3.7 HAZARDOUS MATERIALS

Introduction

This section describes the types of hazardous materials currently handled at Kaiser's Redwood City Medical Center, the regulatory setting applicable to such activities, Kaiser's established health and safety policies and procedures, and the potential for the project to result in health and safety impacts as a result of increasing the use of hazardous materials associated with the project, and the generation of hazardous waste at the facility. The term "hazardous material" is defined in different ways for different regulatory programs. For purposes of this EIR, the definition of "hazardous material" is similar to that in the California Health and Safety Code, Section 25501:

> Hazardous materials that, because of their quantity, concentration, or physical or chemical characteristics, pose a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.

"Hazardous waste" is a subset of hazardous materials. For the purposes of this EIR, the definition of hazardous waste is essentially the same as that in the California Health and Safety Code, Section 25517, and in the California Code of Regulations, Title 22, Section 66261.2:

> Hazardous wastes are wastes that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may either cause, or significantly contribute to an increase in mortality or an increase in serious illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Hazardous materials can be categorized as hazardous non-radioactive chemical materials, radioactive materials, and biohazardous materials. For hazardous chemicals, the above definitions are typically adequate. Radioactive and biohazardous materials are further defined below.

- Radioactive materials contain atoms with unstable nuclei that spontaneously emit ionizing radiation to increase their stability.
- Radioactive wastes are radioactive materials that are discarded (including wastes in storage) or abandoned.
- Biohazardous materials include materials containing certain infectious agents (microorganisms, bacteria, molds, parasites, viruses) that normally cause or significantly contribute to increased human mortality, or organisms capable of being communicated by invading and multiplying in body tissues.
- Medical waste include both biohazardous wastes (byproducts of biohazardous materials) and sharps (i.e., devices capable of cutting or piercing, such as hypodermic needles, razor blades,

and broken glass) resulting from the diagnosis, treatment, or immunization of human beings, or research pertaining to theses activities.

During the course of Kaiser's patient care and facility maintenance operations, the facility uses various materials, some of which pose potential hazards. For example, clinical laboratories use potentially hazardous chemicals to analyze patient blood and urine samples. Radioactive materials are used to treat certain kinds of cancer. Various patient diagnosis and treatment activities involve potentially biohazardous materials (i.e., infectious agents). Hazardous materials use often results in byproducts that must be handled and disposed of as hazardous wastes. The following analysis describes the extent to which the potential for exposure to hazardous materials is controlled through the implementation of applicable laws and regulations, and Kaiser's policies and procedures already in place at the facility.

As discussed in the Initial Study (Appendix B), the proposed project is not included on the list of hazardous materials sites (Cortese List) compiled pursuant to Government Code Section 65962.5, is not located within an airport land use plan or within the vicinity of a private airstrip, will not interfere with an adopted emergency response plan or evacuation plan, and is not located within a area that has the potential for wildland fires. Therefore, these aspects of public health and safety will not be addressed in this EIR.

Setting

Hazardous Material Use and Storage

Patient care activities involve relatively small quantities of hazardous materials, primarily in clinical offices, cleaning and sterilizing processes, nuclear medicine, and pharmacies. Types of hazardous materials found in medical facilities include chemotherapy reagents and other pharmaceuticals; chemicals used to sterilize equipment; formaldehyde for specimen preservation; and solvents, oxidizers, corrosives, and stains used in clinical laboratories. Facilities maintenance activities require various common hazardous materials, including cleaners (which may include solvents and corrosives, in addition to soaps and detergents); paints; pesticides and herbicides; fuels (e.g., diesel); and oils and lubricants. Table 3.7-1 summarizes existing hazardous materials at the Medical Center according to the California Code of Regulations (CCR), Title 22 hazard classes. Title 22 hazard classes categorize hazardous waste based on their characteristics of ignitability, corrosivity, reactivity, or toxicity. Hazardous waste with any of these characteristics is also known as Resource Conservation and Recovery Act (RCRA) waste. Hazard class examples are provided for each category.

Table 3.7-2 lists existing radioactive materials at the Medical Center. These materials are primarily used to treat certain types of cancer. Radioactive materials generally contain radioactive atoms; however, x-ray equipment (which does not involve any radioactive substances) is also regulated as radioactive material. When a radioactive atom emits radiation, it eventually becomes non-radioactive. The level of radioactivity decreases by one half after a period called a half-life. The half-lives of the radioactive atoms that the facility uses are included in Table 3.7-2. Radioactive materials with half-

Table 3.7-1
Maximum Amounts of Hazardous Chemicals at Kaiser's Redwood City Medical Center[1]

