

## **Verification of Earthquake Simulation Capabilities for Small Modular Reactor (SMR) Floating Seismic Isolation Systems**

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The U.S. Nuclear Regulatory Commission (NRC), Office of Nuclear Regulatory Research is executing technical work to provide understanding of the performance of floating seismic isolation systems (FSIS) that have been proposed for small modular reactors (SMR). The NRC effort, under a Memorandum of Cooperation between the NRC and the Japan Atomic Energy Agency (JAEA), is focused on the development and evaluation of system computational models that can represent the phenomena associated with coupled fluid-structure dynamic response of a fluid isolated SMR during earthquake events. The evaluation and successful testing of available computer modeling capabilities will provide the NRC with experience as well as technical tools necessary to evaluate the seismic performance and safety of isolated reactors.

Lawrence Berkeley National Laboratory (LBNL) is supporting the NRC in the evaluation of existing software tools for adequate simulation of FSIS earthquake response. In this effort two widely used nonlinear finite element codes LSDYNA and OpenSeesPy are being evaluated. The evaluation is in terms of the ability of the software to simulate earthquake generated transient dynamic response after appropriately gravity-initializing an SMR-fluid system with air cavities, and to evaluate the efficacy of the proposed isolation concepts. This presentation will provide an overview of the simulation evaluations performed to date, including the completion of a set of test problems that allow critical assessment of code performance for the necessary elements of FSIS earthquake response.

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