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Radiological studies for FCCee

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The radiation protection studies shall ensure that the proposed design of FCCee is compatible with the objectives and constraints for radiological protection of the personnel and the environment. An assessment of the radiological parameters, such as the levels of prompt and residual radiation and activation, allows to evaluate their impact during the operation and maintenance of the facilities.

The studies further provide input, the expected released activities through air and water, to the radiological environmental impact study. This allows to confirm that the design of the FCCee will align with the environmental objectives and constraints for the protection of the public.

FLUKA Monte Carlo simulations are performed to confirm that the envisaged design of the civil engineering infrastructure minimizes the prompt and residual radiation levels in areas where access is required. Either during maintenance periods, i.e. in the arc, at beam and beamstrahlung dump locations, around the positron target or during operation periods, i.e in the service caverns, the klystron galleries or the surface facilities.

A first evaluation of material activation is also conducted, as it involves various types of constraints. The activation of high volume accelerator components (such as yokes, coils, photon absorbers, synchrotron radiation shielding) is evaluated to assess the potential radioactive waste production. This study is still in its preliminary stage, and will help to select materials that can be removed from regulatory control within a foreseeable timespan after the FCCee operation.

We will present an overview of the conducted studies and outcomes and present an outlook on what will be important in terms of radiation protection optimisation in the ongoing feasibility study and as the FCCee project further develops.

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