NEPA REVIEW SCREENING FORM (NRSF) 3 Categorically Excluded Actions

I. Project Title:

Laser Interferometer Gravitational-Wave Observatory, Hanford, Cosmic Explorer Beamtube Experiment Laboratory (CEBEX Lab)

II. Describe the proposed action, including location, time period over which proposed action will occur, project dimension *(e.g., acres displaced/disturbed, excavation length/depth)*, and area/location/number of buildings. Attach narratives, maps and drawings of proposed action. Describe existing environmental conditions and potential for environmental impacts from the proposed action. If the proposed action is not a project, describe the action or plan.

BACKGROUND

The U.S. National Science Foundation (NSF) is a federal agency that funds the Laser Interferometer Gravitational-Wave Observatory (LIGO) at the U.S. Department of Energy (DOE) Hanford Site (LIGO Hanford), in Benton County, Washington State. LIGO Hanford is operated by the California Institute of Technology (Caltech). LIGO Hanford is located on DOE-managed land in accordance with a 1993 Memorandum of Understanding and under a permit from the DOE Richland Operations Office (DOE-RL). On October 6, 2024, the DOE-RL and DOE Office of River Protection (DOE-ORP) were combined into a single entity and is currently the DOE Hanford Field Office (DOE-HFO). The NSF proposes to fund the construction of a vacuum tube test building at LIGO Hanford to inform and support future gravitational wave research. This proposed building and the testing it would support is called the Cosmic Explorer Beamtube Experiment Laboratory (CEBEX Lab). The CEBEX Lab would be constructed adjacent to, and on the southern side of, the existing Mid-Y Station of the southern LIGO Hanford beamtube. Access would be from existing roads and parking, or turnaround areas. The CEBEX Lab would be used to support Cosmic Explorer (a next-generation gravitational wave detector) research (e.g., vacuum engineering tests) without affecting LIGO Hanford operations. The CEBEX Lab would house a 120 meter (400 feet) long by 1.2 meter (4 feet) prototype ultrahigh-vacuum beamtube with instrumentation and controls, as well as space for an office, workshop, and support activities. Between three and five full time staff would occupy the CEBEX Lab.

The CEBEX Lab would be an aboveground building measuring 137.2 meters (450 feet) long, 7.3 meters (24 feet) wide, and 6.1 meters (20 feet) high. The CEBEX Lab would require footings and the pouring of a concrete slab. Construction would require leveling of the land and compaction of the soil using water and tamping instead of heavy equipment to minimize vibrational effects and potential disturbance of ongoing LIGO Hanford experiments. Electrical utilities would be routed underground from the existing electrical connections within the project area. Water would be provided by tapping into an existing LIGO Hanford water pipeline on the northern side of the beamtube and would be trenched under the beamtube to the CEBEX Lab. The depth of disturbance for construction of the CEBEX Lab and associated utilities would not exceed 3 meters (10 feet). Exterior paving for access and parking would cover an additional 10,000 square feet, which is mostly in previously disturbed areas and would connect to existing roads in the area along the beamtube. All borrow and staging areas, grading, tamping, and excavation for construction of the CEBEX Lab and all of its supporting structures and infrastructures would take place within the 4.68 hectare (11.6 acre) project area shown in Figure 1. Although Figure 1 shows the large area surveyed for cultural resources, the area of disturbance to construct the CEBEX Lab would be a fraction of this area, an estimated 0.23 hectare (0.57 acre), consisting of 14,800 square feet for the CEBEX Lab (including experiment hall and the supporting office and workshop space) and 10,000 square feet for the access road, parking, and turnaround. Construction is planned to begin in 2025.

ECOLOGICAL RESOURCES REVIEW

NSF's environmental contractor, Jacobs Engineering Incorporated (Jacobs), conducted a desktop habitat assessment in December 2024 (Jacobs Technical Memorandum, December 10, 2024), which includes recent photographs of the site (see Figure 2). As described in the assessment, the DOE Hanford Site Biological Resources Management Plan (BRMP, DOE/RL-96-32, Rev. 2, February 2017) applies a hierarchical approach to prioritize biological resources and associates different levels of management actions based on the type and relative ecological value of the resources. The biological resources on the Hanford Site are categorized into six priority levels (0 through 5), where 0 represents the lowest level of concern and 5 represents the highest level of concern. BRMP Level 0 and Level 1 habitats have little ecological value with no compensatory mitigation requirements other than compliance with applicable environmental regulations [e.g., Migratory Bird Treaty Act of 1918 (MBTA)]. BRMP Level 2, 3, and 4 habitats require compensatory mitigation at habitat replacement ratios of 1:1, 3:1, and 5:1, respectively. BRMP Level 5 habitats are areas

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containing rare plant communities mapped and identified by the Washington Natural Heritage Program (i.e., element occurrences) that are difficult to replace if lost and compensatory mitigation is determined on a case-by-case basis. The proposed project area is considered a predominantly BRMP Level 2 mid-successional plant community habitat, which includes upland stands with a sparse climax or successional shrub overstory and non-native understory, and steppe stands with native plants co-dominant with non-native plants. As described in the assessment, the proposed project would have no effect on federal or state threatened, endangered, sensitive, candidate, or otherwise listed plant and animal species.

