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U.S. Department of Energy (DOE)
Finding of No Significant Impact
for the
Construction and Operation
of a
Genome Sequencing Facility in Building 64
at
Lawrence Berkeley Laboratory, Berkeley, California

AGENCY: U.S. Department of Energy (DOE)

ACTION: Finding of No Significant Impact (FONSI)

SUMMARY: The U.S. Department of Energy (DOE) has prepared an Environmental Assessment (EA), DOE/EA-1065, evaluating the proposed action to construct and operate a Genome Sequencing Facility at Lawrence Berkeley Laboratory (LBL). LBL is located in Berkeley, California and operated by the University of California (UC). The project consists of modification of 14,900 square feet of existing Building 64 and construction of laboratory and office space to house human genome sequencing and research on human genetics. This project would comprise one of five components of LBL's Genome Sequencing Initiative.

Based upon information and analyses in the EA, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969. Therefore, an Environmental Impact Statement is not required.

DESCRIPTION OF THE PROPOSED ACTION:

The proposed action is to modify 14,900 square feet of LBL Building 64, to be used as a Genome Sequencing Facility. This facility would be part of DOE's Human Genome Program, dedicated to the sequencing of the entire human genome. The Genome Sequencing Facility would allow LBL to demonstrate that LBL's Directed DNA Sequencing Strategy can be scaled up from the current level of 750,000 base pairs per year to a facility that produces over 6,000,000 base pairs per year, while still retaining its efficiency. The facility would be occupied by a staff of approximately 40 scientists, approximately 15 of whom would be relocated from buildings 74 and 74B, resulting in a net increase of 25 persons at LBL.

ALTERNATIVES:

Five alternatives to the proposed action were considered: (1) no action, (2) an alternative on-site location (Building 27), (3) a second alternative on-site location (Building 53), (4) multiple locations on the LBL site (buildings 62, 70, 70A, and 74), and (5) an alternative off-site location (Richmond Field Station).

(1) Under the no action alternative, genome sequencing activities would continue to be conducted in Building 74 on a limited scale. No modified facility for expanded genome sequencing would be constructed. The Directed DNA Sequencing Strategy developed at LBL to outperform and supplant the current predominant method of large-scale sequencing would not be implemented. Expanded human genome research activities would be conducted at another institution and would not benefit from the techniques and expertise at LBL. The no-action alternative would have no effect on the environment above existing conditions. However, this alternative would adversely affect DOE's ability to fulfill the Human Genome Project mission.

(2) The LBL Building 27 alternative consists of converting Building 27 from its current use as a High Voltage Test Facility and Cable Shop to office and laboratory space to house the Genome Sequencing Facility. This alternative would provide fewer square feet of operating space than the proposed action, and would not permit the full extent of sequencing activity that is the goal of the proposed action without the construction of an addition to the building. The potential for nearby groundwater contamination and for encountering asbestos during renovation is about the same for this alternative as for the proposed action. If an addition to the building were constructed to accommodate the proposed research and sequencing activities, the construction activities would result in an increase in short-term impacts to air quality, traffic and parking, and noise, with potential impacts relating to geology, hydrology, and air quality. In addition to the greater costs associated with construction, the Building 27 alternative would incur a higher cost than the proposed action because the building is currently occupied by other programs which would have to be relocated. The environmental effects associated with facility operations would be similar to the proposed action.

(3) Under the LBL Building 53 alternative, Building 53 would be converted from its current use by the Magnetic Fusion Energy program to office and laboratory space to house the Genome Sequencing Facility. As with the Building 27 alternative, asbestos would likely be encountered during renovation that would need to be removed. In addition, soil and groundwater contamination has been encountered in the vicinity of the building. This alternative would also incur a higher cost than the proposed action because the building is currently occupied by other

programs which would have to be relocated. Building 53 contains high-bay space used for heavy industrial assembly, which includes heavy high-load floors and overhead cranes. If this space were allocated to human genome research, new high-bay space would need to be constructed elsewhere at LBL to accommodate ongoing needs for this type of assembly space for other programs, such as the Advanced Light Source. Although the operational effects of this alternative would in general be similar to the proposed action, use of the high-bay space for human genome research would result in much greater energy expenditures and utility costs associated with keeping the space heated during colder months.

(4) The Multiple Locations alternative would utilize portions of LBL buildings 62, 70, 70A, and 74 to house human genome research and sequencing activities, displacing the activities currently taking place at those locations. This alternative would result in greater energy expenditures and utility costs associated with running equipment at numerous locations. The nature of the genome sequencing research requires that certain equipment be immediately accessible; therefore, instead of teams sharing equipment in a single building, equipment would be required at each research location, dramatically increasing program costs. Splitting the researchers into fragmented groups rather than an integrated team would impair effective communication and would lead to a duplication of effort and other inefficiencies. In addition, the frequent face-to-face interactions that facilitate the continual development of improved sequencing methods would be retarded under this alternative.

