Optimization of the LHC Interaction Region With Respect to Beam-Induced Energy Deposition[*], N. MOKHOV, FERMILAB; J. STRAIT[#], CERN - Energy deposition in the superconducting magnets by secondary particles from pp collisions is a significant challenge for the design of the LHC high luminosity insertions. We have studied the dependence of the energy deposition on the aperture and gradient of the inner triplet quadrupoles, the length and position of the beam separation dipoles, and the placement of collimators and absorbers in front of and within the bore of the quadrupoles. Monte Carlo simulations were made using the code DTUJET93 to generate 7x7 TeV pp events and the code MARS13(95) to follow hadronic and electromagnetic cascades induced in the insertion components. The 3D geometry and magnetic field descriptions of the LHC-4.1 lattice were used. With a quadrupole aperture ≥ 70 mm, absorbers can be placed within the magnet bore which reduce the peak power density, at full luminosity, below 0.5 mW/gm, a level which appears to allow the magnets to operate at their design field. Heat load to the cryogenic system, residual dose rate and accumulated dose are also optimized.

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