4.7 HAZARDS AND HAZARDOUS MATERIALS

UC Merced is expected to use many materials, some of which are considered hazardous, during the course of daily operations. Such hazardous materials include many chemical reagents, solvents, radioisotopes, fuels, paints, cleansers, pesticides, and biohazardous substances that are used in activities such as laboratory research, building and grounds maintenance, vehicle maintenance, and fine arts. Hazardous materials use on campus generates hazardous byproducts that must eventually be handled and disposed of as hazardous wastes.

Hazardous materials could be released to the environment during their delivery to or removal from campus facilities; the potential for such a release is considered in this section. Once hazardous materials are delivered to campus facilities, inadvertent sewer disposals, accidents in outdoor areas, and air emissions from the fume hood and other building vents would be the potential release sources for hazardous materials to the immediate outside environment because most activities related to hazardous materials would occur inside buildings. The potential for impacts from air emissions is considered in Section 4.3, Air Quality. The potential impacts from accidents in outdoor areas and impacts due to sewer disposal are discussed in this section. Impacts from development and operation of Phase 1 Campus are discussed in Volume 2.

No comments related to hazards and hazardous materials were received in response to the Notice of Preparation issued for this EIR.

4.7.1 Summary of Site Selection EIR Impacts and Mitigation Measures

The SSEIR evaluated impacts of use and generation of hazardous materials at the Lake Yosemite site on the development of a new campus. That EIR considered impacts from exposure to contaminated soil or groundwater and from the use, storage, and transportation of hazardous materials and hazardous wastes.

All impacts identified in the SSEIR relevant to the proposed project are presented in the following table. For all impacts, the level of significance before and after application of mitigation measures identified in the SSEIR is also presented in the table. Although the proposed location of the campus on the VST property has been shifted compared to the location evaluated in the SSEIR, this change does not increase the significance and severity of impacts that were identified in the SSEIR.

Several impacts in the SSEIR related to hazardous materials were determined to be significant, and some were considered significant and unavoidable even after mitigation. The analysis in this LRDP EIR concludes that all of those impacts are less than significant, based on examination of specific-site information and more data from other UC campuses. This EIR also notes that the cumulative impacts from the use, handling, storage, and disposal of hazardous materials and waste would be less than significant because all entities, including the proposed campus, would comply with applicable federal, state, and local laws.

SITE SELECTION EIR IMPACTS	Level of Significance Prior to Mitigation	Level of Significance after/with Mitigation
Operation of a campus at the site would involve the use of hazardous wastes, which could potentially be released into the surrounding soils.	S	SU_1
There could be existing contaminated soil due to previous site use. Construction and grading in these areas could expose workers to risks associated with contaminated soil.	NI	N/A
Off-campus and cumulative development, in conjunction with development of a campus at any of the sites, would increases the use of hazardous materials and generation of hazardous wastes, which could be released to surrounding soils.	S	SU_2
Construction and grading activities could expose workers to risks associated with existing contaminated groundwater.	NI	N/A
Operation of a campus would involve the use of hazardous materials and the generation of hazardous wastes, and the discharge of wastewater, which could release contaminants to surface water and groundwater.	PS	SU_1
Off-campus and cumulative development, in conjunction with development of a campus at the site, would increase grading and construction activities in the region. Previous land uses in the region include agricultural activities, which often leave residual chemical contaminants in the soil. Development of the area could expose construction workers to risks associated with contaminated soils.	S	SU_2
Cumulative development, in conjunction with development of a UC campus, would increase the use of hazardous materials and generation of hazardous waste and the discharge of wastewater, which could release contaminants to surface or groundwater.	S	SU_2

PS=Potentially Significant; S=Significant; LS=Less than Significant; B=Beneficial; NI=No Impact; N/A=Not Applicable; SU_1= Impacts that cannot be mitigated, or for which it is not certain that mitigation could reduce the impact to a less-than-significant-level; SU_2= Impacts that could be reduced to less-than-significant levels but require action by a jurisdiction other than the University; SU_3= Impacts that, even with mitigation, cannot, or might not, be reduced to a less-than-significant level, and for which mitigation would not be under the University's jurisdiction.

Mitigation measures in the SSEIR include the following:

- **SSEIR Mitigation Measure 4.1-4** – *The use, handling, storage, transportation, and disposal of hazardous substances associated with the operation of a campus at any of the sites shall be in compliance with all applicable federal and state regulations and campus policies regarding hazardous waste.*
- **SSEIR Mitigation Measure 4.1-11** – *Prior to development, an initial site assessment shall be performed to identify the potential for soil contamination due to historic site uses or the presence of underground storage tanks. If contamination is identified, remedial activities shall be performed in coordination with local agencies to ensure that potential worker exposure to known contaminants has been eliminated.*

- **SSEIR Mitigation Measure 4.2-15** – *The use, handling, storage, transportation, and disposal of hazardous substances associated with the operation of a UC campus shall be in compliance with all applicable federal and state regulations and campus policies regarding hazardous materials and hazardous waste.*

Campus facilities would comply with state and federal regulations for the use, handling, storage, and transportation of hazardous materials, as also required by SSEIR Mitigation Measures 4.1-4 and 4.2-15 and LRDP Policies. Pursuant to SSEIR Mitigation Measure 4.1-11, a Phase 1 site assessment has been completed for the entire 2,000-acre campus site. This study has shown that there is no contamination on the site (including the Merced Hills Golf Course) that poses any significant risk to life and property.

4.7.2 Environmental Setting

4.7.2.1 Definitions

The term **hazardous material** is defined in different ways for different regulatory programs. This EIR uses the definition given in California Health and Safety Code Section 25501(n) and (o), which defines hazardous material as

> *any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous wastes, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.*

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 the applicable hazardous chemicals, radioactive materials, and biohazardous materials.

