



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001**

Grant # 31310021M0003

Grantee: Texas A&M University - College Station

Title of Grant: Assessment of TRACE Thermal-Hydraulic System Code for the Prediction of the Reactor Cavity Cooling System Behavior and Performance

Period of Performance: 11/30/2020-11/29/2023 (FY2020 Notice of Funding Opportunity NOFO)

Executive Summary

We will conduct a validation campaign using existing high-fidelity experimental data generated by the Water-Cooled RCCS (WRCCS) experimental facility at Texas A&M University, with the ultimate goal of assessing and demonstrating the capabilities of TRACE to simulate the relevant RCCS phenomena during normal conditions (steady state) and accident scenarios. We will develop a faithful WRCCS TRACE model and apply innovative modeling techniques to account for the complex heat transfer mechanisms between the reactor vessel, cooling panel, and secondary system.

Impact

- The project will increase the predictive capability maturity, and the overall TRACE code readiness.
- The assessment will serve numerous advanced non-LWR technologies where the RCCS is considered as a safety system.
- The experimental data that will be included in the project are essential for the validation of other thermal-hydraulic codes included in the BlueCRAB code suite for non-LWRs.

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Presentations and Publications

The list of publications was submitted with the final report after grant expiration.

1. Journal paper: M. Gorman, K. Fernandez-Cosials, J. Sanchez-Torrijos, C. Queral, Y. Hassan, "[TRACE system code benchmark of Station Blackout of a NuScale-like reactor and comparison with NuScale simulator - ScienceDirect](#)" accepted April 2025
 1. Journal paper: M. Sena, Y. Hassan, "Thermal-hydraulic behavior simulations of the reactor cavity cooling system (RCCS) experimental facility using Flownex, <https://www.sciencedirect.com/science/article/pii/S1738573323002498>" accepted May 2023
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Patents

N/A