

DEMOLITION OF BUILDING 51 AND THE BEVATRON

Environmental Assessment
DOE/EA-1541



Prepared for:
Lawrence Berkeley National Laboratory

March 2008



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1 Cyclotron Road
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PREFACE

The National Environmental Policy Act of 1969 (NEPA) requires that Federal agencies consider the environmental consequences of their proposed actions before decisions are made. In complying with NEPA, the U.S. Department of Energy (DOE) follows the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] 1500 through 1508) and DOE's own NEPA implementing procedures (10 CFR 1021). The purpose of an Environmental Assessment (EA) is to provide Federal decision-makers with sufficient evidence and analysis to determine whether to prepare an Environmental Impact Statement (EIS) or issue a Finding of No Significant Impact (FONSI). This EA has been prepared to assess the environmental consequences resulting from the demolition of Building 51 and the Bevatron, located at the Lawrence Berkeley National Laboratory (LBNL; also referred to as “Berkeley Lab,” “the Laboratory,” or “the Lab” in this document), a DOE National Laboratory.

The objectives of this EA are to (1) describe the underlying purpose and need for DOE action; (2) describe the Proposed Action and identify and describe any reasonable alternatives that satisfy the purpose and need for DOE action; (3) describe baseline environmental conditions at LBNL; (4) analyze the potential impacts to the existing environment from implementation of the Proposed Action and other reasonable alternatives; and (5) compare the impacts of the Proposed Action with the No Action Alternative and other reasonable alternatives.

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CHAPTER 1.0

Executive Summary

1.1 Proposed Action

This Environmental Assessment (EA) describes a proposal by the U.S. Department of Energy (DOE) to demolish the Bevatron and the structure housing it, Building 51, at Berkeley Lab. During its operation from 1954 until 1993, the Bevatron was among the world's leading particle accelerators, and during the 1950s and 1960s, four Nobel Prizes were awarded for work conducted in whole or in part there. The Bevatron is approximately 180 feet in diameter. Building 51 is a large (approximately 126,500 gross square feet) shed-like structure built to shelter the Bevatron apparatus and its associated mechanical, electrical, shop and office functions. Since the end of the Bevatron's operations in 1993, Building 51 has had limited use for equipment storage, office space, and dry laboratories.

The Bevatron and Building 51 are no longer needed by LBNL. The Bevatron has not operated since 1993 and is non-functional. The Building 51 structure housing the Bevatron is deteriorating, and consumes disproportionate maintenance resources. It does not meet current building codes, the roof leaks in several locations, and portions of the structure do not comply with current seismic design standards. In addition, removal of the building and its contents would free up the site for future development. However, while development of the site is likely at some point in the future, at this time, there are no firm plans for future development that have reached the level of a proposed or reasonably foreseeable action.

The project site is approximately four acres in size, including parking and staging areas. Of this total, approximately 2.25 acres would be converted from developed area (i.e., occupied by Building 51) to an undeveloped area for an indeterminate time, until another project is proposed, approved, and initiated. Under the proposed project, the concrete shielding blocks that surround the Bevatron would be removed, the Bevatron apparatus would be disassembled, Building 51 and the shallow foundation and tunnels underneath the building would be demolished, and the resulting debris and other materials would be removed. Minor soil remediation effort is expected as part of this action. The site would then be backfilled, and the fill compacted and leveled. The duration of the physical work for the project may vary from four to seven years, from early 2008 through 2011 or beyond, contingent upon funding and results of material sampling. For the

purposes of conservative impact assessment, where impacts presumably are intensified in a shorter project timeframe, the project is assumed to take place over a four year period.¹

Approximately half of the materials that would be removed would consist of non-hazardous debris and other items typical of building demolition projects. Hazardous waste, low-level radioactive waste, and mixed waste also would be shipped from the site. The project would seek to reuse or recycle materials (e.g., uncontaminated metals and concrete) where feasible. Items that could not be reused or recycled would be handled and disposed in accordance with applicable policies and regulations. An estimated maximum of about 4,700 one-way truck trips to ship items off-site, and to bring in such things as equipment and fill material for bringing the site back to a level condition, would be required over the course of the project. A maximum of about 50 temporary workers would be used by the project at any one time.