A **hazardous waste**, for the purposes of this EIR, is any hazardous material that is to be abandoned, discarded, or recycled.

4.7.2.2 Regulatory Background

Hazardous materials and hazardous waste management are subject to numerous laws and regulations at all levels of government. These laws would apply to the future classroom activities, research related activities, maintenance work, and other activities on campus just as they do to other hazardous materials users. A brief summary of these regulations is described below.

Hazardous Materials Management

State and federal laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, to prevent or to mitigate injury to health or the environment.

Worker Safety

The California Occupational Safety and Health Administration (Cal/OSHA) and the federal Occupational Safety and Health Administration (Fed/OSHA) are the agencies responsible for assuring worker safety in the handling and use of chemicals in the workplace. In California, Cal/OSHA assumes primary responsibility for developing and enforcing standards for safe workplaces and work practices.

Hazardous Waste Handling

The California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control (DTSC) regulates the generation, transportation, treatment, storage, and disposal of hazardous waste under the Resource Conservation and Recovery Act (RCRA) and the California Hazardous Waste Control Law. Both laws impose "cradle to grave" regulatory systems for handling hazardous waste in a manner that protects human health and the environment.

Radioactive Materials

The Radiologic Health Branch of the California Department of Health Services administers the federal Atomic Energy Act, the California Radiation Control Law, and related regulations, which govern the receipt, storage, use, transportation, and disposal of sources of ionizing radiation (radioactive material) and provide for protecting the users of these materials and the general public from radiation hazards.

Biohazardous Materials and Animals

The United States Department of Health and Human Services Public Health Service, Centers for Disease Control and Prevention, and National Institutes of Health prescribe containment and handling principles for use in microbiological, biomedical, and animal laboratories. Although following these guidelines is not legally required for most activities, all UC Merced laboratories would operate with the intent to follow these good hygienic practices. Based on the potential for transmitting biological agents and the rate of transmission of these agents, and based on the quality and concentrations of biological agents produced at a laboratory, Biosafety Levels may be instituted as prescribed by these principles.

Federal and state laws such as the Animal Welfare Act specify standards for registration, record keeping, handling, care, treatment, and transportation of animals. Such laws are enforced by the U.S. Department of Agriculture and the California Department of Fish and Game.

Medical Waste Handling

Medical (biohazardous) waste is generally regulated in the same manner as hazardous waste, except that special provisions apply to storage, desinfection, containment, and transportation. The California Department of Health Services Medical Waste Management Program enforces the Medical Waste Management Act and related regulations.

Hazardous Materials Transportation

The U.S. Department of Transportation regulates hazardous materials transportation between states. The state agency with primary responsibility in California for enforcing federal and state regulations and responding to hazardous materials transportation emergencies is the California Highway Patrol. Together, these agencies determine container types used and license hazardous waste haulers for hazardous waste transportation on public roads.

Emergency Response to Hazardous Materials Incidents

California has developed an Emergency Response Plan to coordinate emergency services provided by federal, state, and local government and private agencies. Response to hazardous materials incidents is one part of this plan. The Plan is administered by the state Office of Emergency Services, which coordinates the responses of other agencies, including the Cal-EPA, the California Highway Patrol, the Department of Fish and Game, the Central Valley Regional Water Quality Control Board (RWQCB), and the Radiologic Health Branch of the Department of Health Services. The plan will be implemented through the UC Merced Office of Environmental Health and Safety, in cooperation with the local Fire Department that will serve the campus.

4.7.2.3 Potential Hazardous Materials at UC Merced

Hazardous materials potentially used at UC Merced will be principally related to research and teaching laboratories and could include

- solvents, used for cleaning, extraction, or other laboratory activities;
- reagents (chemical starting materials);
- reaction products (products of chemical reactions), which may have unknown composition;
- radioisotopes, radioactive elements used to stimulate or trace chemical reactions;
- infectious agents, including bacteria, viruses, and other materials encountered in biological studies; and
- test samples (e.g., specimens such as blood, tissue, soil, or water), prior to use in a testing procedure.

Campus maintenance activities also require hazardous materials. Examples of hazardous materials involved in vehicle, grounds, and building maintenance include

- fuels (gasoline and diesel);
- oils and lubricants;
- antifreeze;
- cleaners, which may include solvents and corrosives in addition to soaps and detergents;
- paints and paint thinners (both oil-based and latex);
- freons (refrigerants); and
- pesticides and herbicides.

In addition, fine arts programs use relatively minor amounts of solvents, paints, and acids.

The following sections describe hazardous materials according to three broad categories: chemical (nonradioactive), radioactive materials, and biohazardous materials.

Hazardous Chemicals (Nonradioactive)

Quantities of nonradioactive hazardous chemicals to be used on site are not yet available. UC Merced will, however, be required to include an inventory including names and quantities of all hazardous chemical materials used on site for which quantities are greater than 55 gallons of liquid, 500 pounds of solid, or 200 cubic feet of gas per building. Use will likely be typical of other UC campuses.

Radioactive Materials

Radioactive substances may be used in certain types of research in the campus. As required by the Radiation Control Law, UC Merced will implement a Radiation Safety Program providing adequate protective measures against exposure and routine monitoring program (including wipe samples, radiation leak detection, and visual inspection) for specified radioactive materials under the law. Furthermore, and similar to other UC campus, prior to obtaining radioactive materials, each principal investigator will have to receive a Radiation Use Authorization.