		Maximum Amount On Site		
Type of Material	**Examples**	**Solids (pounds)**	**Liquids (gallons)**	**Gases (cubic feet)**
Inert Compressed Gases and Cryogenic Liquids[2]	liquid nitrogen, compressed air, helium, nitrous oxide, argon	-	2	22,630
Flammable Compressed Gases and Liquids[2]	spray paint and other aerosols, acetylene, propane	-	31	673
Flammable Liquids	gasoline, isopropanol, acetone, ether, other solvents	-	103	-
Combustible Materials	oil-based paint, hydraulic oil, mineral oil, diesel fuel	4	10,601[3]	-
Oxidizers	chlorine bleach, hydrogen peroxide, nitric acid, oxygen	-	6,102	6,914
Corrosive Materials	sodium hydroxide, trisodium phosphate, calcium hypochlorite, ammonia, acetic acid, hydrochloric acid	-	440	-
Toxic Materials	chemotherapy chemicals, phenol crystals, latex paint, mercuric chloride, freon, glutaraldehyde	120	859	2,282
Carcinogens	chloroform, ethylene oxide	-	55	1,011
Irritants	acrylamide, sodium sulfate, sodium lauryl ether sulfate, sodium dodecylbenzene sulfonate	-	40	-
Sensitizers	ammonium thiosulfate, hydroquinone	-	660	-

Sources: EIP Associates; Kaiser Permanente Medical Center, *"Hazardous Materials Business Plan"* filed with the County of San Mateo Health Services Agency, Environmental Health Division, January 31, 2002.

Notes:
1. Some chemicals fall into more than one category; therefore, the columns presented here cannot be added to derive actual totals.
2. Cryogenic liquids are extremely cold liquids.
3. Diesel storage accounts for up to 10,400 gallons of the flammable liquids at the Medical Center. The remaining 201 gallons are other materials.

Table 3.7-2
Radioactive Materials at Kaiser's Redwood City Medical Center

Radionuclide	Half-Life	Amount On Site (mCi)
Sealed Sources for Calibration		
Cobalt-57	270 days	35
Barium-133	11 years	0.285
Cesium-137	30 years	0.750
Americium-241	458 years	9
Europium-152	127 years	5×10^{-7}
Sources for Patient Use (not sealed)		
Cobalt-57	270 days	0
Gallium-67	78 hours	20
Technetium-99*m*	6 hours	1,000
Iodine-123	13 hours	2
Iodine-131	8.1 days	500
Indium-111	2.8 days	3
Thallium-201	73 hours	30

Sources: EIP Associates; Kaiser Permanente, "Radionuclides on site on any given day" filed with the County of San Mateo Health Services Agency, June 24, 2002.

lives greater than 90 days are considered long-lived radioactive materials; those with half-lives less than 90 days are considered short-lived radioactive materials. Many of the radioactive materials at the Medical Center are short lived. Most of the long-lived radioactive materials are neither purchased nor disposed of routinely; they are essentially used as sealed, stationary sources of radiation. Cobalt-57 is the only radioactive material with a half-life longer than 90 days used for patient treatment at the Medical Center. Biohazardous materials and medical wastes (including pathological specimens, surgical specimens, human tissues, bulk blood and blood products, blood specimens, and body fluids) are handled in clinical offices, nuclear medicine, dialysis units, operating rooms, pathology, radiology, and respiratory therapy.

Hazardous Waste Generation

Use of hazardous materials typically produces hazardous waste. Much of the hazardous material handled at the Medical Center is consumed through use. The remaining waste is summarized in Table 3.7-3. This waste is shipped to hazardous waste treatment, storage, and disposal facilities off site in accordance with the California Hazardous Waste Control Law. Each year, in the course of patient treatment, the Medical Center generates roughly 6,555 gallons of hazardous chemical waste. All of this waste is shipped off site for disposal or recycling. No incineration of hazardous waste occurs on site.

Table 3.7-3
Hazardous Chemical Waste Generated at
Kaiser's Redwood City Medical Center

Type of Waste	Annual Waste Generation
Solvents	0 gallons
Waste Oil/Mixed Oil	70 gallons
Photography Liquids	6485 gallons
Photography Solids	0 pounds

Sources: EIP Associates; Kaiser Permanente, e-mailed to Michael K. Kay (EIP Associates) from Ariane Zand (Kaiser Permanente) on October 24, 2002.

The Medical Center generates relatively little radioactive waste for off-site disposal. As shown in Table 3.7-2, most of the radionuclides used to treat patients have half-lives no greater than 52 days. Because the radionuclides have such short half-lives, they are stored on site until their radioactivity decays to background levels, and then they are disposed of as ordinary non-hazardous solid waste. Typically, this process requires less than two years. Kaiser uses relatively little (about 5 millicuries) of Cobalt-57 each year. Cobalt-57 is provided to patients as a pill; therefore, no residual waste is generated. All of the other radioactive materials handled at the Medical Center are encapsulated in sealed sources that are not conducive to release and are used to calibrate radiation-sensitive equipment. Because these radionuclides have long half-lives and serve long-term purposes, they are not typically discarded but are kept on site or sold to other users.

Physical Hazards

As with all work environments, various physical safety hazards exist at the Medical Center. Office and clinical activities are associated with various physical hazards from common activities such as lifting, using sharp tools, and performing repetitive motions. Some employees work with equipment that presents special hazards, such as high voltage electrical equipment, x-ray-producing instruments, lasers, and high-intensity magnetic fields. Some hazardous materials have the potential to pose physical safety hazards, like burns, if not properly managed. Classes of materials that can be associated with physical injuries include pressurized liquids and gases, cryogenic (extremely cold) liquids, flammable materials, and corrosive chemicals.

