

Activity and Decay Heat Estimates for the European DEMO Divertor with Respect to WCLL and HCPB Breeder Blanket Module Integration

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This work was carried out within the framework of EUROfusion/PPPT SAE (Safety and Environment) project. Activity and decay heat values were calculated for the DEMONstration power plant (DEMO) 2015 baseline model divertor. Two irradiation scenarios were considered lasting for 5.2 and 14.8 calendar years respectively. Each irradiation scenario describes continuous irradiation with exception of 10 days in the end where irradiation corresponds to an operation cycle (4 hours of irradiation, 1 hour of rest). Activation characteristics for divertor were obtained with regards to three different blanket module configurations: single-module segmentation water cooled lithium lead (WCLL SMS), multi-module segmentation water cooled lithium lead (WCLL MMS) and helium cooled pebble bed (HCPB). Divertor model consists of 62 segments subdivided into 4 layers with different material makeup. Neutron transport calculations were performed with MCNP code with JEFF-3.2 nuclear data library. Activation calculations were performed with FISPACT code with EAF-2010 nuclear data library.

In general, lowest decay heat and activity values for whole divertor were seen in HCPB model configuration followed by WCLL MMS and WCLL SMS.

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