Biohazardous Materials

Various biologically hazardous substances may be used for research on campus like recombinant DNA molecules, infectious agents, parasites, and other biological agents. UC Merced will use the Department of Health and Human Services guidelines contained in *Biosafety in Microbiological and Biomedical Laboratories* and *Guidelines for Research Involving Recombinant DNA Molecules* to classify biohazardous agents and to determine the level of safety precautions that must be used. Biosafety levels for infectious agents are based on the characteristics of the agent (virulence, pathenogenicity, route of spread, biological stability, and communicability), the quantity and concentration of the agent, the procedures to be followed in the laboratory, and the availability of therapeutic measures and vaccines. Four biosafety levels apply to biohazardous materials operations, depending on the potential of the hazard used. Biosafety Level 1 is for the least hazardous biological agents, and Biosafety Level 4 is for the most hazardous biological agents. Biosafety Level 1 agents pose minimal or no known potential hazard to laboratory personnel and the environment. Biosafety Level 2 agents are considered to be of ordinary (not special) potential hazard and may produce varying degrees of disease through accidental inoculation, but Biosafety Level 2 agents may be effectively contained by ordinary laboratory techniques. Biosafety Level 3 agents pose serious risks; therefore, work with these agents must be conducted in contained facilities with special ventilation systems and controlled with access separate from public areas.

Although it is not possible to predict or quantify the actual type and amount of biohazardous materials that would be used on campus, it is anticipated that the majority of biological research conducted at UC Merced will involve the use of relatively low-level biohazardous materials and that nearly all biological research at UC Merced will be conducted at Biosafety Level 1 or 2. UC Merced will also develop a Biosafety Program similar to those at other campuses to minimize

community and worker exposure to biohazardous materials through skin contact, ingestion, and inhalation.

Laboratory Animal Use

Because UC Merced would be a center for research and teaching in the life sciences, the campus would use animals for both teaching and research. Laboratory research involving research animals and animal care activities would produce biohazardous wastes. Safety hazards would be associated with handling of research animals. The number of vertebrate animals that would be used in research projects cannot be reasonably predicted at this time but are expected to include rodents.

To ensure proper animal care, similar to other UC campuses, an Animal Care Committee would be established that would include member representatives from the Campus faculty and staff. The Animal Care Committee's focus will be the safe housing and handling of research animals.

4.7.2.4 Hazardous Waste Generation

Hazardous wastes would be generated at campus locations where hazardous materials are used, including research and teaching laboratories and maintenance facilities. To facilitate safe management, hazardous wastes are subcategorized into groups with similar or closely related properties. Hazardous wastes are typically grouped into three major categories: nonradioactive chemical waste, radioactive waste, and medical (biohazardous) waste. Mixed wastes contain hazardous chemical and radioactive wastes. Types of wastes that could be potentially generated at UC Merced are presented in Table 4.7-1, along with estimates of likely quantities that would be involved based on experience at other UC campuses.

All hazardous chemical and radioactive waste generated on campus would be collected and managed by the campus Department of Environmental Health and Safety (EH&S). EH&S personnel will collect wastes from laboratory buildings and other generation points and transport them to a central location for disposal. Before EH&S picks up materials, those would be packaged and labeled properly, which includes placing them in appropriate scaled containers, segregating incompatible materials, and identifying all components with approximate concentrations. Campus plans, policies, and training would emphasize that hazardous wastes will not be placed in the trash or poured down a drain in compliance with applicable laws and regulations.

Table 4.7-1
Annual Hazardous Waste Generation for Calendar Year 2000
(UC Riverside as example)

Waste Category and Classification	Example	CY 2000 Amount
Nonradioactive Chemical Waste		
Flammables	Toluene, acetone, ether	4,301 gal
Compressed Gases	Methane, Oxygen, Nitrogen	2 cylinders
Fuels	Gasoline, diesel, waste oil	1,995 gal
Corrosive, acidic	Hydrochloric acid, sulfuric acid	3,904 gal
Corrosive, basic	Sodium hydroxide, calcium oxide	240 gal
Oxidizers and Reactives		
Oxidizers, Class 4	Hydrogen Peroxide (> 91%), Perchloric Acid (72.5%)	--
Oxidizers, Class 3	Hydrogen Peroxide (> 50%), Perchloric Acid (60-72.5%), Calcium Hypochlorite (>50%)	--
Oxidizers, Class 2	Nitric Acid (>70%), Hydrogen Peroxide (27.5–52%)	94 lbs
Oxidizers, Class 1	Silver Nitrate, Potassium Dichlorate, Ammonium Persulfate, Nitric Acid (<70%), Hydrogen Peroxide (8–27.5%)	550 lbs
Peroxides, ClassII	Peroxyacetic Acid (40%), Acetyl Peroxide (25%)	--
Peroxides, Class I	Benzoyl Peroxide (>90%), t-Butyl Hydroperoxide (>90%)	178 lbs
Water Reactives	Alkali Metals (Sodium, Potassium), Hydrides	--
Pyrophorics	Alkyl metals (e.g. butyl lithium), powdered metals, boranes	--
Poisons		2 lbs
Explosives	Picric acid, nitrocellulose, ammonium nitrate	4 lbs
Special and Other Wastes	PCBs, asbestos, contaminated soil, Superfund Not Included	4,600 lbs soil, 259 cubic yards asbestos
Radioactive Waste:		
Dry Wastes	Radioisotope-contaminated gloves, paper towels, other debris	138 cubic feet
Liquid Wastes	Radioisotope solutions that are not otherwise hazardous	300 gal
Ash	Ash from campus incineration of radioactive animals	No data
Special Wastes (exceptionally radioactive)	Sealed radioactive sources	5 lbs on site
Mixed waste	Scintillation fluid (contains a radioisotope dissolved in an organic solvent)	100 gal
Biohazardous Waste	Infectious agents; sharps; parasites; infected animal carcasses, animal fluids, and resultant bedding and bandages	1,413.2 lbs

Source: UC Riverside, 2001.

Management of medical wastes would include on-site sterilization (e.g., on-site autoclaves). Sharps waste and waste from the student health center would be shipped off-site for disposal by a medical waste hauler. Animal carcasses would be placed in lined containers and stored on-site in a refrigerated area until they are collected by a commercial waste handler.

