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Foreword Special issue on the Kilopower Project, Kilowatt Reactor Using Stirling TechnologY (KRUSTY) Test

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Foreword

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Guest Editor

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This special issue of *Nuclear Technology* contains full-length, peer-reviewed papers describing the design work leading up to and the results of the Kilowatt Reactor Using Stirling TechnologY (KRUSTY) test. KRUSTY was the centerpiece of the National Aeronautics and Space Administration (NASA) Kilopower Project to design, build, and test a space nuclear reactor. This test was the first such test since the end of the Space Nuclear Auxiliary Power (SNAP) project at the end of the 1960s.

In this issue, the introduction paper presents the goals of the Kilopower Project and the potential missions this reactor concept could serve in NASA. Kilopower was intended to serve both human exploration needs on planetary surfaces as well as science needs for deep-space exploration. The design work for the experiment by Poston and the power conversion development by Gibson present the pre-work required to perform the eventual KRUSTY test. A paper on regulatory analysis follows, to show the path used to gain approval of the proposed experiment. Then, the early zero-power critical experiments are presented by Sanchez and Grove. These experiments were essential data used to enhance model predictions prior to the high-temperature test. Next, Poston presents the three experiments (warm criticals) that increase the temperature in an incremental fashion prior to the final experiment. These experiments were used to achieve final regulatory approval of the final high-temperature experiment. The last paper by Poston presents the results of the steady-state and transient testing of the reactor at full power and at the design temperature. These results show that the reactor design and as-built experiment met all of the requirements that NASA had developed for the system.

Any experiment of this magnitude was accomplished only because of the hard work and dedication of a large number of people at multiple institutions, including the NASA Glenn Research Center, NASA Marshall Space Flight Center, Y-12 National Security Site, Los Alamos National Laboratory, and the Nevada National Security Site prime contractor (formerly National Security Technologies and now the Mission Support and Test Services).

The project was jointly funded by the Space Technology Mission Directorate at NASA and the Criticality Safety Program at the National Nuclear Security Administration (NNSA).

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For the authors and multitude of staff that performed this work, the passion for space nuclear reactors was the key to making this experiment a reality.