The Electronic Library of the Thermal Physical Databases

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Up-to-date quality assurance procedure requires the permanent verification of the best-estimate thermal-hydraulic system codes and the uncertainty analysis of results. Therefore, the researches need the growing up amount of the experimental data.

Over the last years RDIPE has been carried out the verification of RELAP5/mod3.2 code and safety analysis for NPP with RBMK reactor. Moreover, these activities include both Russian (Puchok, Korsar, RATEG) and foreign codes (RELAP, MELCOR, ATHLET). Such activities require of the accumulation and the assessment of the large amount of experimental data.

Electronic data base library was created in order to unify and keep the large amount of the primary experimental data. The special attention was given to completeness and sufficiency of information for modelling of the experiments. Generally this activity was carried out in the collaboration with the authors of experiment.

First of all the experimental data for the additional verification of Russian and foreign codes relating to RBMK reactor safety analysis were included in the library. The following phenomena are specific and important:

- outflow from the main circulation circuit including critical flow of water, two phases mixture and vapour through the break, flow limiters, long channels with/ without local resistance and other circuit elements;
- thermal hydraulic process in reactor channels: pressure-drop, relative movement of phases, countercurrent flow, reflooding;
- heat transfer in fuel bundles including radiation heat transfer;
- heat transfer before and after critical heat flux transition in the rod bundle:
- variation of steam-water level in drum separator;

These phenomena were studied at the test sites of KPI (Ukraine), Lithuanian Energy Institute, RDIPE (Russia), Russian Research Center «Kurchatov Institute», EREC (Russia) and others. Transient modes data from operating power plants became the important part of the library.

The authors of the electronic thermal physical base library collect experimental data-base not only for verification of one-dimensional thermal hydraulic system codes with average flow parameters but also include data useful for the subchannel thermal hydraulic analyses in rod bundles

We update the library regularly. Now the library contains the following bases:

- critical heat flux databank (10000 experimental points, 136 test sections, 57 sourses),
- post-crisis heat transfer,
- void fraction in vertical pipes and rod bundles;
- critical flow from pipes, valves and flow limiters;
- heat transfer to supercritical water;
- local thermal hydraulic parameters in fuel rod assemblies;
- transient processes on test sites and nuclear power plants.

MS Access was used for the creation of the library. The experiment description and results are saved in MS Word and Excel formats correspondently. The basic principles of the library are:

- the regular updating of the library;
- the searching and choosing data by user's specify parameters
- the simple data processing;
- the information in each databank must be efficient both for traditional analyses methods and new approaches.

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