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Nuclear fuel cycle analysis of the SABR fusion-fission hybrid transmutation reactor CHRIS SOMMER, George Tech, WESTON STACEY, BOJAN PETROVIC, Georgia Tech — Various fuel cycles have been designed and analyzed for the Subcritical Advanced Burner Reactor (SABR). SABR is a sodium cooled fast reactor fueled with transuranics (TRU) from spent fuel of light water reactors and driven by a tokamak fusion neutron source based on ITER physics and technology. SABR employs a four batch fuel cycle using an out-to-in shuffling pattern, with the fuel being reprocessed at the end of each cycle. The reprocessing method assumes recovery rates of 99.9% of the actinides and 0.1% of the fission products remain in the recycled fuel. The reprocessing fuel cycles were analyzed to find an optimal cycle length in terms of burn up, power distribution, and materials limitations. Fuel cycles are analyzed using CEA's ERANOS2.0 code, with fuel residence times limited by radiation damage at 100, 150 and 200 dpa.

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