The DOE Hanford Site management goal for BRMP Level 2 habitats is conservation with a preference for avoidance and minimization of impacts. The project proposal is consistent with this goal in that it is co-located with existing facilities so that existing parking lots, roads, and utilities would be used to minimize disturbance of ecological resources. Staging of materials and equipment would occur on already disturbed surfaces, to the extent feasible, to further avoid impacts to BRMP Level 2 habitat. For BRMP Level 2, 3, or 4 habitats compensatory mitigation may be triggered if the impact after avoidance, minimization, and onsite rectification is greater than 0.5 hectare (1.2 acres), regardless of the project's location. If required, compensatory mitigation for impacts to BRMP Level 2 habitats would be at a replacement ratio of 1:1. The NSF would be responsible for funding any required onsite rectification or offsite compensatory mitigation in accordance with BRMP requirements and associated revegetation plan prepared by DOE-HFO Ecological Compliance, as applicable.

All land areas disturbed by the CEBEX Lab project that are not needed for continued use, access, or safety considerations would be replanted using locally derived, native plant species. The Hanford Site Revegetation Manual (DOE-RL-2011-116, Rev. 1, September 2013) provides guidance regarding species mix, planting rates, and methods. Revegetation would occur in the first planting window (November through January) after project completion and revegetation planning would occur between January and March of the year prior (7-9 months before the planting window) in order to allow sufficient time to procure plant materials.

There is always the potential for birds to nest within the project area on the ground, on buildings, or on equipment. The nesting season at the Hanford Site is typically from mid-March to mid-July. The active nests (containing eggs or young) of migratory birds are protected by the MBTA. The MBTA makes it illegal for people to "take" migratory birds, their eggs, feathers, or nests. Take is defined in the MBTA to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof. Personnel working on this project would be instructed to watch for nesting birds. If any nesting birds (if not a nest, a pair of birds of the same species or a single bird that will not leave the area when disturbed) are encountered or suspected, or bird defensive behaviors (flying at workers, refusal to leave area, strident vocalizations) are observed within the project area, then project management would contact DOE-HFO Ecological Compliance to evaluate the situation.

A nesting bird survey would be required if the project is to begin ground disturbing activities during the nesting season. An ecological resources review would be conducted by DOE-HFO Ecological Compliance prior to performing ground disturbing activities during the nesting season. Ground disturbing activities during the nesting season are not authorized until project staff has obtained a copy of survey results.

Due to the seasonal and migratory nature of plant and animal species, the ecological resources review is valid for one year from the date the review was performed (until December 10, 2025). If project activities continue beyond the one year time frame, then an ecological resources review renewal may become necessary as determined by DOE-HFO Ecological Compliance.

CULTURAL RESOURCES REVIEW (HCRC#2025-600-002)

NSF, in close coordination with the DOE-HFO Cultural and Historic Resources Program (CHRP) Manager, conducted a Cultural Resources Review (CRR) of the proposed project, which included consideration of previously surveyed areas at the LIGO Hanford facility (see Figure 3). Jacobs, NSF's environmental contractor, conducted a cultural resources survey on May 28, 2024, in anticipation of a need for environmental review (pending panel review of the proposal) for the CEBEX Lab proposal. No cultural materials were observed during the survey. In August 2024, NSF confirmed with the DOE-HFO CHRP Manager that it was continuing its environmental review of the

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proposed CEBEX Lab. Following a briefing to the DOE-HFO CHRP Manager and regional Tribal Nation representatives on September 18, 2024, NSF sent an Area of Potential Effect (APE) notification to the Washington State Historic Preservation Officer (SHPO, Department of Archaeology and Historic Preservation) and regional Tribal Nation representatives on October 22, 2024. NSF transmitted a CRR, with a "No Historic Properties Affected" finding, to the SHPO and regional Tribal Nation representatives for a 30 day comment period on November 25, 2024. The SHPO concurred with the findings of the CRR on December 5, 2024, and no Tribal Nation representatives raised further issues during the 30 day comment period.

The CRR recommended implementation of an unanticipated discovery plan, which would require all workers to watch for cultural resources during all work activities (e.g., mussel shells, bone, stone artifacts, burned rocks, charcoal, arrowheads, stone flakes, cans, bottles, etc.). In the event project personnel encounter cultural resources during project activities, work in the vicinity of the discovery would stop until NSF and the DOE-HFO CHRP Manager have been contacted, the significance of the find assessed, appropriate consulting parties notified, and if necessary, arrangements made for mitigation of the find.

NSF anticipates no adverse impacts from the construction of the CEBEX Lab with implementation of the Inadvertent Discovery Plan (see Appendix C of the CRR).

