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Multi-MOX: Facilitating plutonium multi-recycling in the French PWR fleet

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This study examines the Multi-MOX (MMOX) strategy for plutonium multi-recycling in PWRs using the CLASS fuel cycle simulation tool. MMOX involves blending reprocessed plutonium from various sources to produce viable fresh nuclear fuel. While MMOX significantly curtails the growth of the plutonium inventory, it does not stabilize it entirely in the long term. Although lower burnup reduces plutonium buildup, it increases the production of minor actinides. Comparing MMOX to non-recycling and mono-recycling scenarios, we find that it reduces plutonium inventory by 35% and 19%, respectively. Despite higher minor actinide production, MMOX decreases overall transuranic element production. Additionally, MMOX reduces the need for interim spent fuel storage by a factor of ten compared to non-recycling and by two-thirds compared to mono-recycling, while substantially lowering the age of stockpiled used nuclear fuel.

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