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-OSU_-0701-01

Participants of first biannual meeting

RESULTS

**Results:**
- Completed mechanical drawings of the Transient Reactor Test Loop (TRTL)

**Accomplishments:**
- Significant progress on the steady state reactor physics benchmark report
- Problem description report for sodium benchmark problem underway
- RELAP and TRACE models are presently being developed for the TRTL against a frozen design.
- Identified parameter monitoring needs and how needs have been affected by TREAT restart program and upgrades to reactor data acquisition system.