

# DOE-ID NEPA CX DETERMINATION

**SECTION A. Project Title: Gamma-ray Computed and Emission Tomography for Pool-Side Fuel Characterization – Missouri University of Science and Technology**

**SECTION B. Project Description**

The Missouri University of Science and Technology, in collaboration with the Idaho National Laboratory, proposes to design, build, and test a submersible gamma ray tomography platform for performing pool-side physical, structural, and chemical characterizations of irradiated fuel elements from test reactors. The compact platform will be designed to reside in an irradiated fuel canal or spent fuel cooling pond so that tomographic scans of irradiated fuel capsules may be taken without removal of the fuel from the canal/pond.

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

Radioactive Material Use – Radioactive materials will be used in this project. Low activity (0.1-1 uCi) detector calibration sources ( $^{60}\text{Co}$ ,  $^{137}\text{Cs}$ ,  $^{154}\text{Eu}$ ) are already available on the campus of Missouri University of Science and Technology and covered by the Nuclear Regulatory Commission material license #24-00513-40. Safe handling, accounting and disposing of radioactive materials is overseen by the campus' Environmental Health and Safety department's radiation safety officers and the campus' Radiation Safety Committee. A ~10 Ci  $^{60}\text{Co}$  source will be procured and shipped to the Advanced Test Reactor in a Spec-300 Type-B transportation package from the company providing the source. The Advanced Test Reactor has an adjacent underwater fuel canal for storing irradiated fuel and radioactive materials. Installation of the  $^{60}\text{Co}$  source will be performed onsite at the spent fuel canal by means of underwater transfer of the source capsule to the gamma ray tomography system to ensure the ALARA (As Low as Reasonably Achievable) principle of radiation protection is followed. Transfer of the source to a lead or tungsten transfer container (transfer pig) which may be hoisted into the fuel canal will be considered as the main option for transferring the source into the pool. Long hooks and arms will be constructed to perform the underwater transfer of the source capsule to the tomography platform. The source will be held within the tomography platform indefinitely, or until a time in the future where significant decay has deemed it necessary to replace the source with a new one, or until the platform is removed from the fuel canal. A rack of shielded source holders will be provided should long-term storage of the sources in the fuel canal be desired. Eventual storage or disposal of the source will be in accordance with the practices of the test reactor facility at that time.

**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 aimed developing a new capability to perform non-destructive characterization of spent nuclear fuel.

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 6/28/2017