IV AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter discusses the environmental effects for issues analyzed under National Environmental Policy Act (NEPA). The discussion is separated into two sections: those issues that are irrelevant, or only of minor relevance, with respect to the Proposed Action and alternatives and those that require more detailed consideration.

IV.A. Location and Existing Conditions at LBNL

The LBNL site is a 200-acre site in the Berkeley Hills, straddling the border between the cities of Berkeley and Oakland, east of San Francisco Bay. The eight structures proposed for demolition are all located in the western portion of the site within Berkeley City limits, as is the site proposed for construction of the general-purpose laboratory (GPL). Building 85/85A, where seismic strengthening work would occur, is located in the City of Oakland. Locations of the components of the Proposed Action are shown on Figure III-1.

IV.B. Issues Determined Not to Warrant Further Consideration

Department of Energy (DOE) guidance recommends against addressing clearly insubstantial effects in detail, but rather advocates providing enough information to show why greater consideration is not needed.[1] The following environmental topics are either irrelevant to the area of the affected environment due to the nature and/or location of the Proposed Action and alternatives, or do not provide a basis for distinguishing between the Proposed Action and alternatives and therefore do not require further discussion. In the absence of effects, no cumulative effect is possible and therefore these issue areas are also not discussed in Chapter V.

[1] U.S. Department of Energy (DOE), 2004, Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements, page 3.

IV.B.1. Population and Housing

If the GPL is constructed at either of the on-site alternative locations at LBNL or at the Richmond Field Station (RFS), occupants would relocate from other locations on the site. Demolition of Building 55 and the Building 71 trailers would cause the additional relocation of approximately 110 UC LBNL staff to other LBNL site locations. In the case of Alternative C, if functions transferred to an off-site leased space facility in Berkeley or Emeryville, around 100 people could transfer from the LBNL hill site. There would be no relocations under Alternative D or the No Action Alternative.

None of these relocations would be expected to affect population or housing as the distance between the LBNL site, the UC LBNL Potter Street facility, and the RFS is 6 miles or less and well within a reasonable commute from existing residences. Likewise, the seismic strengthening work would not affect population or housing needs.

IV.B.2. Socioeconomics and Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires agencies to identify and address disproportionately high and adverse human health or environmental effects its activities may have on minority and low-income populations.

The construction of the entire project is expected to last less than three years and all temporary contractors would likely be drawn from the local area at the discretion of subcontractors selected to perform the work. The subcontractors would be hired in compliance with UC and DOE guidelines. The residential areas surrounding the LBNL site do not qualify as minority neighborhoods, although the number of students living in the area means that some areas qualify as low-income areas, as they contain a higher percentage of low-income households than the Alameda County average. Nevertheless, the Proposed Action and alternatives would not result in environmental effects or human health risks which could affect the low-income populations near the site.

Census data indicate that the area around the RFS contains high concentrations of minority and low-income residents; however, the RFS is located in an area of light-industrial uses, and is largely isolated from the adjoining residential areas in Richmond by the freeway and railroad tracks.

Project operation under the Proposed Action and Alternatives A through C involves relocation of existing staff rather than hiring additional personnel.

IV.B.3. Public Services

The new GPL would be built to all currently applicable codes and would provide emergency access as required under applicable laws and regulations. The on-site fire station, which is located approximately 0.45-mile from the location of the GPL under the Proposed Action, would provide first response capabilities in the event of a fire or hazardous materials release. Police services are provided by the UC Police Department. As there would be only a negligible increase in the average daily population (ADP) of the site as a result of the Proposed Action or Alternative B, there would be no new effect on the provision of public services.

Alternative B would result in the transfer of 130 staff to the RFS. Although this would be relatively large compared with the working population of around 500 at the RFS, it is small compared with surrounding business and industrial community, and would place little new demand on Station 64 of the Richmond Fire Department, located less than 2 miles from the RFS. With Alternative C, approximately 100 additional UC LBNL personnel would be transferred to an off-site leased space facility in Berkeley or Emeryville. Neither Alternative D nor the No-Action Alternative would result in a change to the site ADP, and therefore neither alternative would affect provision of public services.

IV.B.4. Cultural Resources

The State Historic Preservation Officer (SHPO) confirmed that Building 25/25B was not eligible for listing in the National Register of Historic Places based on the application of the Criteria for Evaluation identified in the Na-

tional Historic Preservation Act (NHPA).[2] The DOE Berkeley Site Office (BSO) has determined that the buildings 55 and 71 trailers are also not eligible for inclusion.[3,4] Building 85/85A, which would be modified internally and underground, was built in 1996 and is not considered a historic resource.

As the Proposed Action would take place on previously disturbed ground, the potential to encounter archaeological or paleontological resources is low. Alternative B would result in construction on a steep hillside, and it is very unlikely that archeological or paleontological resources would be uncovered. In the unlikely event that they were, Standard Project Features (SPF) CUL-3 from Appendix A would prevent their destruction prior to further investigation by halting activities within a 50-foot radius and summoning a qualified archaeologist. SPF CUL-3 would be adopted voluntarily at the RFS for Alternative B and would be used in the unlikely event that archaeological or paleontological remains are uncovered. Alternative C, D, and the No-Action Alternative would not involve ground disturbance from new construction.

IV.B.5. Land Use and Planning

The Seismic Phase 2B Project involves DOE UC LBNL facilities operated and managed by the University of California on land owned by the University. DOE facilities and the University of California, under Article IX, Section 9 of the California Constitution, are exempt from local land use regulation, including general plans and zoning. UC nevertheless seeks to cooperate with local jurisdictions to reduce any physical consequences of potential land use conflicts to the extent feasible. As such, only the UC LBNL plans and

---

[2] Janet M. Neville, State Historic Preservation Officer. *Letter Re: Identification and Evaluation of Old Town Buildings, Ernest Orlando Lawrence Berkeley National Laboratory, Berkeley, Alameda County.* April 27, 2004.

[3] Abbott, Kim, Environmental Programs Manager, DOE Berkeley Site Office. Determination of Ineligibility for Building 55 and Building 71 in the National Register of Historic Places. December 10, 2009.

[4] Trailer 71D was mistakenly omitted from the list of structures in the Determination of Ineligibility. However, as it is similar to C, F, J, K, and P that were included, the same conclusions also apply.

polices such as the SPFs listed and described in Appendix A are binding on the Proposed Action.

The construction of the GPL would take place either entirely at UC LBNL on lands designated by the University of California as Institutional Research and Academic, or, at the RFS on lands designated for teaching and research, or in the case of Alternative C, the off-site leased space alternative, within an existing facility. The Proposed Action and alternatives would therefore not place incompatible land uses in proximity to one another or raise any other issues related to land use.

IV.B.6. Soils

The term "soil" refers to unconsolidated materials formed from bedrock or other parent material. The majority of soils on the LBNL site are characterized as Xerorthens-Millsholm complex, 30 to 50 percent slope. These are well-drained soils that are highly susceptible to erosion, although runoff is minimized on the LBNL site by heavy vegetation. Measures to prevent soil erosion that could result from the Proposed Action or alternatives are discussed in Section IV.C.3, Water Resources. The Building 74 SE Parking Lot site is in an area of relatively steep terrain against a hillside. Issues of possible landslides that might occur with heavy rain, and/or induced by earthquakes, are discussed in Section IV.C.1.

The southern portion of the LBNL site, including the Building 85/85A site, is underlain by Altamont Clay which is expansive and subject to shrink-swell potential, depending on variations in moisture levels.[5] Soil conditions have been factored into the design of all LBNL buildings, including Building 85/85A. However, only the seismic strengthening of those buildings and their attachment to underlying bedrock is relevant to this analysis.

[5] LBNL, 2007, *Long-Range Development Plan Environmental Impact Report*, page IV.E-10.

The RFS is a relatively flat-lying bayside area. Any potential issues due to expansive soil would be factored into the building design.

IV.B.7. Intentional Destructive Acts

Intentional destructive acts such as sabotage and terrorism from internal or external sources are required to be considered in NEPA documents, according to interim guidance from the Office of NEPA Compliance Policy (part of the DOE Office of General Counsel).[6] The Proposed Action involves construction of a new GPL at LBNL that would take over functions currently being carried out in several other buildings at LBNL and this would not result in a change to the risk of intentional destructive acts. The Proposed Action is not expected to require additional security for the LBNL site. The entire LBNL site is fenced, and controlled access is available only at three entry gates. Card keys would be used for building access.

If the GPL were to be built at the RFS, the security configuration would be similar, in that the site is surrounded on all sides by chain link fencing at least 6 feet tall. On the southern side there is a marsh, an approximately 4-foot-tall wire mesh fence, and a section of the popular recreational trail, the Bay Trail. There is one public access point on the northeast corner, with a guard booth. Card keys would also be used for building access.

The building would have a guard on the door during normal business hours and card key access. These security precautions are considered appropriate given the type of work that is carried out, and would be carried out under Alternative C.

IV.B.8. Aviation Hazards

The RFS site is more than 12.5 miles north of the Oakland Metropolitan Airport, and is also not located within the vicinity of a private airstrip. There are no additional risks from overflying planes due to its location. As such,

[6] Need to Consider Intentional Destructive Acts in NEPA Documents. Office of NEPA Policy and Compliance, Department of Energy, December 1, 2006.

implementation of Alternative B would not expose users of the GPL facility at the RFS to aviation hazards. The off-site facility is in existence and there would be no new hazards from greater LBNL occupation of this building as in Alternative C.

IV.C. Issues Determined to Warrant Further Consideration

This section includes comparative analyses of environmental issues that have been deemed relevant to the area of the affected environment, and that provide a basis for distinguishing between the Proposed Action and alternatives. Following a description of the relevant affected environment, the issues are evaluated for each alternative, and also compared to each other in order to establish a preferred alternative with respect to each issue. A summary table of these conclusions is presented in Chapter I, Executive Summary.

IV.C.1. Geological and Seismic Hazards

IV.C.1.a. Affected Environment

IV.C.1.a.i. Ground Shaking in Earthquakes

The San Francisco Bay Area contains active and potentially active faults and it is considered a region of high seismic activity. The Working Group on California Earthquake Probabilities has concluded that there is a 62 percent probability of at least one magnitude 6.7 or greater earthquake occurring in the Bay Area before 2032.

The northwest-trending Hayward Fault traverses the western edge of the LBNL site. The San Andreas Fault Zone, the longest in the State, is located approximately 19 miles west of the site. Both faults have experienced movement in the last 150 years. At the LBNL hill site, ground shaking resulting from an earthquake on the Hayward Fault is anticipated to be "violent" to "very violent."[7] In addition, strong ground shaking can be expected at the site

[7] As defined by the Modified Mercalli Scale. Definitions are available at www.abag.org.

as a result of moderate to major earthquakes on other faults in the region such as the Concord-Green Valley Fault (14 miles northeast of the site), the Calaveras Fault (18 miles southeast of the site), the Healdsburg-Rodgers Creek Fault (23 miles north of the site), as well as the San Andreas Fault.[8] Movement along these larger faults would generate substantial shaking that is factored into the design of new buildings built in California.

The intensity of shaking at the proposed site depends on the distance between the site and the earthquake epicenter, the magnitude of the earthquake, and the response of the underlying soil and bedrock. It is reasonable to assume that throughout the lifetime of the buildings, Building 85/85A and the GPL would be subjected to at least one moderate to severe earthquake that could produce potentially damaging ground shaking at the site.

Likely maximum ground accelerations during an earthquake at LBNL have been quantified for most of types of subsurface conditions. For the UC Berkeley campus and LBNL, this information has been combined with the probability of earthquakes of a certain magnitude occurring within a certain number of years to make a set of probabilistic seismic hazard analyses.[9] These calculations are used to ensure that new buildings are designed, and existing ones strengthened, to withstand likely earthquakes.

In accordance with Section 1.3 (A) (Codes) of the LBNL Facilities Master Specifications, General Requirements, and with SPF GEO-2 from Appendix A, all improvements to existing buildings and all new construction would comply with the provisions of the most current version of the California Building Code (CBC). The CBC requires varying levels of geotechnical analysis and engineering provisions for grading, foundations, retaining walls, according to different seismic zones based on potential for seismic activity.

[8] LBNL 2006, *LRDP EIR*, Geology and Soils Chapter, page IV.E-5.

[9] URS Corporation, 2009, Updated Probabilistic Seismic Hazard Evaluation and Development of Seismic Design Ground Motions for the University of California, Berkeley and Lawrence Berkeley National Laboratory.

The most stringent seismic design requirements contained in the code would apply to the LBNL geographic area.[10,11] In addition, UC probabilistic seismic hazard analyses describing the risk to construction in different locations on different substrates would be incorporated into the building design to ensure that the building is able to withstand likely earthquakes.

IV.C.1.a.ii. Active Faulting

The western edge of LBNL is located within an Alquist-Priolo Earthquake Fault Zone (Alquist-Priolo Zone) for the northern segment of the Hayward Fault (Figure IV-1). An Alquist-Priolo Zone is a zone of active faulting, with faults that have moved within the Holocene Era, or in the last 11,000 years. The eastern limit of the Alquist-Priolo Zone passes through LBNL near the Blackberry Canyon entrance. None of the Proposed Action components would be located within this zone.

IV.C.1.a.iii. Landslides

UC LBNL has undertaken studies to map unstable slopes within the site that are prone to sliding. Landslide hazard areas within the LBNL boundary have been assigned a high, medium, and low risk. In addition, UC LBNL has mapped areas where hillsides and historic landslides were repaired and stabilized. Most of the mapped landslides or potential landslides at the LBNL site are located within earthquake-induced landslide hazard zones.[12]

IV.C.1.a.iv. Liquefaction

According to the California Geologic Survey, no areas within the LBNL site have been identified as a Seismic Hazard Zone for liquefaction. Localized liquefaction hazards may be present at LBNL in areas underlain by shallow groundwater and poorly engineered fill or alluvial materials. However, the

[10] LBNL 2006, *LRDP EIR*, Geology and Soils Chapter, page IV.E-16.

[11] Relevant LRDP Mitigation Measures are listed in Appendix A of this document.

[12] LBNL 2006, *LRDP EIR*, Geology and Soils Chapter, page IV.E-7.

thin soil profile on hillside areas and the existence of bedrock very close to the ground surface minimize potential liquefaction hazards at the site.[13]

IV.C.1.a.v. Tsunamis

The LBNL site is sufficiently far from the Bay, and at a relatively high elevation, so that tsunamis are not an issue. ABAG maps of tsunami danger show that the site proposed for GPL construction, is not in a tsunami evacuation zone.[14] Construction at this site would not therefore place personnel at undue risk from tsunamis. Portions of the Berkeley or Emeryville facility and portions of the RFS lie within ABAG designated Tsunami Evacuation Area.

IV.C.1.b. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

IV.C.1.b.i. Demolition of Buildings 25/25B, 55, 71 Trailers

Buildings 25/25B, 55, and Building 71 trailers would be demolished as part of the Proposed Action and these issues would not be relevant.

Demolition of Buildings 25/25B, 55, and 71 trailers would also be components of Alternatives A and B but for the sake of brevity are not repeated below.

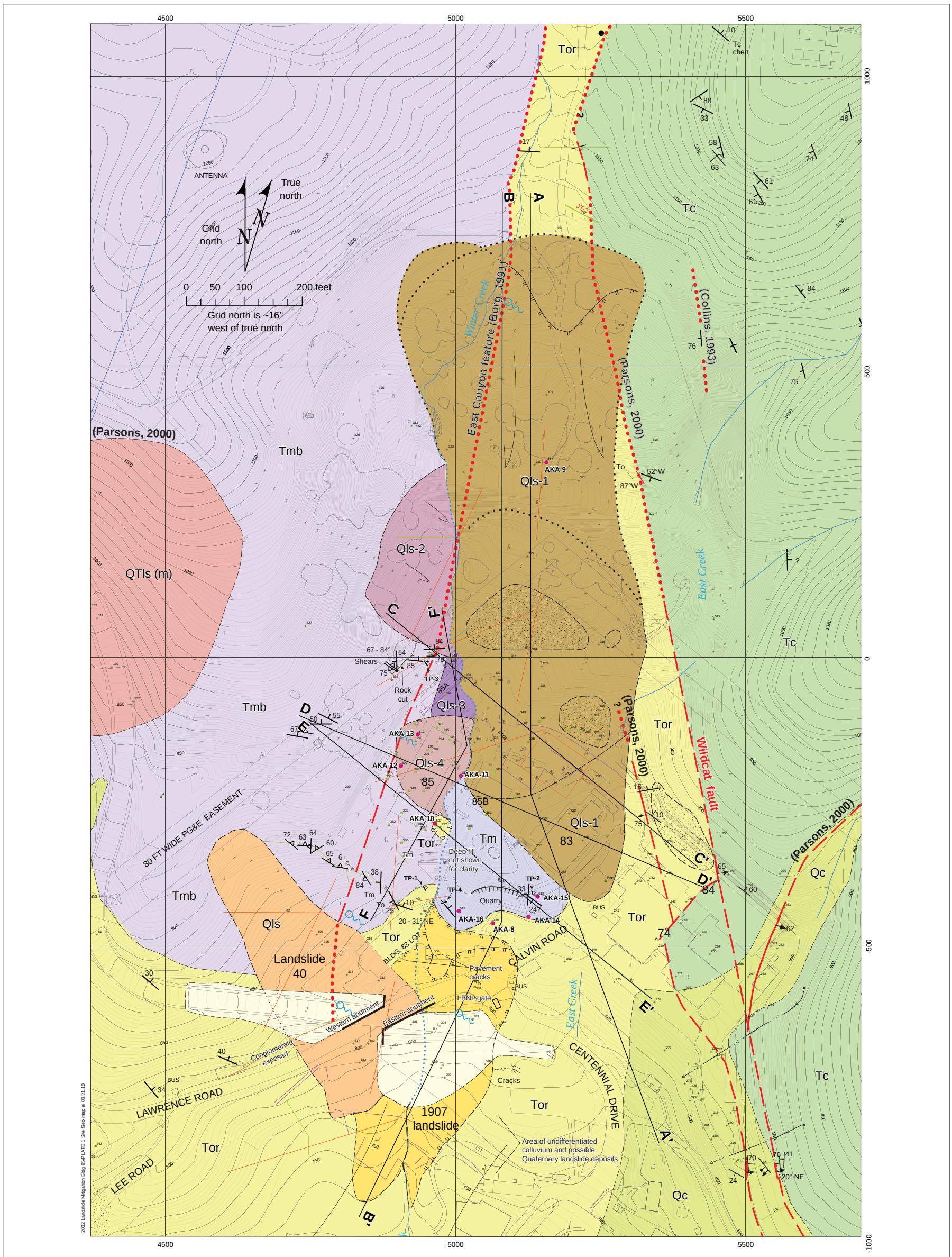
IV.C.1.b.ii. GPL Construction and Operation at Building 25/25B Site

Ground Shaking in Earthquakes

The Building 25/25B GPL site is located approximately 0.4-mile from the surface trace of the Hayward Fault on consolidated deposits of Tertiary age. As described above under IV.C.1.b.ii, all new construction is subject to the State standards of the CBC that have different requirements according to the precise construction location. UC probabilistic seismic hazard analyses also

[13] LBNL 2006, *LRDP EIR*, Geology and Soils Chapter, page IV.E-14.

