

Enclosure 2: Engagements with Transportable Micro-Reactor Vendors on Transport Package Approval

In addition to the Department of Defense for its Project Pele micro-reactor, other vendors have plans to develop transportable micro-reactors transportation package applications. Therefore, the U.S. Nuclear Regulatory Commission (NRC) staff engaged with stakeholders through the periodic advanced reactor stakeholders' meetings in March and July 2023, and as requested, held preapplication engagements with several transportable micro-reactor vendors on transportation package approval. At the two periodic advanced reactor stakeholders' meetings, the NRC staff discussed the value of early preapplication engagements for both NRC and prospective applicants for package approval to inform future NRC budgets and identify any gaps in vendor regulatory approaches before submission of an application.

Based on its limited discussions with micro-reactor vendors on transportation package approval and based on information in the trade press, the NRC staff is aware of several transportable micro-reactor designs by the following entities: Strategic Capabilities Office (SCO); Westinghouse Electric Company; the Defense Advanced Research Projects Agency (DARPA); X-Energy, LLC; Radiant Industries; Ultra Safe Nuclear Corporation; and NANO Nuclear Energy, Inc. The NRC held preapplication engagements with SCO on its Project Pele design, Westinghouse on its eVinci design, DARPA on its Demonstration Rocket for Agile Cislunar Operations (DRACO) design, X-Energy on its Xenith design, and Radiant Industries on its Kaleidos design.

eVinci by Westinghouse

Westinghouse submitted a regulatory engagement plan on November 15, 2021 (Agencywide Documents Access and Management System Accession No. ML21326A275), which it updated on December 21, 2022 (ML22355A185). The NRC reviewed and provided feedback on numerous white papers related to Westinghouse's eVinci micro-reactor, including the deployment model and transportation (ML22090A127, ML22181A134, and ML23089A216). Westinghouse stated that it intends to meet the NRC regulations for package approval. Westinghouse has indicated that if it cannot meet any of the regulations for normal conditions of transport or hypothetical accident conditions, then it would propose using alternate environmental tests and conditions to those specified in 10 CFR 71.41(c) and is considering providing a probabilistic risk assessment for the package to show that the risk is low.

Demonstration Rocket for Agile Cislunar Operations by the Defense Advanced Research Projects Agency

The DARPA, in collaboration with the National Aeronautics and Space Administration, is developing a nuclear thermal rocket engine, the DRACO, which it currently plans to test in earth's orbit in 2027. DRACO is a micro-reactor that will use heat from fission to expel a propellant. BWXT was awarded the contract to fabricate DRACO in Lynchburg, VA, and will seek NRC approval of a package for transportation to the launch site. The early indication from DARPA is that the package approval will meet all of the 10 CFR Part 71 requirements, although it does not yet have a contract with a package designer.

Xe-Mobile by X-Energy

X-energy was awarded a Phase II contract for Project Pele in September of 2023 from SCO to develop its micro-reactor design to address both military and civilian needs for power in remote

locations and for grid resiliency. X-energy's micro-reactor deployment strategy will require 10 CFR Part 71 Transportation approval requests. X-energy has submitted an initial regulatory engagement plan to the NRC (ML23317A095) and has committed to preapplication engagement for its transportation needs. X-Energy has not stated what its transportation package approval strategy will be.

Kaleidos Reactor by Radiant Industries, Inc.

The NRC staff has not had any substantial discussions with Radiant Industries, Inc. (Radiant) on a transportation package approval methodology. On October 13, 2023, Radiant submitted a regulatory engagement plan (ML23286A328) to the NRC. In its regulatory engagement plan Radiant stated that it plans to use the alternative test criteria in 10 CFR 71.41(c) to obtain package approval for transport of its Kaleidos reactor.

Other Transportable Micro-Reactor Designs

The NRC has not had preapplication engagement on a transportation package approval methodology with the following: Ultra Safe Nuclear Corporation on its Micro Modular Reactor Energy System transportable micro-reactor; BWX Technologies, Inc. on its BWXT Advanced Nuclear Reactor; and NANO Nuclear Energy, Inc., on its Zeus transportable micro-reactor.