(5) The alternative offsite location is at the University of California-owned Richmond Field Station (RFS) located approximately 7 miles northwest of the LBL site. Under this alternative, adequate space would be leased from the University of California to house all of the proposed Genome Sequencing Facility activities. Although the specific space that would be leased has not yet been identified, it is assumed that some renovation work would be required and that construction-related impacts could be similar to those of the proposed action. Operational impacts of the Offsite Location alternative would be greater than those of the proposed action because the need for researchers to frequently visit the LBL site would add additional daily commute trips to the local street and freeway system, marginally contributing to existing traffic congestion and resulting in additional air pollutant emissions. The additional traffic also may slightly decrease the Level of Service (LOS) around UCB and LBL.

Use of an offsite location would impede communication with human genome researchers on the LBL site. The accessing of databases and transfer of data, both crucial to the project, would be much more cumbersome and expensive under this alternative. As with the LBL Multiple Locations alternative, the inability to freely interact face-to-face would be an even greater impediment under

this alternative, due to the increased distance from LBL. With less effective and efficient communication, researchers at different locations would be more prone to duplicate efforts.

Currently, hazardous materials are used at the RFS; however, biomedical wastes are not generated. Under this alternative, the relative increase in materials used and wastes generated would be greater than under the proposed action.

ENVIRONMENTAL IMPACTS:

Impacts from Renovation

Renovation activities are expected to generate increased noise levels and short-term vehicle exhaust and airborne particulates. The increased noise levels and air contaminants are not expected to pose a threat to human health because of the low levels that would be generated, the short duration of construction, and the measures that would be taken as a normal part of construction to ensure workers and the environment are protected (for example, ear protection for workers and spraying the ground surface with water to minimize the generation of dust). Short-term transportation effects would include trips by construction workers to and from the site. The effects to traffic and parking would be minor and of short duration.

Precautions would be taken to ensure that an air release of the lead-based paint present on all of the building's structural steel would not occur during building modification, in accordance with the LBL Lead Compliance Program and the Bay Area Air Quality Management District (BAAQMD) requirements. Removal of asbestos-containing material would be accomplished by qualified personnel following Federal and local regulatory requirements. Construction debris would be recycled, if possible, or disposed of in a sanitary landfill. Equipment would be recycled to the extent possible. The small quantities of hazardous wastes that would be generated during renovation activities (such as paint and solvents) would be recycled or disposed of in compliance with LBL standard procedures for handling and disposing hazardous wastes. Only a very limited amount of grading and excavation would be required, with little or no soil remaining for disposal. Samples would be collected of any soil to be disposed of and analyzed for contaminants to determine whether or not it would be classified as hazardous waste. If so, the soil would be handled and disposed of in accordance with LBL policies and regulations for disposal of hazardous waste.

Existing provisions of utilities, services, and energy at LBL are expected to be adequate for renovation activities. During renovation, temporary electrical power (generally, 100 amp/110 volt) and water would be provided to the project site through temporary connections to existing on-site

distribution systems. The proposed action would have no impact on hydrology and water quality, geology, land use, visual quality, or sensitive biological or cultural resources.

Impacts from Operations

A wide range of chemicals common to biological research laboratories would be stored and used in small quantities (5-liter quantities or smaller). The estimated ground-level concentrations of 11 indicator chemicals chosen for safety analysis would be below the Threshold Limit Values (TLV) for occupational exposures. In most cases the concentrations would be thousands of times lower than the TLVs or comparison criteria and in many cases they would be millions of times lower than those threshold values.

Biological materials that would be used during operation of the proposed project include viruses and bacteria. The viruses that would be used infect only bacteria and would pose no threat to human health and safety. *Escherichia coli* (*E. coli*) would be the sole bacterium used as a viral host; this would be a continuation of current genome research at LBL and would merely represent a change in building location at which the activities occur. *E. Coli* is classified as a Class 2 agent: one that presents ordinary potential hazard. This class includes agents which may produce disease of varying degrees of severity from accidental inoculation or injection or other means of cutaneous penetration but which can usually be adequately and safely contained by ordinary laboratory techniques. Personnel at the genome sequencing facility would practice standard laboratory safety procedures and adhere to safety standards contained in the *Biosafety in Microbiological and Biomedical Laboratories* guide prepared by the U.S. Department of Health and Human Services, National Institutes of Health, and the U.S. Center for Disease Control. In addition, release of biohazardous agents to the environment would be minimized through the use of approved biological safety cabinets equipped with HEPA filtering devices.

Air Quality. Air emissions from operations would include ozone precursors, carbon monoxide, PM_{10}, and hazardous air pollutants (HAPs). Because of the small quantities of chemicals to be used, the proposed project operations are expected to result in a slight increase in LBL emissions that would not approach the BAAQMD thresholds of significance. However, the expected emissions may exceed other BAAQMD thresholds for permitting and standards of operation, and a formal permit review by BAAQMD is anticipated for project operations. The estimated annual emissions from the Genome Sequencing Facility would be less than 0.37 percent of current emissions from existing LBL sources.

