

**SECTION A. Project Title:** Fast Modular Reactor Conceptual Design with Verifications of Key Metrics in Fuel, Safety, and Operational Performance

**SECTION B. Project Description**

General Atomics proposes to conduct research and development activities to support conceptual design of a gas-cooled fast modular reactor. While conducting conceptual design, General Atomics will focus on verification of feasibility of low technical readiness areas such as high-burnup fuel performance, passive safety, rapid grid adaptability, and the licensing approach. The experimental verification efforts include: (i) fuel fabrication campaign, high-burnup irradiation test in the Advanced Test Reactor, and transient testing in the transient test reactor test facility (TREAT) to qualify the fuel design; (ii) scaled test and analysis of the reactor vessel cooling system to verify the passive safety capability; and (iii) generator cooling tests to verify the high-efficiency power conversion technology.

**SECTION C. Environmental Aspects / Potential Sources of Impact**

**Radioactive Material Use:** The project will use low-enriched uranium to fabricate multiple test rods consisting of uranium dioxide (UO<sub>2</sub>) pellet and zirconium silicide (Zr<sub>3</sub>Si<sub>2</sub>) reflectors encapsulated in a silicon carbide (SiC) UO<sub>2</sub> composite cladding. Work Authorization already in place for handling of radiological materials and chemicals in lab.

**Radioactive Waste Generation:** Rodlet fabrication will generate low level dry hot waste (gloves, wipes, etc.), an approved disposal path such through commercial vendor is used. Test rods fabricated for irradiation campaigns have a pre-defined disposal path at the reactor sites.

**Chemical Use/Storage:** Fabrication of SiC rodlets requires the use of chemicals and gases (methyltrichlorosilane, hydrogen, argon, etc). Cleaning steps require the use of solvents (acetone, isopropanol, etc.).

**Chemical Waste Disposal:** Solvents are collected in approved containers and disposed of via commercial outfit. The work is covered by pre-approved Hazardous Work Authorization

**Hazardous Waste Generation:** Solvents are used to clean SiC tubes including wipes and gloves. Used solvents are collected in approved containers as well as dry waste (gallon quantities).

**SECTION D. Determine the Level of Environmental Review (or Documentation) and Reference(s):** Identify the applicable categorical exclusion from 10 CFR 1021, Appendix B, give the appropriate justification, and the approval date.

Note: For Categorical Exclusions (CXs) the proposed action must not: 1) threaten a violation of applicable statutory, regulatory, or permit requirements for environmental, safety, and health, including requirements of DOE orders; 2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities; 3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; 4) adversely affect environmentally sensitive resources. In addition, no extraordinary circumstances related to the proposal exist which would affect the significance of the action, and the action is not "connected" nor "related" (40 CFR 1508.25(a)(1) and (2), respectively) to other actions with potentially or cumulatively significant impacts.

References: B3.6 Siting, construction, modification, operation, and decommissioning of facilities for small-scale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial development.

Justification: The activity consists of research and development activities to support an advanced nuclear reactor design.

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act)  Yes  No

Approved by Jason Sturm, DOE-ID NEPA Compliance Officer on 2/18/2021