

Status of Nuclear and Radiation Safety of SNF Transportation in Russia and Challenges for Transportation of MOX from VVER-1000 Reactors -ABSTRACT

This paper overviews current regulatory practices for the assurance of nuclear and radiation safety during railway transportation of SNF on the territory the Russian Federation from NPP's to long-term-storage of reprocessing sites. The legal and regulatory requirements (mostly compliant with IAEA ST-1), licensing procedure for NM transportation are discussed.

The current procedure does not require a regulatory approval for each particular shipment if the SNF fully comply with the Rosatom's branch standard and is transported in approved casks. It has been demonstrated that SNF packages compliant with the branch standard, which is knowingly provide sufficient safety margin, will conform to the federal level regulations. The regulatory approval is required if a particular shipment does not comply with the branch standard. In this case, the shipment can be approved only after regulatory review of Applicant's documents to demonstrate that the shipment still conformant to the higher level (federal) regulations.

Several typical examples and experience gained from regulatory reviews of such "non-standard" SNF shipments from VVER-440 reactors in wet casks TUK-6 and from VVER-1000 in dry casks TUK-13 are presented. Also, the paper discusses foreseen implications related to transportation of high-burnup and mixed-oxide SNF.

The spent MOX-fuel is given a special attention due to the anticipated future needs for transportation of spent MOX-fuel to be produced under the US-Russian Weapon-Grade Plutonium Disposition Program from VVER-1000 to long-term storage sites. It has been shown that the neutron radiation will be very high from spent MOX-fuel exposed to burnups which will be enough to convert weapon-grade plutonium into a weapon unusable form. As a result, in order satisfy radiation safety criteria the spent MOX-fuel will require longer cooling period in at-reactor fuel storage pools before it can be transported using existed casks, which in its turn will result in exhaustion of the reactor pool capacity and, finally, reactor shutdown. Several possible options to solve the problem are further considered.