4.7 HAZARDS AND HAZARDOUS MATERIALS

4.7.1 Introduction

This section discusses existing hazards and hazardous materials at the project site. It analyzes the potential for development under the proposed 2014 LRDP development to increase the use, generation, and disposal of, or exposure to hazards and hazardous materials, focusing on existing site conditions and anticipated future demolition, construction, and laboratory activities.

Public and agency NOP comments related to hazards and hazardous materials are summarized below:

- The EIR should include a comprehensive, independent, and transparent safety and risk analysis of the proposed actions, including for any novel aspects of new science.
- The EIR should identify and propose remedies related to known contamination.
- The EIR should discuss prevention of, and planned response to, any possible release of pollutants and biohazards into the environment if there is an accident, including earthquake, fire, and flood.

4.7.2 Environmental Setting

Historical chemical manufacturing operations at the California Cap Company and industrial operations at neighboring properties released or deposited chemicals onto the uplands, marsh, and transition areas of the RFS and the property adjacent to Regatta Boulevard. More recently, research studies at the RFS have been primarily in the field of engineering; thus, hazardous materials[32] use at the RFS has been relatively minor. As described in historical records, chemicals used at the RFS include bench-scale laboratory chemicals and radioisotopes, mercury manometers, radioisotopes for tracer studies, wood treatment chemicals, gasoline, diesel fuel, hydraulic oil, herbicides for grounds maintenance, PCBs in electrical equipment, building paint and caulking, and other miscellaneous products for housekeeping and other facilities maintenance activities (UC Berkeley 2008).

Because the RFS is an academic teaching and research facility, generally only small laboratory-scale (1 gallon or less) amounts of chemicals are used and stored at the site. Available records indicate that larger quantities were used in a few exceptional instances, but currently the only laboratory research chemicals in reportable quantities are gases, hydraulic oil, and petroleum products (UC Berkeley 2008).

Current site operations include the use of solvents, adhesives, cements, paints, cleaning agents, degreasers, and vehicle fuels. The 2013 Hazardous Materials Business Plan for the RFS lists the following chemicals in reportable quantities: acetylene, argon, asphalt, asphalt cold patch, carbon dioxide, cleaners, orange oil degreaser, gasoline, helium, hydraulic oil, hydrogen, nitrogen, oil, oxygen, paint, propane, roof sheeting, safety kleen, transmission fluid, and waste oil. The 2013 Hazardous Materials Business Plan for the RBC site property west of Regatta Boulevard lists diesel fuel being present in a 400-gallon container at this property. The May 2013 Chemical Inventory for the RFS reports less than 1,000 gallons of liquids and less than 500 pounds of solids of laboratory chemicals on hand. Wet chemistry laboratories remain in operation at Buildings

[32] Section 22501(o) of the California Health and Safety Code defines "hazardous material" as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment. Hazardous materials are commonly used in research laboratories and commercial, agricultural, and industrial applications, and in residential areas to a limited extent.

112, 478, and 484, and a number of small mechanical engineering shops with some shop chemicals are present in other buildings. Hazardous wastes are packaged, labeled, and categorized for transport to appropriately licensed off-site treatment and disposal facilities.

Existing Structures

As with the UC Berkeley main campus, many current and historical RFS research facilities used or stored hazardous chemicals. These include the earthquake engineering facilities at Buildings 420 and 421 and Buildings 102, 110, 111, 112, 113, 114, 117, 118, 121, 125, 138, 151, 158, 177, 197, 278, 280A, 280B, 450, 460, 470, 474, 478, 480, and 482 (UC Berkeley 2008). Although there are no indications that spills have occurred, few, if any, samples have been collected in these areas. While few soil samples have been collected adjacent to these buildings, a site-wide groundwater monitoring well network has been installed that did not detect any evidence of widespread contamination of the RFS.

Building 120 was used as a solvent storage shed at the time of the 1989 inspection, and approximately 20 55-gallon drums of thinner, kerosene, and various petroleum hydrocarbon products were observed in the building (UC Berkeley 2008). Spills were observed on the floor and in drip pans and these were cleaned up at the time. Empty and full unlabeled drums were observed. This building is currently used to store chemical wastes prior to off-site disposal. Approximately 20 unlabeled 55-gallon drums were stacked three-high against a wall outside the building, and most of the drums appeared to be empty (UC Berkeley 2008). Another six 55-gallon drums were found just outside Building 120 near a small area of stained soil. Several of the six drums were empty, while others contained a mixture of water and unknown product (UC Berkeley 2008).

There are potentially asbestos-containing materials in existing facilities in the form of transite walls and wall partitions, floor tiles and mastic; and in pipe and heating, ventilation, and air conditioning insulation materials. A number of surveys for asbestos-containing material have been done at the RFS. The campus maintains an active Asbestos Operations & Maintenance Program to assess suspect asbestos-containing materials that might be impacted by upcoming construction and maintenance projects, including hiring licensed third party industrial hygiene firms to conduct comprehensive surveys for planned building renovation and demolition. When some of the existing facilities were built, lead-based paint was in common use.

Aboveground Storage Tanks

Currently there are eight aboveground storage tanks (ASTs) at the RFS storing fuels for facility operations and one AST at the RBC site property, west of Regatta Boulevard storing fuel for an emergency generator.

At the RFS, three ASTs hold fluids for teaching and research laboratories. Tank A-18-1, installed in 1996 on the west side of Building 280A, is an empty 1,500-gallon double-walled SuperVault™ tank that used to contain diesel fuel. Tank A-18-3, installed in 1969 at Building 421, is a 2,000-gallon single-walled steel tank that contains hydraulic fluid for equipment in the Earthquake Engineering Research Center. Tank A-18-4, installed in 1965 at Building 484, consists of two linked tanks containing a maximum of 1,000 gallons of hydraulic fluid for equipment in the Structural Test Laboratory.

Five ASTs are used to store fuels for RFS facilities' operations. Tank A-18-2, installed in 1997 in the Corporation Yard, is a 1,500-gallon double-walled SuperVault™ tank that stores gasoline for fueling RFS maintenance vehicles. The four remaining tanks contain diesel fuel for emergency generators and a fire suppression water pump. Tank A-18-5, installed in 1982, is a 120-gallon single-walled steel tank at Building 400 that supplies fuel to the fire suppression system pressure

booster engine. Tank A-18-6, installed in 2004 in Building 400, is a 110-gallon double-walled steel belly tank attached to a diesel-powered emergency electrical generator. Tank A-18-7, installed in 2005, is a 110-gallon double-walled steel belly tank attached to a diesel-powered emergency electrical generator for Building 194. Tank A-18-8 is a 365-gallon double walled generator belly tank installed in 2012 and attached to a diesel-powered emergency electrical generator for Buildings 112 and 113.

The ASTs are all in good condition and there have been no reports of releases except for a valve seep onto soil from the hydraulic fluid piping between Buildings 421 and 484 (planned for excavation in summer 2013). During a site walk with DTSC staff on May 12, 2011, it was confirmed that there is no staining or evidence of a spill at the other AST locations.

