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Activity inventories and decay heat generation of the LIEBE target at CERN

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LIEBE (Liquid Eutectic Lead Bismuth Loop Target for EURISOL) is envisaged to enhance production of short-lived isotopes at higher beam powers. Radioisotopes produced at MEDICIS facility are extracted via mass separation, implanted in a small foil and delivered to other research facilities and targets like LIEBE. The high intense neutron and gamma radiation produced in the liquid PbBi target results in a strong activation of the target. The activation and decay heat generation of the LIEBE target need to be assessed for maintenance, decommissioning and waste management purposes and the related safety analyses.

This paper presents the analyses performed within the study for providing up-to-date estimates of the activity inventories and the decay heat generation in the LIEBE target. To this end, a series of coupled MCNP transport and FISPACT-II inventory calculations were performed using the up-to-date LIEBE model and nuclear cross-section data from the FENDL-3.1 data library. Activity inventories and decay heat data were assessed for the target, consisting the PbBi, steel and other component materials.

The paper discusses the results obtained for the activity and the decay heat as a function of the decay time after radiation and also addresses the issue of the radiation dose loads which are to be expected due to the activated components/systems including PbBi eutectic.

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Footnotes

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