

**SECTION A. Project Title: Investigation of Thermal Aging Effects on the Evolution of Microstructure and Mechanical Properties of Cast Duplex Stainless Steels – University of Maryland****SECTION B. Project Description**

The University of Maryland proposes to systematically investigate the effects of thermal aging on microstructural evolution and mechanical response during aging. Objectives include:

1. Develop a detailed understanding of relationships between microstructure and mechanical response in the CF-3 and CF-8 stainless steels during thermal aging
2. Investigate the role of the intermetallic G-phase on the kinetics of spinodal decomposition
3. Study the effect of the G-phase and  $M_{23}C_6$  carbide on embrittlement mechanisms
4. Validate the use of 260 °C and 400 °C accelerated aging temperatures to simulate operational aging temperatures during extended service life.

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

Chemical Use/Storage – It is expected that nitric acid, sulfuric acid, etc. for etching of steel specimens will be used. Less than 1 liter of each will be needed.

Chemical Waste Disposal – Waste nitric acid and sulfuric acid will be generated. The University of Maryland has a chemical disposal plan in place.

**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 evaluating thermal aging embrittlement of stainless steel 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 11/18/2013