

# DOE-ID NEPA CX DETERMINATION

## SECTION A. Project Title: Earth Abundant High Temperature Materials for Radiological Power Conversion System

## SECTION B. Project Description

The project consists of performing research and development using earth abundant elements to increase efficiencies to 20-30% through solid state alloying and composites of high temperature materials, thereby improving thermoelectric generator system performance without the need to invest in a single-purpose supply chain. Earth abundant high temperature materials for RTG applications based on Zintl phases will be synthesized and their thermoelectric properties measured and optimized.

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

University of California Davis has procedures in place to handle any waste that will be generated through this project. The action would not create additional environmental impacts above those already permitted at the university.

## 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 project consists of performing research and development using earth abundant elements for thermoelectric generator system performance where Zintl phases will be synthesized and their thermoelectric properties measured and optimized.

Approved by Jack Depperschmidt, DOE-ID NEPA Compliance Officer on 07/01/2016