

NE-21-26061, Microreactor Control Drum Failure Simulation

Founded in 2019, Radiant is a small business located in El Segundo, California. Radiant is developing the first portable micro-High Temperature Gas Reactor (HTGR) and has set a goal to deploy it within 6-8 years. While this is an aggressive schedule, they believe engineering rigor and continuous regulatory engagement will yield success. “Dedication to making nuclear technology cost effective and portable” is their mission.

Radiant has been utilizing the Department of Energy Office of Nuclear Energy (DOE-NE) developed Nuclear Energy Advanced Modeling and Simulation (NEAMS) suite of codes to aid in the design of their micro-HTGR. However, a transient model to simulate “runaway” control drum motion is necessary to allow for accident scenario simulation so that Radiant can finalize control drum motor sizing and control system loop stability. This can be accomplished by using Griffin, a Multiphysics Object Oriented Simulation Environment (MOOSE)-based reactor physics application, which is a subset of the NEAMS tools. Radiant will work with INL to couple Serpent and Griffin to enable a thermal-hydraulics and neutronics multiphysics model of the transient scenario which will accelerate Radiant’s reactor design process.