Fifty-five-gallon drums and two portable fuel tanks (70 and 100 gallons) store petroleum products (for research and vehicle fueling and maintenance) and waste petroleum products, such as waste oil. Drums are kept in Buildings 120, 197, 280A, and 421.

The AST at the RBC site property west of Regatta Boulevard is a 400-gallon double-walled steel belly tank attached to a diesel-powered emergency electrical generator that provides emergency power to the cooling system of the Film Archive.

Underground Storage Tanks

Currently, no known underground storage tanks (USTs) are at the RFS. Five USTs were removed between 1986 and 1997. No known leaks or releases were associated with these tanks (UC Berkeley 2008).

Polychlorinated Biphenyls Transformers

Current RFS electrical power distribution equipment contains only non-PCB dielectric fluids. Historically, most transformers were originally mounted to utility poles and they were later replaced with ground-level transformers on pads. Records showed that all PCB-containing electrical distribution system transformers were either removed for off-site disposal or retrofilled on-site with non-PCB oils in the late 1980s and early 1990s (UC Berkeley 2008). During this period, approximately 40 pieces of electrical equipment (mostly capacitors and some transformers) were temporarily placed on a concrete pad in the northern portion of Building 280B, as part of a campus-wide cleanout of PCB items. There are no records indicating that spills of PCB oils ever occurred, and former employees did not recall any leaks or spills associated with the transformers at the RBC (UC Berkeley 2008). PCBs have been detected in the soil at a number of locations that require cleanup, as discussed in Section 3.10 (Tetra Tech 2013).

Radiological Materials

Radiological materials have been used in certain types of research at the RFS since the 1950s. Meter readings were taken and building interior surfaces were wipe-surveyed as part of the routine radiation safety inspections conducted for decades, with no evidence of radiological contamination identified (UC Berkeley 2008).

Records also show two locations where radionuclides were used in tracer experiments in the outdoor environment. In one study, short-lived radionuclides were used in areas secured with four-foot-high "antipersonnel" fences to research nutrient uptake in isopods. In another location, UC Berkeley developed a research project in the early 1950s for deep-well injection and contaminant transport as part of a State of California-funded program. Following completion of studies in 1953, some or all of these wells were used in studies in the 1950s and 1960s to evaluate groundwater transport. These studies used primarily short-lived radionuclide tracers, such as cesium (Cs-134), iodine (I-131), and strontium (Sr-89); however, small amounts of

several long-lived radionuclides (strontium (Sr-90), cesium (Cs-137), tritium (H3), and carbon (C-14)) were also used.

No radiological spills outside of buildings have been reported. Records indicate that well purge water with residual radioactive tracer compounds from the Research Well Field was discharged to San Francisco Bay through the storm drain system of ditches and pipes. Also, a former UC employee reported in 2005 that he witnessed drums of rocks he was told were radioactive buried in trenches in the bulb portion of the transition area (in the Natural Open Space). Meter surveys and soil sample analyses have not detected radiological content above background, but in 2006, a magnetometer survey by DTSC found an anomaly in one area indicating ferrous metal beneath the surface.

Currently, there are two Radiation Use Authorizations for UC Berkeley activities-- one for radiation-producing machines and one for radioactive sources; the number of Radiation Use Authorizations can change regularly depending on current research needs.

Soil and Groundwater Contamination

Soil and Groundwater Investigations

Investigations between 1981 and 2008 involved collection of soil and groundwater samples in a variety of locations in the RFS. Soil samples were generally analyzed for metals, PCBs, polycyclic aromatic hydrocarbon (PAH), semivolatile organic compounds, or pesticides. The investigations prior to 2010 focused on potential source areas and identified areas requiring further investigation. The data collected during these investigations is summarized in the Current Conditions Report (Tetra Tech 2008) and Site Characterization Report (Tetra Tech 2013).

Significant soil and groundwater sampling has been done through the oversight of DTSC through the Field Sampling Workplan (FSW) that was prepared by UC Berkeley and approved by DTSC in 2008. This section summarizes FSW Phases I, II, and III investigation activities and sampling results from 2010 through 2012.

The FSW addresses data gaps identified in the Current Conditions Report that warranted additional characterization or evaluation at the RFS. The purpose of the FSW investigation was to close previously identified data gaps and to identify any immediate or potential risks to public health and the environment. The results are briefly summarized below and are described in detail in the Site Characterization Report (Tetra Tech 2013), which was recently submitted to and approved by the DTSC in connection with a proposed RAW for developable portions of the RBC within the RFS.

Chemicals of Concern

The results of the historical and FSW investigations indicate that there are elevated concentrations of certain metals, PAHs, and PCBs. Other potential contaminants more limited in soils include dioxins, total petroleum hydrocarbon (TPH), and VOCs. For this discussion, "elevated" concentrations in soil refers to soil concentrations above the screening criteria used in the Site Characterization Report. Two VOCs in groundwater (TCE and carbon tetrachloride) have been detected above the calculated human health vapor intrusion criteria for future commercial workers.

Metals. Arsenic concentrations above background levels in soil are the result of historical placement of pyrite cinders as fill material. Arsenic is commonly associated with iron sulfides, such as those used in production of sulfuric acid at the former Stauffer production areas. In addition, it is found in related sulfide minerals, including arsenopyrite and chalcopyrite.

Potential sources of lead include (1) emissions from automobiles and fuels such as those associated with the adjacent I-580 freeway, (2) as a component of metals used in manufacturing ammunition shells and blasting caps, (3) pyrite cinder used as fill, and (4) lead-based paint from former or existing buildings. Some elevated concentrations of lead are found in isolated areas of RFS soils, perhaps attributable to the "nugget effect" that can occur when lead-based paint chips enter the soil.

Mercury is present at elevated concentrations in RFS soils primarily due to historical activities associated with manufacturing explosives. The former California Cap Company historically used elemental or liquid mercury in the Mercury Fulminate Area (MFA). This form of mercury can volatilize into the atmosphere from soil, sediment, or water. Drawings of the mercury fulminate production plant show an open structure (presumably for ventilation) and air stack that could have contributed to aerial deposition of mercury in the areas surrounding the mercury fulminate plant in the central meadow. Drawings also identify storage tank rinsate areas in the MFA. Additionally, movement of the blasting caps around the facility via the tram system could have tracked mercury away from the mercury fulminate plant.

PAHs. PAHs at the RFS are likely a result of burning carbon-containing compounds (including at the former waste incinerator near Building 120 and the former Field Laboratory), aerial emissions from surrounding industrial facilities, and gasoline and diesel exhaust from regional roadways and railyards. An assessment of the soil data, mostly in the Corporation Yard, indicates that concentrations of PAHs decrease with depth; where PAHs are present, concentrations of PAHs are elevated above screening criteria in surface soils (0 to 0.5 foot below ground surface (bgs)), but are typically less than screening criteria at deeper depths (2 to 2.5 feet bgs), and are not detectable below 2 to 2.5 feet bgs.