The transport of hazardous chemical waste on public roadways requires the use of containers approved by the Department of Transportation as well as proper shipping documentation. The campus would manage almost all of its hazardous chemical waste generated at off-campus locations using outside contractors. Once packed for disposal, wastes would be categorized according to their off-campus disposal methods. Outbound hazardous chemical waste streams include lab-pack liquids, recyclable liquids, alternative fuels, incinerable liquids, treatable liquids, recyclable oils, and solids. Table 4.7-2 presents disposal methods for nonradioactive chemical waste.

Table 4.7-2
Chemical Waste Disposal Methods

Material	Disposal Method
Lab Pack Liquid	Small containers (up to one gallon) are packed with absorbent material into larger drums and sent for off-campus incineration. Typically, these wastes are aqueous poisons or dissolved metals (aqueous or solvent).
Recyclable Liquid	These wastes are consolidated into 55-gallon drums and sent to a commercial recycler for reblending. The wastes that are handled in this manner include very clean acetone and dichloromethane.
Cement Kiln Fuel	After consolidation into 55-gallon drums, these solvents are used for fuel at a cement kiln. They are typically organics with low water content, no cyanides, and low chlorination.
Incinerable Liquids	Liquids sent off campus for destructive incineration include most organics without metal contamination and with low to moderate water content. Incoming liquids are consolidated into 55-gallon drums before shipping.
Treatable Liquids	Liquid acids and bases are consolidated into 15-gallon containers as appropriate and sent off campus for neutralization and disposal.
Recyclable Oil	Most recyclable oil is from vehicle maintenance. Teaching and research departments may send vacuum pump oil for recycling as long as it is not contaminated. Recyclable oil is consolidated and then collected by an off-campus oil recycler.
Solids	Solid poisons, oxidizers, metals, and other solid materials are packaged in lab packs according to hazard class and sent off campus for incineration.

Source: UC Davis, 1994.

4.7.3 Impacts and Mitigation Measures

Due to the nature of campus research, the chemicals used at any particular time on campus may change rapidly and sporadically, as may the quantities of materials used. Therefore, a detailed inventory of hazardous materials to be used on campus is impracticable. However, the types of hazardous materials that would be used on campus should resemble those hazardous materials found on other UC campuses. Similarly, while most health and safety risks are impossible to quantify, the level of operations proposed at UC Merced can be compared to existing operations at other UC campuses. This analysis considers these operations in light of campus circumstances that serve to mitigate potential health and safety impacts.

Since historical activities on the campus location consisted of grazing use and golf course use only, as confirmed by a Phase 1 site assessment performed for the VST property, no soil or groundwater contamination is expected to exist at the site.

4.7.3.1 Standards of Significance

The following standards of significance are based on Appendix G of the CEQA Guidelines. For the purposes of this EIR, an impact is considered significant if the implementation of the LRDP would

- create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- 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;
- be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment;
- for a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area;
- impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;
- 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.

CEQA Checklist Items Not Analyzed in the Impact Discussion

The following checklist items do not directly apply to the proposed project and therefore are not discussed in the following impact analysis.

- emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

  There are no existing or proposed schools within one-quarter mile of the proposed campus; therefore no impact would occur.

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

  The proposed UC Merced campus location is not within an airport land use plan, within 2 miles of a public or public use airport. The project is more than 8 miles from the former Castle Air Force Base, the nearest airport that may be used for public aviation in the future.

4.7.3.2 Project Impacts and Mitigation

4.7-1 Use of hazardous chemicals and the generation of hazardous waste at UC Merced would not significantly expose campus occupants and nearby public to potential health or safety risks. This is considered to be a *less-than-significant* impact.

Implementation of the LRDP would lead to the development of laboratories and other facilities such as building and vehicle maintenance that would involve the use of hazardous materials. Various chemicals that may be used may pose different levels of hazards in their use, some in terms of human safety and others in terms of human health impacts.

Workers might be exposed to hazardous chemicals through inhalation, skin absorption (contact), ingestion, and injection (cuts). UC Merced policies and procedures would address the procurement, handling, and disposal of carcinogenic, controlled, volatile, flammable, and explosive substances. EH&S and the campus department would be charged with implementing measures designed to ensure compliance with applicable laws and regulations and to impose additional, more stringent UC Merced policies to further reduce the potential for human harm.

To minimize exposure to chemicals in the air, students, researchers, and other workers would take standard procedural precautions, such as working under fume hoods, when using chemicals likely to present exposure hazards. Fume hoods and other engineering controls would be required to meet Cal/OSHA requirements. Proper use of the fume hoods and other engineering controls would keep indoor laboratory air toxics concentrations below the legal limits of the OSHA Permissible Exposure Levels.

To prevent exposure through skin contact, campus policies and procedures would require that protective clothing, such as laboratory coats, gloves, and safety glasses are worn while handling hazardous materials and wastes. Proper washing after handling chemicals would also be required. Also, in accordance with state laws and campus policy, eating, drinking, applying cosmetics, and chewing gum or tobacco would not be allowed in laboratories using radioactive, carcinogenic, or biohazardous materials; these restrictions would be imposed to prevent the potential ingestion of chemicals.

Campus departments would primarily be responsible for ensuring that safe work practices are followed; EH&S would support departments with this responsibility. EH&S would also review proposed laboratory designs for nonstructural seismic safety concerns and compliance with Cal/OSHA requirements to provide appropriate protection for the workers.

In contrast, the extent to which students and workers could be exposed to hazardous materials is related to the training they would receive, how conscientiously they follow given safety procedures, and the extent to which compliance is supervised and enforced. Compliance with all state and federal laws and regulations as well as campus policies would reduce the impact of hazardous materials used on campus to a less-than-significant level.

As described in the setting section, hazardous chemical wastes are generated whenever hazardous chemicals are used. General types of hazardous chemical wastes include spent solvents from laboratories and the physical plant, discarded laboratory reagents and reaction products, unused paints and oils, and contaminated materials such as gloves and containers.

