NUCLEAR RESEARCH INSTITUTE

Structural and Lifetime Assessment Department
Integrity and Technical Engineering Division

IN VESSEL MELT RETENTION EXPERIMENTAL FACILITIES

THS-15: Large scale experimental facility for IVMR experiments

Value for customers

- **Large scale** experimental **facility THS-15** to demonstrate the ability of Reactor Pressure Vessel (RPV) cooling utilizing the In Vessel Melt Retention (IVMR) strategy during the final stage of a severe accident.
- One of the few experimental large-scale facilities (**THS-15**) of this type worldwide.

- **Small scale** experimental **facility BESTH-2** to study specific effects during the external cooling of RPV, easily adjustable for specific conditions.
- High reachable heat flux (approx. 2,3 MW/m2)

Application

- Demonstration of applicability of the external cooling of RPV during IVMR strategy for Pressurized Water Reactors (PWR) and Light Water Small Modular Reactors (LW-SMR)
- Studies regarding the Critical Heat Flux (CHF) phenomena during IVMR.
- Simulations of conditions during IVMR (e.g., from integral calculations)
- Validation of thermal-hydraulic codes.

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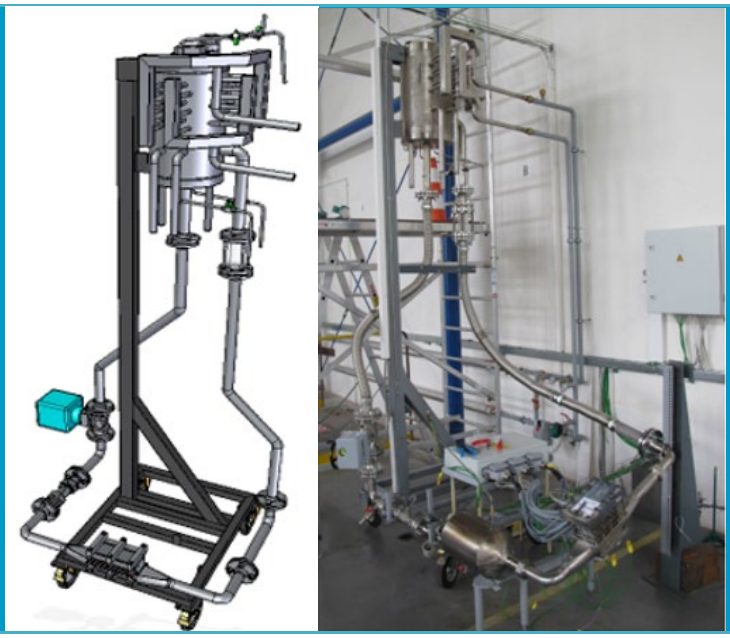
What we offer

- Possibility of thermal-hydraulic codes validation based on experimental results
- CHF phenomena research under specific conditions (RPV inclination, pressure range, type of steel, RPV surface modifications – coatings, roughness, type of coolant) and its influence on the CHF values
- Simulations leading to a refinement of computational work dealing with RPV flooding from the outside
- Chemical experiments (Small scale facility BESTH-2 only) – long term cooling, effect of type of the coolant (DI water, tap water, boric acid, tri-sodium phosphate)
- Along with analytical support, it offers a comprehensive examination of the IVMR strategy for PWRs and SMRs.

Our references

- EU Project “IVMR” (Horizon 2020, Proposal number 662157, 2015 - 2019)
- National project No. TB03SUJB002 (2015 - 2016) “Experimental and analytic works needed for validation of the In-Vessel-Melt-Retention strategy as final solution for the severe accident mitigation for the VVER 1000/320 type NPP”
- National project No. TITSSUJB830 (2020 – 2022) “Assessment of In Vessel Melt Retention Strategy”
- EU Project “SEAKNOT” (HORIZON-EURATOM-2021-NRT-01 under Grant Agreement No. 101060327, 2022 – 2026), SEAKNOT
- EU Project “EASI SMR” (HORIZON-EURATOM -2023-NRT-01, Grant agreement ID: 101164810, 2024 – 2028), Easi-SMR



BESTH-2: Small scale Experimental Facility for IVMR experiments