PCBs. Aroclors-1248, -1254, and -1260 are commonly found at the RFS and are likely associated with hydraulic fluids and di-electrical fluids in capacitors and transformers, or with one of the many uses of PCBs allowed until 1977, including heat transfer fluids for gas turbines, hydraulic fluids for vacuum pumps, fire retardants, and plasticizers in adhesives, textiles, surface coatings, sealants, printing, and carbonless copy paper (Lloyd and others 1975). Typically, a release of PCBs to surface soils from a spill would have migrated little from its original release point, as PCBs adsorb strongly to soil. This model is supported by the sampling data obtained during the FSW Phase II investigation, which sampled near former PCB-containing transformers. Where PCB contamination was detected, elevated concentrations of PCBs were limited to a small area, both horizontally and vertically, confirmed through step-out sampling.

PCBs have also been detected at low concentrations (below screening criteria) in surficial soils in the RFS, most of which may not be attributed to a spill but possibly to aerial deposition from surrounding industrial facilities, including the PG&E facility northwest of the property.

Dioxins. Dioxins in the environment are the result of burning chlorine-based chemical compounds with hydrocarbons, such as stack emissions from the incineration of municipal refuse and certain chemical wastes or exhaust from automobiles powered by leaded gasoline. The former waste incinerator at Building 120 may be a potential historical source of dioxins; soil samples collected for dioxin analysis near the former incinerator location indicate that dioxin concentrations in that area exceed commercial screening values in surficial soil, but concentrations decrease as sample depth increases.

VOCs. Although RFS soils have not been found to contain concentrations of VOCs exceeding screening criteria, groundwater results indicate that TCE, TCE-related chlorinated hydrocarbons, and carbon tetrachloride exceed groundwater screening criteria.

Groundwater impacted with elevated levels of TCE and TCE-related chlorinated hydrocarbons exceeding California and federal maximum contaminant levels has migrated onto the RFS from the adjacent former Zeneca site. UC concluded that the source of TCE and related chlorinated hydrocarbons in groundwater at the RFS is legacy industrial activities at the former Zeneca site, based on (1) the measured groundwater gradient from the former Zeneca site to the RFS, (2) known historical TCE sources and groundwater contamination at the upgradient former Zeneca site, and (3) lack of measured or identified TCE sources within the RFS property. The remedy for contaminants in groundwater originating from the former Zeneca Site, including TCE and its breakdown components, is subject to the former Zeneca Site Investigation and Remediation Order (IS/E-RAO 06/07-005) issued by DTSC.

Carbon tetrachloride was detected at one location in the coastal-terrace prairie at concentrations exceeding the commercial vapor intrusion screening criteria and California maximum contaminant levels during the FSW Phase I investigation. Carbon tetrachloride has also been detected at some locations downgradient of this location at concentrations exceeding the California maximum contaminant level. No source of carbon tetrachloride has been identified in the immediate area or upgradient of the locations where it was detected.

TPH. Low concentrations of TPH compounds in soil may originate from small diesel spills from equipment, from ASTs or former USTs, from incomplete combustion of petroleum from nearby automobiles and industrial uses, or as a carrier in herbicides. No evidence of spills was observed at any of the ASTs still in place, and all USTs have been removed and administratively closed. Soil sample results indicate that the Earthquake Engineering hydraulic lines at Building 484 have leaked, and soil excavation in this area is proposed to be completed as a maintenance activity. TPH contamination may be present near and around the Earthquake Engineering hydraulic lines.

Explosives. Between the late 1800s and 1948, the California Cap Company and other smaller companies manufactured blasting caps, ammunition shells, and explosives on the RFS property. The chief constituent of the explosive used by the California Cap Company was a nitrocellulose (guncotton) base called "tonite," the manufacturing of which included the production of mercury fulminate. Documentation indicates that nitrocellulose and mercury fulminate were the primary explosives used in these manufacturing operations; however, other explosives such as octogen (HMX), cyclotrimethylenetrinitramine (RDX), or 2,4,6-trinitrotoluene (TNT) may have been employed. Historical documents indicate that explosives were tested and stored in the north-central portion of the RFS property. Soil data indicates that HMX may have been used, as it was detected at a low level in one soil sample collected near the former explosives storage area at a concentration of 0.37 milligrams per kilogram, five orders of magnitude below the commercial screening criteria.

4.7.3 Regulatory Considerations

The RBC site is subject to environmental, health, and safety regulations applicable to proposed site activities, including the transportation, use, management, and disposal of hazardous materials and wastes. This section provides an overview of the regulatory setting.

State and Federal

Among primary federal agencies with regulatory responsibility for environment, health, and safety management are EPA, US Department of Labor, Occupational Safety and Health Administration (OSHA), DOT, and DOE. Federal laws, regulations, and responsible agencies relevant to the proposed RBC are discussed in detail in this section. In many cases, California state law mirrors or is more restrictive than federal law, and enforcement of these laws has been delegated to the state or a local agency. All demolition activities involving possible radiological contamination would be coordinated with the California Department of Public Health in order to

assure proper management of any possible radiological contamination. In January 1996, the California Environmental Protection Agency adopted regulations implementing a Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program). The program has six elements: hazardous waste generators and hazardous waste on-site treatment, underground storage tanks, aboveground storage tanks, hazardous materials release response plans and inventories, risk management and prevention programs, and Unified Fire Code hazardous materials management plans and inventories. The local agency responsible for implementing the Unified Program is called the Certified Unified Program Agency. Because the RBC site is in the city limits of the City of Richmond, the City of Richmond is the designated Certified Unified Program Agency.

Hazardous Materials Management

Federal and state laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and if they are accidentally released, to prevent or to mitigate injury to public health or the environment. These laws require hazardous materials users to prepare written plans detailing the types and quantities of hazardous materials used on site and addressing emergency response and training procedures. The City of Richmond, through its Certified Unified Program Agency program, requires any business that handles hazardous materials above certain thresholds to prepare a Hazardous Materials Business Plan. At the proposed RBC site, UC Berkeley voluntarily complies with these state requirements as implemented by the City of Richmond. LBNL also maintains a Hazardous Materials Business Plan for LBNL facilities and operations.

Hazardous Waste Handling

Under the federal Resource Conservation and Recovery Act of 1976 (RCRA), the EPA regulates the generation, treatment, and disposal of hazardous waste, and the investigation and remediation of hazardous waste sites. Individual states may apply to the EPA to be authorized to implement their own hazardous waste programs in lieu of RCRA, if the state program is at least as stringent as federal RCRA requirements. The EPA authorized California to implement its own hazardous waste program, with certain exceptions. In California, DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste and the investigation and remediation of hazardous waste sites. The DTSC program incorporates the provisions of federal and state hazardous waste laws (LBNL 2007). In California, oversight of waste management practices at hazardous waste generator sites is generally provided by Certified Unified Program Agencies.