No direct public exposure to hazardous wastes generated at the UC Merced campus is anticipated. The extent to which students and workers could be exposed to hazardous waste is related to the training they receive, how conscientiously they follow safety procedures, how well engineering controls are maintained and operated, and the extent to which compliance is supervised and enforced.

The University would prepare guidelines for proper disposal of hazardous wastes based on regulations established by the U.S. Environmental Protection Agency and the California

Department of Toxic Substances Control. To facilitate safe management, hazardous wastes would be subcategorized into groups with similar or closely related properties. Before EH&S picks up materials, they must be packaged and labeled properly, which includes placing them in appropriate sealed containers, segregating incompatible materials, and identifying all components with approximate concentrations. Hazardous materials would be separated into subcategories based on the handling methods employed, storage locations at the facility, and the ultimate destination of the materials. Flammable wastes (mostly solvents), corrosives (acids and bases), certain oils, poisons, heavy metals, and oxidizers would be shipped off-site for recycling, treatment, or disposal. Chemical wastes, once packed for disposal, would be further categorized according to their off-campus disposal methods.

The University would prepare guidelines for labeling, storage, and transportation of hazardous materials on site and off-site. Compliance with hazardous waste storage and transportation regulations would reduce this impact to a *less-than-significant* level.

Mitigation Measures

No mitigation required.

4.7-2 Use of radioactive material and the generation of radioactive waste at UC Merced would not significantly expose campus occupants to potential health or safety risks. This is considered to be a *less-than-significant* impact.

As discussed in the setting section, some radioactive substances could be used on campus, since they are highly useful in research. The potential human health effects from radiation exposure range from no known health effects to minor skin irritations or headaches to cancerous tumors.

Average background radiation exposure in the United States is about 163 millirem per year. Typical average doses to workers at other UC campuses are less than 30 millirem per year, a level below naturally occurring or background radiation and below applicable standards. Radiation could pose a health risk to those who are exposed, but exposure can be prevented with proper protective equipment and procedures. UC Merced would implement a Radiation Safety Program, as required by the Radiation Control Law, designed to provide adequate protective measures against exposure to sources for visitors, students, faculty, staff, and the community at large in order to reduce the risk of illness and accidents. Furthermore, radioactive materials would be monitored closely. For example, before obtaining radioactive materials, each principal investigator will receive a Radiation Use Authorization from the Radiation Use Committee, which will specify the particular radioisotopes to be used and maximum quantities to be possessed. Compliance with regulations for radiation safety would reduce this impact to a *less-than-significant* level.

Campus research laboratories could generate small amounts of solid and liquid low-level radioactive waste, as discussed in the setting. Radioactive waste generation, if not adequately managed, could pose health or safety threats analogous to those mentioned above for radioactive materials use.

Similar to other UC campuses, radioactive waste would be segregated, sealed, and labeled by the generating researcher who would then call EH&S for pickup. EH&S would remove radioactive materials from laboratories and take them to the Environmental Services Facility to prepare them for eventual disposal by one of three methods. The material would be (1) held for decay followed by disposal as nonradioactive, (2) released to the sanitary sewer on campus, or (3) incinerated

off-site. UC Merced policy would be to release no more than half the legal limit of radioactivity to the sewer provided under 17 C.C.R. Section 30253(a) and 10 C.F.R. Section 20.2003. On the basis of these regulations, EH&S would calculate daily limits and dispose of no more than half of these calculated limits. Radioactive waste to be treated or disposed would be shipped off campus. Compliance with applicable laws would reduce this impact to a *less-than-significant* level. Further, because radioactive waste landfill capacity is currently limited for California low-level radioactive waste generators, and the long-term, legal disposal of all classes of radioactive waste is not guaranteed, UC Merced will prepare and implement a campuswide waste minimization plan that will specify feasible programs to reduce generation of low-level radioactive wastes and mixed wastes in accordance with SB 14, the Hazardous Waste Source Reduction and Management Review Act of 1989. Implementation of a campuswide radioactive waste minimization plan would further reduce this *less-than-significant* impact.

Mitigation Measures

No mitigation required.

4.7-3 Use of biohazardous materials and the generation of biohazardous wastes at UC Merced would not significantly expose campus occupants to potential health or safety risks. This is considered to be a *less-than-significant* impact.

A scientific research facility cannot predict in advance every possible biological agent or research application it might conceivably use in the future. However, it is expected that small quantities of various biologically hazardous substances would be used for research at UC Merced. UC Merced will use the U.S. Department of Health and Human Services guidelines, *Biosafety in Microbiological and Biomedical Laboratories,* put forth by the National Institutes of Health and the Centers for Disease Control to classify biohazardous agents. As discussed previously in the setting, most UC Merced research with biohazardous materials would probably occur at Biosafety Levels 1 and 2. Biosafety Level 3 agents, which require upgraded containment capabilities and practices, would exist in only a few Campus laboratories equipped with appropriate procedural controls and equipment.

Most biohazardous materials, because of their limited viability in the environment, pose no significant hazard to workers or the community; others could pose a potential hazard if accidentally released. Biohazardous materials can potentially affect humans through air (inhalation of aerosols), water (release to the sewer), waste disposal, and accidents. Biological aerosols are generated during the mixing, shaking, and other disruptive handling of biological organisms. Campus policies would require that these activities be conducted in biosafety cabinets, which contain aerosols and filter all released air to remove biohazardous materials. Biosafety cabinets would be high-efficiency particulate (HEPA) filtered. HEPA-filtered ventilation systems and biological safety cabinets would be tested and certified annually by EH&S. Most HEPA filters for biosafety cabinets recirculate air into laboratories and are 99.97 percent effective in screening out particles at 0.3 microns in size. HEPA filter particle-removal efficiency does not decrease greatly for particle sizes below 0.3 microns. Therefore, HEPA filters would effectively remove biohazardous particles. Laboratory equipment that could generate aerosols, such as shakers and centrifuges, would be sealed or contained during use. In the laboratory, aerosols deposit in relatively short distances from point sources. Potential aerosol emissions, if not controlled by a biosafety cabinet, would be controlled by splash guards and decontamination of surrounding work surfaces. When a laboratory activity is finished, most

tissues, fluids, and cell cultures would be treated as infectious waste. This infectious material would be disposed of in biohazard-labeled bags, autoclaved, and sent to the landfill once sterilized.

