

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Development of Optical Fiber-Based Gamma Thermometer and its Demonstration in a University Research Reactor using Statistical Data Analytic Methods to Infer Power Distributions from Gamma Thermometer Response – The Ohio State University

SECTION B. Project Description

Ohio State University, in collaboration with Texas A&M University and Idaho National Laboratory, proposes to build and test optical fiber-based gamma thermometers (OBBGTs) and develop method to process the data that is produced by OFBGTs to produce estimates of power density in the volume of the reactor that surrounds the OFBGTs. The project will: 1) develop a novel “Big Data” sensor which uses an instrumentation technology that inherently includes data communications, 2) demonstrate the sensor’s performance in a reactor environment without disturbing the reactor, and 3) utilize Big Data analytics to process the output of the sensor.

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive Waste Generation – Small amounts of radioactive material will be produced during irradiations of optical fiber in the Ohio State University Research Reactor. It will be non-removable contamination of aluminum test rigs. The test rigs will be stored at the Ohio State Nuclear Reactor Laboratory until the activity is below regulatory concern. This should take less than a few weeks.

Air Emissions – Small activities of gaseous tritium will be produced as clad is put on sapphire optical fiber in the Ohio State University Research Reactor. The tritium will be released to air by the Ohio State Nuclear Reactor Laboratory in a manner that is consistent with good radiation protection procedures.

Discharge of Wastewater - Small activities of tritium in water will be produced as clad is put on sapphire optical fiber in the Ohio State University Research Reactor. The tritium will be released via hot sink in the Ohio State Nuclear Reactor Laboratory in a manner that is consistent with good radiation protection procedures.

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 activities on fiber-based gamma thermometers.

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

Approved by Jason Sturm, DOE-ID NEPA Compliance Officer on 07/18/2018