

IPRESCA

Integration of Pool Scrubbing Research to Enhance Source-term Calculations

OBJECTIVES

The topic of pool scrubbing is of major relevance both in Boiling Water Reactors and Pressurized Water Reactors as it plays a vital role in mitigating the source-term to the environment by retention of fission products passing through water pools. Several international activities including the ones which were launched in the wake of Fukushima accident identified the topic of “pool scrubbing” as a high priority R&D topic, e.g. in a report under preparation by OECD/NEA Senior Expert Group on Safety Research Opportunities Post-Fukushima (SAREF) and NUGENIA Global Vision released in April 2015.

IPRESCA project aims to promote integration of international research activities related to pool scrubbing by providing support in experimental research to broaden the current knowledge and database, and by supporting analytical research to facilitate systematic validation and development of the existing safety analysis tools for plant application and source-term analysis. Integration of experimental test facilities ranging in size from lab-scale (~1 m³) to large scale (~ 80 m³) on the IPRESCA platform shall allow development of generic database for analytical activities performed by the consortium partners. Currently no external funding is foreseen. Partners are expected to join the project with in-kind contributions.

DESCRIPTION OF WORK

For execution of the IPRESCA work programme, 4 separate but interlinked work packages are planned, which comprise literature survey (models and available experiments), new experimental research as well as new analytical research based on this and reactor applications. The WP-5 contains necessary project management. A brief description of the WPs is as follows:

- ❑ WP-1 Critical Assessment of Background
 - Evaluation of the current state of experimental/modelling knowledge
 - Preparation of a PIRT for representative pool scrubbing phenomena/scenarios
- ❑ WP-2 Experimental activities
 - Reference data from different facilities under simplified conditions to substantially narrow down the data uncertainty bands
 - New experiments under complex accident typical conditions
 - Instrument benchmarking: inter-comparison of aerosol measuring devices and procedures
- ❑ WP-3 Analytical activities
 - Evaluation of relevant models
 - Quantification of modelling uncertainties, identification of potential weaknesses in test data and/or models
 - Improvement, simplification or replacement of models if needed.
- ❑ WP-4 Reactor application and Uncertainty analysis
 - Plant calculations including scaling and uncertainty analysis
 - Pool scrubbing relevant information from plant vendors for use in experimental/analytical work

MAIN RESULTS / HIGHLIGHTS

- ❑ Report on critical assessment of pool scrubbing related experimental database and models
- ❑ Preparation of a PIRT on pool scrubbing
- ❑ Results facilitating implementation of new/improved models or stand-alone pool scrubbing codes into system codes e.g. ASTEC, COCOSYS, MELCOR

DURATION

1st January 2018 – 31st December 2020
3 years

CONTACTS

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PARTNERS

INRNE (Bulgaria); CNL (Canada); CIAE, HEU, HUST, NCEPU, NPIC, SJTU, SPICRI (China); UJV (Czech Republic); VTT (Finland); IRSN (France); BT, GRS, HZDR, KIT, Mannheim University, RUB (Germany); BARC, IITB (India); NINE, Politecnico di Milano (Italy); CRIEPI, IAE, JAEA, RASA/MORIMURA Bros. (Japan); FNC, KAERI, KINS, KHNP (Korea); University of Luxembourg (Luxembourg); CIEMAT (Spain); JSI (Slovenia); PSI (Switzerland); University of Missouri, Purdue University (USA)