Applicable Plans and Regulations

Hazardous materials handling and hazardous waste management are subject to laws and regulations at all levels of government as summarized below. The Medical Center complies with these laws and regulations, in part, by implementing a series of in-house policies and procedures. These policies and procedures are described following the regulatory background information. A discussion of regulatory oversight then follows.

Hazardous Materials Management and Emergency Planning. 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. California's Hazardous Materials Release Response Plans and Inventory Law, sometimes called the "Business Plan Act," aims to minimize the potential for accidents involving hazardous materials and to facilitate an appropriate response to possible hazardous materials emergencies. The law requires businesses that use hazardous materials to provide inventories of those materials to designated emergency response agencies, to illustrate on a diagram where the materials are stored on site, to prepare an emergency response plan, and to train employees to use the materials safely. The Medical Center's current Hazardous Materials Business Plan, dated January 31, 2002, is on file with the County of San Mateo Health Services Agency (CSMHSA) and the Redwood City Fire Department (RCFD). This information is to be updated when there is a substantial change in operations. Businesses that handle certain very hazardous substances must undertake a systematic analysis of their operations, study the potential consequences of possible worst-case accidents, and prepare Risk Management Plans to reduce apparent risks. The Medical Center handles such materials, but not in quantities sufficient to trigger Risk Management Plan requirements. These laws are implemented locally by CSMHSA and by RCFD, which also enforces certain fire code regulations pertaining to hazardous materials storage.

Building and Fire Safety. The Redwood City Community Development Services Department, Building and Inspection, enforces the 1997 California Building Code, and the RCFD enforces the 1997 Uniform Fire Code as amended. These laws specify management practices for flammable materials, including some packaging and containment requirements. They also set forth appropriate construction standards (e.g., fire separations and fire suppression systems) depending on building occupancy classifications. The Building and Safety Division reviews proposed building design plans to ensure compliance with Uniform Building Code requirements.

Worker Safety. Occupational safety standards exist in federal and State laws to minimize worker safety risks from both physical and chemical hazards in the workplace. The California Division of Occupational Safety and Health (Cal/OSHA) is responsible for developing and enforcing workplace safety standards and assuring worker safety in the handling and use of hazardous materials. Among other requirements, Cal/OSHA obligates many businesses to prepare Injury and Illness Prevention Plans and Chemical Hygiene Plans. The Hazard Communication Standard requires that workers be informed of the hazards associated with the materials they handle. For example, manufacturers are to appropriately label containers, Material Safety Data Sheets are to be available in the workplace, and employers are to properly train workers. The U.S. Occupational Safety and Health Administration's Bloodborne Pathogens Standard requires the use of Universal Precautions (handling all human blood and certain body fluids as if they contain infectious agents) in the workplace. All of these safety standards and practices, regarding workplace safety and providing a safe a healthy environment for

patient care, are implemented by Kaiser in the Medical Center's, *Safe Environment Management Plan*[1] that is part of Kaiser's *Environment of Care Program*.

Hazardous Waste Handling. The U.S. Environmental Protection Agency (EPA) has authorized the California Department of Toxic Substances Control (DTSC) to enforce hazardous waste laws and regulations in California. Requirements place "cradle-to-grave" responsibility for hazardous waste disposal on the shoulders of hazardous waste generators. Generators must ensure that their wastes are disposed of properly, and legal requirements dictate the disposal requirements for many waste streams (e.g., banning many types of hazardous wastes from landfills). Many hazardous waste generators are required to prepare Hazardous Waste Minimization Plans pursuant to the California Hazardous Waste Source Reduction and Management Review Act. However, the Medical Center does not generate sufficient quantities of hazardous waste to trigger Hazardous Waste Minimization Plan requirements. All hazardous waste generators must certify that, at a minimum, they make a good faith effort to minimize their waste and to select the best waste management method available. Hazardous waste laws and regulations are enforced locally by the CSMHSA.

Radioactive Materials Management. The Radiologic Health Branch of the California Department of Health Services administers the federal and State radiation safety laws that govern the storage, use, and transportation of radioactive materials and the disposal of radioactive wastes. The Radiologic Health Branch licenses institutions that use radioactive materials and radiation-producing equipment, such as x-ray equipment. To maintain a radioactive materials license, an institution must meet training and radiation safety requirements and be subject to routine inspections. These safety requirements are also presented in the Medical Center's *Safe Environment Management Plan*.

Medical Waste Handling. The California Department of Health Services Medical Waste Management Program enforces the California Medical Waste Management Act and related regulations. Medical waste is generally regulated in the same manner as hazardous waste, except that special provisions apply to storage, disinfection, containment, and transportation. The law imposes a cradle-to-grave tracking system and a calibration and monitoring system for on-site treatment. Facilities that treat medical wastes must obtain permits to do so and are subject to annual audits. However, Kaiser does not treat or incinerate medical waste on site. Medical waste is to be stored in closed red bags marked "biohazard" and, when transported for disposal, placed inside hard-walled containers with lids.

