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Conceptual Core configuration for increasing Power of Fast Breeder Reactor to 40 MWt

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Fast Breeder Test Reactor (FBTR) in India is designed for 40 MWt Thermal 13.2 MWe. At present FBTR is operating at 32 MWt with 56 fuel sub assemblies (FSA) of 48 Mark I and 8 MOX type fuel sub assemblies. Mark I FSA are of Pu-U Carbide fuel with 70% Pu and MOX FSA are of PuO₂ (44%) and UO₂ (56%). Due to constraint on minimum shut down margin of 4200 pcm, the core could not be expanded and hence the power could not be increased to design power. A conceptual core configuration has been suggested and safety analysis was being carried out, by introducing four poison sub assemblies, Boron SA, with 50% B₁₀ concentration, in the second ring, which would enable to expand the core and increase the power to the design power of 40 MWt and at the same time minimum criterion on shut down margin also will be met. The envisaged core for 40 MWt comprises 70 numbers of Mark I FSA.

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