[14] Association of Bay Area Governments (ABAG). ABAG Tsunami Information, http://www.abag.ca.gov/bayarea/eqmaps/tsunami/tsunami.html. Accessed on April 6, 2010.



Fill
Qc — Quaternary colluvium/alluvium
QTls(m) — Moraga paleolandslide unit
Tmb — Miocene Moraga Formation (volcanics)
Tor — Miocene Orinda Formation (sandstone-siltstone conglomerate)
Tc — Miocene Claremont Formation (chert-shale)

Repaired landslide
1907 landslide
Landslide 40
Qls-1 - Quaternary landslide deposits
Qls-2- Quaternary landslide deposits
Qls-3- Quaternary landslide deposits
Qls-4- Quaternary landslide deposits

Contour, 10-foot interval (2003)
Contour, 2-foot interval (2003)
Contact; dashed where approximate dotted where concealed
Scarp morphology from 1907 photographs
Fault projected verticle from depth, dashed where approximate, dotted where concealed and uncertain
Strike and dip of bedding
Overturned strike and dip
Fault strike and dip
Shear
Syncline
Anticline
Buildings, roads, vegetation (2003)
Spring (Parsons, 2000)
Stream (LBNL, 2003)

GIS Data Point ID
AKA-8 to AKA-16 — Boring (this study)
24 — Boring
294 — Pier hole
72 — Slope indicator boring
4 — Piezometer
283 — Monitoring well
164 — Well boring
352 — Test pit
103 — Borehole-hydrograph

GIS Data Line ID
60 — Hydrauger
34 — Seismic line
22 — Trench or test pit
72 — Cut wall

Notes: 1. Coordinate system is the University of California Grid system.
2. Mapping is based on field reconnaissance and compilation of previous studies.
3. The location accuracy of all data is only as good as the source location information. Georeferencing error can be as much as +/- 10 feet.

FIGURE 4-1

GEOLOGIC MAP OF THE EAST CANYON AREA

describe the risk to construction at different UC locations and these risks are factored into the building design to ensure that the building is able to withstand likely earthquakes. This reduces the risks to personnel and buildings from ground shaking in earthquakes to a low level.

Seismically Induced Landslides

Building 25/25B is considered by several consultants to have been built on a paleolandslide[15] that separates a block of the Moraga Formation from the underlying Orinda Formation; other consultants have concluded that the contact between these two geologic units is depositional. The most recent and most detailed study of this issue by Lettis and Associates (2009) included new trenching.[16] It concluded that the evidence was equivocal as to whether a paleolandslide existed beneath Building 25 or not, but if the landslide did exist, it was geologically stable and had not moved in thousands of years. Lettis and Associates (2009) concluded that the Building 25/25B site was suitable for redevelopment and recommended the following should take place:

- Prior to the final design of new major structures, site-specific geotechnical and/or geologic investigations should be performed to assess the soil and bedrock conditions, minor slope instabilities, site grading and loading, strong ground shaking and surface fault rupture potential and recommendations presented in those reports should be followed.
- As the trenches were not backfilled to engineering design specifications, any proposed buildings or structures that intersect the trenches should include removal and re-compaction of the trench backfill.

Preparation of a site-specific geotechnical report is part of this project as required by SPF GEO-2. Geological investigations focused on the possibility of a landslide were carried out in 2009 and an additional supplemental geotechnical investigation was completed in April, 2010. The report made recom-

[15] Parsons, 2000, *RCRA Facility Investigation Report*.

[16] Lettis and Associates, 2009, *Palaeolandslide Investigation Building 25, Lawrence Berkeley National Laboratory, Berkeley, California*.

mendations pertaining to the design of the GPL which would be implemented if the Proposed Action goes forward at this location.[17] In addition, it would be standard engineering practice to remove and re-compact any encountered trench backfill.

In conclusion, construction of the GPL at the Building 25/25B demolition site would not place personnel or buildings at unacceptable levels of risk from groundshaking during earthquakes or other seismically-induced phenomena.

IV.C.1.b.iii. Building 85/85A Seismic Strengthening

The Building 85 complex was built in 1996 in conformance with the CBC. It is located 0.7-mile from the Hayward Fault and would experience violent to very violent shaking due to an earthquake on that fault.

Ground Shaking in Earthquakes

Part of the seismic strengthening work will include additional bracing inside Building 85. This will further enhance the structure's integrity and ability to withstand earthquake-related ground shaking.

Active Faulting

A linear geologic feature, called the East Canyon Feature and shown on Figure IV-1 (taken from Lettis & Associates, 2008) runs through the Building 85 complex. The East Canyon Feature has been mapped as a branch of the Wildcat Fault that forms the western margin of the canyon and also runs through the Building 74 southeast parking lot. Figure IV-1 shows the linear feature overlain by two landslide deposits to the north.[18] The feature was evaluated prior to building construction by Geo/Resource Consultants (1994) when it was concluded that it was an inactive fault.

[17] Alan Kropp & Associates, Inc., 2010, *Geotechnical Investigation Report, GPL at B25 Site, Lawrence Berkeley National Laboratory, Berkeley, California*.

[18] According to the Lettis & Associates 2008 figure, reproduced as Figure 4.5-2, the fault cross-cuts the older of the landslides to the east.

Seismically Induced Landslides

The landslides now considered to underlie part of Building 85 and all of Building 85A were not known when the Building 85 complex was built in 1996, and were not revealed by geotechnical surveys carried out in 1994 to determine the presence of active faults in the vicinity.[19] Landslides were first suspected in the Building 85 area in 2004 when they were discovered at the adjacent Building 86 (Animal Care Facility) site, during pre-construction geotechnical surveys, including analysis of historical photographs taken prior to the development of LBNL.[20] As their discovery had possible ramifications for Building 85, additional work was commissioned for the Building 85 area to investigate this in more detail.[21] This involved additional trenching in August 2005 to establish the western margins of the landslides. Two reports (Alan Kropp & Associates 2006a and 2006b) showed two landslides of Holocene age directly underlying Building 85 (Figure IV-1).[22,23]

The landslides in the Building 85/85A area are considered to be of Quaternary age (which is the most recent geological period, including about the last 1.6 million years) and it is not known if they have moved as coherent units with the Holocene Period (in the last 11,000 years). They were first recognized as landslides from their landslide-like topography shown in the photographs taken in 1885 and 1903 prior to development of the Canyon. Alan Kropp & Associates (2006b) found no evidence that the landslides have moved within historic times.

---

[19] Geo/Resource Consultants, Inc., 1994, *Fault Investigation, Building 85 Hazardous Waste Handling Facility*.

[20] Alan Kropp and Associates, 2006a, *Geotechnical Investigation Report, Animal Care Facility, Lawrence Berkeley National Laboratory, Berkeley, California*.

[21] Alan Kropp and Associates, Inc., 2006b, *Summary Report. Initial Landslide Study, Building 85, Lawrence Berkeley National Laboratory, Berkeley California*.

[22] Alan Kropp and Associates, 2006a, *Geotechnical Investigation Report, Animal Care Facility, Lawrence Berkeley National Laboratory, Berkeley, California*.

[23] Alan Kropp and Associates, Inc., 2006b, *Summary Report. Initial Landslide Study, Building 85, Lawrence Berkeley National Laboratory, Berkeley California*.

A follow-up report[24] made recommendations to prevent the landslides from moving beneath Buildings 85 and 85A. These involved the installation of a system of drilled piers and tiebacks that would anchor the building and landslide into the bedrock and prevent the slide from moving during a seismic event.

The seismic strengthening of Building 85/85A would be carried out to resist the ground accelerations that could be expected in an earthquake of a magnitude such as could be expected to be encountered every 475 years. The calculations of accelerations and their probabilities are those now used for all UC Berkeley and LBNL buildings.[25] Design of the underground system and the internal building strengthening is subject to peer review by consultants appointed by UC LBNL. The UC seismic safety rating of Building 85 would be upgraded to "good" after completion of the improvements. The seismic strengthening would not affect everyday building operations and would enhance building safety.

The seismic strengthening at the Building 85 complex would also be a component of the project as described under alternatives A, B, C, and D (but not the No-Action Alternative) but for the sake of brevity is not repeated below.

IV.C.1.c. Alternative A (GPL Construction and Operation at B74 SE Parking Lot, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Ground Shaking in Earthquakes

The Building 74 SE Parking Lot site is located around 0.7 miles from the Hayward Fault and on consolidated, Tertiary deposits. As with the Proposed Action, building design would ensure that risks from ground shaking are

[24] Alan Kropp & Associates, April 27, 2007, *Letter Report on Conceptual-Level Study of the Mitigation of a Landslide in the East Canyon Area of LBNL*.

[25] URS Corporation, 2009, *Updated Probabilistic Seismic Hazard Evaluation and Development of Seismic Design Ground Motions for the University of California, Berkeley and Lawrence Berkeley National Laboratory*.

minimized and upon completion of construction the GPL building would have a UC seismic rating of "good."

Active Faulting

The Building 74 SE Parking Lot site directly overlies a feature marked on geologic maps as the Wildcat Fault. This fault is not recognized by the California Division of Mines and Geology as an active fault.[26] However, in 2008 UC LBNL requested a geotechnical survey to verify the location of this fault and whether or not it is active.[27] These investigations showed that the fault was present at its mapped location. Trenching revealed that, along the western trace of the fault, sediments of early to middle Holocene age were undeformed, and east of the proposed GPL site, latest Pleistocene colluvium sediments were also unfaulted. The fault has therefore not been active since the oldest sediments (of Pleistocene age) were deposited and is therefore technically inactive.

Although the Wildcat Fault is inactive, it represents a structural weakness in the earth and zone of friable material that could damage the building's foundation. In conformance with Section 1.3 (A) Codes of the UC LBNL Facilities Master Specifications, building foundations and structural designs would be required to conform with the CBC design standards.

Landslides

Although Alternative A site is against a steep hillside, neither the elevated slope above this site to the northeast nor the lower slope to the southwest was identified as a landslide hazard in the LBNL 2006 LRDP.[28]

---

[26] California Division of Mines and Geology (CDMG), 1982. Official map of Special Studies Zones, Richmond Quadrangle.

[27] Lettis and Associates, 2008, "Surface-fault Rupture Hazard Investigation of the Wildcat Fault." Proposed General Purpose Lab. Lawrence Berkeley National Laboratory, Berkeley, California.

[28] LBNL 2007, *LRDP EIR*, Geology and Soils Chapter, Figure IV.E-4, page IV.E-12.

In conclusion, construction of the GPL at the Building 74 SE Parking Lot site would not place personnel or buildings at unacceptable levels of risk from ground shaking during earthquakes or other seismically-induced phenomena. The presence of the Wildcat Fault and zone of structural weakness underneath the proposed building site at the Building 74 SE Parking Lot site is comparable to the risks of construction at the Building 25/25B site.

IV.C.1.d. Alternative B (GPL Construction and Operation at RFS, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Affected Environment at RFS

The RFS is located 2.2 miles from the Hayward Fault and within a mile of the Bay and the underlying geology is Holocene alluvium. The alternative site is located in a topographically flat area and a portion of the site has been excavated and backfilled with imported soil. The Association of Bay Area Governments (ABAG) Liquefaction maps show the RFS is in an area of moderate liquefaction hazard following an earthquake of magnitude 7.1 along the entire Hayward Fault.[29] The site is not located in an area of landslide risk.

Construction and Operation of the GPL at RFS

As discussed above, the Association of Bay Area Governments (ABAG) Liquefaction maps show the RFS is in an area of moderate liquefaction hazard following an earthquake of magnitude 7.1 along the entire Hayward Fault. Therefore, although this location is farther from the fault than if the GPL was built at the Building 25/25B site on the main LBNL hill site, the substrate presents greater risks to building stability. However, based on soil borings which show that sand layers occur at depths greater than 8 feet, UC concluded that the liquefaction potential for the upland area of the RFS is not high.[30] Additionally, adherence to the requirements of the CBC would

[29] Available online at: http://www.abag.ca.gov.

[30] UC Berkeley, 2008, Final Current Conditions Report, University of California, Richmond Field Station, California.

minimize the associated risks and construction of the GPL at the RFS would not involve a greater level of risk than construction at the LBNL site.

The site is not located in an area of landslide risk, and ABAG maps of tsunami danger show that only the marshland in the south of RFS is in tsunami evacuation zone.[31] Construction at this site would not therefore place personnel at undue risk from tsunamis.

IV.C.1.e. Alternative C (No GPL Construction but Use of Leased Space Off-Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

This alternative would use an existing off-site facility in Berkeley or Emeryville which is around 3 miles from the Hayward Fault and, located on Holocene alluvium.

IV.C.1.f. Alternative D (Reduced Project with only B85/85A Seismic Strengthening)

This alternative involves only the seismic strengthening of Building 85/85A. In comparison to the Proposed Action, and to Alternatives B, C, and D, personnel would continue to use Building 55 that has been designated as seismically "poor" under the UC seismic rating system and the Building 71 trailers described as antiquated. (Personnel have already been moved from the "very poor" Building 25/25B and the building would remain vacant.) If these buildings were not demolished, the risk to personnel and to others who work in proximity to them would be greater in comparison to the Proposed Action and key benefits of the project would not be achieved, including the co-location of similar research programs and the construction of modern, energy efficient research and office space fully suitable for DOE mission objectives. In the long term, personnel would still need to be moved from these buildings, given the age and structural integrity of the buildings.

[31] Association of Bay Area Governments (ABAG). ABAG Tsunami Information, http://www.abag.ca.gov/bayarea/eqmaps/tsunami/tsunami.html. Accessed on April 6, 2010.

Additionally, Alternative D would not create the modern scientific research space in line with project objectives.

IV.C.1.g. No-Action Alternative

None of the beneficial aspects of the project related to reduction of geological and seismic risks would be achieved under this alternative, as UC LBNL personnel would remain exposed to potential life safety hazards due to occupation of buildings that have a "poor" seismic rating or are described as antiquated. Building 85/85A is now known to be located on two ancient landslides. These landslides are considered stable except possibly in response to a severe earthquake, when they could move. Under the No-Action Alternative, Building 85/85A would continue to have risk of potential building damage in severe earthquakes.

Building 85/85A, built in 1996, is currently satisfactorily serving its function as a hazardous waste handling facility at LBNL. HWHF operations cannot be relocated to an existing building on site, as there is no space available that would meet the requirements for this facility, and the option of relocating the HWHF off-site was rejected as unreasonable for the reasons described above in Section III. Without installation of slope stabilization improvements and minor upgrades to the building structure, there would be a continued risk of potential damage to the building in response to a significant earthquake.

Under the No-Action Alternative, the current situation would continue and life- and building-safety benefits would be unrealized.

IV.C.2. Hazardous Substances and Human Health

IV.C.2.a. Affected Environment at LBNL

IV.C.2.a.i. Hazardous Substances in Older Buildings

Hazardous substances are commonly found in building materials, including those used in structures affected by the Proposed Action. Buildings constructed more than 30 years ago, such as those proposed for demolition as part of the Proposed Action, may contain several hazardous materials, including:

- *Asbestos*, a common component of older building materials. Inhalation of airborne fibers is the primary mode of asbestos entry into the body, making friable (easily crumbled) materials the greatest health threat.
- *Lead*, a hazardous neurotoxin that accumulates in soft tissue over time and may cause serious blood and brain disorders. It is present in lead-based paint that was commonly used in buildings prior to the 1970s.
- *Polychlorinated Biphenyls* (PCBs), organic oils that were formerly placed in many types of electrical equipment, including fluorescent lighting ballasts. Exposure to PCBs may cause various health effects, and PCBs are highly persistent in the environment.
- *Radioactive materials*, which have been used in several laboratory buildings at LBNL including Buildings 25 and 55. Material could be present as dust on exposed or hidden surfaces, in ventilation systems or drains.
- *Other hazardous chemicals*, including chemical residues on laboratory buildings that could be released to air, soil and groundwater during demolition.

IV.C.2.a.ii. Soil and Groundwater Contamination

Past chemical handling practices at LBNL were not as stringent as current practices and there were some releases of hazardous chemicals to soil and groundwater. In 1988, UC LBNL began a rigorous evaluation as part of an investigation under the Resource Conservation and Recovery Act (RCRA) for renewal of its Part B Hazardous Waste Facility Permit. This process revealed contamination in soil and groundwater due to past site activities. A total of 174 Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) were identified during the initial RCRA Facility Assessments, of which responsibility for 166 units was assigned to the California EPA DTSC, and responsibility for eight radiological units was assigned to DOE for regulatory oversight.

A number of targeted investigations and interim remedial cleanup actions were undertaken during the 1990s. The remaining contamination was addressed by a Corrective Measures Implementation (CMI) Work Plan, which

was approved by DTSC in March 2006. Remedial activities continue at the site. All cleanup standards and methods are consistent with UC LBNL's *Environmental Assessment and Corrective Measures Study Report for Remediating Contamination at LBNL Regulated under the Resource Conservation and Recovery Act*[32] and applicable laws. In January 2007, DTSC determined that UC LBNL had implemented the approved remedies for the soil contamination and that the approved remedies for groundwater had been constructed and were operating successfully.[33]

Although all areas of soil contamination have been cleaned up to levels consistent with UC LBNL operations (designated as institutional land use) and acceptable to regulatory oversight agencies, residual contamination is present in soil at numerous locations. In addition, there may be undiscovered contamination that is encountered during building demolition and earthmoving activities.

VOC Contamination in the Building 71 Area

The primary contaminants of concern in project construction areas are volatile organic compounds (VOCs), including a number of compounds associated with degreasers and industrial solvents: tetrachloroethylene (PCE), trichloroethylene (TCE), carbon tetrachloride, 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), 1,1,1-trichloroethane (1,1,1-TCA), and 1,1-dichloroethane (1,1-DCA). Freon-113, a coolant, is also a contaminant of concern in the Building 71 area.

Past Curium-244 Release in Building 71 Area

Radioactive curium-244 was released to the environment accidentally in 1959 as a result of research activities being conducted within Building 71 at that time. Curium-244, which has a half-life of approximately 19 years, was found at very low levels (maximum activity of 2.6 pCi/g) in soil around the building

[32] DOE/EA-1527.

[33] Department of Toxic Substances Control, Envirostor database, http://www.envirostor.dtsc.ca.gov/public/, accessed February 6, 2009.

during investigations in 2003. Analysis of groundwater samples taken from around Building 71 in 2003 did not detect measurable levels of curium-244. As a result, the DOE approved a No Further Action (NFA) status for the radiation release.[34] Approval of NFA status provides that no additional environmental investigations are required for this event under the RCRA-related corrective action process.

Tritium from Building 75

The National Tritium Labeling Facility (NTLF) was located in Building 75, northeast of the Old Town Area, and approximately 750 to 1,500 feet from the various construction areas for the project. The NTLF conducted tritium labeling research and development between 1982 and 2001. During operation of the NTLF, small amounts of tritiated water, or steam, were released to the air from the Hillside Stack discharge location and have since been found in the soil and groundwater at the LBNL site. A comprehensive tritium sampling program revealed that the highest soil and groundwater concentrations are located near the NTLF. A tritium groundwater plume has been mapped showing a plume that has migrated to the south of the NTLF and well east of the Building 25/25A area. In addition, in the Building 71B area, some isolated measurements have detected tritium in groundwater at close to detection limits. The tritium is believed to be from surface runoff of material that condensed from releases to the air from the NTLF area.