Hazardous Materials Transportation

The DOT regulates the transportation of hazardous materials between states. The State of California has adopted DOT regulations for the intrastate movement of hazardous materials and regulates the transportation of hazardous waste originating in the state and passing out of the state. The two state agencies that have primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies are the California Highway Patrol and the California Department of Transportation (Caltrans). The California Highway Patrol enforces hazardous material and hazardous waste labeling and packing regulations to prevent leakage and spills in transit and to provide detailed information to cleanup crews if there is an accident. The California Highway Patrol regularly inspects licensed transporters to assure regulatory compliance. Caltrans has emergency chemical spill identification teams at as many as 72 locations throughout the state that can respond quickly if there is a spill (LBNL 2007).

At the proposed RBC site, DOE Order 460.1B ("Packaging and Transportation Safety") would also apply to LBNL activities, as this Order establishes the safety requirements for the proper

packaging and transportation of DOE offsite shipments and onsite transfers of hazardous materials.

Department of Toxic Substances Control

Pursuant to Section 102 of CERCLA, 42 U.S.C, Section 9602, and California Health and Safety Code (HSC) Section 25316, DTSC provides the oversight of "hazardous substances" as listed in 40 CFR Section 302.4. DTSC has issued a Site Investigation and Remedial Action Order (Order) as a result of hazardous substances identified at the RFS property.

The HSC provides jurisdiction to DTSC regarding the oversight and enforcement of the DTSC Order for the RFS. The Order is issued pursuant to its authority under HSC Sections 25358.3(a), 25355.5(a)(1)(B), 58009, and 58010.

- HSC Section 25358.3(a) authorizes DTSC to take various actions, including issuance of the Order, upon DTSC's making certain determination of a release or a threatened release of a hazardous substance.
- HSC Section 25355.5(a)(1)(B) authorizes DTSC to issue an order establishing a schedule for removing or remedying a release of a hazardous substance at a site, or for correcting the conditions that threaten the release of a hazardous substance. The order may include but is not limited to requiring specific dates by which the nature and extent of a release shall be determined and the site adequately characterized, a remedial or removal action plan prepared and submitted to DTSC for approval, and a removal or remedial action completed.
- HSC Section 58009 authorizes DTSC to commence and maintain all proper and necessary actions and proceedings to enforce its rules and regulations; to enjoin and abate nuisances related to matters within its jurisdiction that are dangerous to health; to compel the performance of any act specifically enjoined upon any person, officer, or board, by any law of California relating to the matters within its jurisdiction; or on matters within its jurisdiction, to protect and preserve the public health.
- HSC Section 58010 authorizes DTSC to abate public nuisances related to matters within its jurisdiction.

All response actions taken pursuant to the Order must be consistent with the requirements of HSC Chapter 6.8 and any other applicable state or federal statutes and regulations, including Title 29 CFR 1910.120 and Title 8 CCR Section 5192 health and safety regulations.

Occupational Safety

Occupational safety standards are in federal and state laws to minimize worker safety risks from physical and chemical hazards in the workplace. The federal OSHA is generally responsible for assuring worker safety in the workplace. In California, the Department of Industrial Safety (Cal/OSHA) operates an occupational worker safety and health program under an agreement with OSHA. Under that agreement, Cal/OSHA has jurisdiction in California over most public and private sector workplaces, with certain exceptions. At the proposed RBC, while Cal/OSHA would have jurisdiction over UC Berkeley non-radiological occupational safety and health, future LBNL operations would be subject to LBNL policy and DOE's jurisdiction and worker safety regulation, which includes requirements to comply with various OSHA standards.[33] LBNL also

[33] DOE's "Worker Safety and Health Program" (10 CFR 851) establishes DOE's nonradiological occupational safety and health regulation for DOE workplaces, just as OSHA and Cal/OSHA regulations do for non-DOE workplaces. This program ensures

adheres to Cal/OSHA Construction Safety Orders for subcontracted work when a Cal/OSHA standard is more stringent than federal standards. OSHA and Cal/OSHA regulations contain requirements, concerning the use of hazardous materials in the workplace and during construction, that mandate employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, emergency action and fire prevention plan preparation, and a hazard communication program. The hazard communication program regulations contain training and information requirements and require preparation of emergency action plans (escape and evacuation procedures, rescue and medical duties, alarm systems, and training in emergency evacuation).

Biosafety Standards

Federal and state laws and funding agencies establish standards for working with biohazardous materials and biological materials in research. Materials are defined as being biohazardous based on the applicable biosafety standard. Biohazardous materials are generally materials, agents, or organisms that potentially present a risk to humans, animals, plants, or the environment (e.g., infectious agents, and research recombinant organisms) The U.S. Public Health Service, including the National Institutes of Health and the Centers for Disease Control and Prevention, establish standards for working with biohazardous materials. These federal guidelines address biological safety in research, including containment levels (e.g., biosafety level 1 to 4) and controls for different types of recombinant experiments and research operations such as laboratories, animals, or greenhouses. Operations at RBC will operate at the lower and more common biosafety levels (e.g., biosafety level 1 or 2). OSHA also establishes worker safety requirements for research with materials such as human blood or tissue. In addition, U.S. Department of Agriculture and California agencies set requirements to control acquisition of and prevent release of materials (e.g., soil), agents (e.g., pathogens), or organisms (e.g., transgenic plants) that may harm plants or animals such as crops or livestock. UC Berkeley and LBNL research involving biohazardous materials is conducted in compliance with these federal and state laws and guidelines and in compliance with California Department of Public Health medical waste regulations.

Radiation Safety—Ionizing Radiation and Non-Ionizing Radiation

Ionizing Radiation. Ionizing radiation is high energy particle and non-particle radiation (such as x-rays and gamma rays) emitted from radioactive sources and radiation-producing machines which is capable of imparting ionizing energy in a biological medium such as the human body. Sources of ionizing radiation are present at UC Berkeley and LBNL in research applications. UC Berkeley laboratories using radioactive materials must comply with regulations of several federal agencies, including the Nuclear Regulatory Commission. Radionuclides released to the atmosphere from LBNL research activities must adhere to EPA National Emission Standards for Hazardous Air Pollutants regulations and DOE Order 458.1, "Radiation Protection of the Public and the Environment." EPA administers the National Emission Standards for Hazardous Air Pollutants regulations (under 40 CFR Part 61), which limit the dose to the public from airborne radionuclide emissions to 10 millirem per year. DOE has established a set of limits for radiation workers in 10 CFR Part 835. To minimize radiological impacts to the environment and the public, UC and LBNL manages its programs so that radioactive emissions and exposures are as low as reasonably achievable.

that DOE contractor workers have safe and healthful workplaces where hazards are abated, controlled, or otherwise mitigated in a manner that provides reasonable assurance that workers are protected from the hazards associated with their jobs. It establishes management responsibilities, workers' rights, required safety and health standards, and worker training on the hazards of their jobs, and hazard controls.