Depending upon funding, a project variant, under which project activities would be conducted in an alternative sequence, has been developed since publication of the Draft of this Environmental Assessment. The alternative-sequence project variant would begin with appropriate sampling and surveys for hazardous building construction materials and debris, followed by removal and abatement of all hazardous materials within Building 51. Prior to demolition of the building structures, systems and components, the project would set up additional stormwater drainage and collection systems. Once the building was demolished down to the grade level concrete slab, the Bevatron shielding blocks and equipment would be dismantled and removed with the use of two modern mobile cranes. Finally, the project would demolish and remove the building foundations, tunnels, trenches and slabs and backfill with suitable clean fill material. This alternative-sequence variant, if implemented, would not create a new significant impact, nor would it substantially increase the severity of a significant impact associated with the Project nor would it require new or altered mitigation measures.²

1.2 Alternatives

1.2.1 No Action

Under this alternative, the Bevatron would not be dismantled and Building 51 would not be demolished. Radioactive materials, as well as other hazardous materials such as lead dust, oils, and asbestos, would continue to remain in place.

¹ A variant of the project could reduce the minimum duration of the project from four years to three and a half years, but this reduction in schedule would have no resulting effect on project impacts, including traffic impacts. See revised page 76 and Appendix G.

² The alternative-sequence variant was analyzed in a Technical Memorandum dated July 3, 2007. The Memorandum was included in the Final EIR for the Demolition of Building 51 and the Bevatron, Appendix E. The Bevatron Final EIR was certified on July 19, 2007. The Memorandum is included in this Environmental Assessment as Appendix G. It determined that there would not be an increase in severity of impacts under the alternative-sequence or alternate duration.

1.2.2 Preservation

Under the Preservation Alternative, the entire site would be dedicated to non-LBNL uses and could be managed by another public agency, such as the National Park Service, with the intention of actively preserving Building 51 and the Bevatron equipment within it. The public agency would maintain and preserve the building in accordance with the *Secretary of the Interior's Standards for Preservation*, and would allow limited public access for interpretive/educational purposes. These Standards for Preservation define Preservation as “the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.” This alternative would also allow some level of abatement of hazardous materials, such as lead and asbestos removal, to the extent that abatement can be accomplished while maintaining the Bevatron equipment in place.

This alternative would not achieve most of the Laboratory's goals for the site. In addition, the facility would still require long-term maintenance and substantial financial investment for clean-up and refurbishment. This would include such things as significant reroofing and exterior waterproofing. Reinforcement would be required to strengthen the structure to make it seismically safe. New roll-up doors would also be required to replace those that were either removed or are inoperable. The facility would have to be patrolled periodically to prevent unauthorized uses, due to the continuing presence of hazardous materials, and, as would be the case for any unoccupied building, to ensure that it did not become occupied by unwanted animals or pests.

1.2.3 On-Site Rubbling

Under the On-Site Rubbling Alternative, activities called out in the Project Description would remain the same with the exception of activities related to concrete. In this alternative, a local “crushing plant” operation would be set up in the work zone outside of Building 51. Two large (approximately 35 feet [length] by 15 feet [width] by 10 feet [height]) diesel-powered concrete crushing machines would form the core of the operation. Concrete from shielding, the building walls and floor and foundation would be broken up using the crushing equipment. Following initial crushing, the material would require transfer by heavy equipment for processing through a second crusher to achieve the uniform sizing necessary to make the material attractive for reuse.

Under this alternative, most of the concrete from the building structure (i.e., walls and floors), foundation, and many of the concrete blocks shielding the Bevatron would be rubble on-site. Metal (e.g., rebar) in the debris would be separated and disposed of separately. Only concrete containing no detectable added (i.e., non-naturally occurring) radioactivity and otherwise clear of contaminants would be rubble. The rubble material and segregated reinforcing steel would be

recycled if public or private sector demand was available at the time of production. If not, it would be disposed of at a landfill. LBNL could use the rubble as aggregate or fill material if the need for such materials coincided with its production, although this is speculative at the present time.