Between 1997 and 2002, US EPA evaluated tritium levels in air, soil, sediment, and surface water and determined that there were no significant hazards and LBNL was not eligible for the National Priorities List (NPL, commonly referred to as Superfund). Concentrations of tritium have been below the Maximum Contaminant Level for drinking water (< 20,000 pCi/L) in all wells at the LBNL site since February 2005 (shortly after closure of the

[34] Summary of Radionuclide Investigations for LBNL Environmental Restoration Program, http://www.lbl.gov/ehs/erp/assets/pdfs/RadionuclidePDFfinal.pdf, accessed September 2003.

NTLF), with a maximum detected concentration of 16,000 pCi/L reported in the 2008 annual report.[35]

IV.C.2.b. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

IV.C.2.b.i. Demolition of Buildings 25/25B 55, and 71 Trailers

Pre-Demolition Removal of Hazardous Substances

A survey to identify hazardous materials was conducted during 2008 at Building 25/25B, 55, and 71 trailers.[36] The survey identified asbestos-containing materials in thermal pipe insulation, sheetrock, floor tile, transite interior and exterior panels, acoustical ceiling tile, sink undercoating material, and roofing materials at Building 25; in carpet and other flooring materials, ventilation systems, and roofing materials at Building 55; and floor tiles and window caulking at the Building 71 trailers. Lead-based paint was identified on interior surfaces in Buildings 25 and 55. Other hazardous materials noted during the survey included fluorescent light fixtures with presumed PCB ballasts and lighting tubes, coolant gases, mercury thermostats, hydraulic fluid for elevators at Building 55, and an electrical trench with metal debris at Building 25.

Radioactive materials were historically used in Buildings 25 and 55. The demolition would be required to comply with the UC LBNL Radiological Work Permit Program. At Buildings 25 and 55, where radiological materials have historically been used, whenever construction work exposes previously unexposed surfaces or opens up trenches, ventilation, plumbing, drains, or vacuum lines, the area must be surveyed by a Radiological Control Technician. Radiation testing would also be conducted during removal of fume hoods, exhaust fans, ducting, vacuum systems, and flooring.

---

[35] LBNL Environmental Restoration Program, 2009. Quarterly Progress Report and Annual Status Summary. Fourth Quarter Fiscal Year 2008, February, page10.

[36] Winzler & Kelly, 2008, Hazardous Materials Survey, Seismic Upgrade Phase II, Lawrence Berkeley National Laboratory.

As described in Chapter III, project areas found to have building-related chemical or radiological hazards would be cleaned and decontaminated under oversight of UC LBNL industrial hygienists and health physicists prior to any further demolition work. Hazardous and radioactive materials would be disposed in accordance with UC LBNL procedures.

Emissions from demolition activities would be reduced by a series of measures outlined in Appendix A of this EA. Implementation of SPF AQ-1 (a), related to dust control, as discussed in Section IV.C.8, Air Quality, would minimize the airborne release of particles to non-hazardous levels.

Excavation and Remediation of Soil and Groundwater

Demolition at Building 55 and Building 25/25B would involve removal of soil to at least 3 feet below grade. The most recent investigations of subsurface contamination under Building 25, completed in February and March 2010, indicate no considerable subsurface contamination.[37] A more comprehensive evaluation of potential subsurface contamination would be completed as part of the building demolition process in order to confirm these results, after removal of the building and concrete floor slab.

Soil and groundwater contamination is known to be present in the Building 25/25B area as described in the UC LBNL Environmental Restoration Program's Quarterly Progress Reports.[38] No soil or groundwater contamination is known in the Building 55 area but, because the building was used as a chemical laboratory, contamination could be discovered during the excavation process.

If the soil under the buildings is found to be contaminated, it would be cleaned up as necessary as part of the Proposed Action. Sampling of soil and

[37] Environment, Health and Safety Division, and Earth Sciences Division, LBNL, 2010. Initial Evaluation of Potential Subsurface Contamination Under Building 25. 2010.

[38] Available online at: http://www.lbl.gov/ehs/erp/html/documents.shtml.

groundwater would be in accordance with the site-specific SMP and GMMP. Any newly discovered environmental releases of hazardous constituents would meet the notification and corrective action requirements in LBNL's Hazardous Waste Facility Permit (EPA ID. No. CA 4890008986), Section VI.B, "Newly Identified Releases." Cleanup standards and methods would be consistent with LBNL's *Environmental Assessment and Corrective Measures Study Report for Remediating Contamination at LBNL Regulated under the Resource Conservation and Recovery Act*.[39] Known or suspected contaminated soil would be placed in covered bins or other sealed containers, or stockpiled and covered with plastic sheeting held in place. Clean soil would be trucked to a Class III landfill, contaminated soil to a Class I or II landfill. In the unlikely event that any soil was found to have low-level radioactive contamination, it would be sent to the Nevada Test Site or equivalent facility.

Demolition of Building 25/25B may require relocation of several groundwater monitoring wells located adjacent to Building 25 by filling in existing wells and drilling new ones. The wells are used to monitor the effectiveness of a corrective measure approved by DTSC (*in-situ* soil flushing) designed to achieve the required groundwater cleanup levels for the groundwater contamination at Building 25/25B. The well decommissioning process, which involves overdrilling, removal of well casings and resurfacing with cement grout or sealant, would comply with California Well Standards and require a well closure permit from the Alameda County Public Works Agency. The groundwater extraction and treatment system is located outside of the construction area, so there would be no impact on the system.

No soil contamination is known or suspected at the Building 71 trailers, which were used for offices. Although groundwater beneath the Building 71 trailers has been impacted by solvents, demolition of the trailers involves removal of the surface structure without penetrating the underlying asphalt.
In conclusion, the demolition of Building 25/25B, 55 and 71 trailers, if it proceeded, would implement SPF HAZ-3 (a) which calls for a Site Environ-

[39] DOE/EA-1527.

mental Report, with soil and groundwater testing as described in the SMP and GMMP, and would result in a low risk of release of hazardous chemicals into the environment, or exacerbation of an existing contamination situation. Implementation of the health and safety plans discussed above would provide adequate protection of construction workers.

Demolition of Buildings 25/25B, 55 and 71 trailers is also part of Alternatives A and B, but for brevity, this discussion is not repeated below.

IV.C.2.b.ii. Construction of GPL at Building 25/25B site

If the GPL is constructed at the Building 25/25B site, as under the Proposed Action, soil would be excavated to greater depth than if the site were left vacant after demolition. Risks of encountering contamination and procedures to be followed if this occurred were described above under Section IV.C.2.b.i. Construction of the GPL would involve standard construction materials and would result in a low risk of release of hazardous substances to the environment.

IV.C.2.b.iii. GPL Laboratory Operations

The GPL would house normal general purpose laboratory equipment, typical of current laboratories located on site, including instruments such as lasers and an X-ray machine. Potential hazards associated with these pieces of equipment include eye injuries from laser use, fire and explosion, and radiation dangers. Precautionary measures for operation of these instruments are contained in the UC LBNL EH&S Manual, Pub 3000. A suite of laboratory chemicals would be used, including very low level (typically 1 milli-Curie - 5 mCurie) radioactive substances. Such low-level radioactive substances would be stored and used in very small amounts and under highly controlled conditions. Adequate radiation shielding would be incorporated into the building design. The GPL will also use compressed gases and cryogenics during operation. The use of compressed gases is subject to the requirements of Pub 3000, Chapter 7, Pressure Safety & Cryogenics, and Chapter 13, Gases. Plans and procedures to ensure safe operation of equipment and to prevent hazardous chemical releases to the environment are listed in Chapter III, Section III.E.3

and III.E.4. All radioactive wastes are handled, stored, and treated in accordance with DOE requirements. All hazardous wastes are handled, stored, and treated in accordance with the LBNL's permit.

GPL laboratory operations would be similar for Alternatives A, B, and C, but for the sake of brevity, is not repeated below.

IV.C.2.b.iv. Building 85/85A Seismic Strengthening

Building 85/85A was constructed in 1996 in accordance with requirements in the Uniform Building Code, Uniform Fire Code, hazardous materials laws and regulations, and accepted industrial waste management practices. These include the use of curbs, trenches, and sumps for hazardous material containment, coated floors, backup emergency power supply, and pollution abatement equipment, monitors, and alarms to minimize the release of hazardous or radioactive substances to the environment. All radioactive wastes at Building 85 are handled, stored, and treated in accordance with DOE requirements. All hazardous wastes are handled, stored, and treated in accordance with the facility's RCRA Part B permit. Mixed wastes are handled, stored, and treated in accordance with both DOE requirements and the Part B permit.

The soil and groundwater around Building 85/85A have been analyzed for potential contaminants, primarily prior to building construction, and the level of contamination was within established regulatory thresholds. Since then, according to facility personnel, no spills have occurred.

During the construction work at Building 85/85A, sub-grade piers would be installed below the building overhang in the lower yard. Piles would also be installed on the southeast and northeast sides of Building 85A. Depth to groundwater ranges between approximately 37 and 40 feet below ground surface (bgs) at monitoring well MW 85-96-2, which is south of Building 85; 14 to 16 feet bgs at MW 85-96-1, which is north of Building 85; and 5 to 11 feet bgs at MW 85-95-2, which is east of Building 85A.

As described in the project description, borings for the piers would be approximately 4 to 5 feet wide and 40 to 50 feet deep and are expected to con-

tact groundwater. Sampling of soil and groundwater would be in accordance with the site-specific SMP and GMMP. The holes would be drilled in dry weather. The metal piers would be inserted and the holes would be filled with concrete, slowly, to prevent spaces within the structure. The holes would be filled as soon as feasible after drilling to prevent creating a path for rainwater to enter the subsurface.

In conclusion, the seismic strengthening of Building 85/85A is not likely to lead to any releases of hazardous or radioactive waste into the environment, or exacerbate any existing contamination problem. Procedures to be followed if this occurred were described above under Section IV.C.2.b.i. The building would continue to operate during the construction work (with temporary closure of some areas) and operations would return to normal when the work was completed.

The seismic strengthening at the Building 85 complex would also be a component of the project as described under Alternatives A, B and C (but not the No-Action Alternative) but for the sake of brevity is not repeated below.

IV.C.2.c. Alternative A (GPL Construction at B74 SE Parking Lot, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening

Construction of the GPL would result in excavation of a 20,600 gsf area that includes the existing parking lot and area occupied by Building 74F, which would be demolished. The excavation would be a maximum of 20 feet deep and is expected to intersect groundwater. The Building 74 SE Parking Lot site is adjacent to a former plume of diesel-contaminated groundwater that originated from leaks in a diesel tank pipe around Building 74, but the plume was determined not to have reached the GPL excavation area. In addition, monitoring wells in this area are sampled quarterly and tested for total petroleum hydrocarbons as diesel. Results were below the limit of detection in the

third quarter of FY 2009[40] and no further cleanup is necessary.[41] It is therefore unlikely that any remnant diesel contamination would be spread due to the construction of the GPL. Buildings 74 and 84 have not been associated with other contamination issues. The chances of construction workers encountering contaminated soil and groundwater at this site are therefore very low.

IV.C.2.d. Alternative B (GPL Construction and Operation at RFS, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Affected Environment at RFS

The southeast portion of the RFS site was used for explosive manufacturing between 1840 and 1945. Soils and sediments contain levels of metals, PCBs, and pesticides above the California hazardous waste Total Threshold Limit Concentration criteria. Most of the contamination within the proposed site at the RFS has been remediated; however, UC Berkeley is currently conducting an investigation of pyrite cinders contamination at the site and plans to remediate the site in compliance with DTSC requirements. Groundwater contamination is described below in section IV.C.3.d.

Construction and Operation of the GPL at RFS

As described above, a portion of the site proposed for the GPL at the RFS has been remediated for various metals that exceeded site-specific human and ecological target levels. Additionally, soil management and groundwater monitoring programs are in place to ensure ecological and human safety.[42] It is anticipated that UC Berkeley would remediate the site entirely, in compliance

[40] Environmental Restoration Program. Quarterly Progress Report. Third-Quarter Fiscal Year 2009 for the LBNL Hazardous Waste Facility Permit.

[41] City of Berkeley Toxics Management Division has notified UC LBNL that no further action is required for the investigation of the former underground storage tank.

[42] UC Berkeley, 2008, Final Current Conditions Report, University of California, Richmond Field Station, California.

with DTSC requirements, prior to development. Therefore, locating the GPL facility at this site would not expose facility users to contamination.

IV.C.2.e. Alternative C (No GPL Construction but Use of Leased Space Off-Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

There would be no new building construction under this alternative and therefore no new environmental effects associated with existing soil or groundwater contamination.

IV.C.2.f. Alternative D (Reduced Project with only B85/85A Seismic Strengthening)

The only potential environmental effects under this alternative would be the result of the Building 85/85A seismic strengthening work, as described in Section IV.C.2.b.iv, above.

IV.C.2.g. No-Action Alternative

Under this alternative, there would be no new effects related to construction or demolition. Potential hazards from release of hazardous substances from the HWHF due to earthquake damage are avoided due to the secondary containment of all storage containers and by the tertiary containment that is a feature of the entire facility.[43] Therefore the environmental effects of hazardous materials release to the environment from demolition of older buildings would be avoided. There would be no new environmental effects from the No-Action Alternative.

IV.C.3. Water Resources and Soil Erosion

IV.C.3.a. Affected Environment at LBNL

Runoff and Drainage

LBNL is located within the Strawberry Creek watershed in an area characterized by three main canyons and related tributaries. A site-wide storm drain

[43] Nancy E. Rothermich, LBNL Waste Management Group Leader. Email to Jerry O'Hearn, LBNL FA Capital Projects Department Head, January 21, 2010.

system, designed and installed beginning in the 1960s, discharges runoff from the northwestern portion of LBNL to the North Fork of Strawberry Creek and the remaining areas in the south and east to the main stem (sometimes referred to as the "South Fork") of Strawberry Creek. Strawberry Creek then flows through Berkeley to San Francisco Bay.

UC LBNL manages stormwater flows originating from sources upstream of the site and from within the site through engineering controls and management practices. Subsurface hydraugers[44] were installed at LBNL to facilitate hillside drainage and improve slope stability. Groundwater collected in these hydraugers is subsequently directed into the LBNL storm drain system, except in areas where groundwater quality has been affected by historic chemical releases.

Stormwater Runoff Water Quality

Stormwater runoff from portions of the site where industrial activities occur is monitored as required under the NPDES Industrial General Permit. In addition to NPDES-required stormwater sampling, the UC LBNL EH&S Division conducts quarterly sampling of creeks in and near the main LBNL hill site. Discussion of data related to contaminant releases and groundwater quality is included in Section IV.C.2, Hazardous Substances and Human Health.

Freshwater Supply to LBNL Buildings

Groundwater flow through bedrock beneath LBNL occurs as a typical fracture flow with a slow recharge and low yield and groundwater is currently not used, nor likely to be used in the future, as a supply of potable water. Drinking water is supplied to LBNL and the cities of Berkeley and Richmond by the East Bay Municipal Utility District (EBMUD).

[44] Hydraugers are in-hill drainage pipes installed at locations throughout the Lab to draw groundwater out of the hillside and prevent saturation of the soil that otherwise could lead to slumps and landslides.

IV.C.3.b. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

IV.C.3.b.i. Demolition of Buildings 25/25B, 55, 71 Trailers

The original topography and existing drainage pattern of the sites affected by demolition activities would be maintained under the Proposed Action. Following demolition, the Building 55 site, and the Building 25/25B site if not further developed, would be filled with ¾-inch drain rock and paved to prevent groundwater intrusion. The Building 71 trailers are already resting on asphalt. There would therefore be no change to the net pervious area at LBNL as a result of the demolition component of the Proposed Action. Although an ephemeral stream runs close to Building 55, the demolition would be at a sufficient distance from this so that it is unlikely to be affected. There are no stream or river courses close to Building 25/25B or 71 trailers.

As the area covered by the Proposed Action is more than one acre, a project-specific Stormwater Pollution Prevention Plan (SWPPP) would be prepared and implemented as required by NPDES permit so as to provide runoff control, prevent chemical release via stormwater, and ensure that erosion and siltation are minimized.

Demolition of Buildings 25/25B, 55 and 71 trailers is also part of Alternatives A and B but for brevity this discussion is not repeated below.

IV.C.3.b.ii. GPL Construction at Building 25/25B Site

After construction of the GPL, the post-construction topography would differ very little from the pre-construction topography. Drainage plans are being prepared as part of the detailed design. There would not be any changes in drainage patterns, sediment runoff, or groundwater infiltration as a result of the GPL construction at the Building 25/25B site as part of the Proposed Action.

The possible effects of the operation of the GPL related to wastewater and water use, for the Proposed Action and each alternative, are discussed in Section IV.C.10, Utilities and Waste Management.

IV.C.3.b.iii. Building 85/85A Seismic Strengthening

There would be minor changes to the subsurface drainage patterns at Building 85/85A because of the presence of impermeable concrete plugs proposed as part of the pile borings. However, these would be largely underneath the impermeable building or yard surface, and would have minimal effects on surface drainage.

The seismic strengthening at the Building 85 complex would also be a component of the project as described under Alternatives A, B, and C (but not the No-Action Alternative) but for the sake of brevity is not repeated below.

IV.C.3.c. Alternative A (GPL Construction at B74 SE Parking Lot, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

As would be the case under the Proposed Action, construction of the GPL at the Building 74 SE Parking Lot site would maintain existing drainage patterns and would not significantly alter the topography of the site. Development and implementation of the SWPPP would also result in runoff control and prevent chemical release via stormwater.

However, whereas the Proposed Action would not increase the total amount of paved surface, Alternative A would result in approximately 20,000 additional square feet of impervious surface at the LBNL site. In addition, construction under Alternative A would be located at the base of a steep slope. Additional stormwater runoff would be managed with three new stormwater drains and a new detention basin that would be designed in conformance with NPDES regulations. While this would ensure that there would be no net increase in stormwater volume from construction of the project, it means that development and stormwater management at the site would be more complex than under the Proposed Action.

IV.C.3.d. Alternative B (GPL Construction and Operation at the RFS, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening

Affected Environment

The RFS is located in a small un-named watershed that primarily drains the neighboring City of Richmond properties to the west and north. The watershed is almost completely urbanized and consists of housing, light industry, commercial and institutional facilities, and some small parks. On-site storm-water drainage is by overland flow that is conveyed from the upland area through a series of culverts and open swales. Two subcatchments on the RFS drain to two storm drain outlets at the edge of Western Stege Marsh, known as the Eastern Storm Drain and the Western Storm Drain. These storm drains discharge into a series of tidal salt marsh channels that drain to Meeker Slough.[45]

According to the Current Conditions Report prepared for the RFS site, at least three water-bearing zones are present at the RFS: a shallow groundwater zone, from approximately 10 to 20 feet bgs, an intermediate groundwater zone, from approximately 30 to 74 feet bgs, and a deeper-groundwater zone, from approximately 90 to 100 feet bgs. Based on groundwater monitoring well observations, groundwater flow is generally south toward San Francisco Bay (UC Berkeley 2008). The Current Conditions Report provides an evaluation of the groundwater contaminants present at the RFS site. Contamination, including metals, VOCs, and PCBs, has been identified within the shallow-zone groundwater, and fewer contaminants are identified in lower zones (UC Berkeley 2008).