Non-ionizing Radiation. Non-ionizing radiation is energy that is not created by radioactive materials and does not impart ionizing energy in a biological medium such as the body. Many sources of non-ionizing radiation are present at UC Berkeley and LBNL in research applications or in ancillary equipment. These sources include lasers, large magnets, microwave generators, and radio-frequency radiation. In general, non-ionizing radiation tends to be less hazardous to humans than ionizing radiation. However, depending on the wavelength/frequency and the irradiance (or power density) value, non-ionizing radiation sources may present a human health hazard. Most typically, the hazard, if any, is to those in the lab and not members of the public.

OSHA standards apply to non-ionizing radiation by requiring a safe and healthful workplace free of recognized serious hazards. Additionally, DOE's "Worker Safety and Health Program" (10 CFR 851) ensures that DOE contractor workers have safe and healthful workplaces where hazards are abated, controlled, or otherwise mitigated in a manner that provides reasonable assurance that workers are protected from the hazards associated with their jobs. Both UC Berkeley and LBNL have laser safety programs that include control measures, medical surveillance, and safety training. These laser safety programs are based on ANSI Z136.1 Standard for the Safe Use of Lasers.

Local

The proposed RBC would include portions of the RFS and other properties in Richmond owned or controlled and operated by the University of California. As a state entity, the University is exempted by the state constitution from compliance with local land use regulations, including general plans and zoning. However, the University seeks to cooperate with local jurisdictions to reduce any physical consequences of potential land use conflicts to the extent feasible.

The City of Richmond General Plan 2030 includes the following policies pertaining to hazardous materials:

- Continue to work with the appropriate local, state, and federal agencies to promote the clean-up and reuse of contaminated sites to protect human and environmental health. Work with property owners and regional agencies to prevent, reduce or eliminate soil and water contamination from industrial operations, the Port and other activities that use, produce or dispose of hazardous or toxic substances. Implement appropriate mitigation measures and clean-up of sites that are known to contain toxic materials as a condition of reuse. Support the remediation and reuse of large, disturbed sites, such as the Winehaven complex at Point Molate and the Terminal 4 site at Point San Pablo, into mixed-use centers that provide the maximum benefit to the community without compromising the integrity of the surrounding natural areas.
- Implement standards dealing with the safe management of hazardous substances in close coordination with the City Fire Department and the DTSC. The standards should require soil testing at development sites where contamination is suspected, address safe household hazardous and universal waste disposal and ensure compliance with hazardous substance regulations and safe transport of hazardous materials. Use of the latest technologies available should be considered when conducting remediation to expedite the cleansing process and do the least harm to the environment (City of Richmond 2012).

The 2030 General Plan EIR determined that the effects on hazards and hazardous materials from future development pursuant to the General Plan would be less than significant. Future development would not create a significant hazard from the routine use, storage, transportation, and disposal of hazardous materials or from the demolition or renovation of existing structures that could contain hazardous materials. Existing regulations would minimize the potential for

people to be exposed to hazardous materials at contaminated sites. No mitigation measures would be required. Cumulative impacts would also be less than significant.

Emergency response plans are maintained at the federal, state and local level for all types of disasters, including human-made and natural. UC Berkeley EH&S maintains a Dedicated Spill Response Team that consists of health and safety professionals, hazardous materials technicians, and appropriately licensed hazardous materials drivers. The team is trained to respond to most incidents and arranges for appropriate outside assistance when necessary. LBNL developed a Master Emergency Program Plan (MEPP) that establishes policies, procedures, and an organizational structure for responding to and recovering from a major disaster. The MEPP uses the Standardized Emergency Management System for managing response to multi-agency and multi-jurisdiction emergencies in California and the National Incident Management System, which is a nationwide standardized approach to incident management prescribed by Homeland Security Presidential Directive 5. The plan includes four phases of emergency management: mitigation, preparedness, response, and recovery. UC Berkeley and LBNL would coordinate with state and local authorities to develop a site-specific emergency response plan for the new facilities proposed for the RBC.

4.7.4 Impacts and Mitigation Measures

Standards of Significance

The impacts related to hazards and hazardous materials from development under the 2014 LRDP would be considered significant if they would exceed the following Standards of Significance, in accordance with Appendix G of the State CEQA Guidelines and the UC CEQA Handbook:

- Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?
- Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?
- Would the project result in development that would emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?
- Would the project be on a site that is on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?
- Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

CEQA Checklist Items Adequately Addressed in the Initial Study

The analysis in the Initial Study prepared for the project and circulated with the NOP concluded that further analysis of the following issues was not required in the EIR:

- For a project within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?
- For a project near a private airstrip, would the project result in a safety hazard for people residing or working in the project area.

- Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands

The proposed RBC is not in an airport land use plan or within 2 miles of a public airport, so further analysis is not required. The proposed RBC is not near a currently operating or planned private airstrip, so further analysis is not required. The proposed RBC is not near wildlands and the risk of wildland fires is low. There are numerous open space and wetland areas, but these are not considered moderate or high-risk for wildland fires due to their limited and non-contiguous setting away from large open or natural areas that are susceptible to wildland fires. Further analysis is not required.

Analytical Methods

By convention, most hazardous materials are thought to be hazardous chemicals, but certain radioactive materials and biohazardous materials, as defined here, are also hazardous. This EIR considers hazardous materials to include hazardous chemicals, radioactive materials, and biohazardous materials that would be used at the RBC.

This analysis was prepared using information gathered from available documentation and information in the 2014 LRDP. Data regarding hazardous materials, materials of concern, and wastes that would be used and generated at the RBC were gathered by compiling available documentation such as program descriptions, monitoring reports, and the LRDP project description. Potential 2014 LRDP impacts concerning hazardous materials and materials of concern were then evaluated in light of existing programs and proposed LRDP policies intended to protect the environment from unintended consequences.

RBC 2014 LRDP Policies

The RBC 2014 LRDP policies related to hazards and hazardous materials include the following:

- SP1 – Safety and Preparedness Policy on Model Programs: Develop model health and safety programs for the RBC.
    - Develop comprehensive and effective physical safety, life safety, and emergency service plans to protect the environment, the public, employees, and guests at all times.
    - Ensure clear and responsible management of environment, health, and safety programs and services.
    - Implement land use controls to prohibit unsafe exposure of workers, visitors, and the surrounding community to environmental contaminants.
    - Use transparent environment, health, and safety reporting practices.
- SP2 – Safety and Preparedness Policy on Inclusion: Ensure that the RBC contributes to and serves as a resource for the Richmond community.
    - Encourage inclusion through an open, un-gated campus to advance the ideals of institutional transparency and mutual trust, with security at the building level rather than the campus level.
    - Enable community access to RBC amenities such as outdoor spaces and meeting facilities to promote a better understanding of the University's mission.

- Expand partnerships with local agencies, including fire and police departments, and local neighborhoods to promote understanding and address safety and security concerns of neighbors and the campus population (University of California 2013).