Hazardous Materials Transportation. The U.S. Department of Transportation (DOT) has developed regulations pertaining to the transport of hazardous materials and hazardous wastes by all modes of transportation. The U.S. Postal Service (USPS) has developed additional regulations for the transport of hazardous materials by mail. DOT regulations specify packaging requirements for different types of materials. EPA has also promulgated regulations for the transport of hazardous wastes. These more stringent requirements include tracking shipments with manifests to ensure that wastes are delivered to their intended destinations. In California, the California Highway Patrol, the California DOT (Caltrans), and the DTSC play a role in enforcing hazardous materials transportation requirements.

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[1] Kaiser Permanente, *Redwood City Medical Center, Environment of Care Program – Safe Environment Management,* issued January 1995, revised May 2002.

Hazardous Building Components. Structural building components sometimes contain such hazardous materials as asbestos, polychlorinated biphenyls (PCBs), lead, and mercury. During demolition or renovation of any existing Medical Center building, these hazardous material building components may be disturbed and thus exposing workers, the public and the environment to these hazards. These materials are subject to various regulatory schemes as described below.

Asbestos. Asbestos is regulated both as a hazardous air pollutant and as a potential worker safety hazard. Bay Area Air Quality Management District (BAAQMD) and Cal/OSHA regulations restrict asbestos emissions from demolition and renovation activities, and specify safe work practices to minimize the potential for release of asbestos fibers. These regulations prohibit emissions of asbestos from asbestos-related manufacturing, demolition, or construction activities; require medical examinations and monitoring of employees engaged in activities that could disturb asbestos; specify precautions and safe work practices that must be followed to minimize the potential for release of asbestos fibers; and require notice to federal and local government agencies prior to beginning renovation or demolition that could disturb asbestos. California requires licensing of contractors who conduct asbestos abatement activities.

PCBs. DTSC has classified PCBs as a hazardous waste when concentrations exceed 5 parts per million (ppm) in liquids or 50 ppm in nonliquids. Fluorescent light ballasts may contain PCBs, and if so, they are regulated as hazardous waste and must be transported and disposed of as hazardous waste. Ballasts manufactured after January 1, 1978, should not contain PCBs and are required to have a label clearly stating that PCBs are not present.

Lead. Cal/OSHA standards establish a maximum safe exposure level for types of construction work where lead exposure may occur, including demolition of structures where materials containing lead are present; removal or encapsulation of materials containing lead; and new construction, alteration, repair, or renovation of structures with materials containing lead. Inspection, testing, and removing lead-containing building materials must be performed by state-certified contractors who are required to comply with applicable health and safety and hazardous materials regulations. Typically, building materials with lead-based paint attached are not considered hazardous waste unless the paint is chemically or physically removed from the building debris. The U.S. Department of Housing and Urban Development has developed Guidelines for Evaluation and Control of Lead-Based Paint Hazards.[2]

Mercury. Spent fluorescent light tubes, thermostats, and other electrical equipment contain heavy metals that, if disposed of in landfills, can leach into soil or groundwater. Lighting tubes typically contain concentrations of mercury that may exceed regulatory thresholds for hazardous waste and, as such, must be managed in accordance with hazardous waste regulations. Elemental mercury can be found in many electrical switches, and when disposed of, such mercury is considered hazardous waste. The use of mercury in thermometers is being phased out and replaced with digital thermometers.

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[2] U.S. Department of Housing and Urban Development, *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*, June 1995, Chapter 7, revised 1997.

Impacts and Mitigation Measures

Significance Criteria

For purposes of this EIR, the project would be considered to result in a significant hazardous materials impact if it were to:

- 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 or accident conditions involving the release of hazardous materials into the environment; or
- Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan.

Methodology

To assess the potential for the proposed project to involve the use, production, or disposal of materials in a manner that poses substantial hazards to people, or to animal or plant populations, the following analysis considers the pathways through which exposure to hazards could potentially occur, and evaluates the controls that would foreseeably be placed on each of these pathways. Exposure pathways that would be sufficiently controlled to pose no substantial hazards are considered less-than-significant health and safety issues.

As an acute care medical facility, the Medical Center will continue to use hazardous materials and generate hazardous waste associated with medical care with or without the project. The project, however, would increase hazardous materials use and hazardous waste generation. The existing hazardous materials found at the Medical Center probably reflect the range of hazardous materials types that could be found in the future, and the nature of the hazards associated with future materials. The increase in hazardous materials use and hazardous waste generation would be roughly proportional to the projected increase in patients (which is a function of membership) at the Medical Center. This increase could be roughly 21 percent at buildout based on project increases in membership. The actual increase in hazardous materials handling could be somewhat more or less than 21 percent since not all changes in hazardous materials use and hazardous waste generation would necessarily be proportional to the projected increase in patients. Nevertheless, this assumption is reasonable and illustrative, given available information.

Environmental Analysis

As described in Section 3.1, for each impact, a level of significance is determined and is reported in the impact statement. Conclusions of significance are defined as follows: significant (S), potentially significant (PS), less than significant (LTS), and no impact (NI). If the mitigation measures would not diminish potentially significant or significant effects to a less-than-significant level, the impacts are

classified as "significant unavoidable effects (SU)." For this section, HM refers to Hazardous Materials.

