

- **IVMR HORIZON 2020 Project**
- J.Zdarek UJV Rez
- „Innovations in the Business Sector“
- Czech Office Standard, Metrology and Testing
- June 28, 2018

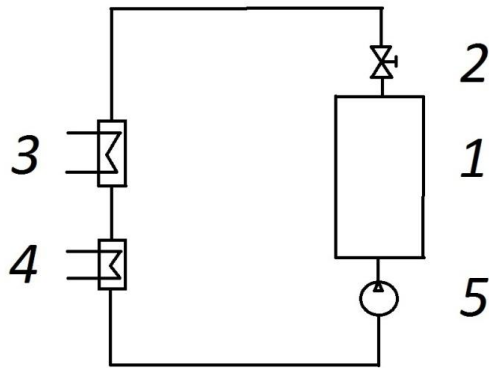
IVMR

- Review existing approach for in-vessel retention
- Extend it to various designs
- Improve it by providing new experimental data and justifying less conservative assumptions
- Investigate possible innovations for in-vessel retention
- Provide harmonized methodology for IVR safety evaluation

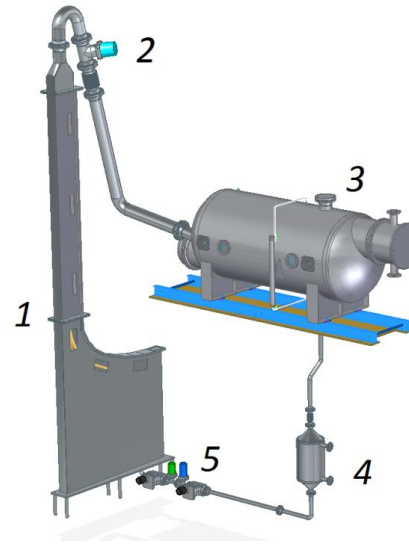
- June 2015-June 2019
- 8,6 M€ (2/3 for experiments) → more than 5 M€ funded by Europe
- 23 European organizations
(Utilities, Technical Support Organizations, Nuclear Power Plant vendors, Research Institutes...)
- IRSN coordination
- Collaborative actions with IAEA
- IVR workshop in Aix en Provence (2016): 130 participants from many countries
- Last workshop in UJV Rez in May 2018. the same number of participants

- KAERI, KINS, KAIST, POSTECH (Korea)
- CNPRI (China)
- IBRAE, NRC-KI (Russia)
- SSTC-NRS (Ukraine)
- IAE (Japan)

Construction scheme of the THS-15



Primary circuit



3D model of the cooling channel and primary circuit

1 – RPV Cavity Model, 2 – Valve to simulate the steam release, 3 – Condenser, 4 – Additional Cooler, 5 – Pump

Section No. 2 near the roof



Section No. 1 and No.2. to be connected



Today summary of our large scale tests

- We have performed 16 large scale tests documented with Test Protocols based on 5 main heat flux profiles
- Heat flux profiles covered 3 calculations – 1 two layer configuration (early phase and late phase) based on KI calculation, 1 three layer configuration (approx. 10000 s and 12500 s) made by KI and one CFD (Fluent) calculation made by UJV
- Heat flux profiles were not carried out of cases with prediction to exceed the CHF (two layer configuration or CFD calc.)
- Large steam bubbles were noticed during the test of three layer configuration HF profiles in the area of lower part of RPV lower head (first rating segment)

- UJV Rez initiated the IVMR Project in HORIZON 2020 proposal.
- With more than 24 participants it was decided to provide leadership to IRSN.
- With application of the IVMR strategy significant increase of NPP safety will be reached.
- Already today, there is growing interest for cooperation on this strategy

Thank you for your attention

