

SECTION A. Project Title: Robust Bullet-Time Tagging and Tracking System Based on Computer Vision for Individual Ex-Core TRISO-fueled Pebble Identification – Missouri University of Science and Technology**SECTION B. Project Description**

The Missouri University of Science and Technology (Missouri S&T) proposes to develop and validate a bullet-time tagging and tracking system for individual TRISO-fueled pebble identification and *in-situ* transit time determination for ex-core evaluation. The system is intended to tag and track each individual pebble in the core for ex-core evaluation and will be integrated with Residence Time Distribution (RTD) and Radioactive Particle Tracking (RPT) techniques. In addition, the test will evaluate the tagged graphite pebble's surface for abrasion at prolonged operation times. The project will evaluate residence time and surface degradation to maximize in-reactor time (near the target burnup of the reactor fuel) while avoiding excessive surface degradation and over-spent fuel pebbles.

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive Material Use – A CO-60 radioactive particle (activity: 0.5 mCi) will be used for the Radioactive Particle Tracking Technique. The Environmental Health and Safety Department at Missouri S&T will involve and offer thorough procedures and supervisions to handle the use and disposal.

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 an investigation into using remote acoustic sensors to monitor component integrity and thereby reduce personnel dose rates.

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 7/30/2020