Construction and Operation of the GPL at RFS

The GPL facility site at the RFS is currently undeveloped, and therefore the facility would add new impervious surfaces that would generate increased storm water. Due to the site's location very near the San Francisco Bay, hy-

[45] UC Berkeley, 2008, Final Current Conditions Report, University of California, Berkeley, Richmond Field Station, Richmond, California.

dromodification effects of this increased runoff are not a concern for this site. Water quality could be affected by the runoff generated by the parking lot that would be built to serve the GPL facility population. However, compliance with NPDES requirements would minimize water quality effects. Construction-phase water quality impacts would be addressed in a SWPPP that would be developed and implemented in compliance with NPDES requirements.

Additionally, the RFS is not located in an area at risk of inundation from sea level rise expected in the next century, as defined by the San Francisco Bay Conservation and Development Commission (BCDC).[46]

IV.C.3.e. Alternative C (No GPL Construction but Use of Leased Space Off-Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Use of an existing building under this alternative would eliminate any environmental effects to water resources due to new construction.[47]

IV.C.3.f. Alternative D (Reduced Project with only B85/85A Seismic Strengthening)

Only the minor environmental effects from seismic strengthening described above are relevant to this alternative.

IV.C.3.g. No-Action Alternative

This alternative would not include any of the environmental effects from new construction, demolition, or Building 85/85A seismic strengthening.

---

[46] San Francisco Bay Conservation and Development Commission. Climate Change, http://www.bcdc.ca.gov/planning/climate_change/climate_change.shtml. Accessed on April 7, 2010.

[47] San Francisco Bay Conservation and Development Commission. Climate Change, http://www.bcdc.ca.gov/planning/climate_change/climate_change.shtml. Accessed on April 7, 2010.

IV.C.4. Biological Resources

IV.C.4.a. Affected Environment at LBNL

Of the approximately 131 acres of undeveloped lands within the LBNL site, 67 acres are comprised of grassland, including both annual grassland and mixed grassland. Mixed grassland is found in small patches along steep slopes throughout the LBNL site. Mixed grassland occurs on the south side of Building 25, on the north side of Building 55, and in undeveloped areas adjacent to Building 85/85A.

A total of 12 acres of the LBNL site is comprised of non-native eucalyptus stands with sparse understory vegetation consisting primarily of non-native weedy species. A line of non-native blue gum (*Eucalyptus globulus*) trees is located southwest of Building 25/25B. Eucalyptus trees also occur on the north side of Building 55. Landscape trees of 10 giant sequoias (*Sequoiadendron gigantea*) and one dawn redwood (*Metasequoia glyptostroboides*) with irrigated turf as an understory are located along the western side of the Building 25 site.

Coast live oak woodland comprises approximately 9 acres on the LBNL site. This vegetation type ranges in cover from sparse to dense canopy, with coast live oak (*Quercus agrifolia*) the only tree species present. Where oaks are widely spaced, annual or mixed grasslands occur in the understory. This community occurs adjacent to Building 55 on the hillside to the north and west and across the road on the south side; and adjacent to the Building 71 trailers on the south side.

IV.C.4.b. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

IV.C.4.b.i. Demolition of Buildings 25/25B, 55, 71 Trailers

Demolition of Buildings 25/25B, 55 and 71 trailers, including use of adjacent staging areas, is an activity restricted to land that is already developed and is therefore unlikely to affect biological resources. The demolition timeframes vary from a few months in length, in the case of the Building 71 trailers, to

around a year for Building 25/25B. Noise and dust created by the construction, although disturbing to local wildlife, is a temporary phenomenon and it is expected that wildlife would return afterwards.

For the Building 25/25B demolition, one of the staging and laydown areas is immediately east of a grove of redwood *(Sequoia sempervirens)* trees planted as landscape elements, and north of an undeveloped area of mixed grasslands. The Alameda whipsnake, a State special-status and Federal threatened status reptile, could possibly use the adjacent grasslands for foraging or movement, and special-species nesting birds may inhabit the trees adjacent to the building. SPFs BIO-3, 4 and 5 (a) through (f)) from Appendix A of this EA, would ensure that adequate precautions are taken during demolition and construction activities to protect special-status wildlife in the vicinity.

The dusky-footed woodrat (*Neotoma fuscipes*), a special status animal, is not expected to use the line of eucalyptus trees along the southwest portion of the proposed GPL site or the landscaped trees located to the west of the Building 25/25B. The individual oak trees located at Building 71 trailers and Building 55 also do not provide the canopy cover necessary for this species. Therefore, the demolition, construction and seismic strengthening activities would not affect this species.[48]

Demolition of Buildings 25/25B, 55 and 71 trailers is also part of Alternatives A and B but for brevity this discussion is not repeated below.

IV.C.4.b.ii. GPL Construction at Building 25/25B Site

Construction of the GPL is planned to take about three years, which is longer than any of the individual demolition components of the Seismic Phase 2B Project and, therefore, has a greater potential for wildlife disturbance. However, the Building 25/25B site is a developed site, and staging and laydown areas would be located exclusively on developed land.

[48] Wildlife Research Associates (WRA), 2009, Biological Assessment for the Seismic Phase 2B Project, Lawrence Berkeley National Laboratory.

GPL construction at the Building 25/25B site would also require the construction of a storm drain approximately 125 feet long, extending from the southeast corner of the new building to a connection point on Segre Road, east of the proposed site. This drain crosses a neighboring hillside, although the land has already been disturbed by the creation of Segre Road. The area is not recognized as habitat for the Alameda whipsnake according to the LBNL 2006 LRDP EIR. In the unlikely event that whipsnake are encountered, SPFs BIO-5 (a) to (f)) would be implemented to prevent harm to the reptile.

The existing 4-inch sanitary sewer pipe would be replaced by a 6-inch diameter pipe running along one of two routing options: either a run of approximately 500 feet west from the proposed GPL between existing buildings, or a run of approximately 650 feet north and then west from the GPL. Both routing options would pass entirely through previously developed land not recognized as habitat for the Alameda whipsnake. Again, in the unlikely event that whipsnake are encountered, SPFs BIO-5 (a) to (f)) would be implemented to prevent harm to the reptile.

GPL construction at the Building 25/25B site is expected to require removal of two Coast live oak trees west of Building 25 in order to realign the driveway, and a Dawn redwood tree on the hillside southeast of the building to allow for the addition of a new storm drain. The two Coast live oak trees have circumferences (as measured at a height of 4 feet above the ground) of 26 inches (tree southeast of B25) and 33 inches (tree southwest of B25), respectively. These trees would be considered protected under the City of Berkeley Tree Ordinance, which covers trees with single-stem diameters greater than 18 inches. However, LBNL is operated by the University of California, which is constitutionally exempt under Article IX, Section 9 from local land use regulation including general plans, zoning, and ordinances. Nevertheless, the University seeks to cooperate with local jurisdictions to reduce any physical consequences of potential land use conflicts to the extent feasible. In the case of tree removal, UC LBNL voluntarily plants trees at a ratio of one to one to replace any that need to be removed.

In conclusion, the GPL would be built on an already developed site under the Proposed Action, and replacement planting would be provided for any necessary minor tree removal in keeping with UC LBNL policy.

IV.C.4.b.iii. GPL Operation
GPL operation would not affect surrounding biological resources.

IV.C.4.b.iv. Building 85/85A Seismic Strengthening
As seismic strengthening work on Building 85/85A would take place largely underground or inside the building, and as staging and laydown areas are on disturbed land, there would only be minor effects to wildlife. Tree pruning necessary for improvement work in close proximity to Building 85/85A could potentially disturb breeding and nesting passerines, raptors and bats that may occupy those trees. However, the inclusion of SPFs BIO-3 and BIO-4 from Appendix A of this EA, ensures that measures such as pre-construction surveys and prohibition of destruction of roosts would be in place to prevent major disturbance. In addition, the presence of Alameda whipsnake in the vicinity of Building 85/85A is minimal due to the existing constant high level of human activity around the complex.

The seismic strengthening at Building 85/85A would also be a component of the project as described under Alternatives A, B, and C (but not the No-Action Alternative) but for the sake of brevity is not repeated below.

IV.C.4.c. Alternative A (GPL Construction at B74 SE Parking Lot, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

The Building 74 SE Parking Lot site is currently occupied by a parking lot and small building that would be demolished under this alternative. However, construction and operation of the GPL at this location would encroach on approximately 20,000 square feet of undeveloped land, mainly for the construction of a fire access lane. The undeveloped portion of the proposed site supports non-native grasslands as well as oak woodlands, and likely provides

foraging or movement habitat for the Alameda whipsnake, a special-status species.[49]

To accommodate the new building, a total of approximately 46 trees would be removed from the eastern portion of the site, including 24 Coast live oak trees, eight Coast redwoods and five Monterey pines. As part of Alternative A in compliance with UC LBNL policies, UC LBNL would plant replacement trees at a ratio of one to one elsewhere on the LBNL site, in keeping with UC LBNL policy. The trees that would be removed provide potential nesting habitat for both passerine and raptor species of birds. SPF BIO-3 from Appendix A sets out a strategy for minimizing loss of nesting passerine and raptor birds which includes restricting grading and tree removal activities to months outside the breeding season.

Removal of these trees could also potentially disturb the Dusky-footed woodrat habitat or result in mortality of individuals. However, the inclusion of SPF BIO-5(f) from Appendix A, which calls for site vegetation management prior to tree removal, would prevent the take of individuals during tree removal or ground breaking activities.

The site proposed for the GPL under this alternative is adjacent to Unit 6 of Critical Habitat for the Alameda whipsnake, and there is a high likelihood that the reptile uses the undeveloped 20,000 square-foot portion of the site for foraging or movement. SPFs BIO-5 (a) to (f)) from Appendix A were developed to minimize potential adverse effects on the Alameda whipsnake. In consultation with USFWS under Section 7 of FESA, UC LBNL would replace lost habitat, either through habitat conservation or in the form of a Conservation Easement, and appoint a United States Fish and Wildlife Service-approved Biological Monitor to oversee actions implemented on-site for the preservation of the Alameda whipsnake during the construction phase.

[49] Wildlife Research Associates (WRA), 2009, Biological Assessment for the Seismic Phase 2B Project, Lawrence Berkeley National Laboratory.

In conclusion, project features built into Alternative A would cause effects to the environment such as disturbance to the Alameda whipsnake and loss of trees to be minor. Nonetheless, the potential for construction and operation of the GPL to affect sensitive species is greater under Alternative A than under the Proposed Action.

IV.C.4.d. Alternative B (GPL Construction and Operation at RFS, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Affected Environment

The proposed GPL site at the RFS is disturbed, and a portion of it is developed with Building 167 and a parking lot. The habitat on the site includes disturbed native and non-native grassland, ornamental trees, eucalyptus trees, and a drainage ditch that is potentially a jurisdictional feature. The grassland at the site provides potential habitat for western burrowing owl (*Athene cunicularia hypugaea*, a state species of concern) and foraging habitat for loggerhead shrike (*Lanius ludovicianus*, a state species of special concern). The eucalyptus grove provides nesting habitat for white tailed kite (*Elanus leucurus*, a state species of concern, fully protected).[50] Native grasslands that occur at the site include California Oatgrass Bunchgrass Grassland (*Danthonia californica*) and purple needlegrass (*Nassella pulchra*). Both grassland types are considered a sensitive natural community by the CDFG "List of California Terrestrial Communities Recognized by the California Natural Diversity Database".[51] No federally listed plant or wildlife species occur on the site.

Construction and Operation of the GPL at RFS

The drainage along the eastern side of the GPL site at RFS may potentially be under the jurisdiction of the U.S. Army Corps of Engineers (USACE) and/or California Department of Fish and Game (CDFG). If it is determined that

[50] UC Berkeley, 2003, Richmond Field Station Remediation Project Initial Study and Mitigated Negative Declaration. SCH #2003052124.

[51] UC Berkeley, 2003, Richmond Field Station Remediation Project Initial Study and Mitigated Negative Declaration. SCH #2003052124.

the drainage feature qualifies as a jurisdictional feature, it would be avoided. If avoidance is not feasible, compliance with federal and State policies would reduce the environmental effects related to the water feature. The potential for Alternative B to affect wetland habitat is greater than the potential under the Proposed Action, however the effects would be reduced by the implementation of SPFs from Appendix A of this EA, which would be voluntarily applied under this alternative.

It is anticipated that most of the trees on the site would remain under this alternative, and only a few trees would be removed. The removal of active nests and nest abandonment due to construction noise would be avoided through implementation of SPF BIO-3 from Appendix A, which involve pre-construction surveys and implementation of additional measures in case active nests are encountered. UC LBNL would also comply with the Migratory Bird Treaty Act.

In addition, construction of the GPL under this alternative could potentially affect the sensitive natural communities -- California Oatgrass Bunchgrass Grassland (*Danthonia californica*), and purple needlegrass (*Nassella pulchra*) - that are present on the site. Although these species are not federally protected, implementation of SPFs BIO-5 (f), BIO-6a, and 6b from Appendix A, involving vegetation management and floristic surveys for special-status plants) would minimize this effect.

IV.C.4.e. Alternative C (No GPL Construction but Use of Leased Space Off-Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

This alternative would require no new construction. Instead of building a new GPL, UC LBNL personnel would occupy additional leased space in an existing facility located in an urban area.

IV.C.4.f. Alternative D (Reduced Project with only B85/85A Seismic Strengthening)

This alternative also would not involve the construction of a new GPL or the demolition of seismically deficient buildings. As described above, the seismic strengthening component of the Proposed Action, and thus of Alternative D, would not affect biological resources.

IV.C.4.g. No-Action Alternative

This alternative would result in no change to the status quo and no effects on biological resources.

IV.C.5. Aesthetics

IV.C.5.a. Affected Environment at LBNL

The 200-acre LBNL site is located on a steep, rugged hillside with elevations that range from approximately 500 feet to approximately 1,100 feet. Wooded areas of eucalyptus, sequoias, redwoods, coast live oaks, and other trees cover 42 acres of the site. Due to areas of dense vegetation and the relatively steep topography, many LBNL buildings are hidden from view and the site cannot be seen in its entirety from any single viewpoint. The result is a semi-rural setting with pockets of clustered development.

LBNL's built environment is defined by an eclectic and diverse architectural style and building form, the result of development over many decades. Permanent buildings typically display a utilitarian, semi-industrial aesthetic defined by concrete facades and box-like massing. Temporary structures, such as the Building 71 trailers, are often indistinguishable from one another. Many of the site's pathways and gathering areas encroach on service areas, loading zones, and parking lots, ultimately detracting from visual cohesion.

IV.C.5.b. Proposed Action (GPL Construction at B25/25B Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

IV.C.5.b.i. Demolition of Buildings 25/25B, 55 and 71 Trailers

The demolition component of the Proposed Action would remove several functional structures that are aging and architecturally unremarkable. All of

these buildings can be seen from on- and off-site viewpoints. Building 25/25B can be seen from residences to the north, from various places on the UC Berkeley campus and from hiking trails in the vicinity of LBNL. Building 55 is partially visible from streets in Berkeley. Building 55 and the six Building 71 trailers can be seen from Lawrence Hall of Science on the UC Berkeley campus. Demolition of these buildings would thus serve to marginally enhance views to and from the LBNL site, while the demolition of the Building 71 trailers and Building 55 would serve to increase the amount of undeveloped space on the LBNL site, an asset to the site's overall visual quality.

Demolition of Buildings 25/25B, 55 and 71 trailers is also part of Alternatives A and B but for brevity this discussion is not repeated below.

IV.C.5.b.ii. GPL Construction at Building 25/25B Site

The Proposed Action would involve the construction of a modern GPL facility on the LBNL site at the site of the demolished Building 25/25B. As evident in Figure IV.2, which shows a simulation of the GPL from Centennial Road looking southwest toward the building, the GPL would be modern in appearance, thoughtfully designed and largely obscured by adjacent trees. Vegetated hillsides and undeveloped ridgelines would remain intact. As proposed, most viewers would consider it an improvement over the utilitarian aesthetic and lack of articulation that define Building 25/25B and surrounding buildings.

Simulations of the GPL from the Jordan Fire Trail across Strawberry Canyon show that it would be almost entirely hidden behind eucalyptus trees.[52] It is possible that the two exhaust stacks could be seen from some vantage points in the Panoramic Hills neighborhood, but the rest of the building would be heavily screened by existing vegetation and topography. Simulations made from viewpoints along residential areas of Campus drive also scarcely showed the building, although the two exhaust stacks are visible. In general, from

[52] As the GPL was scarcely noticeable in these additional simulations, they are not included in this EA.

Source: DC&E, 2009

FIGURE IV-2

SIMULATION OF GPL AT B25/25B SITE (VIEW SOUTHWEST FROM CENTENNIAL DRIVE)

medium-range and long-range viewpoints, the new building would scarcely be visible. Incorporation of SPF VIS-4 (a) through (c)) from Appendix A of this EA, would minimize light and glare from the building through design standards that confine illumination to the site and through the prohibition of reflective exterior wall materials.

During the construction phase, some construction equipment would be more visually prominent than the completed building. However, the temporary appearance of the construction equipment would lack prominence when viewed against the scale and density of existing development.

IV.C.5.b.iii. Building 85/85A Seismic Strengthening

Work associated with the seismic strengthening of Building 85/85A would be performed either below-grade, inside the building or in the rear yard area, shielded from view by the structure. Improvements would consist mainly of underground retaining structures, pier foundations, tiebacks, and some internal work. Once completed, these generally would not be noticeable from off-site locations. Although the seismic strengthening work would involve construction equipment visible from a distance, it would be temporary, and lack prominence when viewed against the backdrop of the large, industrial building. The temporary presence of construction equipment would not be detrimental to the aesthetics of the Building 85/85A area.

The seismic strengthening at Building 85/85A would also be a component of the project as described under Alternatives A, B, and C (but not the No-Action Alternative), but for the sake of brevity is not repeated below.

IV.C.5.c. Alternative A (GPL Construction at B74 SE Parking Lot, B25/25B, 55, 71 Trailer Demolition and B85 Seismic Strengthening)

Alternative A would also involve the construction of a modern GPL facility at LBNL, but at a site in Strawberry Canyon. At this location, the GPL would be adjacent to an area of open space and would be located, at its closest point, about 40 feet from the edge of the UC Botanical Garden, a facility ad-

mired for its natural setting and high aesthetic quality. Under this alternative, the GPL would be highly visible from the UC Botanical Garden, some nearby residences in the Panoramic Hill neighborhood, and an adjacent hiking trail. A simulation of the GPL at the Building 74 SE Parking Lot site, as viewed from the walkway looking northeast across Centennial Drive towards the UC Botanical Garden, is shown in Figure IV-3.

The GPL would be approximately 30 feet high and terraced into the hillside, with stacks projecting an additional 30 feet or so higher than the surface of the building roof. While its position upslope from the Garden would accentuate its height, the building would not significantly increase the amount of shadow cast onto the gardens because it would be set against the hillsides. Preliminary shadow studies have indicated that the building would cast shadows on the edge of the Garden for a period of two morning hours during summer months. SPF VIS-4 (a) through (c)) from Appendix A would minimize light and glare through design standards that confine illumination to the site and through the prohibition of reflective exterior wall materials. However, in conclusion, even with landscaping after building construction, it is unlikely that vegetative screening could grow tall enough in a reasonable length of time to screen the building.