This alternative would result in increased air quality and noise effects on-site, although these impacts would be negligible.

1.3 Impacts and Mitigation Measures

LBNL incorporates various mitigation measures on a Laboratory-wide basis, as required under its site-wide environmental documents prepared in accordance with the California Environmental Quality Act (CEQA) (see Appendix A of this EA). In addition, to reduce potential impacts to negligible levels in the areas of biological resources and transportation and circulation, the following project-specific mitigation measures are included in the CEQA Environmental Impact Report prepared for the Proposed Action:

Biological Resources

Impact: Noise and activities associated with demolition may indirectly disturb nesting special-status birds such that they abandon their nests or such that their reproductive efforts fail. To address potential indirect adverse effects on nesting special-status birds, the following mitigation measure would be adopted.

Mitigation Measure: Pre-Demolition Special-Status Avian Survey and Subsequent Actions. No more than two weeks in advance of any demolition activity involving concrete breaking or similarly noisy or intrusive activities commencing during the breeding season (February 1 through July 31), a qualified wildlife biologist shall conduct pre-demolition surveys of all potential special-status bird nesting habitat in the vicinity of the Building 51 project site and, depending on the survey findings, the following actions shall be taken to avoid potential adverse effects on nesting special-status nesting birds:

1. If active nests of special-status birds are found during the surveys, a no-disturbance buffer zone will be created around active nests during the breeding season or until a qualified biologist determines that all young have fledged. The size of the buffer zones and types of construction activities restricted within them will be determined through consultation with the California Department of Fish and Game (CDFG), taking into account factors such as the following:
 - a. Noise and human disturbance levels at the project site and the nesting site at the time of the survey and the noise and disturbance expected during the construction activity;
 - b. Distance and amount of vegetation or other screening between the project site and the nest; and
 - c. Sensitivity of individual nesting species and behaviors of the nesting birds.

2. If pre-demolition surveys indicate that no nests of special-status birds are present or that nests are inactive or potential habitat is unoccupied, no further mitigation is required.
3. Pre-demolition surveys are not required for demolition activities scheduled to occur during the non-breeding season (August 1 through January 31).
4. Noisy demolition activities as described above (or activities producing similar noise and activity levels in the vicinity) commencing during the non-breeding season and continuing into the breeding season do not require surveys (as it is assumed that any breeding birds taking up nests would be acclimated to project-related activities already under way). However, if trees and shrubs are to be removed during the breeding season, the trees and shrubs will be surveyed for nests prior to their removal, according to the survey and protective action guidelines 1a through 1c, above.
5. Nests initiated during demolition activities are presumed to be unaffected by the activity, and a buffer is not necessary.
6. Destruction of active nests of special-status birds and overt interference with nesting activities of special-status birds shall be prohibited.
7. The noise control procedures for maximum noise, equipment, and operations identified in Section 5.1.7 shall be implemented.
8. Shrubs that have been determined to be unoccupied by special-status birds may be removed as long as they are located outside of any buffer zones established for active nests.

Impact: Noise and activities associated with demolition may indirectly disturb nesting special-status bats such that they abandon their nests or such that their reproductive efforts fail. To address potential indirect adverse effects on roosting special-status bats, the following mitigation measure would be adopted.

Mitigation Measures: Pre-Demolition Special-Status Bat Survey and Subsequent Actions. No more than two weeks in advance of any demolition activity involving concrete breaking or similarly noisy or intrusive activities, commencing during the breeding season (March 1 through August 31), a qualified bat biologist, acceptable to the CDFG, shall conduct pre-demolition surveys, utilizing techniques acceptable to the CDFG, of all potential special-status bat breeding habitat in the vicinity of the Building 51 project site.

