

SECTION A. Project Title: Nanoscale Stable Precipitation-Strengthened Steels for Nuclear Reactor Applications – Los Alamos National Laboratory

SECTION B. Project Description

The objective of this investigation is to use cutting-edge alloy development strategies to produce thermally stable precipitation hardened steels manufactured by conventional methods for nuclear reactor structural applications. The team from Los Alamos National Laboratory, National Energy Technology Laboratory, Colorado School of Mines, and Northwestern University will be engaged to produce irradiation resistant and manufacturable steels with optimized high-temperature strength, ductility, creep resistance, corrosion resistance, and affordability. The effectiveness of the nanoscale precipitates for improved irradiation resistance will also be evaluated.

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage/Chemical Waste Disposal/Industrial Waste Generation – The proposed work will include the metallographic preparation of metallic specimens, which requires the use and storage of chemicals, along with producing some industrial waste. Chemicals used for metallographic preparation will include ethanol, diamond suspension (diamond, water, and glycol) and nitric acid, with total quantities used for the project less than 1 liter. Industrial waste will include grinding papers (SiC) and epoxy resins for mounting. The use, storage, and disposal of these materials are covered by integrated work documents within the Materials Science and Technology – 6 group at LANL.

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.

B3.10 Siting, construction, modification, operation, and decommissioning of particle accelerators, including electron beam accelerators, with primary beam energy less than approximately 100 million electron volts (MeV) and average beam power less than approximately 250 kilowatts (kW), and associated beamlines, storage rings, colliders, and detectors, for research and medical purposes (such as proton therapy), and isotope production, within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible), or internal modification of any accelerator facility regardless of energy, that does not increase primary beam energy or current. In cases where the beam energy exceeds 100MeV, the average beam power must be less than 250 kW, so as not to exceed an average current of 2.5 milliamperes (mA).

Justification: The activity consists of analyzing alloys irradiated with an ion accelerator for research purposes.

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 8/9/2011