

NE-21-26096, Experimental and systems-level validation of thermal-hydraulic behavior in SFRs

Based in Sunnyvale, California, Oklo Inc. is a privately funded nuclear technology developer. They are currently developing the Aurora product line, which is a series of commercial reactors on the megawatt scale. The primary purpose of these reactors is to provide off-grid electric power to remote locations all over the world.

Two of the largest sources of uncertainty in systems-level modeling of liquid metal fast reactors are thermal stratification and transition to natural circulation. This project seeks to address the gap in high-resolution and high-quality data in various conditions of interest related to these phenomena. Oklo will partner with Argonne National Laboratory (ANL) to generate high-pedigree experimental data to help to validate the systems analysis codes SAS4A/SASSYS-1 and SAM which can be used to inform advanced reactor designers on thermal-hydraulic behavior during transients as well as support licensing activities. These phenomena will be studied through prioritized experimental activities within the Thermal Hydraulic Experimental Test Article (THETA) facility which is a newly installed component of the Mechanisms Engineering Test Loop (METL) facility at ANL.

The potential benefits of this project will include the ability to use higher temperatures and yield higher power operations through reduced conservatism. This will improve economic competitiveness and reduce uncertainties associated with thermal-hydraulic modeling of these phenomena, which can lead to more efficient safety margins.