Under such surveys, potentially suitable habitat shall be located visually. Bat emergence counts shall be made at dusk as the bats depart from any suitable habitat. In addition, an acoustic detector shall be used to determine any areas of bat activity. At least four nighttime emergence counts shall be undertaken on nights that are warm enough for bats to be active, as determined by a qualified bat biologist.

Depending on the survey findings, the following actions shall be taken to avoid potential adverse effects on breeding special-status bats:

1. If active roosts are identified during pre-demolition surveys, a no-disturbance buffer will be created, in consultation with the CDFG, around active roosts during the breeding season. The size of the buffer will take into account factors such as the following:

- a. Noise and human disturbance levels at the project site and the roost site at the time of the survey and the noise and disturbance expected during the construction activity;
 - b. Distance and amount of vegetation or other screening between the project site and the roost; and
 - c. Sensitivity of individual nesting species and the behaviors of the bats.
2. If pre-demolition surveys indicate that no roosts of special-status bats are present, or that roosts are inactive or potential habitat is unoccupied, no further mitigation is required.
 3. Pre-demolition surveys are not required for demolition activities scheduled to occur during the non-breeding season (September 1 through February 28).
 4. Noisy demolition activities as described above (or activities producing similar noise and activity levels in the vicinity) commencing during the non-breeding season and continuing into the breeding season do not require surveys (as it is assumed that any bats taking up roosts would be acclimated to project-related activities already under way). However, if trees are to be removed during the breeding season, the trees would be surveyed for roosts prior to their removal, according to the survey and protective action guidelines 1a through 1c, above.
 5. Bat roosts initiated during demolition activities are presumed to be unaffected by the activity, and a buffer is not necessary.
 6. Destruction of roosts of special-status bats and overt interference with roosting activities of special-status bats shall be prohibited.
 7. The noise control procedures for maximum noise, equipment, and operations identified in Section 5.1.7 shall be implemented.
 8. Shrubs that have been determined to be unoccupied by special-status bats and that are located outside the no-disturbance buffer for active roosts may be removed.

Traffic and Circulation

Impact: The Proposed Action would temporarily and intermittently increase traffic volumes on roadways used by demolition-related vehicles. To address potential temporary and intermittent adverse effects to transportation and traffic, the following mitigation measure would be adopted.

Mitigation Measures: The frequency of truck trips (loaded or empty) shall be no greater than (a) one every 10 minutes (six truck trips per hour) during the a.m. and p.m. peak commute hours, and (b) one every five minutes (12 truck trips per hour) during periods other than the a.m. and p.m. peak commute hours.

Under this limitation, the projected level of truck traffic would have minimal effects on traffic flow, even if those trucks were to travel through the congested intersections on University Avenue at San Pablo Avenue and Sixth Street during the peak commute hours. Project-generated hourly truck trips would represent an increase of no more than about 0.9 percent above the a.m. and p.m. peak-hour traffic volumes, respectively, at the above-cited congested intersections.

Other Impacts

All other impacts identified in the analysis were determined to be unimportant for the reasons set forth in the EA. Regarding areas of relatively greater concern, minimal air quality impacts would be created by project-related emissions of construction dust, criteria air pollutants, diesel particulate matter, and asbestos, due to control measures that would be implemented as part of the project, and the nature or limited extent of the pollutants themselves. Similarly, impacts in the areas of water quality and noise would be negligible, due to control measures and the nature of the project site. The potential impacts of hazardous materials, hazardous waste, and other hazards would be reduced to negligible levels. In particular, it is expected that no detectable radioactivity would be contained in the dust generated by the project, and any exposures stemming from the off-site disposal of items containing radiological activity would be far below applicable regulatory limits.

Regarding cultural resources, a Memorandum of Agreement (MOA) has been signed among DOE, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation regarding the demolition of Building 51. The stipulations of the MOA required that the building be documented in accordance with the National Park Service's Historic American Engineering Record (HAER) requirements. In September 1997, LBNL staff prepared the HAER documentation which included a written historical and architectural description of the building and accelerator, and extensive photographic recordation in accordance with the MOA's stipulations. The HAER documentation was submitted to and accepted by the US Department of Interior National Park Service (NPS) in March 1998.

