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Физико-технический институт
ТОМСКИЙ ПОЛИТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ

ANALYSIS OF DOSE CHARACTERISTICS IRRADIATED (TH, PU) O₂ FOR THE ORGANIZATION OF ACCOUNTING AND CONTROL OF NUCLEAR MATERIALS IN THE PRODUCTION

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Because of neutron radiation and processes which lead to its education in crust, are connected difficult about the diverse nuclear and physical phenomena. The main processes causing the natural neutron radiation of the got breeds following: 1) spontaneous division of heavy-nuclei; 2) (α, n) - reactions on easy elements under the influence of natural - radiators; 3) generation of neutrons under the influence of space radiation; 4) resonant photonuclear reactions.

The contribution of the listed above channels of formation of a neutron background will be defined by composition of ore, technology of production and processing, feature of course (α, n) - reactions. If at uranium production there is a powerful source of α - particles, the significant role in formation of a neutron background is played (α, xn) - reactions. An exit of neutrons on reaction (α, n) for the most widespread elements of crust is studied rather well [1], he is studied also for the fresh and irradiated nuclear fuel [2]. Despite it the tendency of increase of a neutron background of the fresh and irradiated nuclear fuel (the regenerated fuel, fuel compositions of type – (Pu, Th) by O₂, (U, Pu) O₂, UC / (U, Pu) C, UN / is observed already today (U, Pu) N)) that demands revision of procedures of the treatment of this fuel in production.

Work purpose: to carry out a settlement assessment of an exit of neutrons at production stages (a chemical compound of UF₆) and storages of nuclear fuel (finished goods – UO₂, regenerate, (Pu, Th) O₂, (U, Pu) O₂, UC / (U, Pu) C, UN / (U, Pu) N)).

In the work the physical and mathematical model of processes allowing to carry out quantitative estimates of an exit of neutrons from various fuel compositions is offered. Calculation of spectral structure of radiation is performed by sharing of a settlement code on the basis of the Monte-Carlo method (MCU₅) and modern libraries of the estimated nuclear data.

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WWER-1300 SAFETY SYSTEMS ANALYSIS

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This paper discusses the principles of WWER-1300(WWWER-TOI) safety. WWER-TOI or WWER-TOI is a project for a two-unit water pressurized reactor constructed to meet modern nuclear and radiation safety requirements.

The paper considers:

Safety barriers