IV.C.5.d. Alternative B (GPL Construction and Operation at RFS, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Affected Environment at RFS

The visual setting of the RFS consists of a flat, developed, bayside plain surrounded by industrial and residential land uses, and Interstate 580 to the northeast. Although this setting differs greatly from the setting at Building 25/25B on the main LBNL hill site, building form and design at both locations would be comparable. The site proposed for the GPL is located at the center of the RFS. Views of the proposed site are primarily available from two public viewpoints: the Bay Trail along the southern end of the RFS and the Marina Bay Residential Housing complex southwest of the property.

FIGURE IV-3

SIMULATION OF GPL AT BUILDING 74 SE PARKING LOT (VIEW NORTHEAST TOWARD UC BOTANICAL GARDEN)

Construction and Operation of the GPL at RFS

Views of the proposed facility would be largely screened from the Bay Trail and nearby housing by intervening buildings and vegetation. The building would be adjacent to existing structures and would therefore appear as an incremental addition to the existing development at the RFS site. Voluntary inclusion of SPF VIS-4 (a) through (c)) from Appendix A of this EA, would ensure that adverse effects from light and glare are minimized. Under this alternative the amount of development on the LBNL hill site would not increase, and thus have little effect on site aesthetics.

IV.C.5.e. Alternative C (No GPL Construction but Use of Leased Space Off-Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Under this alternative, no new GPL facility would be constructed and there would be no aesthetic effects due to use of an existing facility. Rather, UC LBNL personnel would be relocated from the site to space leased in an existing facility in Berkeley or Emeryville. Therefore, there would be no new visual impact associated with this alternative.

IV.C.5.f. Alternative D (Reduced Project with only B85/85A Seismic Strengthening)

Under this alternative there would be no demolition of existing structures or new construction. The Building 85/85A seismic strengthening component of this work would not result in any environmental effects related to aesthetics.

IV.C.5.g. No-Action Alternative

The No-Action Alternative would not involve demolition of any structures on the LBNL site. Under this alternative, the GPL would not be constructed, thereby avoiding visual impact but the opportunity to slightly improve views from the surrounding area by eliminating unattractive structures would be lost.

IV.C.6. Transportation and Traffic

IV.C.6.a. Affected Environment at LBNL

The LBNL site is approximately 3 miles east of Interstate 80, the nearest major freeway and connection between the San Francisco Bay Area and Sacramento region. Regional access to LBNL is also provided by Interstate 580 and State Routes 24 and 13. Local vehicular access generally occurs along Hearst Avenue and Centennial Drive, while vehicular circulation within LBNL primarily occurs via Chamberlain Road and McMillan Road, which constitute LBNL's "upper" circulation system, and Lawrence Road and Alvarez Road, which constitute the "lower" circulation system. An extensive network of pedestrian paths crisscrosses the LBNL site and bike lanes are provided on the site where feasible.

Traffic counts conducted as part of the LBNL 2006 LRDP EIR indicated that roughly 5,700 vehicle trips are generated daily by the approximately 4,000 employees at the LBNL site. Approximately 40 percent of UC LBNL staff use alternative modes of transportation to the single occupancy vehicle, including LBNL shuttle, bicycling, Bay Area Rapid Transit (BART), and carpooling.[53] UC LBNL has developed and is implementing a Transportation Demand Management (TDM) program which seeks to reduce total vehicle trips to and from LBNL and minimize demand for additional parking spaces. The TDM program promotes increased use of the Laboratory Shuttle Service, the Guaranteed Ride Home program, Pretax Transportation Program Incentives, and carpooling/vanpooling as well as encouraging telecommuting and the use of flex time where feasible. In addition, potential alternative transportation measures being considered include: development of remote parking with shuttles for employees and construction personnel, as well as subsidizing public transit costs with vouchers, discounted BART tickets and participation in the Alameda County Transit Easy Pass program.

[53] LBNL, 2006, *Long-Range Development Plan Environmental Impact Report*, page IV.L-19.

The City of Berkeley has established designated truck routes to manage the movement of construction vehicles on its streets. The designated truck routes that would be used by construction vehicles associated with UC LBNL projects, including the Proposed Action, are shown on Figure IV-4. In 2009, Fehr & Peers identified four key intersections along the designated truck routes for study (see Figure IV-4). Fehr & Peers found that all four intersections operate at acceptable levels of service (LOS) [54] (LOS D or better under City of Berkeley standards) during the AM peak hour. During the PM peak hour, however, three of the four intersections operate at unacceptable levels.

In August 2007 and May 2009, Fehr & Peers studied four intersections on local roads used by traffic accessing the LBNL site.[55] As shown in Table IV-1, two of the four study intersections (Hearst Avenue/Gayley Road/La Loma Avenue, and Durant Avenue/Piedmont Avenue) currently operate at acceptable LOS D or better in both the AM and PM peak hours. A third intersection (Stadium Rim Way/Gayley Road) currently operates at an acceptable level of service in the AM peak hour, but is at an unacceptable LOS E in the PM peak hour. The fourth intersection (Bancroft Way/Piedmont Avenue) operates at LOS F during both AM and PM peak hours when pedestrian crossings are factored into the analysis.

[54] Level of service (LOS) is a qualitative measure describing operational conditions within a traffic stream. Level of service assesses conditions in terms of speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. Six levels of service are defined by letter designations from LOS A to F, with LOS A representing the best operating conditions, and LOS F the worst.

[55] Construction traffic would travel only on the City of Berkeley designated truck routes, whereas it is anticipated that operational traffic would access the main hill site from a variety of directions. Therefore, a different set of study intersections was selected for construction and operational traffic studies so as to reflect the differing conditions.

Source: Fehr & Peers, 2009

FIGURE IV-4

CITY OF BERKELEY DESIGNATED TRUCK ROUTES

TABLE IV-1 **EXISTING TRAFFIC CONDITIONS AT INTERSECTIONS ON LOCAL ROADS IN THE VICINITY OF LBNL (LEVEL OF SERVICE SUMMARY)**

Intersection	Intersection Control	Peak Hour	Delay (seconds)	LOS
Centennial Drive/ Grizzly Peak Boulevard	All-Way Stop-Controlled	AM	10.2	B
		PM	17.7	C
Stadium Rim Way/ Gayley Road	All-Way Stop-Controlled	AM	29.6	D
		PM	**41.1**	**E**
Hearst Avenue/ Gayley Road/ La Loma Avenue	Signalized	AM	22.7	C
		PM	24.1	C
Bancroft Way/ Piedmont Avenue	All-Way Stop-Controlled	AM	**>60 (v/c =0.930)**	**F**
		PM	**>60 (v/c =0.825)**	**F**
Durant Avenue/ Piedmont Avenue	All-Way Stop-Controlled	AM	17.4	C
		PM	17.6	C

Note: Results in **bold** represent unacceptable levels of service.
Source: Fehr & Peers Transportation Consultants. August 2007 and May 2009.

IV.C.6.b. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

IV.C.6.b.i. Demolition, Construction/Seismic Strengthening

Given the location of the demolition, construction and seismic strengthening activities for the Proposed Action, the majority of trucks would enter and exit the site though the Blackberry Canyon Gate, traveling through Berkeley on Hearst and University Avenues. UC LBNL has a Site Construction Coordinator, responsible for administering best management practices and ensuring that UC LBNL construction vehicle traffic does not contribute to a substantial increase in volumes or degradation in LOS on surrounding roadways. In its 2009 report, Fehr & Peers recommended the following maxi-

mum allowable number of daily truck trips to and from LBNL so as to avoid exceeding the City of Berkeley established thresholds governing intersection operations, roadway segment operation, and pavement condition:

- An average of 98 one-way truck trips per day through the Hearst Avenue and University Avenue intersections.
- An average of 50 one-way truck trips per day through the Stadium Rim Way/Gayley Road intersection.

By itself, the Proposed Action is not expected to generate more than a maximum daily average of 38 one-way truck trips at any time, and in combination with other projects at LBNL would not generate a daily average of more than 98 trips, even at the peak of construction activities in June-July 2011. In addition, as shown in Table IV-2, below, Fehr & Peers found that construction truck traffic from all UC LBNL construction projects controlled by the Site Construction Coordinator, including the Proposed Action, not to exceed 98 one-way truck trips per day, would not exceed the City's thresholds at any of the truck route study intersections. Regardless, the Site Construction Coordinator would oversee the development and implementation of a Construction Traffic Management Plan for the Proposed Action, as well as the management of concurrent project schedules to as to minimize overlap of construction activity that requires numerous truck trips for demolition and excavation.

Under the Proposed Action, parking lots around Buildings 25/25B, 55 and 71 trailers would be used as staging and laydown areas during the demolition and construction phase. This would result in an approximately 24-month loss of 113 surface parking spots that are normally available to UC LBNL staff. Priority for available spots would be given to construction vehicles during this phase, and the precise number and location of spots required by contractors would be identified in the relevant project-specific Construction Traffic Management Plan.

TABLE IV-2 **NEAR TERM LEVEL OF SERVICE CONDITIONS WITH AND WITHOUT LBNL CONSTRUCTION TRUCK TRAFFIC**

			Background Conditions		Conditions with LBNL Construction Traffic	
Intersection	Intersection Control	Peak Hour	Delay (Seconds)	LOS	Delay (Seconds)	LOS
University Ave./ Sixth St.	Signalized	AM	40.3	D	40.8	D
		PM	**69.5**	**E**	**71.1**	**E**
University Ave./ San Pablo Ave.	Signalized	AM	43.8	D	44.0	D
		PM	**93.1 (v/c=1.00)**	**F**	**95.3 (v/c=1.00)**	**F**
Stadium Rim Way/Gayley Rd.	All-Way Stop-Controlled	AM	30.5	D	32.3	D
		PM	**42.4**	**E**	**44.8**	**E**
Hearst Ave./ Gayley Road/ La Loma Ave.	Signalized	AM	25.8	C	27.1	C
		PM	24.8	C	25.7	C

Note: Results in **bold** represent unacceptable levels of service.
Source: Fehr & Peers Transportation Consultants, May 22, 2009.

Despite this temporary reduction in parking supply due to the Proposed Action, there are nine parking lots in the area immediately surrounding the site of the Proposed Action that would still be available. Depending on the progress of various UC LBNL projects, these lots, which together form LBNL Parking Zone 5, would contain between 520 and 580 parking spaces between 2010 and 2018 (the timeframe of the Proposed Action). During that same timeframe, it is estimated the demand for parking in that same area would fluctuate between 466 and 544 spaces and the rate of occupancy for lots in

Parking Zone 5 would range from 80 to 99 percent.[56] To further compensate for lost parking spots, UC LBNL is negotiating with UC Berkeley for temporary use of additional spaces in UC lots during the construction phase.[57]

IV.C.6.b.ii. Operation of the GPL

As discussed above, the future occupants of the GPL would be drawn primarily from other locations on-site at LBNL, with some additional researchers relocating from the adjacent UC Berkeley campus. No parking passes would be issued to UC Berkeley researchers, all of whom would use the shuttle service to travel to and from the site. Consequently, there would be no increase in the number of commute trips made to and from the site as a result of the Proposed Action. Additionally, continued implementation of the TDM program would encourage further use of alternatives to single-occupancy vehicle trips to and from the site. Therefore, operation traffic from the Proposed Action would not adversely affect LOS conditions at stressed intersections in the vicinity of LBNL.

When in operation, the new GPL is not expected to take any of the existing parking spaces from the surface parking lot adjacent to Building 25. In addition, 49 parking spots in Lots N4 and P, closest to the proposed GPL site, would be reserved for future GPL occupants.[58] Lots near the site proposed for the GPL under this alternative are currently 100 percent occupied at peak hour (11:00 a.m.),[59] and current plans add only a limited number of additional spaces on the LBNL site.

---

[56] Fehr and Peers Transportation Consultants, 2007, *LBNL On-Site Parking Management Study.*

[57] Les Dutton, Site Construction Coordinator, LBNL. Personal communication with DC&E, October 20, 2009.

[58] Les Dutton, Site Construction Coordinator, LBNL. Personal communication with DC&E staff. January 25, 2010.

[59] Lawrence Berkeley National Laboratory, 2007. *Long-Range Development Plan, Draft Environmental Impact Report.*

However, continued implementation of the TDM program developed as an SPF TRANS-1(d) from Appendix A of this EA, which seeks to reduce total vehicle trips to and from LBNL and minimize demand for additional parking spaces, would temper demand for parking.

IV.C.6.c. Alternative A (GPL Construction at B74 SE Parking Lot, B25/25B, 55, 71 Trailer Demolition and B85 Seismic Strengthening)

IV.C.6.c.i. Demolition, Construction/Seismic Strengthening

As would be the case under the Proposed Action, construction traffic and parking demand under this alternative would be managed to avoid unacceptable congestion. However, the management plan for parking would be more complex than that necessitated by the Proposed Action because construction of the GPL on the Building 74 SE Parking Lot would result in the loss of more parking stalls than under the Proposed Action.

IV.C.6.c.ii. Operation of the GPL

For the reasons described above in IV.C.6.b.ii, operation traffic from the Alternative A would not adversely affect LOS conditions at stressed intersections in the vicinity of LBNL. Similarly, demand for parking under Alternative A would be tempered by the TDM program developed and implemented as a SPF TRANS-1 (d), from Appendix A of this EA.

IV.C.6.d. Alternative B (GPL Construction at RFS, B25/25B, 55, 71 Trailer Demolition and B85 Seismic Strengthening)

Affected Environment at RFS

The RFS site is accessible via Interstate 80 and Interstate 580. There are three interchanges on Interstate 580 that provide access to the RFS: Marina Bay Parkway interchange, Regatta Boulevard interchange, and Bay View Avenue interchange. Syndicate Street, Regatta Boulevard, and Frontage Road provide access to the RFS main entrance gate at 46th Street. The Regatta Boulevard interchange is 0.35 miles from the main entrance and provides the most direct

access to and from the freeway.[60] The intersection of Syndicate Street and Meade Street is the only major intersection between the Regatta interchange and the RFS main gate. This intersection is signalized and currently operates at an acceptable level of service.

The RFS site is served by Alameda-Contra Costa Transit District (AC Transit) bus number 71, which links the RFS to Richmond BART station, and by the AC Transit RFS bus that provides service between RFS and the El Cerrito Del Norte BART station.

Construction and Operation of the GPL at RFS

The RFS is located 6 miles northwest of the site, in the City of Richmond. The construction of the GPL facility at RFS would reduce the number and volume of construction vehicles on roads in the vicinity of the LBNL site in Berkeley. As the RFS is located in close proximity to Interstate 580 interchanges, construction vehicles traveling to and from the site would travel for less than 5 minutes on Richmond streets. The number of construction-related truck trips would be small as compared to regional traffic patterns and freeway traffic.

While the RFS can be reached by Alameda-Contra Costa Transit District (AC Transit) bus number 71 from Richmond BART station or by AC Transit RFS bus from El Cerrito Del Norte BART station, both routes require more than 30 minutes travel time, which would be a deterrent to use of public transit. Additionally, as UC LBNL personnel would not be consolidated in research clusters on the LBNL site, occupants of the GPL under this alternative would have to travel to the site for meetings. Consequently, this alternative would likely generate more vehicle traffic than on-site alternatives.

Vehicles traveling to and from the RFS site via the Regatta interchange travel through one major intersection at Syndicate Street and Meade Street, which currently operates at an acceptable level of service. Based on trip generation

[60] UC Berkeley, 2003, Richmond Field Station Remediation Project Initial Study and Mitigated Negative Declaration.

rates for Single Tenant Office uses in the Institute of Traffic Engineers (ITE) Trip Generation guide,[61] the additional traffic generated by the approximately 130 full-day GPL occupants and associated visitors would not adversely affect the Syndicate and Meade Street intersection. Furthermore, given the relatively small number of people who would be relocated to the proposed RFS site in comparison to the volume of traffic on freeways used to access the site, and the fact that most UC LBNL employees would be counter-commuting to and from the RFS, operation of Alternative B would not greatly affect transportation and traffic on the network adjoining the RFS.

IV.C.6.e. Alternative C (No GPL Construction but Leased Space Off-Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

IV.C.6.e.i. Demolition, Construction/Seismic Strengthening

This alternative would not involve the construction of a new GPL facility, as additional space would be leased in an existing building such as the facility in Berkeley or Emeryville. Although demolition of seismically deficient buildings on the LBNL site and seismic strengthening of Building 85/85A would still occur, construction related-traffic at LBNL under Alternative C would be considerably less than that resulting from the Proposed Action.

IV.C.6.e.ii. Operation of the GPL

The off-site facility would be located in an urbanized area and is accessible by public transit. Given the ease of access to the site by public transit and the fact that many UC LBNL employees live within walking or biking distance of the off-site facility, the proportion of vehicle trips made to and from the site would be less than those made to and from the LBNL site. Using the LRDP trip generation rate of 1.42 vehicle trips per employee for a conservative estimate, an additional 100 employees located at an off-site facility would generate no more than 43 vehicle trips, 14.8 additional trips in the AM peak period and 16.8 additional trips in the PM peak period. Therefore, the effects

[61] Institute of Transportation Engineers, 2008, Trip Generation, 8th Edition.

on transportation and traffic are would not be considered substantial and would be less than those of the Proposed Action.

IV.C.6.f. Alternative D (Reduced Project with only B85/85A Seismic Strengthening)

IV.C.6.f.i. Seismic Strengthening

Construction traffic under Alternative D would be limited to trucks from the Building 85/85A seismic strengthening component. As with the Proposed Action, the Site Construction Coordinator would manage construction traffic to stay within accepted daily limits.

IV.C.6.f.ii. Operation of the GPL

With no relocation of functions there would be reduced effects under this alternative compared to the Proposed Action.

IV.C.6.g. No-Action Alternative

The No-Action Alternative would not involve any demolition, new construction or seismic strengthening and there would be no change to the current situation with respect to transportation and traffic.

IV.C.7. Noise and Vibration

IV.C.7.a. Affected Environment at LBNL

Within the boundaries of LBNL, the majority of ambient noise is generated by automobile and shuttle bus traffic and stationary equipment such as heating ventilation, and air-conditioning (HVAC) equipment and pumps, generators, cooling towers. Intermittent high-altitude jet aircraft overflights also contribute to ambient noise levels. Based on measurements taken at 13 sites within LBNL and at 299 Panoramic Way (0.4 miles from the site of the Proposed Action), daytime noise levels range from 45 dBA L_{90} to 71 dBA L_{max}.

The LBNL site is surrounded by numerous noise-sensitive land uses. These include City of Berkeley residential areas to the west and north; the UC Botanical Garden to the east of the LBNL site; the Lawrence Hall of Science, Space Sciences Laboratory and Mathematical Sciences Research Institute to

the north; and nearby parks and student dormitories. There are also several vibration-sensitive laboratories and scientific instruments within other UC LBNL facilities.

The DOE and the University of California, under Article IX, Section 9 of the California Constitution, are exempt from local land use regulation, including general plans, zoning and noise ordinances. However, UC seeks to cooperate with local jurisdictions to reduce any physical consequences of potential land use conflicts to the extent feasible. Therefore, because the western part of the LBNL site is within the Berkeley city limits, and the eastern part is within the Oakland city limits, this section assesses the noise effects of the Proposed Action and alternatives with respect to both City of Berkeley and City of Oakland ordinances related to noise.

