Contribution ID: **155** Type: **Poster**

Increasing plutonium disposition rate in the thermal reactors (VVER and RBMK)

Wednesday, 26 June 2019 10:45 (15 minutes)

Several countries reuse MOX fuel (reactor-grade (RG) and weapons-grade (WG) Pu) in the thermal reactors, but within no more than 30% of the total core loading. Many years of operational experience with MOX-fuelled cores along with well-developed technologies in the management of MOX fuel demonstrate possibilities in extending MOX fuel share in commercial nuclear power plants. Therefore, this paper deals increasing weapons-grade plutonium disposition rate (mPu) in the thermal reactors using differenced methods as: reducing the burnup, reducing the residence time of the MOX assemblies in the reactor, increasing the fraction of MOX assemblies in the core, and reducing the plutonium enrichment in the MOX fuel. The results showed at EOC for 100% MOX fuel that the mPu were: 1320 and 930 kg/year and the 240Pu fractions were: 31 and 45% for VVER and RBMK respectively. The mPu was increased: 930, 985, 1076 and 1590 when the plutonium enrichment was reduced: 1.8, 1.6, 1.4, 1.0 % respectively. The mPu was increased by 45% when using four UO2 fuel cycles and one MOX cycle instead of three UO2 fuel cycles and one MOX cycle.

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Country or International Organization

Syrian Arab Republic

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Session Classification: Track 4 Poster Session

Track Classification: Track 4: Recycling as a spent fuel management option