The projected increases in membership would be the same under the proposed project or the Higher Occupancy Scenario described in Section 2. Therefore, this section does not include a separate analysis of the Higher Occupancy Scenario.

HM-1. Construction-Related Hazardous Materials Disturbance *– Under the proposed project and the Higher Occupancy Scenario, project-related demolition or renovation could disturb hazardous materials in existing building components and thereby cause adverse health or safety effects. (PS)*

Both the proposed project and the Higher Occupancy Scenario include the demolition of some of the existing on-campus buildings. Building components in structures built prior to 1981 could contain hazardous materials, such as asbestos, PCBs, lead, and mercury.

Asbestos poses health hazards only when inhaled; therefore, friable (easily crumbled) asbestos is potentially hazardous if not encapsulated. Non-friable asbestos or encapsulated asbestos does not pose substantial health risks. Upon building renovation or demolition at the Medical Center, asbestos fibers (if any are present) could be disturbed, released into the air and inhaled by construction workers or the public unless proper precautions are taken. Existing government regulations limit asbestos emissions from asbestos-related demolition or construction activities, and specify precautions and safe work practices that must be followed to minimize the potential release of asbestos fibers.

Building components containing PCBs, lead, or mercury could also be found in areas to be demolished or renovated. PCBs are regulated under the federal Toxic Substances Control Act of 1976. In sufficient concentrations, lead and mercury are regulated as hazardous wastes. The U.S. Department of Housing and Urban Development has prepared Guidelines for Evaluation and Control of Lead-Based Paint Hazards. Applicable health and safety requirements would minimize any risks from handling these materials, unless they fail to be identified adequately prior to demolition or renovation.

If any unidentified hazardous materials were to remain in the existing buildings when demolition or renovation occurred, these hazardous materials could create worker health hazards or result in environmental release (or inappropriate disposal) of these hazardous materials. For this reason, the proposed project could involve handling materials in a manner that poses a hazard to people, or to animal or plant populations, if appropriate hazardous materials surveys and safety precautions are not undertaken. This exposure could constitute a potentially significant impact.

To the extent that the proposed project could involve removing hazardous materials within existing buildings, it could be beneficial over the long term. The removal of such materials could reduce potential health threats and prevent individuals on and off site from encountering

such materials in the future. Properly handling and disposing of contaminated materials would protect the environment and prevent potential future adverse health, safety, or environmental effects related to them.

MITIGATION MEASURE. The following mitigation measure would reduce this potentially significant impact to a less-than-significant level. (LTS)

HM-1.1 Perform Pre-Construction Hazardous Materials Surveys and Manage Properly if Hazardous Materials are Identified. Under the proposed project and the Higher Occupancy Scenario, Kaiser shall retain a qualified environmental specialist (e.g., a Registered Environmental Assessor or similarly qualified individual) to inspect existing building areas subject to demolition or renovation for the presence of as yet unidentified asbestos, PCBs, mercury, lead, or other hazardous materials. If found at levels that require special handling, Kaiser shall manage these materials as required by law and according to federal and state regulations and guidelines, including those of DTSC, BAAQMD, Cal/OSHA, CSMHSA, and any other agency with jurisdiction over these hazardous materials.

HM-2. Exposure to Contaminated Soil and/or Groundwater *- Under the proposed project and the Higher Occupancy Scenario, excavation and construction of proposed basement and building foundations could expose construction personnel and the public to existing contaminated soil and/or groundwater (PS)*

In April 1987, former gasoline underground storage tanks (USTs) located at the Medical Center were discovered to have leaks. The tanks were removed and remediation of contaminated soils was conducted in 1988. The site was granted site closure for these leaking USTs in 1993.[3] However, residual contaminated areas may be encountered during site grading and excavation activities in the vicinity of the former USTs. Although the site was granted closure for the leaking USTs, site closure only means that contaminant levels at the site are below levels established by the local regulatory agency and that exposure pathways to the public and the environment have been eliminated. However, residual contamination may be encountered by construction workers in the area of the former USTs. The proposed project would involve basement and foundation excavation, where excavation could be sufficiently deep to encounter residual contaminated soil or groundwater. On the basis of existing information, the most likely contaminants encountered during earth-moving activities would be petroleum hydrocarbons. During excavation, construction, and dewatering activities, construction workers and members of the public could be at risk for exposure to soil and groundwater contaminated with Total Petroleum Hydrocarbons as gasoline (TPHg).

Exposure to hazardous materials could cause various short-term or long-term health effects specific to each chemical present if of sufficient concentration and duration. Acute effects,

[3] County of San Mateo Health Services Agency, Local Oversight Program, Case #330041, closed September 8, 1993.

often resulting from a single exposure, could range from major to minor effects, such as nausea, vomiting, headache, or dizziness. Chronic exposure to hazardous materials could result in systemic damage or damage to specific organs, such as lungs, liver, or kidneys (related to benzene exposure, a known carcinogen and a common additive to TPHg).