IV.C.7.b. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

IV.C.7.b.i. Demolition, Construction/Seismic Strengthening

The two principal sources of noise generated during demolition and construction work would be construction vehicle traffic on local roads and construction equipment used on the project site. Under worst case scenario conditions, calculations suggest that construction truck traffic would cause noise levels at key local intersections to rise by less than 1 dBA over existing conditions. Noise from individual trucks would be distinguishable from regular traffic and limited to the demolition/construction phase of the project.

On-site construction activities would be subject to SPF NOISE-1 (a) from Appendix A, which limits the hours in which construction activities can take place, require the use of quiet equipment, and prescribes the use of special controls such as noise attenuation barriers to reduce the effects of construction noise on the surrounding environment. Building 55 is approximately 550 feet from the nearest residences, but the aforementioned SPF would assure noise would not exceed the City of Berkeley single-family residential maximum noise standard of 60 dBA per the Noise Ordinance. Building

25/25B is located at the center of the LBNL site, approximately 1,500 feet from the nearest recreation area and 1,800 feet from the nearest residences. Given these distances, receiving noise levels at nearby recreational areas and residences would not exceed limits in the City of Berkeley Noise Ordinance. Building 71 trailers are smaller structures and their demolition would not measurably contribute to ambient noise levels.

The use of pneumatic impact drills on-site during seismic strengthening activities at Building 85/85A would generate a predicted maximum noise level of between 85 and 90 dBA at a distance of 50 feet. Building 85 is located 750 feet from the UC Botanical Garden, and maximum noise from the pneumatic drills is predicted to be 66 dBA at that location, which is below the 70 dBA maximum allowable receiving noise limits for commercial/industrial receptors[62] set out in the City of Oakland Noise Ordinance for weekday construction activity lasting longer than 10 days. Inclusion of SPFs NOISE-1 (a) to (b) and NOISE-4 as described in Appendix A of this EA, would further reduce noise in the vicinity by implementing comprehensive noise control specifications.

In general, UC LBNL employees are most likely to be affected by construction noise levels; however, as they work indoors, this effect is expected to be minimal and limited to the timeframe of the demolition and construction phase.

The demolition of Buildings 25/25B, 55 and 71 trailers would also be a component of Alternatives A and B, and the seismic strengthening at Building 85/85A would also be a component of Alternatives A, B, and C (but not the No-Action Alternative), but for the sake of brevity are not repeated below.

[62] The Oakland Noise Ordinance has only two categories of receptors: commercial/industrial, and residential. It was considered more appropriate use the commercial/industrial limit than the residential, because the UC Botanical Garden does not include permanent housing.

IV.C.7.b.ii. Operation of the GPL

The primary source of operational noise from the Proposed Action would be the cooling towers on the GPL. For comparison, noise levels resulting from representative cooling towers at LBNL (monitored in January 2009) ranged from about 65 to 70 dBA at a distance of approximately 50 feet. As discussed above, the nearest residences to the proposed site for the GPL under the Proposed Action are located 1,800 feet away. At that distance, noise from the cooling towers would be 40 dBA (L_{eq}) or less. Noise from the building HVAC system at that distance would be less than 30 dBA, which is substantially lower than existing ambient noise levels and approximately equivalent to the lowest nighttime ambient noise level.

The Lawrence Hall of Science, located on the hillside above the proposed GPL site, has an outdoor activity area approximately 850 feet from the proposed location of the building. The noise level from the cooling towers and HVAC systems associated with the GPL, without accounting for reductions in the noise due to shielding from the GPL building itself, is calculated to be 45 to 50 dBA at the most affected location outside the Lawrence Hall of Science. Such levels would have no impact on speech or activities and would be indistinguishable from the noise of other equipment and distant traffic.

As described above, because the Proposed Action would only result in a negligible increase in the ADP of the site or an associated increase in the number of vehicle trips made to the site, there would be no measurable contribution to ambient noise levels from associated operational traffic.

IV.C.7.c. Alternative A (GPL Construction at B74 SE Parking Lot, B25/25B, 55, 71 Trailer Demolition and B85 Seismic Strengthening)

IV.C.7.c.i. Demolition, Construction/Seismic Strengthening

The site of the new GPL facility under this alternative would be in the City of Oakland portion of LBNL, less than 50 feet from the nearest point of the UC Botanical Garden. Construction traffic would be audible to members of the public and Botanical Garden employees (when outdoors). Given the

short distance, noise from construction equipment is likely to exceed the maximum allowable receiving noise limits set out in the City of Oakland Noise Ordinance. The Ordinance specifies that, for residential and civic receptors, the maximum allowable receiving noise for weekday construction activity of greater than 10 days in duration is 65 dBA, while on weekends the maximum allowable receiving noise for long-term construction is 55 dBA. Even with implementation of noise SPFs included in Appendix A of this EA (refer to SPFs NOISE-1 (a) to (b) and NOISE-4 in Appendix A), which call for limiting construction to a schedule that minimizes disruption, etc., it is unlikely that the noise level from construction at this location would meet the standard at the UC Botanical Garden.

IV.C.7.c.ii. Operation of the GPL

The design of the GPL facility would be similar to that under the Proposed Action, and the operational noise would be principally attributable to the cooling towers, vehicular traffic generated by the facility and the building HVAC system. As described above, there would be no increase in the number of vehicle trips and no measurable contribution to ambient noise levels from operational traffic.

The cooling towers and HVAC system of the GPL would be more than 0.5-miles from the nearest residences, sufficient distance for noise levels to be nearly inaudible. However, sensitive receptors in the UC Botanical Garden could be affected by operational noise from the GPL under this alternative. Cooling tower noise is somewhat directional and depends on the sloping topography and the orientation with respect to the receivers. Noise levels would range from 65 to 70 dBA at a distance of approximately 50 feet to the side of the towers. Noise from ventilation fans are typically at least 10 dBA lower. Given that the GPL would be less than 50 feet from the edge of the UC Botanical Garden at its nearest point, City of Oakland noise limits could be exceeded. Strategies such as location, insulation and shielding would be implemented to reduce GPL noise to levels in conformance with City standards.

IV.C.7.d. Alternative B (GPL Construction at RFS, B25/25B, 55, 71 Trailer Demolition and B85 Seismic Strengthening)

Affected Environment at RFS

Traffic noise from the surrounding street network and Interstate 580 freeway dominates the noise environment at the RFS. However, the site proposed for the GPL is located at center of the RFS and ambient noise levels in this area are low given the distance from the roadways and adjacent industrial uses. Land uses surrounding the RFS are largely industrial. The residential Marina Bay neighborhood is located to the southwest of the RFS. However, this neighborhood is at least 1,509 feet from the proposed GPL site and there are several intervening buildings between the site and the homes so that a clear line of sight is not available.

Demolition, Construction/Seismic Strengthening

Noise levels generated during construction of the facility would be the same as described under the Proposed Action. Land uses surrounding the RFS are largely industrial. Although there is a residential neighborhood adjacent to the site at least 0.28 miles to the southwest, construction trucks would access the site from roads to the north and northeast, and would thus not pass near the homes. Intervening distance, existing buildings, and vegetation between the proposed GPL site and the residential neighborhood to the southwest would attenuate construction noise. In addition, voluntary inclusion of SPFs NOISE-1 (a) through (b) and NOISE-4 from Appendix A of this EA, in this alternative would further reduce noise levels by limiting construction to specific times, etc., such that City of Richmond Noise Ordinance standards would not be exceeded.

Operation of the GPL

The design of the GPL facility would be similar to that under the Proposed Action and operational noise would be principally attributed to the cooling towers of the new building, with additional contributions from vehicular traffic generated by the facility and the building HVAC system. The building would be situated between 0.28-miles from the Marina Bay residences to the southwest, a distance too far for operational noise from the cooling towers or

the HVAC system to have a considerable effect. Traffic associated with the new GPL would access the site from roads to the north and northeast and would not pass near the residential area.

IV.C.7.e. Alternative C (No GPL Construction but Leased Space Off-Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

IV.C.7.e.i. Demolition, Construction/Seismic Strengthening

Alternative C would see the lease of additional space in an existing facility in Berkeley or Emeryville instead of the construction of a new GPL facility. As such, construction noise would be avoided.

IV.C.7.e.ii. Operation of the GPL

The vicinity of the off-site facility would be in a highly developed, semi-industrial section of Berkeley or Emeryville. The increase in vehicular traffic that would be expected from this alternative would be minimal and is not likely to have a substantial effect on ambient noise levels in the vicinity. Additionally, operational noise from building HVAC maintenance equipment would not increase substantially as there would be no addition or expansion of the existing facilities. However, as Alternative C would not result in the construction of a new, energy-efficient laboratory building, there is no potential for realizing operational noise reductions attributable to newer, more up-to-date equipment.

IV.C.7.f. Alternative D (Reduced Project with only Building 85/85A Seismic Strengthening)

The two principal sources of noise generated during seismic strengthening work would be construction vehicle traffic on local roads and construction equipment used on the project site. As discussed above, even under worst case scenario conditions, there would be only a minimal rise in ambient noise levels on local roads due to construction truck traffic. However, as the Reduced Project Alternative would not result in the construction of a more energy efficient GPL building, there is no potential for realizing operational noise reductions attributable to newer, more up-to-date equipment.

IV.C.7.g. No-Action Alternative

This alternative would not produce noise effects from new construction, demolition, or Building 85/85A seismic strengthening. It would result in no new operational or construction noise. However, as the No-Action Alternative would not result in the construction of a more energy efficient GPL building, there is no potential for realizing operational noise reductions attributable to newer, more up-to-date equipment.

IV.C.8. Air Quality

The air quality impact assessment in this EA has been prepared in accordance with the applicable Federal law, including CEQ's directives and the Clean Air Act (CAA), administered by the U.S. Environmental Protection Agency (US EPA). Because the CEQ NEPA Regulations require NEPA documents to discuss possible conflicts with "State, and local . . . land use plans, policies, and controls for the area concerned," local air quality planning by the California Air Resources Board (CARB) and the Bay Area Air Quality Management District (BAAQMD) was also considered, and no violation of a state or local requirement was noted.

IV.C.8.a. Affected Environment and Regulatory Setting

The Proposed Action and alternatives would be situated in an area which is subject to air quality planning programs developed in response to both the federal CAA and the California Clean Air Act (CCAA). Within the San Francisco Bay Area, air quality is monitored, evaluated, and regulated by the US EPA, the CARB, and the BAAQMD. The LBNL site is located in Alameda County, which, along with eight other counties, is within the San Francisco Bay Area Air Basin (SFBAAB or Basin).

IV.C.8.a.i. Federal Air Quality Regulations

Criteria Pollutants

The US EPA is responsible for enforcing the CAA and the National Ambient Air Quality Standards (NAAQS). The NAAQS identify levels of air quality for seven criteria pollutants that are considered the maximum levels of ambient (background) air pollutants considered safe, with an adequate margin of

safety, to protect the public health and welfare. The seven criteria pollutants are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter less than 10 microns in diameter (PM_{10}), fine particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb).

Based on monitoring data collected in the air basin, the SFBAAB is currently classified by the US EPA as a nonattainment/marginal area for the 8-hour standard for O_3. The SFBAAB was recently designated non-attainment for the new federal $PM_{2.5}$ standard. For all other federal standards, the SFBAAB is in attainment or unclassified.

In response to its enforcement responsibilities, the US EPA requires each state to prepare and submit a State Implementation Plan (SIP) describing how the state will achieve the federal standards by specified dates, depending on the severity of the air quality within the state or air basin. The SIP as it pertains to the SFBAAB is discussed below in Section IV.C.8.a.ii, State Air Quality Regulations.

Hazardous Air Pollutants

Federal law defines hazardous air pollutants (HAPs) as non-criteria air pollutants with short-term (acute) and/or long-term (chronic or carcinogenic) adverse human health effects. The 1990 federal CAA Amendments offer a comprehensive plan for achieving significant reductions in both mobile and stationary source emissions of HAPs. Under the 1990 CAA Amendments, a total of 189 chemicals or chemical families were designated HAPs because of their adverse human health effects. Major stationary sources of HAPs are required to obtain an operating permit from the BAAQMD pursuant to Title V of the 1990 CAA Amendments. A major source is defined as one that emits at least 10 tons per year of any HAP or at least 25 tons per year of all HAPs. LBNL is not considered a major source.

IV.C.8.a.ii. State Air Quality Regulations

Criteria Pollutants

CARB, a branch of the California Environmental Protection Agency (Cal/EPA), oversees air quality planning and control throughout California. It is primarily responsible for ensuring implementation of the 1988 CCAA, for responding to the federal CAA requirements, and for regulating emissions from motor vehicles and consumer products within the state. The CCAA and other California air quality statutes designate local air districts, such as the BAAQMD, with the responsibility for regulating most stationary sources, and to a certain extent, area sources.

Like the US EPA, CARB has established ambient air quality standards for the state (i.e. CAAQS). These standards apply to the same seven criteria pollutants as the federal CAA and also address sulfates (SO4), visibility-reducing particles, hydrogen sulfide (H2S) and vinyl chloride (C2H3Cl). The CCAA standards are more stringent than the federal standards and, in the case of PM_{10} and SO_2, far more stringent. Based on pollutant concentrations measured at monitoring stations within the Basin, the SFBAAB is classified as nonattainment for the state O_3 8-hour and 1-hour standards, the state PM_{10} annual and 24-hour standards, and the state $PM_{2.5}$ standard. For all other state standards, the SFBAAB is in attainment or unclassified.

Toxic Air Contaminants

California law defines TACs as air pollutants having carcinogenic or other health effects. A total of 245 substances have been designated TACs under California law; they include the federal HAPs adopted as TACs in accordance with AB 2728. The Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; AB 2588 does not regulate air toxics emissions directly. Under AB 2588, sources emitting more than 10 tons per year of any criteria air pollutant must estimate and report their toxic air emissions to the local air districts. Local air districts then prioritize facilities on the basis of emissions, and high priority facilities are required to submit a health risk assessment and communicate the results to the affected public. Depending on risk levels, emitting facilities are

required to implement varying levels of risk reduction measures. The BAAQMD is responsible for implementing AB 2588 in the Basin. One of the TACs being controlled by the BAAQMD is diesel particulate matter (DPM) from diesel-fueled engines. Compared to other TACs, DPM emissions are estimated to be responsible for about 70 percent of the total ambient air toxics risk in the Basin. LBNL has not been identified by BAAQMD as a facility with risk levels that warrant risk reduction measures.

IV.C.8.a.iii. General Conformity

The US EPA adopted the General Conformity Rule in November 1993 to implement conformity provision of Title I, Section 176 (c)(1) of the Federal CAA. This provision requires that the federal government not engage, support, or provide financial assistance to licensing, permitting, or approving any activity not conforming to an approved SIP. To determine whether a federal action would conform or conflict with an approved SIP, a conformity review is performed. The review process comprises the following four steps:

1. Determine whether the proposed action causes emissions of criteria air pollutants.
2. Determine whether the emissions of a criteria pollutant or its precursor would occur in a non-attainment or maintenance area for that criteria air pollutant.
3. Determine whether the federal action is exempt from the conformity requirement as per 40 CFR 93.153 (c)(2)-(e).
4. Estimate emissions and compare to the threshold emissions rate and the nonattainment or maintenance area's emissions inventory.

The de minimis levels for a general conformity analysis vary based on the attainment status of each criteria pollutant in the air basin, as shown in Table IV-3, below. Because the SFBAAB is a nonattainment/marginal area for the 8-hour standard for O_3 and has been designated non-attainment for the new federal PM2.5 standard, a general conformity analysis is required for the Proposed Action. As such, the estimated emissions of the Proposed Action and alternatives must be compared to the de minimis levels set forth in 40 CFR 93.153 (b)(1) and (2). The de minimis levels for a general conformity analysis

vary based on the attainment status of each criteria pollutant in the air basin, as shown in Table IV-3, below.

If the emissions are greater than or equal to the de minimis levels, a conformity determination must be performed. The purpose of the conformity determination, if needed, is to show if a proposed action conforms to the applicable SIP. Any one of the following three options can be used to establish conformity:

- The applicable SIP can specifically include an allowance for emissions of the proposed project.
- The proposed project can purchase offset emission credits for the total direct and indirect emissions, which fully offset emissions within the same non-attainment or maintenance area so that there is no net increase in emissions.
- The SIP can be changed to include the emissions budget of the proposed project.

IV.C.8.b. Proposed Action (GPL Construction and Operation at B25/25B Site; B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening) Air Quality Impacts

The environmental effects on regional air quality from the emissions of criteria pollutants from the construction and operation of the Proposed Action are evaluated below in terms of the Proposed Action's conformity with an approved SIP, as required under federal law. Because there are no well-defined federal thresholds for evaluating impacts from HAP or TAC emissions, the BAAQMD thresholds are used to evaluate those impacts.

IV.C.8.b.i. Demolition, Construction, and Seismic Strengthening Emissions of Criteria Pollutants

Construction activities associated with the Proposed Action would generate fugitive dust emissions from site grading, building construction, hauling of equipment, hauling soil to and from the site, and construction worker commuting. These emissions would be temporary and would be further reduced

TABLE IV-3 **GENERAL CONFORMITY DE MINIMIS LEVELS**

Pollutant	Area Designation Type	De Minimis Levels (Tons/Year)
Ozone (ROG or NO_x)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region	**100**
Ozone (NO_x)	Marginal and moderate nonattainment inside an ozone transport region	100
	Maintenance	100
Ozone (ROG)	Marginal and moderate nonattainment inside an ozone transport region	50
	Maintenance within an ozone transport region	50
	Maintenance outside an ozone transport region	100
CO, SO_2, and NO_2	**All nonattainment and maintenance**	**100**
PM_{10}	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
$PM_{2.5}$	**Nonattainment**	**
Lead (Pb)	All nonattainment and maintenance	25

Note: Bold indicates status of SFBAAB relative to attainment and relevant de minimis levels.
** The US EPA has not established a general conformity de minimis level for $PM_{2.5}$.
Source: US EPA, "De Minimis Levels," http://www.epa.gov/air/genconform/deminimis.html.

through the implementation of Appendix A of this EA and incorporated into and a part of the Proposed Action and alternatives. Specifically, SPF AQ-1a from Appendix A is included in the Proposed Action and would require minimizing the generation of fugitive dust.

In addition, construction activities under the Proposed Action would generate criteria pollutants (ROG, NO_X, PM_{10}, $PM_{2.5}$, CO, and SO_2). These pollutant emissions were calculated using the URBEMIS2007 Environmental Management Software, in accordance with emission factors and parameters appropriate for the Bay Area. Implementation of SPF AQ-1b from Appendix A would minimize the generation of exhaust emissions during the construction of the proposed facility. This would ensure that emissions of ozone precursors are minimized during construction. Construction activities would also comply with Regulation 8, Rules 3 and 15, related to architectural coatings and emulsified and liquid asphalt.[63]

Construction of the Proposed Action would emit criteria air pollutants and would not be exempt from general conformity, because the Proposed Action is located in the SFBAAB, which is designated as a "marginal" nonattainment area for the federal 8-hour ozone standard. The Basin is also designated as a nonattainment area for the federal $PM_{2.5}$ 24-hour standard, and is designated as a maintenance area for the federal CO standard. Table IV-4 below compares the Proposed Action's combined off-road and on-road construction emissions to the general conformity de minimis levels.

