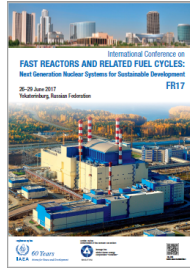


# International Conference on Fast Reactors and Related Fuel Cycles: Next Generation Nuclear Systems for Sustainable Development (FR17)



Contribution ID: 549

Type: ORAL

## DETERMINISTIC SAFETY ANALYSIS OF REACTOR BREST-OD-300

Wednesday, June 28, 2017 2:10 PM (20 minutes)

As part of the power unit with reactor BREST-OD-300 project justification, deterministic safety analysis with imposition of postulated single failure of systems and equipment, or human error on the initiating event (IE) was held in JSC "NIKIET". Work was done for the version of the core with jacketless TVS. The calculations were performed using the verified dynamically bound neutron-physical and thermal-hydraulic software package DINAR.

Results of the safety analysis of the power unit with reactor BREST-OD-300 are presented in the paper for up to four OE violations in normal operation (VNO), one from each group of the internal effects listed below. Selected VNO initiating events, accompanied by the greatest disturbance and deeper relative to the nominal power deviations of parameters important to safety. Initial events of violations in normal operation were considered including the following groups of effects:

- Initiating events that lead to the unauthorized introduction of positive reactivity;
- Initiating events that lead to the disruption of the heat sink from the core;
- The deterioration of heat removal by second circuit;
- Excess heat removal by second circuit.

Scenarios of IE with the imposition of a single failure of the safety systems, or human error take into account the requirements of the Russian nuclear power industry standards and regulations, according to which the power plant security must be provided in any of the initial event carried in project with imposition of one independent from the initiating event failure of any of the following safety systems: an active element or a passive element having mechanical moving parts, or a passive element with no moving parts, having a probability of failure of safety functions  $10^{-3}$  or more, or one independent from the initiating event of personnel mistakes in accordance with the principle of single failure. In addition to the one failure of the one of the elements listed above and independent from the initiating event, all failures resulting from this single failure or initial event, as well as non-detectable failures in the operation of the AC elements affecting the development of the accident were taken into account.

As the security criteria of the reactor facility in violation of the normal operation the exceedance of the established design limits of the power unit parameters were taken.

### Country/Int. Organization

JSC NIKIET, Moscow/Russia

**Primary author:** Mr STREMIN, Andrei (JSC NIKIET, Moscow/Russia)

**Co-authors:** Mr MURATOV, Andrei (JSC NIKIET, Moscow/Russia); Mr LEMEKHOV, Vadim (JSC NIKIET, Moscow/Russia)

**Presenter:** Mr STREMIN, Andrei (JSC NIKIET, Moscow/Russia)

**Session Classification:** 3.5 General Safety Approach

**Track Classification:** Track 3. Fast Reactor Safety