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Probabilistic Safety Analysis of NPP with BREST-OD-300 reactor

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As part of the PSA level 1 with BREST-OD-300 reactor the following main tasks have been solved:

- selection and grouping of initiating events. List of IE was formed as a result of the analysis (including specific local impact);
- success criteria (SC) for safety systems and functions. In the frame of this task several deterministic calculations were performed;
- analysis of accident sequences. For each groups of IE models of accident sequences were developed and event trees were constructed. Developed event trees for all groups of IE were included into the logical-probabilistic model of the unit to estimate the probability of the final states;
- analysis of systems. In the frame of this task logical-probabilistic models (fault trees) have been developed for the following systems:
 - a) the system of emergency cooling of reactor (SECR);
 - b) the steam generator leak localization system (SGLLS);
 - c) the integrated system of reactor control and shutdown (ISRCS);
 - d) the control system of technological process (CSTP);
 - e) the system of reactor normal cooling (SNC);
 - f) the gas system of reactor unit (GSRU);
 - g) the electrical power system;
 - h) the system of steam generator protection;
 - i) and others;
- data analysis. Evaluation of the frequency of IE groups was based on the generalized statistical data processing from different NPPs and research reactors;
- analysis of PSA results. The resulting integral risk value of severe core damage (category A) is $9,01 \cdot 10^{-9}$ 1 / year. It meets the target values of NP-001-15 (Regulatory requirements) for the total yearly probability of severe accidents 10^{-5} , and also for the total probability of a large accidental release 10^{-7} .

Country/Int. Organization

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