With the acceptance of the HAER report by NPS, DOE may demolish Building 51 provided that DOE contacts the Historic American Building Survey (HABS) division of NPS to determine what level and kind of recordation is required for the buildings, and that such documentation is completed and accepted by HABS prior to demolition. LBNL has consulted with NPS. The latter determined that an addendum to the HAER report would meet HABS requirements. The HAER addendum has been completed and was accepted by NPS in August 2006. For NEPA purposes, with the signed MOA, completion of the HAER documentation, and approval of the HABS addendum by NPS, LBNL has adequately mitigated for the potential loss of Building 51, in accordance with the NHPA. As an additional measure, LBNL plans to commemorate the scientific achievements attributed to the Bevatron with a monument and/or display listing the historic discoveries that occurred there.

CHAPTER 2.0

Purpose and Need

The goal of the LBNL Building 51 and Bevatron Demolition Project is to eliminate existing potential hazards and make the building site available for eventual future use. By removing the structure and clearing the site, future site reuse could occur in a timely manner. For example, contaminated materials, equipment or environmental media, if any, would have been removed or otherwise managed as part of the proposed demolition project and would not impede future development. However, at this time, there are no existing plans for future development of the site. As future use is speculative, it is not described in this Environmental Assessment, nor are the impacts of such use evaluated. The proposed action would also reduce LBNL maintenance obligations and help off-set creation of new space.

The Laboratory's Long Range Development Plan (LRDP) is a planning document for development at LBNL. When the Draft of this Environmental Assessment was published in 2006, its analysis was completed in accordance with the 1987 LRDP Environmental Impact Report (EIR), as amended,¹ prepared pursuant to the California Environmental Quality Act (CEQA). Since publication of the Draft Environmental Assessment, two documents were prepared by Berkeley Lab that supersede the former LRDP and the 1987 LRDP EIR, as amended: the 2006 LBNL Long Range Development Plan and its accompanying LRDP EIR.² The analysis of this Environmental Assessment, is consistent with the 1987 LRDP EIR, as amended, is also consistent with the 2006 LBNL LRDP, as well as the 2006 LRDP EIR.³ Project-level NEPA and CEQA environmental analysis will be conducted if and when necessary for any future development at the Building 51 site.

¹ The 1987 LRDP EIR consists of the following documents:

- The *Lawrence Berkeley Laboratory Site Development Plan Environmental Impact Report*, August 1987 (State Clearinghouse No. [19]85112610);
- The *Supplemental Environmental Impact Report for the Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley Laboratory*, September 1992 (State Clearinghouse No. [19]91093068); and
- The *Supplemental Environmental Impact Report Addendum for the Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Ernest Orlando Lawrence Berkeley National Laboratory*, September 1997 (State Clearinghouse No. [19]91093068).

These documents are referred to collectively as the "1987 Long Range Development Plan (LRDP) EIR, as amended."

² The draft LRDP and the LRDP EIR were circulated for public review on January 22, 2007. The EIR was certified on July 19, 2007. NEPA documentation is not required for a University of California LRDP.

³ This Environmental Assessment includes references to the 1987 LRDP EIR, as amended, although the analysis is consistent with both the 1987 LRDP EIR and the 2006 LRDP EIR.

2.1 Project Objectives

The primary objectives of the Building 51 and the Bevatron demolition project are as follows:

- Eliminate potential hazards associated with Building 51;
- Reduce the burden on LBNL maintenance resources;
- Free space for potential future activities; and
- Help satisfy a DOE policy requiring that the square footage of new construction at a DOE facility be balanced by elimination of an equivalent amount of excess space.⁴

⁴ This policy is set out in an August 9, 2002 memorandum from Bruce M. Carnes, Director, DOE Office of Management, Budget, and Evaluation. No specific proposed facility at LBNL is contingent or otherwise dependent upon this proposed demolition project.