Dynamic Modeling of Small Modular Nuclear Reactors using MoDSim

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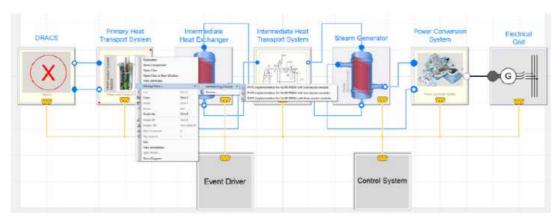John Batteh[2]   Michael Tiller[3]
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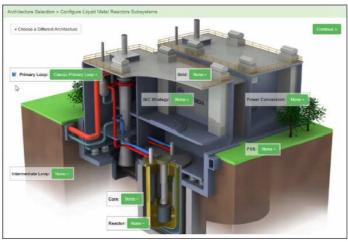[2]Modelon, Inc., Ann Arbor, MI USA
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As part of the advanced small modular nuclear reactor (AdvSMR) R&D program, Oak Ridge National Laboratory (ORNL) is developing a Dynamic System Modeling Tool (MoDSim) to facilitate research and development related primarily to instrumentation and controls (I&C) studies of small modular reactors (SMRs). This paper describes the use of Modelica models and Functional Mockup Interface (FMI) to model, simulate, and deploy compiled models via a web-based platform based on FMQ from Xogeny. The web platform allows both model configuration and parameter specification. The application employs the FMI Add-in for Excel from Modelon to provide automated simulation and post-processing capability locally in Microsoft Excel. The key features of the models, application to the PRISM reactor concept, and simulation platform are discussed and initial results presented.

SMR modeling architecture

SMR model configuration via web-based platform