

SECTION A. Project Title: Experimental Verification of Post-Accident iPWR Aerosol Behavior – Electric Power Research Institute, Inc.

SECTION B. Project Description

EPRI proposes to perform a series of experiments to quantify the most influential decontamination factors and their effect on a class of integrated Pressurized Water Reactor (iPWR) containment designs. The experimental design and method includes development of a thermal hydraulic test loop with an integral reactor and containment vessel scaled with similitude to iPWR critical dimensional ratios such as surface area to volume. The experiments will include transient and steady-state measurements of simulants suspended in steam to determine the nature of their removal from the steam due to natural phenomena which include diffusiophoresis, thermophoresis and hygroscopic effects.

SECTION C. Environmental Aspects / Potential Sources of Impact

Water/Well Use / Discharge of Wastewater – The experiments require use of steam generated from water. The steam will be pressurized in a volume of approximately 400 cubic feet for over 100 hours at various flow rates. This will require approximately 450 cubic feet of water. The steam will condense back to water and some would be lost as water vapor. The water is considered “clean” as the only contaminant that will be introduced is silicon particles (SiO₂). The SiO₂ will be filtered out of the water before disposal. The discharge of the 450 cubic feet of water would occur over a 6-month period at approximately 2.5 cubic feet per day, which is well within the capability of the conveyance systems and can be readily absorbed into the sanitary and storm systems. The Carnegie Mellon University Environmental Health and Safety department will have oversight of the experiments.

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 research aimed at investigating simulant aerosols suspended in steam for iPWRs.

Approved by Jack Depperschmidt, DOE-ID NEPA Compliance Officer on 02/25/2015