As shown in Table IV-4, the construction emissions do not exceed the general conformity de minimis levels for ROG, NO_X, and CO. The US EPA has not established a general conformity de minimis level for $PM_{2.5}$; however, for this analysis, the PM_{10} "moderate" nonattainment and maintenance threshold of 100 tons per year is used to evaluate $PM_{2.5}$ emissions. $PM_{2.5}$ construction emissions would not exceed the 100 tons per year. Therefore, the construction emissions are considered to conform to the General Conformity Rules and applicable SIP. Note that the Proposed Action's construction emissions would also not exceed the BAAQMD's construction CEQA significance

[63] Bay Area Air Quality Management District (BAAQMD), 2010. Regulation 8: Organic Compounds, http://www.baaqmd.gov/Divisions/Planning-and-Research/Rules-and-Regulations.aspx. Accessed June 28, 2010.

TABLE IV-4 **CONSTRUCTION EMISSION COMPARISON WITH GENERAL CONFORMITY DE MINIMIS LEVELS**

	Maximum Emissions in Tons Per Year					
Construction Year	**ROG**	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
2010						
On-Road Construction Emissions	0.0170	0.2520	0.0700	0.0003	0.0090	0.0080
Off-Road Construction Emissions	0.0705	0.5167	0.3501	0.0002	0.0357	0.0733
Total Construction Emissions:	**0.0875**	**0.7687**	**0.4201**	**0.0005**	**0.0447**	**0.0813**
General Conformity Threshold:	100	100	100	N/A	N/A	–
Exceeds Threshold?	NO	NO	NO	N/A	N/A	–
2011						
On-Road Construction Emissions	0.0170	0.2520	0.0700	0.0003	0.0090	0.0080
Off-Road Construction Emissions	0.1496	1.1201	0.8879	0.0003	0.1914	0.0881
Total Construction Emissions:	**0.1666**	**1.3721**	**0.9579**	**0.0006**	**0.2004**	**0.0961**
General Conformity Threshold:	100	100	100	N/A	N/A	–
Exceeds Threshold?	NO	NO	NO	N/A	N/A	–
2012						
On-Road Construction Emissions	0.0170	0.2520	0.0700	0.0003	0.0090	0.0080
Off-Road Construction Emissions	0.1955	1.4232	1.2331	0.0006	0.2170	0.1085
Total Construction Emissions:	**0.2125**	**1.6752**	**1.3031**	**0.0009**	**0.2260**	**0.1165**
General Conformity Threshold:	100	100	100	N/A	N/A	–
Exceeds Threshold?	NO	NO	NO	N/A	N/A	–
2013						
On-Road Construction Emissions	0.0170	0.2520	0.0700	0.0003	0.0090	0.0080
Off-Road Construction Emissions	0.1641	1.2057	0.9725	0.1237	0.4687	0.1516
Total Construction Emissions:	**0.1811**	**1.4577**	**1.0425**	**0.1240**	**0.4777**	**0.1596**
General Conformity Threshold:	100	100	100	N/A	N/A	–
Exceeds Threshold?	NO	NO	NO	N/A	N/A	–
2014						
On-Road Construction Emissions	0.0170	0.2520	0.0700	0.0003	0.0090	0.0080
Off-Road Construction Emissions	0.0390	0.2913	0.2292	0.0001	0.1648	0.0470
Total Construction Emissions:	**0.0560**	**0.5433**	**0.2992**	**0.0004**	**0.1738**	**0.0550**
General Conformity Threshold:	100	100	100	N/A	N/A	–
Exceeds Threshold?	NO	NO	NO	N/A	N/A	–

Note: N/A = Not Applicable.
Source: Impact Sciences, Inc., (2010).

thresholds of 54 lbs per day of ROG and NO_X, 82 lbs per day of PM_{10}, and 54 lbs per day of $PM_{2.5}$ emissions.

IV.C.8.b.ii. Demolition, Construction, and Seismic Strengthening Emissions of Toxic Air Contaminants

PM2.5 concentrations, Lifetime Excess Cancer Risk (LECR), and chronic health hazard were calculated for both on-site, off-road construction/ demolition equipment, and off-site, on-road construction/demolition truck traffic. As shown in Tables IV-5, IV-6, and IV-7 below, concentrations of $PM_{2.5}$, the LECR, and chronic health hazard would be much lower than the BAAQMD thresholds.

The demolition of Buildings 25/25B, 55 and 71 trailers would also be a component of Alternatives A, B, and C, and the seismic strengthening at Building 85/85A would also be a component of Alternatives A, B, C, and D (but not the No-Action Alternative). To avoid unnecessary repetition, discussion of emissions related to demolition and seismic strengthening activities is not repeated below.

IV.C.8.b.iii. Operational Emissions of Criteria Pollutants

Emissions would be generated during GPL operations from the following sources: laboratory fume hood roof exhaust vents; natural gas-fueled building heaters/boilers; maintenance/testing operation of a backup diesel generator; and employee commuting. Natural gas combustion, diesel generator operation, and employee passenger vehicles would generate both criteria pollutants and TACs.[64]

[64] Air quality emissions from current activities at LBNL that would be moved to the GPL after its completion have not been subtracted from the figures for GPL operational emissions estimates. Data presented are therefore overestimates of the Proposed Action's emissions and provide for a conservative analysis.

TABLE IV-5 **MAXIMUM ESTIMATED ANNUAL $PM_{2.5}$ CONCENTRATIONS IN AMBIENT AIR FROM CONSTRUCTION/DEMOLITION EMISSIONS**

Pollutant	Assessment	Maximum Ambient Concentration	Significance Threshold
$PM_{2.5}$	On-Site, Off-Road Equipment Emissions	0.15 $\mu g/m^3$	0.3 $\mu g/m^3$
$PM_{2.5}$	Off-Site, On-Road Truck Emissions	0.005 $\mu g/m^3$	0.3 $\mu g/m^3$

Source: Golder Associates, January 2010.

TABLE IV-6 **MEI LECR AND CHRONIC HAZARD ESTIMATES FOR ON-SITE, OFF-ROAD CONSTRUCTION/DEMOLITION EQUIPMENT DPM EMISSIONS**

Assessment	MEI Result	Significance Threshold
On-Site LECR	7-in-a-million	10-in-a-million
On-Site Chronic Hazard	0.08	1.0
Off-Site LECR	8-in-a-million	10-in-a-million
Off-Site Chronic Hazard	0.01	1.0

Source: Golder Associates, January 2010.

TABLE IV-7 **MEI LECR AND CHRONIC HAZARD ESTIMATES FOR OFF-SITE, ON-ROAD CONSTRUCTION/DEMOLITION TRUCK TRAFFIC DPM EMISSIONS**

Assessment	MEI Result	Significance Threshold
Off-Site LECR	0.6-in-a-million	10-in-a-million
Off-Site Chronic Hazard	0.001	1.0

Source: Golder Associates, January 2010.

Operation of the proposed GPL would emit criteria air pollutants and would not be exempt from conformity, because the Proposed Action, as described earlier, is located in the SFBAAB, which is designated as a "marginal" nonattainment area for the federal 8-hour ozone standard, a nonattainment area for the federal $PM_{2.5}$ 24-hour standard, and a maintenance area for the federal CO standard. Table IV-8 compares the Proposed Action's operational emissions to the general conformity de minimis levels.

As shown in Table IV-8, the operational emissions would not exceed the general conformity de minimis levels for ROG, NO_X and CO. The US EPA has not established a de minimis level for $PM_{2.5}$; however, for this analysis, the PM_{10} "moderate" nonattainment and maintenance threshold of significance of 100 tons per year is used to evaluate $PM_{2.5}$ emissions. $PM_{2.5}$ operational emissions would not exceed the 100 tons per year, and would also be well below a much lower threshold of significance, were a lower threshold to be set. Therefore, the operational emissions are considered to conform to the general conformity rules and applicable SIP.

The Proposed Action's operational emissions, shown in Table IV-8, would also not exceed the BAAQMD's operational CEQA significance thresholds of 10 tons per year of ROG, NO_X, and $PM_{2.5}$ emissions, and 15 tons per year of PM_{10} emissions.

IV.C.8.b.iv. Operational Emissions of Toxic Air Contaminants

As shown in Tables IV-9, IV-10, and IV-11, concentrations of $PM_{2.5}$, the LECR, and chronic health hazard resulting from Proposed Action operations would be much lower than the applicable thresholds. The acute hazards from TACs were assessed only for emissions emanating from the laboratory fume hood exhaust vents, but not from combustion sources (such as the boilers/heaters and diesel generator). The rationale for this approach is that in general boilers, heaters and diesel generators produce TAC emissions that would exceed significance criteria for chronic effects and LECR at far lower levels than would cause them to exceed the significance criteria for acute effects. However, laboratory fume hood vents could emit a wider variety of

TABLE IV-8 **OPERATIONAL EMISSION COMPARISON WITH GENERAL CONFORMITY DE MINIMIS LEVELS**

	Maximum Emissions in Tons Per Year					
Emission Source	**ROG**	**NOx**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Laboratory	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Natural Gas Boiler	0.00160	0.02900	0.02500	0.00018	0.00220	0.00220
Diesel Generator	0.00118	0.09850	0.01560	0.01740	0.00136	0.00136
Employee Vehicles	0.27000	0.31000	2.77000	0.00000	0.45000	0.09000
Total Operational Emissions:	**0.27278**	**0.43750**	**2.81060**	**0.01758**	**0.45356**	**0.09356**
General Conformity Threshold:	**100**	**100**	**100**	**N/A**	**N/A**	**-**
Exceeds Threshold?	**NO**	**NO**	**NO**	**N/A**	**N/A**	**-**

N/A = Not Applicable.
Source: Impact Sciences, Inc., (2010).

TABLE IV-9 **MAXIMUM ESTIMATED $PM_{2.5}$ CONCENTRATION IN AMBIENT AIR FROM PROJECT OPERATIONS**

Pollutant	Maximum Ambient Concentration	Significance Threshold
$PM_{2.5}$	0.0008 $\mu g/m^3$	0.3 $\mu g/m^3$

Source: Golder Associates, January 2010.

TABLE IV-10 **MEI LECR AND CHRONIC HAZARD ESTIMATES FOR GPL BUILDING OPERATIONS**

Assessment	MEI Result	Significance Threshold
On-Site LECR	0.5-in-a-million	10-in-a-million
On-Site Chronic Hazard	0.003	1.0
Off-Site LECR	0.2-in-a-million	10-in-a-million
Off-Site Chronic Hazard	0.001	1.0

Source: Golder Associates, January 2010.

TABLE IV-11 **MAXIMUM ACUTE HAZARD QUOTIENT VALUES FOR GPL LABORATORY FUME HOOD TAC EMISSIONS**

Pollutant	Maximum Hazard Quotient	Significance Threshold
1,3-Butadiene	[a]	1.0
Acetaldehyde	0.0001	1.0
Acrolein	0.004	1.0
Acrylonitrile	[a]	1.0
Benzene	0.0001	1.0
Boron Trifluoride	[a]	1.0
Carbon Tetrachloride	0.0001	1.0
Chlorine	0.001	1.0
Chloroform	0.01	1.0
Crotonaldehyde	[a]	1.0
Ethylene Dichloride	[a]	1.0
Formaldehyde	0.002	1.0
HCl	0.001	1.0
Hydrazine	[a]	1.0
Vinyl Chloride	0.000001	1.0
Vinylidene Chloride	[a]	1.0

Note: Maximum annual average TAC emission rates for the laboratory fume hood exhaust stacks were multiplied by a ratio of hourly to annual average chemical usage for research laboratories determined from a previous study to obtain maximum hourly emission rates for dispersion modeling as per Central Campus Human Health Risk Assessment, prepared by URS Corporation for the University of California at Berkeley, June 28, 2000.
Using the US EPA AEROD dispersion model and meteorological data collected on-site, maximum ambient concentrations (over both on-site and off-site receptor grid locations) were estimated. These results were compared to acute reference concentrations published by OEHHA to determine hazard quotients for each TAC emitted (the hazard quotient is the ratio of the maximum estimated ambient concentration to the acute reference concentration).
[a] No hazard quotient calculated because OEHHA does not publish an acute reference concentration.
Source: Golder Associates, January 2010.

individual chemicals where the acute health effects might dominate the chronic health effects. All values are below BAAQMD thresholds.

IV.C.8.c. Alternative A (GPL Construction at B74 SE Parking Lot; B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Construction emissions generated under this alternative would be equivalent to those generated under the Proposed Action. Therefore, the criteria pollutant emissions would not exceed the de minimis levels and the alternative would conform to the SIP. Similarly the TAC emissions from Alternative A construction would be comparable to the Proposed Action. However, under Alternative A, construction emissions would be generated in closer proximity to sensitive receptors in the UC Botanical Garden. These receptors include both visitors and employees of the Garden who would be exposed to TACs from passing diesel-powered truck traffic and the operation of other construction equipment.

Operational emissions generated under this alternative would be equivalent to those generated under the Proposed Action. Therefore, the criteria pollutant emissions would not exceed the de minimis levels and the alternative would conform to the SIP.

IV.C.8.d. Alternative B (GPL Construction and Operation at RFS, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Under Alternative B, construction of the GPL would occur at the RFS. Criteria pollutant emissions from construction would be comparable to the Proposed Action and would not exceed the general conformity de minimis levels and the alternative would conform to the SIP. The TAC emissions would also be comparable and the impact would be similar to the Proposed Action.

Operational emissions of criteria pollutants from employee commute vehicles, would account for a significant percentage of these criteria pollutant emissions (as well as CO_2 emissions, as discussed in Section IV.C.9). The RFS

is located at a greater distance from the LBNL site, and were the GPL to be built at the RFS, it is likely that there would be an increase in vehicle miles travelled (VMT). Proportionately more employees live in the Berkeley/Albany/Kensington area than in El Cerrito/Richmond/San Pablo, and there are fewer opportunities for public transit commuting to the RFS. However, as calculations for operational emissions of criteria pollutants are sufficiently far below the de minimis levels for the Proposed Action, it is unlikely they would be exceeded under this alternative, even given the greater VMT. On-site operational emissions would be equivalent to those generated under the Proposed Action and well below de minimis levels and the alternative would conform to the SIP. The TAC emissions would be comparable and the impact would be similar to the Proposed Action.

IV.C.8.e. Alternative C (No GPL Construction, but Use of Leased Space Off-Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

For Alternative C there would be no construction of the GPL and therefore no short-term emissions of pollutants associated with construction truck traffic or construction equipment. The offsite location would be more accessible to UC LBNL personnel by alternatives to the single occupancy vehicle, which could reduce VMT for commuting. Therefore, under this alternative, emissions of criteria pollutants from operations would be less than the Proposed Action.

IV.C.8.f. Alternative D (Reduced Project with only B85/85A Seismic Strengthening)

This alternative would not generate the emissions associated with demolition and new construction, although there would still be emissions associated with the seismic strengthening. There would be no new operational emissions from the GPL, although there would still be operational emissions associated with activities and employees that would have otherwise occupied the GPL. Both construction and operational emissions of criteria pollutants would be well below de minimis levels and the alternative would conform to the SIP.

The construction TAC emissions would be much lower and the impact less than that of the Proposed Action.

IV.C.8.g. No-Action Alternative

Without GPL construction, building demolition or Building 85/85A seismic strengthening, emission of construction-period pollutants would be entirely avoided. There would be no new operational emissions from the GPL, although there would still be operational emissions associated with activities and employees that would have otherwise occupied the GPL.

IV.C.9. Greenhouse Gases

IV.C.9.a. Affected Environment and Regulatory Setting

Increased concentrations of greenhouse gases (GHGs) in the atmosphere due to human activities and the associated changes in global climate represent potential adverse environmental effects. The Proposed Action and alternatives are evaluated below for their potential to generate GHGs and contribute to global climate change.

The Council on Environmental Quality (CEQ), the agency responsible for administering the National Environmental Policy Act (NEPA), has released *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions*. The guidance recommends a threshold of 25,000 MTCO2e of direct emissions as a "bright line" threshold for analysis within NEPA documents. In establishing this threshold, CEQ relied upon the final EPA regulations governing GHG monitoring and reporting. Emissions below this threshold would not be relevant to and would not need to be discussed within a NEPA analysis. The draft NEPA guidance focuses on direct emissions (those that would be generated on site by the project) only. It does not include off-site emissions such as those generated by vehicle trips to and from the project site or from the generation of electricity used by the proposed action. The 25,000 MTCO2e reporting threshold can be seen as a dividing line for major GHG emitters, which could have the potential to result in an adverse impact on the environment. This threshold has been used for the purpose of evaluation in this EA.

The BAAQMD has also, as of June 2010, issued guidance for evaluating the climate change impact of land development projects in the Bay Area and from stationary source projects subject to BAAQMD permitting authority. The guidance requires quantification of both direct and indirect emissions from operation of the project. The BAAQMD guidance includes quantitative thresholds of significance for operational impacts. The land use development project threshold is 1,100 metric tons of carbon dioxide equivalents (MTCO2e) per year from both direct and indirect sources, while the stationary source threshold is 10,000 MTCO2e. These BAAQMD thresholds are not binding on a Federal project analyzed in a NEPA document. However, in the interest of a thorough discussion, they are referenced in this analysis.

GHGs and their effect on climate change is an environmental effect that is relevant only in the effect of its contribution to a global problem, and therefore cumulative condition. Despite that, for ease of comparison to the discussion above in Section IV.C.8, Air Quality, it is discussed below in this chapter. It is not discussed again in Chapter V, Cumulative Effects.

IV.C.9.b. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

IV.C.9.b.i. Demolition, Construction/Seismic Strengthening

GHG emissions from construction/demolition activities would occur from internal combustion engine exhaust associated with off-road construction equipment, exhaust from on-road trucks associated with the Proposed Action, and construction worker commute vehicle travel. Emissions of CO_2, the primary GHG emitted from these sources, were estimated using the same methods and models used to calculate criteria pollutant emissions presented in Section IV.C.8. Table IV-12 shows a summary of total estimated carbon dioxide emissions from the Proposed Action. Total annual CO_2 emissions from demolition, construction and seismic strengthening activities are relatively small and far below the CEQ "bright line" threshold of 25,000 MTCO2e of direct emissions. They are also below the BAAQMD thresholds.

TABLE IV-12 **SUMMARY OF PROJECT AND BASELINE ESTIMATED GREENHOUSE GAS EMISSIONS (METRIC TONS OF CO_2)**

Source	2004	2008	Proposed Action	Net Increase over 2008
Construction/Demolition	N/A	N/A	214	214
Operation (Non-Stationary)	1,386[b]	1,195[b]	2,096[a]	901
Operation (Stationary)	N/A	57[c]	46	-11

[a] Includes off-site CO_2 emissions from electricity usage of 4,700 MW-hrs/year by the GPL.
[b] Estimated CO_2 emissions resulting from operation of Buildings 25/25B; 55; and 71C, D, F, J, K, and P (to be demolished) based on natural gas and electricity usage. Energy usage includes operation of Buildings 26 and 71 trailer G because these were not metered separately. Also includes historical electricity usage (2008 usage for 2004 and 2008 estimates) from Potter Street location operations at this site would be transferring to the main LBNL Hill site.
[c] Estimated based on fiscal year 2009 data.
Source: Golder Associates, January 2010.