LRDP Impacts and Mitigation Measures

This section describes the potential hazardous materials impacts from development under the 2014 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LRDP Impact HAZ-1: **Development under the 2014 LRDP would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. (*Less than Significant)***

Development under the 2014 LRDP would increase the amount of space at the site from 1,050,000 gsf to approximately 5,400,000 gsf. Construction would typically begin with demolition of existing facilities, followed by site clearing, soil contamination investigation and management, and excavation work. As described in Section 4.7.2, asbestos and lead-based paint are likely present in facilities that would be demolished. Before demolition, areas with contamination would have to be abated or cleaned as described below.

During demolition, any hazardous materials would be managed in accordance with UC and LBNL procedures. The University would remove, and contain, any asbestos- and lead-containing materials, a process to be overseen by asbestos-certified staff.

In general, asbestos-containing materials would be removed before the start of demolition by a licensed asbestos abatement professional (40 CFR Part 61, Subpart M).[34] BAAQMD regulates the demolition and renovation of buildings and structures that may contain asbestos, and the BAAQMD must be notified at least 10 working days before any demolition. Regulated asbestos-containing materials removed before demolition or encountered in the demolition debris would have to be segregated and packaged in sealed, leak-tight containers and properly labeled for transport and disposal in a disposal facility authorized to accept asbestos. Asbestos-containing materials can be disposed of at a solid waste management facility, such as a demolition landfill. Standard asbestos abatement and removal safety protocols include:

- Seal the area undergoing removal to prevent release of asbestos fibers to noncontaminated areas; use polyethylene film, duct tape, and negative air pressure machines with high-efficiency particulate air (HEPA) filters;
- Wear proper safety equipment, including approved respirators and disposable protective clothing;
- Use a decontamination unit before leaving the sealed area;
- Keep all asbestos-containing materials wet from removal until disposal;
- Leave large pieces of asbestos-containing material intact to avoid the creation of dust;

34 Per 40 CFR Part 61, Subpart M, Section 61.145, asbestos-containing materials do not have to be removed from the building if: (1) it is Category I nonfriable material that is not in poor condition, is on a facility component that is encased in concrete or other similarly hard material, and is adequately wet when exposed during demolition; or (2) it is Category II nonfriable material, and the probability is low that it will become crumbled, pulverized, or reduced to powder during demolition.

- Put all friable asbestos in airtight, leak-proof containers with warning labels for transport to approved asbestos disposal facilities;
- Use only a HEPA-filtered vacuum cleaner designed for asbestos containment when cleaning during and after asbestos removal.

Demolition waste would be likely to include paint residue (chips and scrapings); demolition debris (masonry, metal, and boards painted with lead-based or other heavy metal-based paint); scrap metal (metal objects that contain lead or other heavy metals) that could be classified as hazardous waste, which would have to be managed, transported, and disposed of at an appropriately permitted and licensed off-site facility. All hazardous wastes would be disposed of in accordance with applicable UC Berkeley and LBNL procedures at properly licensed and permitted facilities.

As discussed in Section 4.7.2, the RFS portion of the proposed RBC site includes some areas of contaminated soil and groundwater. The University has done substantial work in characterizing site contamination. Arsenic, copper, lead, mercury and PCBs have been detected in the soil at levels exceeding commercial use standards. Any remediation would be done in accordance with a DTSC Order (see Section 3.9) or other DTSC authority. More specifically, soil would be excavated or evaluated for contamination prior to on-site reuse or off-site disposal, pursuant to a RAW, including Soil Management Plan requirements, if approved by DTSC under Chapter 6.8 of the California Health and Safety Code, which includes requirements to ensure protection of public health and safety and the environment, or under currently specified requirements of the existing DTSC Order under Health and Safety Code Section 6.8. Hazardous soil would be categorized for transport to appropriately permitted and licensed off-site facilities. Contaminated groundwater would be treated to remove contamination as required under DTSC Order or authority. The impacts of such activities would not be expected to create a significant hazard to workers or the public.

During demolition activities, the intrusion of subsurface vapors into buildings is one of the exposure pathways to be considered in assessing the risk posed by releases of hazardous chemicals into the environment. DTSC has provided guidance regarding an approach for evaluating vapor intrusion into buildings and its subsequent impact on indoor air quality (DTSC 2011). Demolition activities would be conducted in accordance with the DTSC guidance, which would include compliance with an 11-step process to identify, evaluate, and potentially mitigate human exposure from vapor intrusion. Compliance with the DTSC guidance should minimize the potential for any significant impacts.

Once operational, there would be an increase in the use of hazardous materials and chemicals, radioactive materials, and production of wastes at the site. The chemicals used in new laboratories and support space developed under the 2014 LRDP would be similar to those currently used at other UC sites such as UC Berkeley and LBNL. The level and the nature of the hazards posed by these chemicals and wastes vary widely and are unique to the individual materials, although they often can be grouped by chemical types. Substances can possess one or more common hazard characteristics such as corrosivity (acids and bases), flammability (solvents such as acetone), toxicity (cyanides, mercuric chloride) and reactivity. Some nonradioactive chemicals have the potential for causing cancer or acute and chronic illnesses, while some substances may present little hazard.

Because most handling of hazardous materials would take place indoors, potential pathways for exposure to non-radioactive hazardous materials under routine conditions include direct contact or injection during research or through accidental spills, or inhalation. To address this potential impact, laboratories and other facilities constructed under the 2014 LRDP would continue to comply with all applicable hazardous materials standards. For UC Berkeley activities, fume

hoods and other engineering controls would be required to meet Cal/OSHA requirements, and fume hood ventilation rates would continue to be checked annually. For LBNL activities, fume hoods and other engineering controls would be required to meet DOE and LBNL requirements, and fume hood ventilation rates would continue to be checked at their established frequencies. Proper use of the fume hoods and other engineering controls would keep indoor laboratory air toxics concentrations below the Cal/OSHA Permissible Exposure Limits for UC Berkeley activities and below the American Conference of Governmental Industrial Hygienists Threshold Limit Values and the OSHA Permissible Exposure Limits for LBNL activities. Continued implementation of UC Berkeley and LBNL policies and procedures, and continued compliance with existing laws and regulations would minimize the risk to workers and students from exposure to non-radioactive hazardous chemicals and the impact would be less than significant.

During operations, the intrusion of subsurface vapors into buildings is one of the exposure pathways to be considered in assessing the risk posed by releases of hazardous chemicals into the environment. As with demolition, operations would be conducted in accordance with the DTSC guidance, which should minimize the potential for any significant impacts from vapor intrusion.

Hazardous materials use and storage areas would be periodically inspected by local regulatory agencies. The following inspections currently occur:

- The Contra Costa County Hazardous Materials Program Division inspects the site approximately annually for hazardous waste storage.
- The Richmond Fire Department inspects the site approximately annually for hazardous materials storage and fire safety.
- The Richmond Public Works Industrial Pretreatment Program inspects the site approximately every two years for hazardous waste storage, hazardous waste manifest recordkeeping, and spill prevention control and countermeasure requirements.
- The City of Richmond collects wastewater samples a number of times per year for compliance with the Industrial Discharge Permit issued to the site.