Wastewater containing biohazardous agents would be generated in facilities on campus that house animals (including quarantine facilities), on sites where research with biohazardous agents is conducted, and from humans in the UC Merced population that are carriers of infectious organisms. Biohazardous agents of concern include bacteria, parasites, and viruses. The significance of the use of biohazardous agents on effluent streams appears minimal with current wastewater treatment conditions, because of the characteristics of the agents, the implementation and enforcement of disposal procedures, laboratory research protocols, and because potential exposure to the community is believed extremely limited. Many of the potential pathogens that could enter the waste stream such as *Giardia sp.*, *Cryptosporidium sp.*, and *Campylobacter sp*. are also common in domestic animals, wildlife, and asymptomatic humans in the general population. Any biohazardous agents that survived the disinfectant process would also be highly diluted in the treatment plant influent.

Assuming the implementation and enforcement of appropriate disposal procedures and sewage treatment processes, the public health risk associated with increased biohazardous agents contained in campus wastewater is considered *less than significant*.

To minimize workers' exposure to hazards, the ampus would establish a Biosafety Program similar to other UC campuses.

Engineering controls would provide a degree of containment of biological agents and minimize personnel contact with these agents. These safety features would be built into facility and equipment design and operation. The most significant engineering control that can be implemented is observation of the correct Biosafety Level criteria of laboratory and equipment design.

Similar to other UC campuses, a Biological Safety Administrative Advisory Committee would be established, which would review and approve biological research on campus and evaluate the potential risks and the adequacy of the safety measures to be implemented before beginning research projects involving biohazardous materials.

Research laboratories at UC Merced would produce biohazardous waste as would animal care activities. Most laboratory tissues, fluids, and cultures are considered to be potentially infectious waste. Potentially infectious animal care wastes can include animal excreta, bedding, uneaten food, cage washing solutions, animal carcasses and tissues, worker's disposable protective clothing, and sharp objects (including needles, scalpels, broken glass, etc.).

Most research-generated biohazardous waste would be placed in a biohazard-labeled bag and autoclaved, a procedure that renders the waste nonhazardous by applying steam under high pressure. Autoclaving is typically performed in the generating laboratory immediately after the biohazardous waste is created. Biohazardous waste that also contains hazardous chemicals or radioactive waste is categorized and handled as hazardous or radioactive waste; items without remaining hazardous constituents, once decontaminated, may be considered nonhazardous solid waste and disposed of off-site. Generated wastes will be segregated, handled, labeled, stored, transported, and disposed of to minimize direct or indirect exposure of personnel.

All biohazardous waste is rendered nonhazardous before disposal, and existing health and safety practices minimize the potential for adverse health effects before disposal. Therefore, campus biohazardous waste generation is considered *less than significant*.

Title 8 of the California Code of Regulations requires every California employer to have an effective Injury and Illness Prevention Program in writing in accord with Title 8 C.C.R. Section 3203 of the General Industry Safety Orders to provide a safe and healthful workplace. OSHA also mandates methods of documenting, investigating, and controlling accidents that result in skin penetration. Evidence presented during OSHA rule-making procedures indicates that safety and health program measures like those described above are effective in reducing the number and severity of injuries and illness in the workplace. Compliance with injury and illness prevention guidelines would serve to minimize potential hazards. For this reason, this impact is considered *less than significant*.

Mitigation Measures

No mitigation required.

4.7-4 Use of laboratory animals at UC Merced would not significantly increase the risk of animal bites, escapes, and disease transmission. This is considered to be *a less-than-significant* impact.

The use of animals in UC Merced research laboratories could pose potential hazards to workers, building occupants, and the neighboring community if contacts between humans and animals were not properly managed. Animals present physical safety hazards, such as bites, and infected animals can spread disease. Exposure to infectious agents can occur through animal bites or by infectious agents being spread to the neighboring community, which can occur if animals escape or if infectious agents are transmitted by vectors. Vectors are organisms that carry diseases from infected animals to others in the community (for example, a mosquito could carry malaria from an infected person to an uninfected person). The possible health effects would depend on the species housed in campus facilities and the types of research pursued.

Before any research involving live vertebrate animals can be initiated on a UC campus, a protocol for the activity must be prepared by the principal investigator and approved by the department chair, the Campus Veterinarian, and the Campus Animal Use and Care Administrative Advisory Committee. Approved protocols must comply with federal and state requirements as well as the National Institutes of Health *Guide for the Care and Use of Laboratory Animals.* Vertebrate animals cannot be obtained for research until experimental protocols are approved. UC Merced would have a program similar to other UC campus programs.

Animal housing facilities must also conform to the National Institutes of Health guidelines and the Animal Welfare Act. Rats and mice are not currently regulated under the Act, but they are covered by the National Institutes of Health guidelines.

Potential off-site effects of animal use are primarily controlled by containing the animals, either in cages or behind fences or by blocking them behind doors, depending on the appropriate method for the species as prescribed. Pest control programs would be implemented when necessary to reduce the potential for vectors. Furthermore, animal facilities would be subject to the design approval oversight of the campus veterinarian. Facilities constructed are expected to

meet these guidelines. For these reasons, no significant impacts are expected to result from animal escapes or disease transmission via pests.