Utilities, Services, and Energy. Proposed project operations are expected to result in a minor incremental increase in the use of water, gas, electricity, and the production of wastewater above

existing levels. The estimated increase in water usage over current LBL levels is less than 1 percent. The proposed project would require less than 630 MW-hr/yr. of electricity, compared to a site usage of 80 GW-hr/yr. It would require 25 M Therms/yr. of natural gas, compared to site usage of 1.3 MM Therms/yr. Available levels of service are expected to be more than adequate for the proposed project. Other services, including communications, emergency notification, fire, and police are also expected to be adequate to support the proposed Genome Sequencing Facility.

Traffic, Circulation, Parking, and Noise. The 40 employees (25 new personnel) who would be accessing this portion of LBL would generate less daily traffic than the traffic generated by use of this portion of Building 64 during its previous occupancy. Daily trips at LBL would remain below the goals set forth in the agreement with the City of Berkeley, and LOS along access roads would not change. Adequate parking would be available to maintain the ratio of employees per parking space established in LBL's Long Range Development Plan. In addition, there is an active carpool/vanpool program offering assistance throughout LBL.

Operation of the proposed project would produce little noise, the major sources of which would be heating/cooling equipment. Noise levels at a typical LBL laboratory are 55 dB (LBL, 1992b). Similar noise levels are anticipated for the proposed project. Noise levels are expected to be less than those associated with the previous use of the building which was a machine shop employing heavy machinery; therefore, it is not anticipated that there would be an increase in the ambient noise level at the nearest Berkeley residential neighborhood. Traffic noise would not increase above current levels because of the small increase in vehicle trips per day.

Geology, Soils, and Seismicity. Operations of the proposed project are expected to have no effects on geology, soils, or seismicity.

Hydrology, Surface Water, and Water Quality. Proposed routine operations would not discharge effluents to the ground, but would discharge (when allowable) to the sanitary sewer system, or effluents would be disposed of as hazardous waste. No adverse impacts to hydrology or water quality would result from proposed project operations.

Waste Management. Hazardous, biomedical, and solid wastes would be generated during proposed Genome Sequencing Facility operations. Proposed operations would generate approximately 1.5 tons of solid hazardous waste, 2.3 tons of liquid hazardous waste, and 2 tons of medical waste annually. This increase in waste generation would represent approximately 3 percent of the 1992 LBL total solid hazardous waste, 1 percent of the 1992 total liquid hazardous waste, and 12 percent of the 1993 LBL total medical waste. Proposed project operations would

generate non-hazardous solid waste, which would be recycled, if possible, or disposed of in a landfill. Proposed project operations would be expected to add less than 1 percent to current LBL-office-type waste generation, 90 percent (by volume) of which is recycled. This is less than the amount of office-type waste that was generated by this portion of Building 64 under its previous occupancy. These increases in waste generation would not require additional waste storage space nor substantially affect current levels of waste transport or disposal. Wastes would be handled, stored, and disposed using approved procedures by qualified LBL personnel in accordance with DOE orders and federal and State regulations.

Land Use, Sensitive Resources, and Aesthetics. Proposed project operations would have no effect on land use, sensitive resource, or aesthetics.

Cumulative Effects:
Potential cumulative effects are anticipated for regional air quality and waste generation. The San Francisco Bay Area does not meet emission standards (nonattainment status) for carbon monoxide, ozone precursors, and particulate matter less than 10 microns in size (PM_{10}). Construction and operation of the proposed project would provide a minor contribution to these emissions in the region. However, construction and operations of the proposed project would be in compliance with emission control measures.

The proposed project would increase the quantity of various types of hazardous and non-hazardous wastes that are being generated at LBL. California lacks adequate disposal capacity to handle current or projected quantities of hazardous wastes generated within the State. Therefore, at present, LBL and other California generators continue to rely on licensed hazardous waste disposal facilities located outside of California. There also exists a shortage of landfill space in the Bay Area and in many other regions of California and the contribution of solid waste from the proposed project would incrementally contribute to this shortage. Currently, about 90 percent of the office-type solid waste generated at LBL is recycled, and only about 10 percent is sent to a landfill. The increase in solid waste generated from the proposed project would represent approximately .01 percent of total LBL solid waste.

DETERMINATION

Based on the information and analysis in the EA, DOE has determined that the proposal to construct and operate the Genome Sequencing Facility does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969. Therefore, a Finding of No Significant Impact is made and an

Environmental Impact Statement is not required.

PUBLIC AVAILABILITY

Copies of this EA (DOE/EA-1065) are available from:

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for James M. Turner, Ph.D.
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