The above inspections occur in addition to inspections by campus EH&S and the fire marshal.

The potential for exposure to the public, including nearby homes and schools, from hazardous materials used at the RBC under routine conditions would be limited, because most hazardous materials use and storage on the campus would take place indoors. The most probable potential pathway for public exposure would be air emissions from accidental releases either on campus or during transportation and routine operations. Exposure to routine air emissions are analyzed in Section 4.2 (Air Quality) and were determined to be less than significant. The potential for public exposure under upset or accident conditions, both from handling of hazardous materials on campus and during transportation, is discussed under LRDP Impact HAZ-2, below.

Development under the 2014 LRDP could introduce the use of biohazardous materials at the RBC, such as microorganisms, plants, and animals that have been genetically engineered or modified using recombinant DNA techniques. All research involving biohazardous materials at the RBC would be required to comply with UC Berkeley policies and procedures (for UC Berkeley facilities) and with LBNL policies and procedures (for LBNL facilities). The potential for exposure of RBC workers or the public to biohazardous materials would be minimized by compliance with Centers for Disease Control and National Institutes of Health guidelines for research involving biohazardous materials. These guidelines specify containment practices for plants, microorganisms, and animals, depending on the potential hazard posed by the organism.

Hazardous waste, mixed waste, combined waste, and radioactive waste would be packaged, labeled, and categorized for transport to appropriate permitted and licensed off-site treatment, storage, and disposal facilities. Biohazardous waste and universal waste would also be generated and managed at the RBC. On-site waste collection areas equipped with all required safety features would be designated to accommodate hazardous waste and radioactive waste (including mixed waste and combined waste) collection and management (e.g., consolidation). Hazardous waste storage areas would be physically separate from the radioactive waste storage area. The RBC would have designated storage areas for management of biohazardous waste (including medical waste) and universal waste.

Compliance with hazardous waste storage and transportation regulations, and continuation of current UC Berkeley and LBNL programs and controls to reduce and manage hazardous wastes and to prevent inadvertent releases of hazardous materials to the sanitary sewer would minimize the hazards to workers, the public, and the environment. Treatment, storage, and disposal facilities are currently available with adequate capacity to accept and safely manage any wastes produced. The increase in hazardous waste generation would be insignificant in relation to the vendor's disposal capacity.

Development under the 2014 LRDP could result in an increase in radioactive material use. Safety controls, plans, and procedures would be implemented to limit exposure to radiation from radioisotopes, radiation-producing machines, and radioactive wastes. The potential for the proposed project to expose workers, non-involved site workers or visitors, or the public to significant health or safety risks is low. With respect to radioactive waste, no radioactive waste would be disposed of at RBC, LBNL, or any offsite LBNL facilities. Implementation of the 2014 LRDP would continue the practice of using out-of-state disposal facilities. The quantities of radioactive wastes would be insignificant relative to the available disposal capacity.

UC Berkeley holds a Broad Scope Radioactive Materials License issued by the State of California Department of Public Health, Radiological Health Branch. Approval and oversight for campus use of radioactive materials and radiation producing machines is provided by the Radiation Safety Committee and the EH&S Radiation Safety Officer (RSO). Any use of radioactive materials and radiation producing machines at UC Berkeley must be preauthorized in writing. The written authorization is referred to as an Radiation Use Authorization and is fundamental to the UC Berkeley campus radiation safety program. The RSO conducts an evaluation of the radiation safety aspects of the proposed use and at the RSO's discretion, complex uses may need review by the Radiation Safety Committee. All aspects of radioactive material or radiation producing machine use on the campus is governed by the Radiation Safety Team that provides oversight and services to support the safe use of these materials and machines.

All work with ionizing radiation at LBNL is subject to a DOE-approved Radiation Protection Program (RPP). This RPP contains plans for implementing measures to ensure worker and public safety from hazards arising from LBNL work with ionizing radiation. All work is conducted according to the As Low As Reasonably Achievable principle.

Implementation of safety plans, programs, practices, and procedures, as defined in this section, would ensure that impacts to the public or the environment through the routine transport, use, or disposal of hazardous and radioactive materials and wastes would be less than significant.
With respect to potential impacts from non-ionizing radiation, compliance with applicable federal and state regulations, UC Berkeley and LBNL requirements, and DOE Orders, would provide reasonable assurance that workers are protected from non-ionizing hazards.

LRDP ENVIRONMENTAL PROTECTION PRACTICE HAZ-1:

In implementing the 2014 LRDP, UC Berkeley and LBNL shall continue the same (or equivalent) health and safety plans, programs, practices and procedures related to the use, storage, disposal, and transportation of hazardous materials and wastes (including chemical, radioactive, and bio-hazardous materials and waste) as are currently practiced at the UC Berkeley main campus and at the LBNL hill site. These include, but are not limited to, UC Berkeley and LBNL requirements for safe transportation of hazardous materials; EH&S training programs; the requirement that laboratories have chemical hygiene plans; a chemical inventory; a toxic use reduction program; a spill prevention, control, and countermeasure plan; monitoring of USTs; a waste minimization program; a biosafety program; a waste management program (including medical and biohazardous waste); a radiation safety and/or protection program; compliance with radioactive air emission regulations (40 CFR Part 61) and compliance with DOE Orders for LBNL activities; compliance with the National Institutes of Health Guidelines for Research Involving Recombinant DNA Molecules; and compliance with US Department of Agriculture requirements for open-field-based research involving transgenic plants.

Mitigation Measure: No mitigation measure is required.

LRDP Impact HAZ-2: **Development under the 2014 LRDP would not create a significant public or environmental hazard through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. (*Less than Significant)***

Federal, state, and local emergency response plans would be implemented to respond to most RBC emergency incidents. UC Berkeley EH&S maintains a Dedicated Spill Response Team that consists of health and safety professionals, hazardous materials technicians, and appropriately licensed hazardous materials drivers. The team is trained to respond to most incidents and arranges for appropriate outside assistance when necessary. LBNL developed a MEPP that establishes policies, procedures, and an organizational structure for responding to and recovering from a major disaster. The MEPP uses the Standardized Emergency Management System for managing response to multi-agency and multi-jurisdiction emergencies in California and the National Incident Management System, which is a nationwide standardized approach to incident management prescribed by Homeland Security Presidential Directive 5. The plan includes four phases of emergency management: mitigation, preparedness, response, and recovery. UC Berkeley and LBNL would coordinate with state and local authorities to develop a site-specific emergency response plan for the new facilities proposed for the RBC.

