

Radiation protection studies for the design of the CERN Neutrino Facility (CENF)

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A short-baseline CERN Neutrino Facility (CENF) has been proposed in which a high-intensity 100 GeV proton beam with a beam power of up to 200 kW will be directed to a new fixed target complex in the North Area of the CERN Prévessin site. The target complex will be located underground at a depth of 15 m and contains, in addition to the production target itself, a focusing system, a decay tunnel and a subsequent beam dump & hadron absorber. The produced neutrinos will then be measured with a near and far detector both located within CERN territory at 460m and 1600m from the target, respectively.

In order to respect the applicable CERN radiation protection legislation regarding doses to personnel as well as the environmental impact, a full radiological assessment of the CENF facility has been carried out. Studies include expected prompt and residual dose rates in the various accessible areas of CENF as well as the effect of the stray radiation on the surrounding experimental and public areas. Furthermore, the risk due to activated air and the consequence of its release into the environment has been evaluated. Finally, studies on ground activation, radioactive waste zoning and radiation exposure of equipment have also been conducted. All studies are based on simulations using the FLUKA Monte Carlo particle transport code.

The results of the radiological assessment, which allowed a careful optimization of the CENF design with regard to radiation protection, will be presented.

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