CONCLUSION

The CEBEX Lab has coverage under DOE'S NEPA Implementing Procedures at 10 Code of Federal Regulations (CFR) Part 1021, Subpart D, Appendix B, Categorical Exclusion (CX) B1.15, "Support Buildings." This CX addresses siting, construction or modification, and operation of support buildings and support structures (including, but not limited to, trailers and prefabricated and modular buildings) within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible). Among other things, covered support buildings and structures include, but are not limited to, those related to small-scale fabrication, assembly, and testing of non-nuclear equipment or components; those for storage of supplies and equipment; and similar support purposes.

NEPA coverage would also be provided by CX B3.6, "Small-Scale Research and Development, Laboratory Operations, and Pilot Projects." This CX addresses siting, construction, modification, operation, and decommissioning of facilities for small-scale research and development projects; conventional laboratory operations; and small-scale pilot projects 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).

Any changes to the proposed CEBEX Lab project described in this NEPA Review Screening Form would require additional review and approval by NSF and the DOE-HFO NEPA Compliance Officer. Furthermore, changes to the project may require additional cultural and ecological resource reviews if they involve new undertakings or expand the APE.

III. Existing Evaluations (Provide with NRSF to DOE NCO):

Maps:

Figure 1 - Project Area for Construction of the CEBEX Lab

Figure 2 - Project Area Ecological Habitat for Construction of the CEBEX Lab

Figure 3 - Project Area and Related Cultural Resource Reviews at the LIGO Hanford Facility

Other Attachments:

N/A

IV. List Applicable CX(s) from Appendix B to Subpart D of 10 CFR 1021:

B1.15, Support Buildings; B3.6, Small-Scale Research and Development, Laboratory Operations, and Pilot Projects

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| V. Integral Elements and Extraordinary Circumstances (See 10 CFR 1021, Subpart D, B. Conditions that are Integral Elements of the Class of Actions in Appendix B; and 10 CFR 1021.410(b)(2) under Application of Categorical Exclusions) | | | Yes | No |
| Are there extraordinary circumstances that may affect the significance of the environmental effects of the proposed action? If yes, describe them. | | | 0 | ۲ |
| Is the proposed action connected to other actions with potentially significant impacts, or that could result in cumulatively significant impacts? If yes, describe them. | | | 0 | ۲ |
| Would the proposed action threaten a violation of applicable statutory, regulatory, or permit requirements related to the environment, safety, health, or similar requirements of DOE or Executive Orders? | | | 0 | ۲ |
| Would the proposed action require siting, construction, or major expansion of waste storage, disposal, recovery, or treatment facilities? | | | 0 | ۲ |
| Would the proposed action disturb hazardous substances, pollutants, contaminants, or natural gas products already in the environment such that there might be uncontrolled or unpermitted releases? | | | 0 | $\textcircled{\bullet}$ |
| Would the proposed action have the potential to cause significant impacts on environmentally sensitive resources? See examples in Appendix B(4) to Subpart D of 10 CFR 1021. | | | 0 | ۲ |
| Would the proposed action involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, such that the action is not contained or confined in a manner designed, operated, and conducted in accordance with applicable requirements to prevent unauthorized release into the environment? | | | \bigcirc | ۲ |
| If "No" to all questions above, complete Section VI, and provide NRSF and any attachments to DOE NCO for review. If "Yes" to any of the questions above, contact DOE NCO for additional NEPA review. | | | | |
| VI. Responsible Organization's Signatures: | | | | |
| Initiator: | | | | |
| Kristen Hamilton, NSF/ECO Hamilton, Krist | Hamilton, Kristen Digitally signed by Hamilton, Kristen Date: 2025.04.01 12:42:18 -04'00' | | | ~ |
| Print First and Last Name | Signature / Date | | | |
| Cognizant Program/Project Representative: | | | | |
| Tashina R. Jasso, DOE-RL/SSD Tephine Desga | Tighine Jussen Digitally signed by TASHINA JASSO Date: 2025.04.01 09:54:49 -07'00' | | | |
| Print First and Last Name | Signature / Date | | | |
| VII. DOE NEPA Compliance Officer Approval/Determination: | | | | |
| Based on my review of information conveyed to me concerning the proposed action, the proposed action fits within the specified CX(s): Xes No | | | | |
| Douglas H. Chapin, DOE-HFO/NCO Douglas H. Chapin | Douglas H. Chapin Digitally signed by DOUGL. Date: 2025.04.01 10:40:06 | | AS CHAPI -07'00' | N |
| Print First and Last Name | Signature / Date | | | |
| NCO Comments (Note: If comments are added, then this field must be filled out prior to entering the electronic signature in VII. | | | | |

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FIGURES

Laser Interferometer Gravitational-Wave Observatory, Hanford, Cosmic Explorer Beamtube Experiment Laboratory (CEBEX Lab)

4 Pages (including this page)



Figure 1. Project Area for Construction of the CEBEX Lab



Figure 2. Project Area Ecological Habitat for Construction of the CEBEX Lab

Figure 3. Project Area and Related Cultural Resource Reviews at the LIGO Hanford Facility [NOTE: the red polygon depicts the CEBEX Lab Area of Potential Effects (APE)]