Construction workers would be at the greatest risk of exposure to contaminated soil or groundwater, particularly if not all hazardous materials in the soil or groundwater are adequately identified. Steps to characterize potential contaminants in soil and groundwater to be disturbed as part of the project need to be implemented to ensure that the project would not create a substantial human health hazard to workers or individuals near the site during earth-moving activities.

Site remediation itself could also have adverse impacts. If site remediation were conducted without appropriate safeguards, workers, and possibly the public, could potentially be exposed to chemical compounds in soils, soil gases (gases or vapors, mostly air, trapped within soil), or groundwater, or to airborne chemicals. Workers directly engaged in on-site activity would face the greatest potential for exposure. The public could be exposed to contaminants if access to the project site were insufficiently controlled.

Worker and public health/safety requirements would apply during remediation activities. Potential adverse impacts of remediation would be mitigated almost entirely by legally required safety and hazardous waste handling precautions. For hazardous waste workers, Cal/OSHA regulations mandate an initial 40-hour training course and subsequent annual training review. Additionally, site-specific training would be required for some workers. These measures, along with application of cleanup standards subject to review by responsible agencies, would serve to protect human health and the environment during site remediation, thus minimizing impacts. Unless these plans are adequately prepared and implemented, the project could pose a significant impact by creating a substantial human health hazard or involving the disposal of materials in a manner that poses substantial hazards to people or to animal or plant populations.

On the basis of the proposed use of the project site as an acute care medical facility, the population that would be present at project completion would include workers employed at the site, patients and visitors at the Medical Center, and off-site residents. In the future, potential health effects could occur if any of these individuals were exposed to elevated levels of contaminants in the soil or groundwater. Exposure could occur through inhalation of soil and groundwater vapors that have migrated to the surface. Direct contact with soil or groundwater would be unlikely because the site is and would remain mostly paved. Because existing soil and groundwater contaminants could, in the future, pose substantial human health hazards to project occupants and adjacent neighbors, the project could result in a potentially significant impact.

MITIGATION MEASURE. The following mitigation measure would be required to reduce impacts from exposure to hazardous materials to a less-than-significant level. (LTS)

HM-2.1 *Prepare Site Health and Safety Plan.* Because the site was a former leaking UST site and in the event that contaminated soil or groundwater is encountered, Kaiser shall comply with the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* regulatory requirements for hazardous materials/waste health and safety plans. The *Site Health and Safety Plan* shall establish policies and procedures to protect workers and the public from potential hazards posed by residual contamination issues at the site. The Plan shall include items applicable to site conditions, such as identification of contaminants, potential hazards, material handling procedures, dust suppression measures, personal protection clothing and devices, controlled access to the site, health and safety training requirements, monitoring equipment used during construction to verify health and safety of workers and the public, measures to protect public health and safety, and emergency response procedures. If petroleum hydrocarbons are present in the soil and/or groundwater proposed for the use of backfill or disposal, the handling and disposal of the contaminated soil and groundwater would be governed by the applicable local and federal hazardous materials regulations.

HM-3. Hazardous Materials Storage and Handling *- Both the proposed project and the Higher Occupancy Scenario would increase hazardous materials storage and handling at the Medical Center, thereby increasing risks of human and environmental exposure to hazardous materials. However, existing health and safety programs limit the potential for exposure to hazardous materials by workers, other individuals on site, the community, and the environment. (LTS)*

The proposed project and the Higher Occupancy Scenario both would increase hazardous materials storage and use by about 21 percent (i.e., roughly proportionally to the increase in members (and patients) served by the Medical Center). As discussed in the Setting section, the hazards posed by chemicals, radioactive materials, and infectious agents vary. Some chemicals can pose physical hazards (e.g., chemical burns) or health hazards (e.g., poisoning), including potential acute or chronic illnesses. The properties and health effects of different chemicals are unique to each chemical and depend on the extent to which an individual is exposed. Exposure to excessive levels of radiation, whether from radiation-producing equipment or radioactive materials, can result in headaches, skin burns, or chronic illness, including cancer. Exposure to biohazardous materials can cause a range of illnesses, depending on the infectious agent encountered. Some infections can result in short-term discomfort (e.g., mild symptoms that can easily be treated or go away by themselves), while others can result in serious acute effects (e.g., dangerous disruptions of life functions). Some chronic diseases may or may not be curable or treatable. Some diseases may be communicable. In all these cases, the risks posed by the hazardous materials depend on the potential for exposure.

Workers and Other Individuals Onsite. The project-related effects of hazardous materials handling and storage would generally be limited to the immediate areas where the materials would be located because this is where exposure would be most likely. (Exposure at more

distant locations would require some mechanism to transport the material to the location.) For this reason, the individuals most at risk would be the Medical Center employees or others in the immediate vicinity of the hazardous materials. The routes through which these individuals could be exposed include inhalation, ingestion, contact, injection, and other accidents.

As described under the Setting section, Kaiser is required to comply with health and safety and environmental protection laws and regulations. To accomplish this, and to otherwise provide a safe and healthy environment, Kaiser implements health and safety policies and procedures with its *Environment of Care Program* and *Safe Environment Management Plan*. With the proposed project, Kaiser would be expected to implement policies and procedures similar in nature to those that exist now. Table 3.7-4 lists some of the primary means through which Kaiser protects workers and other individuals on site from exposure to hazardous materials.

