



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

Computational and Experimental Benchmarking for Transient Fuel Testing

OVERVIEW

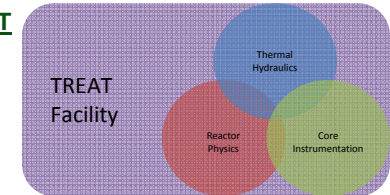
Purpose: Support the transient fuel testing and Transient Reactor Test (TREAT) Facility Research efforts through comprehensive computational and experimental benchmarking. This includes both reactor physics and thermal hydraulics benchmarking efforts.

Objectives: This integrated research project contains four clear objectives:

- A comprehensive evaluation of existing TREAT Facility neutronics data using next generation reactor core neutronics codes.
- A complete thermal hydraulic characterization of existing sodium loop experimental data will be performed and documented.
- The collection of and benchmarking against new experimental thermal hydraulic data of a representative TREAT Facility water flow loop.
- A comprehensive instrumentation plan for the TREAT Facility that objectively aligns with the technical and functional requirements needed to maximize impact.

IMPACT

Logical Path:



Outcomes: Each objective will yield its own high-impact outcome:

- A fully characterized reactor core which may be utilized to support the safety case for the TREAT Facility research and future experiment design analysis efforts.
- A documented basis for developing future sodium flow loops to be utilized within the TREAT Facility.
- A documented water flow loop design and demonstration that is representative of a prototypic configuration for the TREAT Facility to provide benchmarking insights.
- A documented and demonstrated basis for the selection of in-pile instruments within the TREAT Facility that satisfies steady-state and transient test needs.

DETAILS

Principal Investigator: Wade Marcum

Institution: Oregon State University

Collaborators: UM, MIT, INL, ORNL, ANL, HTTP, TerraPower

Duration: Three Years

Total Funding Level: \$4,000,000

TPOC: Nick Woolstenhulme

Federal Manager: Rob Versluis

Workscope: IRP-NE

PICSNE Workpackage #:

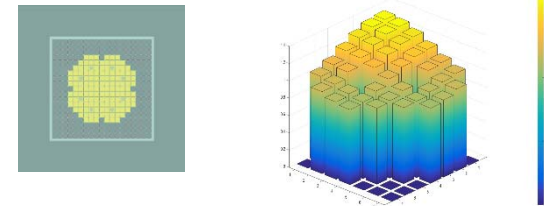
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RESULTS

Results:

- Results reflect normalized steady flux on a quadrant of the TREAT.



Accomplishments:

- Completed SERPENT and PARCS models of minimum critical core.
- Access has been acquired for the previous sodium reactor test performed
- Down selection of significant components complete on the Transient Reactor Test Loop (TRTL)
- Identification of appropriate locations for advanced instrumentation has been performed for instrumentation plan