



BUBBLE CONDENSER EXPERIMENTAL QUALIFICATION PROJECT

Abstract

In the present paper are given the following chapters:

1. Short summary of the BCEQ history:

- 1991-94: OECD Support Group on VVER-440 Bubbler Condenser Containment Research Work → supplementary research work needed.
- 1994: EC launched the PHARE project (NUC 93428) Bubble Condenser (BC) Qualification Feasibility Study. It was completed in early 1996 → need for additional research.
- 1996: PHARE project PH2.13/95 was launched.
- 1997: BCEQ was awarded to a Consortium consisting of Siemens/KWU, EdF and Empresarios Agrupados with local Eastern subcontractors.

2. Specific goals of the PHARE Project:

To provide for NPPs of the Beneficiaries:

- representativeness of the results for all BC “operating conditions” (LOCA conditions)
- adequacy and representativeness of the results for concerned national Safety Authorities
- general suitability of experimental results for code validation and assesment.

3. Tasks of the PHARE project:

- 3.1. To study thermo-hydraulic processes and fluid structure interactions for prototype BC of PAKS NPP during DBA LOCA transient (on EREC test facility).
- 3.2. Experimental qualification of BC mechanical structures, specifically for Dukovany and Bohunice structural configuration (on VUEZ test facility).
- 3.3. Supplementary analytical studies requested from SVUSS in Prague, NRI (Czech R.) and VEIKI (Budapest, Hungary).

4. Results of the PHARE Project:

- 4.1. EREC investigations: 3 tests were performed in 1999 (because of EREC test facility was ready with 7 months delay) → tests demonstrated the BC functionality and the physical parameters are far below the values which could create any risk to the BC.
- 4.2. VUEZ investigations: Integrity of gap-cap systems and their capacities to withstand the requested differential pressure up to 30 kPa without loss of integrity were demonstrated.
- 4.3. Analytical studies: OECD group recommended to perform post-test analyses and to carry out further tests. In 2000 VEIKI performed the detailed post test calculations with GASFLOW 3D code → most of the critical remarks made by OECD group answered.

5. Present status of the BC problem:

- 5.1. New project between Dukovany, Mochovce, Bohunice and Paks NPP to perform additional tests is going on now. According to the scenarios planned to be tested following agreement has been reached: Main steamline break, 200 mm LOCA, 90 mm LOCA.
- 5.2. EU Steering Group and TSO activities have already started.