Community and Environment. For the most part, the health and safety procedures that protect workers and other individuals in the immediate vicinity of hazardous materials would also protect the more distant community and environment. The pathways through which the community or the environment (e.g., local air quality and biota) could be exposed to hazardous materials include air emissions, transport of hazardous materials to or from the site, waste disposal, human contact, and accidents. Table 3.7-5 lists some of the primary means Kaiser uses to protect the community and the environment from exposure to hazardous materials.

With either the proposed project or the Higher Occupancy Scenario, there would be an increase in storage, but the materials would generally be stored in small, individual containers of about five gallons or less except for fuel storage tanks and compressed gas cylinders. Therefore, the probability of a major hazardous materials incident would be relatively low (none has occurred within the last 5 years). Minor incidents would be more likely, but the consequences of such accidents would probably not be severe due to the typically small quantities of materials handled at any particular time and the equipment and training provided to Kaiser staff. The Medical Center presently handles some acutely hazardous materials (materials that can potentially pose serious risks to areas off site, if handled in sufficient quantities), and the quantities of these materials on site would be expected to increase by about 21 percent like most other hazardous materials. However, the quantities of these materials currently at the Medical Center are sufficiently small that they fall well below the thresholds that would trigger the requirements for a *Risk Management Plan*, and the project would not be expected to increase the use of these materials to the point that would trigger these requirements.

Table 3.7-4
Exposure Pathways and Controls — Workers and Other Individuals on Site

Exposure Pathway	Examples of Control Measures
Inhalation (breathing a hazardous substance)	• Working with volatile materials in fume hoods[1] • Working with potentially aerosol-suspended biohazardous materials in biosafety cabinets[2] • Keeping containers closed when not in use • Wearing face masks or respirators, as necessary
Ingestion (swallowing a hazardous substance)	• Not eating or drinking near hazardous materials • Not storing food in refrigerators used for hazardous materials • Not smoking near hazardous materials • Washing hands and work areas
Contact (absorbing a hazardous substance through the skin or eyes)	• Wearing protective clothing and shoes, as necessary • Wearing eye protection (glasses or goggles), as necessary • Wearing gloves, as necessary • Washing hands and work areas • Working with radioactive materials behind shields
Injection (puncturing or cutting the skin with a contaminated object)	• Participating in awareness training • Keeping sharps (i.e., needles, knifes, scissors, etc.) in puncture-resistant containers
Other Accidents	• Participating in emergency response training • Purchasing and handing most hazardous materials in containers of no more than one gallon[3] • Maintaining emergency equipment (e.g., safety showers, emergency eye washes, first aid kits) • Providing appropriate lips on shelves where hazardous materials are stored and other restraints where necessary[3] • Segregating incompatible hazardous materials and storing flammable materials in fire-rated cabinets • Providing secondary containment for hazardous materials that are not in use[3] • Calling the Redwood City Fire Department and its Hazardous Materials Emergency Response Team, if necessary

Sources: EIP Associates; Kaiser Permanente, *Redwood City Medical Center, Environment of Care Program, Safe Environment Management*, May, 2002.

Notes:

1. Fume hoods are cabinets with front-opening (usually sliding) glass doors connected to overhead exhaust fans that draw air from the room through the cabinet and expel it into the atmosphere through rooftop stacks.
2. Biosafety cabinets look similar to fume hoods. They filter aerosols and remove particles from the air, but do not necessarily exhaust the filtered air to the outdoors.
3. The Medical Center purchases hazardous materials in the smallest containers feasible. Only water treatment chemicals, hydraulic oil, and diesel fuel are purchased in containers greater than one gallon. All containers are to be stored using restraining wire or cord, or restraining edges, when open shelving is used. Secondary containment is monitored by the Medical Center Safety Committee.

Table 3.7-5
Exposure Pathways and Controls — Community and Environment

Exposure Pathway	Examples of Control Measures
Air Emissions	• Using fume hood ventilation or alternative exhaust systems to dilute and subsequently disperse emissions to the atmosphere[1]
Transport to and from the Site	• Following packaging requirements specified by the U.S. Department of Transportation, the U.S. Postal Service, and the California Department of Health Services Radiologic Health Branch and Medical Waste Program • Identifying container contents with appropriate labels • Using licensed hazardous waste haulers • Documenting hazardous waste shipments
Waste Disposal	• Training workers • Segregating wastes • Collecting hazardous waste for appropriate disposal • Diluting and treating wastewater from the site • Labeling trash cans • Following federal and state hazardous waste disposal regulations and procedures, including those for hazardous waste manifest documentation
Human Contact	• Identifying container contents with appropriate labels • Training workers • Implementing standard hygiene practices (e.g., wearing protective clothing and gloves when necessary, leaving protective clothing at work, and washing hands and work areas) • Implementing medical surveillance programs to monitor the health of those who work with certain biohazardous materials • Monitoring the exposure of those who work with radioactive materials
Accidents	• Providing emergency response training • Maintaining emergency equipment (e.g., safety showers, emergency eye washes, first aid kits) • Calling the Redwood City Fire Department and its Hazardous Materials Emergency Response Team, if necessary • Plugging floor drains or providing sumps in areas where relatively large quantities of hazardous waste may be handled[2] • Conducting facility inspections and preventative maintenance

Sources: EIP Associates; Kaiser Permanente, *Redwood City Medical Center, Environment of Care Program, Safe Environment Management,* May, 2002.