One state law governing the storage of hazardous materials is the California Accidental Release Program (CalARP). This law addresses facilities that contain specified hazardous materials or "regulated substances" that, if released, could result in adverse off-site consequences. Chemical inventories that would be maintained by UC in the Materials Business Plan and Chemical Inventory would be reviewed at least annually to determine whether the use or storage of regulated substances at any RBC facility would be large enough to trigger CalARP requirements. A risk management plan under CalARP would be required for any chemicals with maximum storage quantities greater than levels that would potentially cause an off-site consequence. RBC best practices would inventory campus hazardous materials in future locations and quantities would be kept to a minimum. Given past experience at other UC facilities, quantities above CalARP thresholds are not anticipated. Should that occur, UC would comply with all applicable CalARP reporting requirements. LBNL activities would also comply with all applicable DOE orders. Compliance with all applicable federal, state, and local laws and regulations related to the

transportation, storage, and use of hazardous and radioactive materials would minimize the potential for a release and provide for prompt and effective cleanup if an accidental release occurred. Therefore, the impacts related to accidental release due to the increased transportation, storage, or use of hazardous and radioactive materials under the 2014 LRDP would be less than significant. Safety plans, programs, practices, and procedures implementation, as defined in the LRDP Impact HAZ-1 discussion, would ensure these impacts remain less than significant.

Mitigation Measure: No mitigation measure is required.

LRDP Impact HAZ-3: **Development under the 2014 LRDP would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. (*Less than Significant)***

The RBC site is not within one-quarter mile of an existing or proposed school per CEQA Guideline 15186. While the RBC would handle certain hazardous materials, these materials and their handling protocols are subject to extensive regulations, procedures, and oversight, as discussed in LRDP Impact HAZ-1. The potential impacts associated with site contamination are also addressed under LRDP Impact HAZ-1. As described in that section, operations would not result in hazardous emissions or hazardous materials handling that could expose off-site receptors to a significant human health or safety risk. The impact would be less than significant.

Mitigation Measure: No mitigation measure is required.

LRDP Impact HAZ-4: **The RBC would be on a site included on a list of hazardous materials sites compiled pursuant to the California Government Code Section 65962.5, but this would not create a significant hazard to the public or the environment. (*Less than Significant)***

The RFS portion of the proposed RBC site is listed on the current California EPA Hazardous Waste and Substances Sites List, also known as the "Cortese list" (California Government Code Section 65962.5). This listing is due to prior site activities that resulted in soil contamination at specific site locations. The DTSC has been directing efforts to address the effects of this past contamination on the RFS portion of the RBC site (see Section 3.9). The potential impacts associated with site contamination are also addressed under LRDP Impact HAZ-1. Because on-site contamination would be addressed in accordance with a RAW if approved by DTSC under California Health and Safety Code Section 6.8, which requires DTSC to ensure protection of public health and safety and the environment from the harmful effects of releases or threatened releases of hazardous substances, or under the current provisions in the existing DTSC order for the RFS under Health and Safety Code Chapter 6.8, the impacts would be less than significant.

Mitigation Measure: No mitigation measure is required.

LRDP Impact HAZ-5: **Development under the 2014 LRDP would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. (*Less than Significant)***

As discussed in Section 4.7.3, emergency response plans are maintained at the Federal, State, and local level for all types of disasters, including human-made and natural. UC Berkeley and LBNL would coordinate with state and local authorities to develop a site-specific emergency response plan for the proposed new RBC facilities. The UC Berkeley EH&S Emergency Response Team and LBNL responders would be capable of responding to most RBC incidents and, if necessary, may arrange for appropriate assistance from the City of Richmond Fire Department, the LBNL Fire Department, and outside emergency response contractors. New 2014 LRDP development would be in areas adjacent to other developed sites. Because on-site activities that could trigger emergency response would generally be similar in nature to current types of LBNL and UC Berkeley activities, and because existing emergency control and avoidance programs would continue, implementation of the 2014 LRDP would not exceed emergency response capabilities and impacts would be less than significant.

Mitigation Measure: No mitigation measure is required.

Cumulative Impacts and Mitigation Measures

LRDP Cumulative Impact HAZ-1: Development under the 2014 LRDP in conjunction with other reasonably foreseeable future development in the project vicinity would not create a significant public or environmental hazard through the routine transport, use, or disposal of hazardous materials. (*Less than Significant*)

The potential for public exposure, including at nearby homes and schools, to RBC hazardous materials under routine conditions would be limited, because most RBC hazardous materials use and storage would take place indoors and under controlled conditions. The most probable potential pathway for public exposure would be air emissions from on-site accidental releases or during transportation and routine operations. Air would be sampled for dust and particulates during removal of soil contaminated with mercury fulminate and during construction. Cumulative exposure to routine air emissions is analyzed in Section 4.2 (Air Quality) and determined to be less than significant. Compliance with all applicable Federal and State laws related to the transportation of hazardous materials would reduce the likelihood and severity of accidents during transit, thereby ensuring that a less than significant cumulative impact would occur in this regard.

LRDP Cumulative Impact HAZ-2: Development under the 2014 LRDP in conjunction with other reasonably foreseeable future development in the project vicinity would not create a significant public or environmental hazard through reasonably foreseeable upset and accidental conditions involving the release of hazardous materials into the environment. (*Less than Significant*)

Cumulative development in the project area would include some industrial and commercial entities that could use various hazardous products in greater quantities than under current conditions. The use, storage, disposal, and transport of hazardous materials could result in an increased risk for

spills and accidents. Although the specific risks of such spills and accidents are not quantifiable, all construction and demolition activities, and all new development, would be subject to compliance with hazardous materials regulations. Future developments would be required to evaluate their respective hazards and hazardous materials impacts on a project-by-project basis. Compliance with all applicable federal, State, and local regulations during the construction and operation of new developments would ensure that there are no significant cumulative hazards to the public or the environment associated with the routine transportation, use, disposal, or release of hazardous materials.

4.7.5 References

CalRecycle. 2012. California Department of Resources Recycling and Recovery, *Solid Waste Characterization Database: Waste Disposal Rates for Business Types*, 2012, accessed through http://www.calrecycle.ca.gov/wastechar/DispRate.htm on January 28, 2013.

City of Richmond. 2012. City of Richmond, General Plan 2030, Richmond, CA.

DTSC 2011. California Department of Toxic Substances Control, "Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance), April.

EPA. 1998. Environmental Protection Agency, *Characterization of Building-Related Construction and Demolition Debris in the United States*. June 1993, accessed through http://www.epa.gov/epawaste/hazard/generation/sqg/cd-rpt.pdf on January 2013.

LBNL 2007 "Lawrence Berkeley National Laboratory, Long Range Development Plan Final Environmental Impact Report," July.

Tetra Tech. 2013. "Final Site Characterization Report Proposed Richmond Bay Campus." May 28, 2013.

Tetra Tech. 2008. "Current Conditions Report, University of California, Berkeley, Richmond Field Site, Richmond, California." November 21, 2008.

UC Berkeley 2008. Current Conditions Report: University of California, Berkeley, Richmond Field Station, Richmond, California. November 21, 2008.

University of California. 2013. Richmond Bay Campus Long Range Development Plan, Community Draft. August 12, 2013.