

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Radiation Resistant Electrical Insulation Materials for Nuclear Reactors Using Novel Nanocomposite Dielectrics – Oak Ridge National Laboratory

SECTION B. Project Description

Nanocomposite materials that are based on XLPE and other epoxy resins incorporating TiO₂, MgO, SiO₂, and AL₂O₃ nanoparticles, will be fabricated using a novel in situ method established at ORNL to demonstrate materials with increased resistance to radiation and thermal degradation. In order to complete the project objectives, four task areas will be pursued:

- Synthesis of nanocomposite dielectrics
- Nanocomposite microstructural analysis
- Irradiation of nanocomposite dielectrics
- Performance assessment of radiation resistance

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage – Chemicals will be utilized to process the nanocomposite materials, but their use and handling should be addressed by current ORNL Work Control Planning.

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 performing small-scale research on nanocomposite dielectrics.

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 8/9/2011