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U.S. Sodium Fast Reactor Codes and Methods: Current Capabilities and Path Forward

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The United States has extensive experience with the design, construction, and operation of a variety of sodium cooled fast reactors (SFRs) over the last six decades. Despite the closure of various facilities, the U.S. continues to dedicate research and development (R&D) efforts to the design of novel experimental, prototype, and commercial facilities. Accordingly, in support of the rich operating history and ongoing design efforts, the U.S. has been developing and maintaining a series of tools with capabilities that envelope all facets of SFR design and safety analyses. This paper will provide an overview the current U.S. SFR analysis toolset, including codes such as SAS4A/SASSYS-1, MC2-3, SE2-ANL, PERSENT, NUBOW-3D, and LIFE-METAL, as well as the higher-fidelity tools (e.g. PROTEUS) being integrated into the toolset. Current capabilities of the codes will be described, and key ongoing development efforts will be highlighted.

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