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Simulations of Cosmogenically Induced Neutrons for LEGEND-1000 CLAY BARTON, Univ of South Dakota, LEGEND COLLABORATION — The LEGEND (Large Enriched Germanium Experiment for Neutrinoless Double-beta decay) Collaboration aims to develop a phased, ^{76}Ge-based double-beta decay experimental program with discovery potential at a half-life beyond 10^{28} years, using existing resources as appropriate to expedite physics results. The host site for the second phase, LEGEND-1000, has yet to be selected. One factor impacting site selection is the background generated by cosmogenics (muons). The most important component of this background is the muon-induced neutrons, because these neutrons can create radioactive isotopes which decay long after the muon veto window. Using a GEANT4-based module, the cosmogenic background is currently being studied. This module allows for the testing of possible shielding configurations and materials. By using parametrized formulas for the properties of the incident muons, potential host sites can also be modeled. This work seeks to inform the design of LEGEND-1000 using simulation results, as well as to assist in the site selection for this next phase.

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