DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-16-040

SECTION A. Project Title: Quantifying Properties for a Mechanistic, Predictive Understanding of Aqeous Impact on Ageing of Medium and Low Voltage AC and DC Cabling in Nuclear Power Plants – University of Minnesota, Duluth

SECTION B. Project Description

The University of Minnesota, Duluth proposes to develop a mechanistic, predictive model for medium and low voltage cable failure based on the primary environmental degradation parameters of aqueous immersion time, temperature, and the oxidation extent encountered in nuclear power plants. In order to determine root cause of degradation of each polymer, both harvested cable insulations and equivalent, neat polymers samples will be prepared, aged, and characterized.

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage – It is estimated that less than 1 kg of each of polypropylene, polyethylene, and crosslinked (peroxide) polyethylene feed stocks will be purchase each year for sample preparation to limit overage. Some polymer samples for testing will be generated via solvent solution casting. Xylene, acetone and other solvents necessary for polymer dissolution and cleaning will be purchased in volumes necessary to work with the polymers, anticipated to be less than 2 liters each per year. Various salts, metal panels/wires for polymer substrate and standard laboratory ware will be purchased to perform the necessary tests. Small quantities of dye penetrants, fluorescent dyes and other chemicals needed in small quantities will also be purchased as needed. All personnel will be trained in accordance with UMD requirements.

Chemical Waste Disposal – Samples of disposed cable sections will be requested from utilities during the operation of the grant. The samples produced above from feed stock, the tested expended cable sections and solvents used to generate the test specimens will be recycled if possible (central copper wire) and disposed of as appropriate as chemical or hazardous waste according to the University of Minnesota Duluth processes and procedures.

Hazardous Waste Generation - Hazardous flammable and chemical waste, mostly solvents, will be used with appreciate PPE's, stored in accordance with safety standards, and disposed of appropriately.

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 on degradation of cabling in nuclear power plants.

Approved by Jack Depperschmidt, DOE-ID NEPA Compliance Officer on 06/30/2016