

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: SiC-ODS Alloy Gradient Nanocomposites as Novel Cladding Materials – Virginia Polytechnic Institute and State University

SECTION B. Project Description

Virginia Tech proposes to design and study gradient nanocomposites that are composed of nanostructured SiC and oxide dispersion strengthened (ODS) steel (9Cr nanostructured ferritic alloy (NFA)) as the most advanced nuclear cladding materials, conduct material testing that most closely resembles nuclear reactor operating conditions, and offer nuclear nanomaterial understanding and prediction abilities based on comprehensive characterization and mechanism studies of these new cladding materials. Specifically the proposed research will:

1. Produce gradient nanocomposites with well controlled and complementary compositions
2. Testing and property evaluation of the designed gradient nuclear composites
3. Comprehensive characterization of the designed nanocomposite microstructure evolution

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage / Chemical Waste Disposal / Hazardous Waste Generation – Analytical chemicals will be purchased through typical research-grade material suppliers. The storage will follow vendors' MSDS sheet instructions. The use and disposal procedures will follow the university's environmental health and safety guidelines.

Water/Well Use – Distilled water and tap water will be used.

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: B3.15 Siting, construction, modification, operation, and decommissioning of facilities for indoor small-scale research and development projects and small-scale pilot projects using nanoscale materials in accordance with applicable requirements (such as engineering, worker safety, procedural, and administrative regulations) necessary to ensure the containment of any hazardous materials. Construction and modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible).

Justification: The activity consists of university scale research aimed at investigating gradient nanocomposites as cladding material.

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 09/17/2014