

**SECTION A. Project Title: Nanostructured Bulk Thermoelectric Generator for Efficient Power Harvesting for Self-powered Sensor Networks – Boise State University****SECTION B. Project Description**

Boise State University will conduct research to research is to develop efficient and reliable thermoelectric generators (TEGs) based on high-efficiency nanostructured bulk materials that directly convert heat into electricity to power wireless sensor nodes (WSNs) for nuclear applications. The university, national lab, and industry partnership will:

1. Develop WSN power requirements and a sensor simulator
2. Select optimal thermoelectric materials for suitable TEG implementation areas
3. Design and simulate TEGs
4. Fabricate and test TEGs
5. Investigate irradiation effects on thermoelectric materials and devices
6. Integrate TEG and WSN and demonstrate proof-of-concept prototypes

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

The project will use a Cobalt-60 source at a national laboratory and will be under the control of the national laboratory. No radioactive waste will be generated. Only minor amounts of hazardous waste will be generated and all hazardous materials will be handled and disposed of in accordance with existing university and national laboratory procedures. The action will not create additional environmental impacts above those already occurring at the university and the laboratory.

**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 *Small-scale indoor research and development projects using nanoscale materials* 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 activities 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 developing and testing simulated thermoelectric generators and wireless sensor nodes.

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 08/13/2014