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 #:** NU-15-OR-USU_-0701-01

RESULTS

**Results:**
- Preliminary reactor physics k-eigenvalue calculations have been performed on a steady state TREAT core configuration.
- Design-base thermal hydraulic predictions have been successfully completed using RELAP5-3D to support design of the water flow loop to be constructed at Oregon State University
- Preparation for irradiation tests at the MIT Research Reactor including scoping of reactor low-power, preliminary scheduling for reactor experiment and survey of available core positions has been completed.

**Accomplishments:**
- The project team is presently on track with respect to the contracted schedule and scope of work.
- A kick off meeting took place at the Idaho National Laboratory with all collaborating institutions.
- All collaborators from participating institutions have become thoroughly familiarized with the TREAT Facility operations and configuration to successfully complete future tasks.