October 28, 2021

The Honorable Eric Lander
Director, Office of Science and Technology Policy
Eisenhower Executive Office Building
Washington, DC 20504

Dear Dr. Lander:

On August 20, 2019, then-President Trump issued National Security Presidential Memorandum (NSPM)-20, “Launch of Spacecraft Containing Space Nuclear Systems.” NSPM-20 updated the process for launches of spacecraft containing space nuclear systems and established Safety Guidelines in the form of probability-consequence limits for protecting the public. It also provided that “[a]dditional safety guidelines may be appropriate for the non-terrestrial operation of nuclear fission systems” and directed the Administrator of the National Aeronautics and Space Administration (NASA), in coordination with the Secretary of Defense and the Secretary of Energy, to provide a report “[…] identifying guidelines for safe non-terrestrial operation of nuclear fission reactors, including orbital and planetary surface activities.” In coordination with the Department of Defense (DoD) and the Department of Energy (DOE), and with the awareness of the Interagency Nuclear Safety Review Board, I am responding to that direction via this letter.

Representatives from NASA, DoD, and DOE reviewed NSPM-20 and the existing regulatory frameworks that are used to license and authorize terrestrial nuclear fission reactors, and concluded that these provide a sufficient basis, tailored as appropriate, to support operation of nuclear fission reactors after launch, based on the following rationale:

- The existing nuclear safety framework from the Department of Energy (DOE), found in Title 10 of the Code of Federal Regulations (CFR) Part 830, “Nuclear Safety Management,” DOE directives, technical standards, and applicable DOE safety analyses for space nuclear systems, and the Nuclear Regulatory Commission (NRC) safety framework, found in 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities,” and associated regulations and guidance, establish processes for the design, construction, and operation of reactors that ensure protection of the public, workers, and the environment. Where appropriate, federal agencies may reference these processes as a basis to address unique aspects of non-terrestrial operation, evaluate risk, inform system design and operation, and establish controls on those occasions requiring the use of the appropriate agency processes to protect relevant assets and objectives.
• Nuclear safety design criteria have been developed by both the NRC and the DOE for terrestrial facilities (e.g., DOE Order (DOE O) 420.1C, “Facility Safety”). These sources, along with the use of DOE safety analyses for space nuclear systems and applicable technical standards, provide a model for establishing design and operational criteria that will provide a safe design basis for non-terrestrial nuclear fission systems.

• The risk-informed methodology of the NSPM-20 Safety Guidelines promotes hazard identification, evaluation of risks, and potential safety controls and mitigations, and thus harmonizes with practices in the nuclear industry for commercial and research nuclear fission reactor operation, which have steadily become more risk-informed. This methodology can be applied to post-launch nuclear fission reactor activities to evaluate risk, inform system design and operation, and establish controls.

We believe that these safety frameworks, and adherence to existing laws, regulations, and international obligations, as applicable, provide a flexible and robust approach to ensuring nuclear safety and risk management in the non-terrestrial operation of nuclear fission reactors. They are further augmented by Department- or Agency-specific procedural requirement documents that provide a formal structure for project execution and engineering processes. These documents can be used to guide reactor system development and ensure appropriate engineering rigor is applied to achieve safety and mission success.

NASA and its interagency partners also considered the effect of Space Policy Directive (SPD)-6, “National Strategy for Space Nuclear Power and Propulsion,” issued on December 16, 2020, which provides a policy framework to ensure the ability to use space nuclear power and propulsion (SNPP) systems safely, securely, and sustainably. Section 3(a) of that document provides direction with respect to safety, testing, launch, operation, and disposition, which reinforces the aforementioned terrestrial safety frameworks and the NSPM-20 Safety Guidelines. For example, with regard to operation and disposition, SPD-6 contains a provision for storing orbiting SNPP systems in sufficiently high orbits after the operational part of their mission and prescribes what is intended in this regard. SPD-6 further strengthens the existing policy-level guidance with regard to non-terrestrial operation of nuclear fission reactors, particularly when combined with DOE safety analyses for space nuclear systems, and agency-level policy that ensures consideration of the full mission life cycle, such as NASA Procedural Requirements (NPR) 7120.5, “NASA Space Flight Program and Project Management Requirements,” in the case of NASA-sponsored missions, and DoD Instruction (DoDI) 5000.02 “Operation of the Adaptive Acquisition Framework,” in the case of DoD-sponsored missions.
Based on this assessment, NASA, DoD, and DOE recommend that no additional policy-level Safety Guidelines be issued for the non-terrestrial operation of nuclear fission systems. We are available to address any questions or to have follow-on discussions with respect to this recommendation.

Sincerely,

William Russ DeLoach
Chief, Safety and Mission Assurance

cc:

Jake Sullivan
Assistant to the President for National Security Affairs

Kathryn Huff
Acting Assistant Secretary for the Office of Nuclear Energy, DOE

John D. Hill
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