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Accelerator Driven Subcritical Reactors for Weapons-Grade Plutonium Disposition and Energy Generation

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We discuss the GEMSTAR reactor concept, which addresses all historical reactor failures, which includes an internal spallation neutron target and high temperature molten salt fuel with continuous purging of volatile radioactive fission products such that the reactor contains less than a critical mass and almost a million times fewer volatile radioactive fission products than conventional reactors like those at Fukushima. GEMSTAR is a reactor that without redesign will burn spent nuclear fuel, natural uranium, thorium, or surplus weapons material. It will operate without the need for a critical core, fuel enrichment, or reprocessing making it an excellent candidate for export. While conventional nuclear reactors are becoming more and more difficult to license and expensive to build, SRF technology development is on a steep learning curve and the simplicity implied by subcritical operation will lead to reductions in regulatory hurdles and construction complexity.

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