Reactor type	Volume (m <sup>3</sup> )	Actvity (TBq)	Reference
BWR	500	500	(USDE, 1997), (Murray, 1994)
GCR	5000	1000	(IAEA, 2008)
LWGR (RBMK)	1500	1000	(IIASA, 2000)
PWR	250	100	(USDE, 1997), (Murray, 1994)
WWER	600	600	(IIASA, 2000)

Volume and activity of LILW generated annually by 1GWe NPP (IAEA, 2010)

# CLASSIFICATION OF THE METALLIC RADIOACTIVE WASTE STREAMS OF THE DIFFERENT TYPES OF REACTORS IN PREDIS

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# CHALLENGES / METHODS

In the frame of PREDIS project, one of WP4 4.5.1 subtask is aiming to provide a scheme for optimised classification of the reactor metallic materials in order to facilitate the procedure of decontamination and clearance or declassification.

#### Methods:

- Modelling (3D reactor simulation with SCALE, MCNP etc.);
- Validation of the models according to available measurements;
- Analysis of experimental results;
- Optimized determination of nuclide vector (NV)- describing inter-correlations between the radioactive waste streams.



RBMK and CANDU type rectors (Walters, 2018)



**OUTCOME / RESULTS** 

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## CONCLUSION

Optimised classification scheme of MRW is beeing developed in the frame of PREDIS project in the WP4 4.5.1 and it is based on nuclide vector (NV) determination the main attention paying on separation of neutron activation and surface contamination activity parts by applying both modelling and measurement techniques (which are beeing developed in WP4 4.5.2 subtask).

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