

Abstract Submittal Form

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Unclassified Abstract (250 – 300 words; do not include figures or tables)

As part of the Nuclear Systems Office Fission Surface Power Technology Demonstration Unit (TDU) project, a reactor simulator test loop (RxSim) was design & built to perform integrated testing of the TDU components. In particular, the objectives of RxSim testing was to verify the operation of the core simulator, the instrumentation and control system, and the ground support gas and vacuum test equipment. In addition, it was decided to include a thermal test of a cold trap purification design and a pump performance test at pump voltages up to 150 V since the targeted mass flow rate of 1.75 kg/s was not obtained in the RxSim at the originally constrained voltage of 120 V. This paper summarizes RxSim testing. The gas and vacuum ground support test equipment performed effectively in NaK fill, loop pressurization, and NaK drain operations. The instrumentation and control system effectively controlled loop temperature and flow rates or pump voltage to targeted settings. The cold trap design was able to obtain the targeted cold temperature of 480 K. An outlet temperature of 636 K was obtained which was lower than the predicted 750 K but 156 K higher than the cold temperature indicating the design provided some heat regeneration. The annular linear induction pump (ALIP) tested was able to produce a maximum flow rate of 1.53 kg/s at 800 K when operated at 150 V and 53 Hz.

- By submitting an abstract, you agree to both complete a final paper for publication and to attend the meeting to present this information.
- Submit abstracts electronically; submittal instructions are found in the call for papers.
- Direct questions to Patricia Szybist, by phone at 410.992.7302 x 215, or email to pats@jhu.edu.