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Use of reactors with fast resonance neutron spectrum cooled by water of supercritical pressure for nuclear stations of low power

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As a result of research for about 10 years in the FSUE "SSC RF - IPPE", OKB "Hydropress", "Kurchatov Institute", NIKIET with water cooled reactors with SCP with thermal and fast neutron spectra. Since 2006 JSC "SSC RF - IPPE" and OKB "Hydropress" are working together to conceptual design WWER-SKD - SKP single-loop NPP with coolant with fast-resonance neutron spectrum capacity of Ne = 1700 MW. This Rector has been acknowledged as the prospect of WWER technology with the ability of a transition to the use of MOX-based (U-Pu-Th) fuel and the closed fuel cycle. State Corporation "Rosatom" recognized this trend as an innovative system and signed an agreement on Russia's participation in the GIF towards SCWR. There is a possibility of using reactors VVER-SKD with a quickly-resonant spectrum of neutrons capacity from 0.3 to 30МВт for nuclear stations of low power (ACMM) are considered. Results of neutron-physical calculations of fuel cycles with MOX-fuel from oxide uranium and plutonium with possible duration of campaign from 2 till 20 years are presented. Preliminary results of calculations weight-dimensional characteristics in comparison with others offered ЯЭУ the specified appointment are resulted. The received results can be used at a substantiation and development of the concept of the developed reactors cooled by water at supercritical parameters, the big capacity for the future atomic.

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Modeling of corrosion products migration in the secondary circuit of NPP with VVER-1200

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Models describing the distribution of concentrations of ethanolamine and ammonia, pH values, corrosion and mass transfer of corrosion products in the secondary circuit of NPPs with VVER-1200 are presented in this work. These models are used to develop computational codes. Calculation of mass transfer and distribution of corrosion products on various flows of the secondary circuit working environment is made by using the physico-chemical model of mass transfer of corrosion products in which the secondary circuit is considered as a cyclic system consists of several interconnected elements. The circuit was divided on calculated parts, where the change of parameters (flow, temperature, pressure) was traced and the rate, of corrosion and corrosion products transport, the value of high temperature pH and concentration of iron calculated were calculated. Verification of the models is made by using the results of chemical analyses on operating nuclear power plant since its start-up and the concentrations of iron corrosion products in feed-water for various NPP depending on pH at 25°C. The calculations results of the parameters of the corrosion and corrosion products mass transfer showed that the model allows to the designer to decide what is more profitable for some parts of the circuit: the concentration increase of corrective agents, the use of steel with a high content of chromium or the periodic cleaning of the steam generator from the crud.

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