



U.S. Department of Energy
Categorical Exclusion Determination Form

Proposed Action Title: LUX-ZEPLIN (LZ) Dark Matter Project LB-CX-15-04

Program or Field Office: Berkeley Site Office

Location(s) (City/County/State): Berkeley, California and other DOE-funded locations associated with LZ including Sanford Underground Research Facility in Lead, South Dakota

Proposed Action Description:

The U.S. Department of Energy (DOE) proposes to construct, assemble, and operate a second generation dark matter experiment, LUX - ZEPLIN (LZ). LZ would have unprecedented sensitivity to directly detect Dark Matter through interactions with normal matter. LZ would be situated in an existing underground cavern on the 4850 foot level of the Sanford Underground Research Facility (SURF) located in Lead, South Dakota. The key element of LZ is a Time Projection Chamber (TPC) that utilizes Photomultiplier Tubes (PMTs) to collect light from these dark matter/matter interactions. The working fluid in and around this TPC would be seven fully active tonnes of liquid Xenon and would be contained in a thermally insulating Cryostat and circulated through a Xenon Purification System to maintain the required purity. Surrounding the Cryostat would be a Veto System consisting of several clear acrylic containment vessels filled with Liquid Scintillator (LS), a number of large 8" PMTs looking for scintillation light from within the LS. Surrounding all this would be a high-purity water filled tank (existing equipment). Also located in the experimental cavern would be the electronics and data acquisition system required to read out the PMT signals. The experiment would be initially assembled on the surface of the SURF site in the existing LUX Surface Laboratory. LZ would also include minor interior building remodeling and an adjacent new (15' x 38') building to house equipment for a commercial radon removal system. At the completion of the research program LZ would remove all equipment and restore the site to its initial condition unless a mutual agreement is reached to transfer the equipment to a subsequent project.

Categorical Exclusion(s) Applied:

B1.15 - Support buildings

B1.31 - Installation or relocation of machinery and equipment

B3.6 - Small-scale research and development, laboratory operations, and pilot projects

For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, including the full text of each categorical exclusion, see Subpart D of 10 CFR Part 1021.

Regulatory Requirements in 10 CFR 1021.410(b): (See full text in regulation)

The proposal fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D.

To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph (b)(2) of 10 CFR Part 1021.1410,

Subpart D; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph (b)(2) of 10 CFR Part 1021.1410, Subpart D.

There are no extraordinary circumstances related to the proposal that may affect the significance of the environmental effects of the proposal.

The proposal has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.

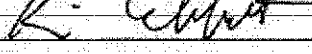
I concur that the above description accurately describes the proposed action.

LBNL Environmental Planner: Jeff Philliber  Date Determined: 5-5-15

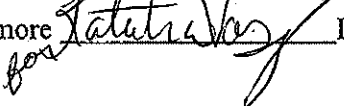
I concur that the above description accurately describes the proposed action.

BSO Project Manager: Katherine Johnescu  Date Determined: 5/4/15

The above description accurately describes the proposed action, which reflects the requirements of the CX cited above. Therefore, I recommend that the proposed action be categorically excluded from further NEPA review and documentation.

Program Point of Contact: Kim Abbott  Date Determined: 5/4/2015

Based on my review of the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer: James L. Elmore  Date Determined: 5/8/15