

SECTION A. Project Title: Continued Development of LWR Fuel with Enhanced Accident Tolerance – GE Global Research**SECTION B. Project Description**

GE Global Research, in collaboration with Idaho National Laboratory, proposes to evaluate iron-chrome –aluminum (FeCrAl) alloys as cladding material for uranium dioxide (UO₂) fuel in light water reactors.

The major tasks to be performed as part of the program include:

1. FeCrAl tube fabrication and testing
2. Interactions with the Nuclear Regulatory Commission
3. Interaction with Utilities
4. Design of the Lead Rod Assemblies

General Electric is planning to participate in several irradiation studies in the experimental reactor at Idaho National Laboratory Advance Test Reactor (ATR). The ATF-2 ATR water loop experiments are a continuation of the ATF-1 drop-in capsule feasibility experiments with the primary objective of testing ATF concepts under Pressurized Water Reactor (PWR) prototypic conditions to demonstrate concept viability, thus exposing the fuel pins (rodlets) directly to the PWR water chemistry and flow. The great advantage of loop tests is the ease with which a variety of samples can be subjected to conditions specified for any PWR design. The Loop 2A can be operated at different temperatures, pressures, flow rates, or water chemistry requirements, and can operate above the standard temperature and pressure of a current commercial PWR power plant. General Electric is participating in ATF-2 tests by providing several rods made of FeCrAl cladding and UO₂ fuel. After the tests, one of these rods will be examined for chemical and mechanical resistance from the coolant side and from the fuel side.

SECTION C. Environmental Aspects / Potential Sources of Impact

Small amounts of non-hazardous chemicals (e.g. 100 g of sodium sulfate) will be used to prepare near pure water solutions that will be used for testing in high temperature water (300°C). GNF will provide solid pellets of UO₂, which will be irradiated at ATR in INL. The test specimens may become waste after the irradiation tests in the laboratory. The amount of UO₂ is small, less than 100 g of U235. INL has over 40 years of experience in the handling of radioactive materials and has extensive facilities, procedures and trained personnel in place for handling significant quantities of all types of radioactive materials. Wastewater may be discharged; water is generally used for cooling or cleaning. The action would not create additional environmental impacts above those already permitted.

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.

The impacts of transporting and disposing of waste resulting from defense activities that was placed in retrievable storage pursuant to a 1970 Atomic Energy Commission policy (see Section 1.2) and TRU waste that was reasonably expected to be generated by ongoing activities and programs was analyzed in DOE/EIS-0026 (October 1980) and the Final Supplement Environmental Impact Statement for the Waste Isolation Pilot Plant (SEIS-I) (DOE/EIS-0026-FS, January 1990).

NEPA coverage for the transportation and disposal of waste to WIPP are found in DOE/EIS-0200-F (May 1997) and Waste Isolation Plant Disposal Phase Supplemental EIS (SEIS-II) (DOE/EIS-0026-S-2, Sept. 1997), respectively. The 1990 ROD also stated that a more detailed analysis of the impacts of processing and handling TRU waste at the generator-storage facilities would be conducted.

DOE-ID NEPA CX DETERMINATION

DOE has analyzed TRU waste management activities in DOE/EIS-200-F (May 1997). The WM PEIS analyzes environmental impacts at the potential locations of treatment and storage sites for TRU waste; SEIS-II addresses impacts associated with alternative treatment methods, the disposal of TRU waste at WIPP and alternatives to that disposal, and the transportation to WIPP. (SEIS-II also includes potential transportation between generator sites.)

Justification: The activity consists of research and development of enhanced accident tolerant fuels to support of deployment in commercial reactors.

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

Approved by Jack Depperschmidt, DOE-ID NEPA Compliance Officer on 10/06/2016