Similar to other campuses, to further minimize risks to the community, animal cages would be washed with detergent and treated with a disinfectant solution. Detergent and disinfectant solutions are believed to be effective against viruses and bacteria. Depending on the circumstances, cages may be steam cleaned with a steam gun, put through a cage washer at an elevated temperature, autoclaved, or washed by hand with detergent. Then cages would be rinsed with a disinfectant. Infectious agents generally cannot survive disinfectant cage washing. The effluent from these washing processes would undergo further treatment at the wastewater treatment plant and will be greatly diluted before reaching the plant.

Controls intended to ensure the safety of animal care workers would also minimize opportunities for infectious agents to be spread from workers to individuals off-site. National Institutes of Health animal care guidelines specify the use of protective wear and safe handling of the animals to decrease the chance of disease transmittal and other work-related hazards through incidents such as bites or needle sticks. Training would be provided to workers to ensure proper animal and cage handling, surgical procedures, and personal hygiene.

Compliance with animal care and use guidelines would serve to minimize potential hazards. For this reason, this impact is considered *less than significant*.

Mitigation Measures

No mitigation required.

4.7-5 Hazardous materials transported to and from the campus would not significantly expose people to potential health risks in the event of an accidental release. This is considered to be a *less-than-significant* impact.

Inbound hazardous materials would be transported in accordance with UC Merced policies and procedures. Several methods would be used to deliver hazardous materials to campus users. Nonradioactive chemicals, biohazardous materials, and other packages for offices and laboratories may be delivered by outside carriers directly to receiving entrances at individual buildings. Alternatively, incoming packages may be left at the campus main receiving facility for UC Merced personnel to deliver to campus locations.

Hazardous materials transportation could increase the possibility of accidents capable of exposing people on and off campus to hazardous materials. To minimize the potential for accidental spills of hazardous materials during transit, suppliers and transporters will be required to follow stringent U.S. Department of Transportation and U.S. Postal Service regulations for packaging and handling.

Wastes leaving the campus would be packaged in drums and containers that meet U.S. Department of Transportation requirements. Because of these strict requirements, U.S. Department of Transportation containers are unlikely to release their contents in the event of an accident. Although the transportation of hazardous materials has associated risks of spills or leaks, appropriate management of transported wastes in compliance with applicable laws and regulations found in the Code of Federal Regulations, Title 49, will minimize these risks.

Because inbound and outbound hazardous materials shipments would be packaged according to strict U.S. Department of Transportation and U.S. Postal Services specifications, the

consequences of unlikely accidents involving hazardous materials in transport would be minimal. Implementing the LRDP could increase the quantities of hazardous materials transported between the Main Campus and off-campus facilities, thereby increasing the potential for an accident during such transport. However, because of the small amounts of hazardous materials involved and compliance with applicable transport regulations, the transport of hazardous materials is not considered likely to create a substantial health or safety hazard. For these reasons, this impact is considered *less than significant*.

Mitigation Measures

No mitigation required.

4.7-6 The campus would be located within 2 miles of a private airstrip but would not create a significant safety hazard for people residing or working on campus. This is considered to be a *less-than-significant* impact.

Although a private airstrip is located less than 2 miles from the campus, it is used infrequently (for agricultural uses) and therefore would not result in a safety hazard for people residing or working on campus. This impact is considered *less than significant.*

Mitigation Measures

No mitigation required.

4.7-7 Campus operations using hazardous materials would not be anticipated to exceed emergency response capabilities of the local providers. This is considered to be a *less-than-significant* impact.

During early years of the new campus, fire protection would be provided by local or regional providers. In subsequent phases, a fire station would be located on campus. The future campus fire station staff would be immediately available on campus 24 hours a day and would be trained for "first-response" capabilities with hazardous materials. The local or regional fire department would be able to identify hazardous materials emergencies, isolate affected areas, and deny entry to these areas. A hazardous material emergency would, however, require the assistance of a team that is experienced and trained to handle hazardous materials incidents.

The Merced County Fire Department maintains a hazardous materials emergency response team that performs emergency spill mitigation and hazardous material information research, and manages civil cost recovery for emergency expenditures. The City of Merced additionally provides full fire protection services, including fire suppression, emergency medical services, fire prevention inspections, and disaster planning within the city limits. The City of Merced Fire Department currently meets an urban level of service with an ISO rating of 2. At present, the closest station to Lake Yosemite is Station 53, at approximately 5 miles from the site. A new station, Station 55, is projected to be functional within 5 years and will be situated less than 3 miles from the proposed campus. The City of Merced also has a master plan to add 9 new stations to accommodate growth in the Merced area, with one of the new stations projected to be located within a mile of the proposed University.

UC Merced will prepare a general Emergency Response Plan for the entire campus in accordance with California Health and Safety Code Section 25503. The campus emergency response team will be adequately trained and equipped to respond to hazardous materials emergencies. UC Merced will provide sufficient resources to respond to a Level A hazardous

materials incident (the most hazardous level), in coordination with the County of Merced, if necessary. UC Merced will prepare (or update) safety planning documents in accordance with California Health and Safety Code Section 25517.5, as well as applicable laws, regulations, and campus policies. The Campus will implement safety training programs upon occupying each new building.

In addition, each department will be responsible for preparing and implementing its own Emergency Action Plan. These plans should spell out very specific procedures for building occupants to follow in the event of various emergencies. Various campus buildings house facilities for many different departments that may all have separate Emergency Response plans. Departments and Principal Investigators will prepare Injury and Illness Prevention Plans, Laboratory Chemical Hygiene Plans, and Emergency Action Plans for all new buildings, as necessary. These plans would be reviewed and approved by UC Merced for each department and each Principal Investigator or Laboratory Director to be located at any particular new building before the department or laboratory would be permitted to occupy the new space.

