

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Purification of Zirconium Cladding Using a Chloride Volatility Process – University of Nevada, Las Vegas

SECTION B. Project Description

The University of Nevada, Las Vegas proposes to 1) investigate, by theoretical methods, the chemical form and thermochemical behavior of the chloride species produced after chlorination of Zr; 2) perform experimental characterization of the chloride species obtained after chlorination of Zr cladding; 3) investigate, under various gaseous atmospheres and in the presence of metallic reducing agents, the thermochemical behavior (volatility and reactivity) of the chloride species identified in task 2; 4) investigate, in the presence of ZrCl₄, the thermal behavior of the chloride species; and 5) perform laboratory scale demonstrations of the removal of the impurity chloride species from ZrCl₄ using the data obtained in task 4.

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage – The proposed bench-scale research projects will involve the storage and use of chemicals. All chemicals will be stored, labeled, and used in accordance with the Risk Management and Safety (RMS) guidelines from the University RMS department.

Chemical Waste Disposal – The proposed bench-scale research projects will involve the generation of chemical wastes, which will be accumulated, documented, and managed in compliance with the University of Nevada, Las Vegas RMS guidelines. Based in the current research activities, the projected chemical waste streams generated from these projects is expected to be less than 10 liters per year, and is expected to consist of solvents (acid, base, and/or organic) with trace amounts of rare earths and heavy metals. There is also likely to be small volumes (less than 5 m³, compacted) of potentially contaminated material, such as gloves, paper towels, sample containers, etc.

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 university-scale research aimed at investigating chlorination of Zr cladding.

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

Approved by Jason Sturm, DOE-ID Deputy NEPA Compliance Officer on 06/09/2015