national accelerator laboratory

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COMMENTS TO "BEAM ABORT SYSTEM FOR THE MAIN RING" (FN-195)

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Secondary particles from the extranuclear cascade in T-1, created by the scrapped protons, will be caught by T-2 and T-3 as well as M-2 and M-3.

The exact fate of the multiple coulomb and diffraction scattered protons has to be studied with a Monte-Carlo type calculation, sampling properly from the beam phase-space and taking into consideration the rate of growth of the beam "bump." Then, a choice may be made between low-A versus high-A inner layer scattering material for T-1.

There are at least two criteria for the choice of beam stopper thicknesses such as T-1 through T-4. One criterion is the dose rate to the coils and their expected useful life. Another one is the remanent exposure rate at some distance from the magnets after given irradiation, cooling-off times, and average beam power loss. In addition, the upstream end of the beam stoppers should be designed with re-entry shapes to minimize backscattered hadron flux.

Should it be desirable to reduce even further the hadron power loss in the accelerator magnets following M-4, then the possibility of increasing the bending powers of M-1 and M-2 + M-3 must be

considered. This increase in bending power would permit increasing the distance between M-3 and M-4, effectively reducing the available solid angle available to the elastic scattered protons and secondaries.

Finally, on page 5 the definitions for θ_{rms} and ϵ are incorrect. The proper formulae are

$$\theta_{rms}\ (\text{projected}) = \frac{0.015}{\beta p}\sqrt{\frac{L}{L_{rad}}}\ (1 + \epsilon)$$

$$\epsilon = -0.14 + 0.06 \log_{10}\left(\frac{L}{L_{rad}}\right).$$

Neither the formulae on page 7 nor the table on page 8 have been checked.