The demolition of Buildings 25/25B, 55 and 71 trailers would also be a component of Alternatives A and B, and the seismic strengthening at Building 85/85A would also be a component of Alternatives A, B, and C (but not the No-Action Alternative), but for the sake of brevity are not repeated below.

IV.C.9.b.ii. Operation of the GPL

GHG emissions from operation of the Proposed Action would occur from stationary and non-stationary sources.[65] Stationary source emissions would include emissions from natural gas combustion in the boilers/heaters, and internal combustion engine exhaust associated with the backup diesel generator. Non-stationary source emissions would include emissions from on-road

[65] "Stationary" sources are defined as those sources that would be covered under the facility operating permit, and "non-stationary" sources are defined as all other sources of GHG emissions associated with the operation of the building being evaluated.

employee passenger vehicles, electricity used in the proposed GPL, and emissions from energy used in water and wastewater conveyance.

Emissions of CO_2, the primary GHG emitted from these sources, were estimated using the same methods and models used to calculate criteria pollutant emissions presented in Section IV.C.8.

Overall, the Proposed Action would, through demolition and new construction, replace a series of older buildings with a single modern, scientific laboratory with associated office space, of equivalent square footage. In addition, the proposed GPL would be designed for a high standard of energy efficiency and, consequently, more energy conserving than the facilities it would replace, thereby reducing GHG emissions. Traffic generated by the Proposed Action would be comparable to existing conditions since the occupants would relocate from other spaces on the site. Additionally, implementation of the TDM program discussed above in IV.C.6.b. would generally help reduce the number of vehicle trips made to and from the site. Therefore, the Proposed Action would not result in an increase in GHG emissions due to operational vehicle traffic.

An assessment of GHG emissions was performed based on the total CO_2 emissions associated with project sources from building energy use and transportation, as well as a comparison to the CO_2 emission reductions anticipated due to the demolition of existing buildings. Because usage of the buildings to be demolished has declined over the last several years in anticipation of the Seismic Phase 2B Project, CO_2 emission estimates were performed for the buildings to be demolished as part of the project for calendar year 2004 (representative of operation of these buildings before partial shutdown) and for calendar year 2008 (the most recent full calendar year of reduced operations).

Emissions of CO_2 from project construction/demolition and project operations are summarized in Table IV-12, along with estimated emissions for 2004 and 2008 operation of the buildings to be demolished as part of this project. In order to evaluate the net increase in GHG emissions due to project opera-

tions, displaced GHG emissions were subtracted from project GHG emissions. The increase or decrease in emissions is shown in the last column in Table IV-12. For stationary sources, a net decrease in GHG emissions was estimated (versus a proposed significance threshold of 10,000 MT of CO_{2e}/yr).

IV.C.9.c. Alternative A (GPL Construction at B74 SE Parking Lot, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Demolition, construction and seismic strengthening emissions under this alternative would be comparable to the Proposed Action and small relative to the non-stationary source significance threshold. As the GPL would be similar to that under the Proposed Action, operational emissions would also be comparable and well below CEQ "bright line" threshold of 25,000 MTCO2e of direct emissions. They would also be below the BAAQMD thresholds.

IV.C.9.d. Alternative B (GPL Construction and Operation at RFS, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Affected Environment at RFS

The affected environment at the RFS would be as described above in IV.C.9.a.

Construction and Operation of the GPL at RFS

Under Alternative B, construction of the GPL would occur instead at the RFS. Emissions from construction traffic would be greater than if the GPL were built at the site, as would operational traffic emissions. This is because the RFS is located a greater distance from the site, and were the GPL to be built at the RFS, it is likely that there would be an increase in VMT, as discussed in Section IV.C.8. Although emissions associated with automobile traffic would be greater than under the Proposed Action, it is not likely that the CEQ threshold of direct emissions, nor the BAAQMD thresholds, would be exceeded under this alternative.

IV.C.9.e. Alternative C (No GPL Construction but Use of Leased Space Off-Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Use of an existing building would mean that there would not be the generation of additional GHGs from construction of the GPL. However, activity associated with demolition of several older buildings and seismically strengthening of Building 85/85A would still generate GHGs.

The location of the off-site facility in Berkeley or Emeryville offers more opportunities to commute by alternatives to the single-occupancy vehicle, which could reduce VMT and related GHG emissions. However, locating programs and personnel at this site would not have the advantage of consolidating people and functions on the LBNL site. Overall, it is unlikely that operational emissions would be greater than the BAAQMD thresholds.

IV.C.9.f. Alternative D (Reduced Project with only B85/85A Seismic Strengthening)

Construction activity associated with the seismic strengthening work would generate GHGs. However, as demolition of seismically weak structures and construction of the GPL would not occur, GHG generation associated with construction activities would be less under this alternative than under the Proposed Action. The operational GHG emissions would occur over the lifetime of the building and are numerically more important than those from construction. Therefore, on balance, this alternative would probably generate slightly less GHGs than the Proposed Action.

IV.C.9.g. No-Action Alternative

In the absence of construction of the GPL and with no demolition activities, construction-period emissions would be entirely avoided and operational emissions would continue as at present.

IV.C.10. Utilities and Waste Management

IV.C.10.a. Affected Environment at LBNL

Stormwater at LBNL is managed via a gravity-fed system in which runoff from the northern portion of the site discharges into the north fork of Strawberry Creek, and runoff from the southern portion discharges into Strawberry Creek itself. Wastewater is conveyed via a gravity-fed system to the City of Berkeley's public sewer system and ultimately to the EBMUD regional wastewater treatment facility. UC LBNL maintains a Sanitary Sewer System Management Plan (SSSMP) which lays out guidelines for monitoring wastewater flows and cost-effectively minimizing infiltration and inflow (I/I) rates. Sanitary sewer discharge at LBNL is subject to both regulatory-based monitoring as mandated in the wastewater permits issued by EBMUD and to DOE-based monitoring,[66] which concentrates on radiological parameters and ensures compliance with radiological limits in the California Code of Regulations.

A recycling contractor collects all non-hazardous and non-recyclable solid waste generated at LBNL and transports it to a collection facility in Richmond, California. LBNL receives its water supply from the EBMUD system, and electrical power is purchased from the Western Area Power Administration (WAPA) and delivered via the Pacific Gas and Electric (PG&E) transmission system.

IV.C.10.b. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, 55, 71 Trailer Demolition and B85 Seismic Strengthening)

Wastewater from Building 25/25B currently flows into two City of Berkeley's sanitary sewer sub-basins: sub-basin 17-013 and sub-basin 17-503. Sub-basin 17-013 has no capacity constraints, while sub-basin 17-503 is constrained during peak wet weather conditions. This constraint could be exacerbated by the increased volume of wastewater from the new, 43,000 gsf GPL facility.

[66] Borglin, Ned. Environment, Health & Safety, LBNL. Personal communication with DC&E, January 11, 2010.

Although the proposed facility would be designed to higher standards of energy and water efficiency, it would have a larger full-day occupant population and would be approximately 22,536 square feet larger than Building 25/25B, which totals 20,644 gross square feet.

However, SPF UTILS-2, from Appendix A requires that UC LBNL implement programs to ensure that additional wastewater flows are directed into unconstrained sub-basins. Under the Proposed Action, detailed plans for the GPL indicate that wastewater from the new facility would be diverted to unconstrained sub-basin 17-013. Additionally, the existing 4-inch diameter sanitary sewer pipe would be replaced with a 6-inch diameter pipe designed in accordance with SSSMP guidelines and connected to unconstrained sub-basin 17-013. The Proposed Action would, therefore, not overburden the existing capacity of sanitary sewer systems.

Construction of the GPL on the site where Building 25/25B now stands would require a new storm drain line, as the existing line is partially blocked and undersized for the current drainage area around Building 25. The new line would be about 125 feet in length, running from the southeastern corner of the new building through a section of hillside. Although the new storm drain line would be a minor addition to LBNL's extensive, existing storm drainage infrastructure, it would alleviate an existing stormwater drainage constraint.

The GPL would use existing electrical, water, and sanitary sewer utility systems that currently serve the Building 25 complex, with only minor additions.

The demolition component of the Proposed Action would not affect utilities except in the removal or capping of utility lines during removal of the buildings. Seismic strengthening of Building 85 would involve some re-routing of utility lines around the new underground construction. Demolition is included in Alternatives A and B below. Seismic strengthening is included in

Alternatives A, B, and C but for the sake of brevity this discussion is not repeated below.

IV.C.10.c. Alternative A (GPL Construction and Operation at B74 SE Parking Lot Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

As explained above, SPF UTILS-2 requires that UC LBNL implement programs to ensure that additional wastewater flows are directed into unconstrained sub-basins. Accordingly, additional wastewater flows would be directed into sub-basin 17-013, sub-basin 17-304, unconstrained portions of sub-basin 17-503, or another sub-basin that has adequate capacity. However, redirection would be more complex than under the Proposed Action, as existing wastewater infrastructure in the vicinity of the Building 74 site currently drains into constrained sub-basin 17-503. Any redirection of wastewater would therefore demand substantial infrastructural improvements including off-site improvements.

Construction of the GPL at this location on the LBNL site would result in an increase of approximately 20,000 square feet of impervious surface, as discussed under Section IV.C.3.c, Water Resources and Soil Erosion. To accommodate additional stormwater runoff from this new impervious surface, construction of three new storm drains and a new detention basin would be required. Work on the storm drains would take place in previously disturbed areas of the site, and collectively the new stormwater infrastructure would effectively restrain the flow of runoff leaving the site and entering downstream water bodies.

IV.C.10.d. Alternative B (GPL Construction at RFS, B25/25B, 55, 71 Trailer Demolition and B85 Seismic Strengthening)

Affected Environment at RFS

The RFS is connected to the City of Richmond and local utilities for water, sewer, electric power, and natural gas. EBMUD serves the RFS with one 8-inch domestic water line and two 12-inch fire main lines. These lines enter the RFS from the north, west, and east sides of the property (UC Berkeley

2008). The Richmond Municipal Sewer District provides wastewater treatment and disposal services to the RFS. Sewer discharge from the RFS flows to the City of Richmond publicly owned wastewater treatment plant, located approximately 3 miles west on Canal Boulevard.[67] Beyond the basic utilities provided at the time of purchase, UC Berkeley installed additional support at the RFS as needed, such as water and sanitary sewer service for restrooms, laboratories, and research projects.[68]

PG&E provides electricity to the RFS through an overhead 12-kilovolt electrical line service, with both underground and aerial power lines comprising the electrical service infrastructure. PG&E also provides natural gas service to the RFS through a high-pressure gas main on South 46th Street.[69]

Construction and Operation of the GPL at RFS

Construction of the GPL at the RFS would not exacerbate sanitary sewer constraints at the LBNL site, although utility, service system, and energy demand at the RFS would increase under this alternative. However, based in current usage levels and capacity, it is anticipated that sufficient utilities and service systems would be available for further development at the RFS.

IV.C.10.e. Alternative C (No GPL Construction but Leased Space Off-Site, B25/25B, 55, 71 Trailer Demolition and B85 Seismic Strengthening)

Use of additional space in an existing facility in Berkeley or Emeryville would not involve new construction of infrastructure and utility systems on the site. Additionally, the sanitary sewer capacity constraints associated with sub-basin 17-503 would not be exacerbated.

[67] UC Berkeley, 2008, Final Current Conditions Report, University of California, Richmond Field Station, California.

[68] UC Berkeley, 2008, Final Current Conditions Report, University of California, Richmond Field Station, California.

[69] UC Berkeley, 2008, Final Current Conditions Report, University of California, Richmond Field Station, California.

IV.C.10.f. Alternative D (Reduced Project with only B85/85A Seismic Strengthening)

The Reduced Project Alternative would not involve the construction of new utilities or services systems, and the seismic strengthening work on Building 85/85A would not alter operation of the building's existing systems. However, Alternative D would not result in the increased energy and water efficiency benefits of the Proposed Action, as it would not include a more energy efficient GPL facility.

IV.C.10.g. No-Action Alternative

The No-Action Alternative would not involve the construction of new utilities or services systems. As with the Reduced Project Alternative however, no energy efficient GPL facility would be constructed and consequently the opportunity for increased energy efficiency at LBNL would be missed.

IV.C.11. Wildland Fires

IV.C.11.a. Affected Environment at LBNL

According to the California Department of Forestry and Fire Protection (CDF) Natural Hazard Disclosure Map Images and Data for Alameda County, components of the Proposed Action are not located in an area that has a substantially high potential for wildland fires.[70] However, the LBNL site does contain various types of vegetation and mature trees that could burn during a wildland fire event.

Wildland fires are a potential concern at the LBNL site and resources have been devoted to fire protection strategies and infrastructure. In 1994, UC LBNL published a Wildland Fire Evacuation/Relocation Plan. The plan, which would apply to the Proposed Action, is based on a wildland fire scenario that would require rapid mobilization of resources, quick decision mak-

[70] California Department of Forestry and Fire Protection, *Natural Hazard Disclosure Map Images and Data for Alameda County*. http://www.fire.ca.gov/ab6/nhd01.pdf. Accessed March 12, 2008.

ing and well–coordinated execution by emergency responders during a wildland fire.[71] Furthermore, fire management would be considered in the selection of plant stock for post-construction landscaping as per the LBNL vegetation management program.[72]

IV.C.11.b. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Demolition and construction activity, as well as regular operation of a building all have the potential to cause sparks and ignite adjacent areas of grassland and trees. However, the chances of uncontrolled wildland fires at LBNL have been reduced to a very low level by LBNL-wide measures listed in Section IV.C.11.a. Additionally, Building 25/25B is in the center of the LBNL site, surrounded mainly by other buildings and an irrigated grove of redwood trees. The location has a considerably lower fire risk than areas on the periphery of the site that are closer to vegetation.

The demolition of Buildings 25/25B, 55, and 71 trailers would also be a component of Alternatives A and B, and the seismic strengthening at Building 85/85A would also be a component of Alternatives A, B, and C (but not the No-Action Alternative), but for the sake of brevity is not repeated below.

IV.C.11.c. Alternative A (GPL Construction at B74 SE Parking Lot, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

The Building 74 SE Parking Lot site that would be used under Alternative A is in an area that is surrounded by vegetation on most sides and in close proximity to trees and grassland. It is therefore at slightly greater risk of wildfires

[71] Supplemental EIR Addendum for the Proposed Extension of the Contract between the DOE and the UC Regents for Operation and Management of LBNL, http://rfplbnl.sc.doe.gov/docs/pdf/lbnl_1997_seir.pdf, page IV-H-1. Accessed April 3, 2008.

[72] LBNL 2006, *LRDP EIR*, Hazards and Hazardous Materials Chapter, page IV.F-8.

than at the Building 25/25B site as under the Proposed Action. However, the fire prevention and response measures described in the Wildland Fire Evacuation/Relocation Plan would also reduce the fire risk at this location.

IV.C.11.d. Alternative B (GPL Construction and Operation at RFS, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

The RFS is close to San Francisco Bay, bordered by industrial and residential areas of Richmond and the freeway. It is not located in a California Fire Hazard Severity Zone.[73]

IV.C.11.e. Alternative C (No GPL Construction but Use of Leased Space Off-Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

The off-site facility is closer to San Francisco Bay, Interstate 80 freeway, the Berkeley aquatic park lagoon and industrial and residential areas of Berkeley. It is not located in a California Fire Hazard Severity Zone.[74]

IV.C.11.f. Alternative D (Reduced Project with only B85/85A Seismic Strengthening)

There would be a reduced risk of wildland fires from this alternative as only the seismic strengthening construction work would contribute.

IV.C.11.g. No-Action Alternative

There would be no change to the existing fire risk under the No-Action Alternative.

[73] CalFire, http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_zones_maps.php, accessed on November 2, 2009.

[74] CalFire, http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_zones_maps.php, accessed on November 2, 2009.

IV.C.12. Accidents

Accidents are discussed in various different sections of this EA. For accidents due to earthquakes and landslides, see Section IV.C.1, Geological and Seismic Hazards. For accidents due to wildland fires, see Section IV.C.11. Traffic accidents are discussed below.

IV.C.12.a. Affected Environment at LBNL

Traffic accidents are considered for the Proposed Action and Alternative A sites for construction trucks travelling from the project sites to the freeway. These routes are described above in Section IV.C.6.

IV.C.12.b. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Accident data for collisions involving trucks along the designated truck route in Berkeley between 2002 and 2004 was obtained from the Department of California Highway Patrol (CHP) and analyzed. Table IV-13 shows roadway names, segment lengths, total number of collisions involving trucks over the three year period of analysis, average number of accidents per year, and the number of accidents where fault was attributed to the truck driver. As shown in the table, the total number of accidents involving trucks is low and the number of accidents where fault was attributed to the truck driver is even lower.

The Proposed Action would not change the physical characteristics of the street network on the site or along the designated truck route. Construction traffic generated by the Proposed Action would be controlled by the Site Construction Coordinator and would be maintained below the level required to avoid exceeding City of Berkeley thresholds governing intersection operations, roadway segment operation, and pavement conditions. In other words, there would be no considerable increase in construction truck traffic and therefore no corresponding increase in potential for traffic accidents compared to existing conditions. Therefore, there would be no reasonably

TABLE IV-13 **COLLISIONS INVOLVING TRUCKS ALONG THE DESIGNATED TRUCK ROUTE (2002-2004)**

Roadway	Length of Segment (Miles)	All Accidents		Truck Driver at Fault	
		Total	Per Year	Total	Per Year
University Avenue (Oxford St. to I-80)	2.19	17	5.7	10	3.3
Oxford Street (University Ave. to Hearst Ave.)	0.12	1	0.3	1	0.3
Hearst Avenue (Shattuck Ave. to Highland Pl.)	0.72	1	0.3	1	0.3

Source: CHP, 2004.

foreseeable increase in risk to health and safety from transporting demolition or construction material associated with the Proposed Action.

The demolition of Buildings 25/25B, 55 and 71 trailers would also be a component of Alternatives A and B, and the seismic strengthening at Building 85/85A would also be a component of Alternatives A, B, and C (but not the No-Action Alternative).

IV.C.12.c. Alternative A (GPL Construction and Operation at B25/25B Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

As under the Proposed Action, there would be no considerable increase in construction truck traffic and therefore no corresponding increase in potential for traffic accidents compared to existing conditions.

IV.C.12.d. Alternative B (GPL Construction and Operation at RFS, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

Construction trucks have only a short distance to travel from the RFS site entrance to the freeway, thereby reducing the risk of accidents on Richmond Streets to a very low level.

IV.C.12.e. Alternative C (No GPL Construction but Use of Leased Space Off-Site, B25/25B, 55, 71 Trailer Demolition, and B85/85A Seismic Strengthening)

There would be no associated construction trucks associated with use of an existing building in Berkeley or Emeryville.

IV.C.12.f. Alternative D (Reduced Project with only B85/85A Seismic Strengthening)

As only the construction trucks associated with seismic strengthening work would contribute under Alternative D, the potential for accidents would be lower than under the Proposed Action.

IV.C.12.g. No-Action Alternative

There would be no construction trucks at risk of accidents from the No-Action Alternative.