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Radiation Skyshine Calculation with MARS15 for the mu2e Experiment at Fermilab

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The Fermilab Antiproton source is to be repurposed to provide an 8 kW proton beam to the mu2e experiment by 1/3 integer, slow resonant extraction. Shielding provided by the existing facility must be supplemented with in-tunnel shielding to limit the radiation effective dose rate above the shield in the AP30 service building. In addition to the nominal radiation shield calculations, radiation skyshine calculations were required to ensure compliance with Fermilab Radiological Controls Manual. A complete model of the slow resonant extraction system including magnets, electrostatic septa, magnetic fields, tunnel enclosure with shield, and a nearby exit stairway are included in the model. The skyshine model extends above the beam enclosure surface to 10 km vertically and 5 km radially.

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