UC Merced will address emergency planning and safety training for the occupants of new buildings by assigning a Building Safety Coordinator for each building. These staff would coordinate emergency response planning and implementation efforts for the building and implement required Cal/OSHA regulations related to developing an evacuation plan. For example, emergency drills would be coordinated so that all of the building's occupants would participate at the same time, regardless of their departmental affiliations. The evacuation plan and emergency response plans would provide general guidelines and procedures to be followed during emergencies and disasters. The plans would address the removal of occupants and the establishment of temporary meeting areas in the event of an emergency. As part of implementing the plans, project occupants would be adequately trained to implement the plans, as well as all other required safety procedures. The impact is considered *less than significant*.

Mitigation Measures

No mitigation required.

4.7-8 Construction activities would not create a significant risk of exposure of campus occupants and construction workers to contaminated soil or groundwater. This is considered to be a *less-than-significant* impact.

As described in the environmental setting, a Phase 1 site assessment was conducted of the 910-acre campus site. No contamination was found at the site. The assessment also noted that there were no hazardous material release sites near the Campus that could affect construction activities on Campus. The impact is therefore considered to be *less than significant*.

Mitigation Measures

No mitigation required.

4.7-9 Construction of the campus adjacent to the canals would not expose the campus population to physical safety hazards. This impact is considered *less than significant*.

The Le Grand and Fairfield Canals traverse the campus site, creating a potential safety hazard for the campus population. This hazard, however, has been recognized by campus planners, and steps will be taken to limit public access to the canals. Measures to decrease the risk to public

safety would include a combination of fencing and landscaping. In particular, efforts to reduce access and thus risk to the public entail fencing off some portions of the canals (especially along the concrete grade-change chute on Fairfield Canal), and landscaping to limit accessibility to the unfenced portions of the canals (Hughes, 2001). The public safety impact would be *less than significant*.

Mitigation Measures

No mitigation required.

4.7-10 The construction of the proposed campus could expose people or structures to a significant risk of loss, injury, or death involving wildland fires. This is considered to be a *less-than-significant* impact.

Exposure to and incidence of wildland fires could potentially increase with the implementation of the UC Merced project. The project could not only be affected by but also be the cause of a greater incidence in wildland fires. Because the surrounding project area is covered with annual grasses that could act as fuel for wildland fires, the growth in population due to the project could translate into a greater potential for causing wildland and urban fires along with a greater number of people exposed to fires on and off campus.

Adequate wildland fire defenses and responses to wildland fires are a priority with the State. The State, in recognition of the severity of wildland fire hazards in certain areas of California, has enacted legislation (California Public Resources Code Section 4291) requiring local jurisdictions to adopt minimum recommended standards pertaining to road standards for fire equipment access, standards for identifying streets, roads, buildings, minimum private water supply reserves for emergency fire use, and fuel breaks and greenbelts to achieve fuel reductions.

The campus has been designed to minimize human intrusion into the adjacent Campus Land Reserve and the Campus Natural Reserve, by way of landscaping and fencing. The University would additionally take measures to minimize the risk of injury and property damage from wildland and urban fires. All buildings will have adequate sprinkler systems, emergency exits, and fire routes that give access to and from each building. In addition to the automatic fire-extinguishing system, manual fire extinguishers would be made available throughout the campus. Long-term plans include having campus fire-fighting services. Grassy and landscaped areas surrounding the campus buildings would be irrigated and maintained at a low height to create a buffer area (Maloney, 2001; Sieron, 2001). Fire breaks would be installed within the 910-acre Main Campus, as it progressively developed. As campus development moves to the eastern and northern boundaries of the 910-acre Main Campus, it would not be possible to use fire breaks for protection, because the construction of fire breaks in the Campus Land Reserve could affect sensitive biological resources there. Section 4.4 includes a mitigation measure to address this issue. With the implementation of fire-prevention measures noted above and the additional mitigation measure noted in Section 4.4, the impact relative to wildfires would be reduced to a *less-than-significant* level.

Mitigation Measures

No mitigation required.

4.7.3.3 Cumulative Impacts

4.7-11 The Campus, the University Community, and other regional development would involve the use, storage, transport, and disposal of hazardous materials and wastes. The cumulative impact from these activities would be *less than significant.*

Campus, University Community, and Campus Parkway. The use of hazardous materials and the generation of hazardous wastes by both the campus and the University Community are not expected to have significant cumulative impacts. Both the proposed University Community and the proposed UC Merced campus are expected to use varying amounts and types of hazardous materials in the day-to-day activities and operations. The University Community residents and commercial businesses and the UC Merced Campus are expected to comply with the appropriate federal, state, and local laws and regulations that regulate the use, storage, and transportation of hazardous materials.

Hazardous materials would be handled and stored routinely by households and most businesses at the proposed community. Hazardous materials are generally consumed through their use, and thus the quantity of hazardous materials is believed to be substantially greater than the volume of hazardous waste generated. The Merced County Division of Environmental Health also has a household hazardous waste collection program that safely collects, transports, and disposes of residual hazardous wastes.

During the course of daily operations, UC Merced is also expected to use many materials, some of which are considered hazardous, which may include chemical reagents, solvents, radioisotopes, fuels, etc. In the same manner as the proposed UCP, the volume of hazardous waste generated will be predictably smaller than the original quantity of hazardous materials, which must also be handled and disposed of. Proper disposal of hazardous wastes would be based on regulations established by the U.S. Environmental Protection Agency and the California Department of Toxic Substances Control.

Compliance with appropriate federal, state, and local laws and regulations would minimize potential impacts for each project; thus the impact for each project alone would be less than significant. The impact of the proposed projects together on the potential health and safety is therefore considered to be a *less-than-significant* cumulative impact.

Other Cumulative Development. Other development in the region would also involve the use, handling, storage, transport, and disposal of hazardous materials and wastes. However, each project would be required to comply with appropriate federal, state, and local laws, which would minimize impacts, and the cumulative impact would be *less than significant*.

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