Notes:

1. Fume hoods are cabinets with front-opening (usually sliding) glass doors connected to overhead exhaust fans that draw air from the cabinet and expel it into the atmosphere through rooftop stacks.
2. Floor drains in generator rooms are equipped with removable plugs to prevent spills from entering the wastewater sewer. A sump located at the loading dock minimizes the potential for a hazardous materials release to the storm sewers.

The Medical Center maintains an *Emergency Response Plan* to ensure that staff can respond to possible hazardous materials emergencies. In addition, RCFD provides "first response" capabilities to identify and secure access to hazardous materials incidents. Other jurisdictions are available, if necessary, to support Redwood City through mutual aid agreements. The increase in demand for hazardous materials emergency services at the Medical Center would be about 21 percent, proportional to the projected membership/patient increase. This increase would not substantially affect the demand for hazardous materials emergency response services in Redwood City and would not substantially affect the availability or response times of emergency responders because the types of hazardous materials used would not change, only amounts kept at the Medical Center.

Aside from accidents possibly occurring on site, accidents during hazardous waste transport to and from the site could expose individuals and the environment to risks at some distance from the project site. However, transportation accidents are infrequent. According to Caltrans, less than 3.7 vehicle accidents occur for every million vehicle miles traveled on major undivided urban highways. The frequency is substantially less on other types of urban highways. Moreover, DOT, USPS, and the California Department of Health Services Radiologic Health Branch and Medical Waste Program (CDHSRHB) all specify packaging requirements for hazardous materials and wastes that limit the potential for packages to fail on impact. These requirements reduce the potential for hazardous materials releases to occur in the unlikely event of an accident.

Hazardous Materials Use and Storage Summary. Although the project would increase the storage and use of hazardous materials at the Medical Center, the controls summarized in Tables 3.7-4 and 3.7-5 would continue to be implemented. These mechanisms would be expected to minimize the potential for exposure to adverse health or safety effects. Therefore, the proposed project would not involve the use of materials in a manner that poses any substantial hazards to people, or to animal or plant populations. Furthermore, the Medical Center would continue to implement its *Emergency Response Plan* and Redwood City would continue to provide emergency response services. Therefore, the project would not interfere with emergency response plans or emergency evacuation plans relating to hazardous materials. For these reasons, the project would not result in a significant environmental impact related to the increased storage and use of hazardous materials by the Medical Center and would not require mitigation.

HM-4. Hazardous Waste Generation *- Both the proposed project and the Higher Occupancy Scenario would increase hazardous waste generation by the Medical Center, but, by itself, would not substantially increase risks of environmental exposure. (LTS)*

Kaiser membership in the Redwood City area is projected to increase by 21 percent by 2025 with either the proposed project or the Higher Occupancy Scenario. This increase would be expected to increase hazardous materials use at the Medical Center proportionately. The increased use of hazardous materials would, in turn, result in increased hazardous waste

generation, including hazardous chemical, radioactive, and medical waste generation. Proper hazardous waste disposal, regardless of the method selected, often affects the environment. Hazardous waste landfills generally leak at some point and occasionally fail. Waste incinerators release toxic air contaminants to the atmosphere and result in ash that contains unburnable hazardous constituents (such as metals). Most other treatment and recycling methods also result in hazardous residuals that must be disposed of as hazardous waste. These residuals are usually either incinerated or landfilled. For this reason, the generation and disposal of hazardous waste is considered to be a form of pollution, and current hazardous waste management policies designate hazardous waste disposal as the least desirable management approach. Waste management strategies that seek to prevent pollution by reducing waste generation at its source are considered the most desirable approach. Pollution prevention is a national objective established by the Pollution Prevention Act of 1990. This priority is reflected in San Mateo County's Hazardous Waste Management Plan.

Hazardous Chemical Waste. The proposed project, as well as the Higher Occupancy Scenario, would incrementally contribute to the volume of hazardous chemical waste generated in Redwood City. The increased hazardous chemical waste generation would increase the volume of waste managed at hazardous waste facilities inside and outside California. The increased demand for waste treatment and disposal would incrementally contribute to the demand for new hazardous waste treatment, recycling, and disposal facilities. The likely effects of hazardous waste disposal would probably occur far from the project site (i.e., no hazardous chemical waste landfills or incinerators are located in the Redwood City vicinity).

California's hazardous chemical waste generators rely heavily on out-of-state treatment and disposal facilities to meet their disposal needs. For example, no hazardous chemical waste incinerators in California accept waste from third-party generators, such as the Medical Center. Out-of-state facilities may not receive environmental supervision equivalent to that of California. Therefore, the possibility exists that some hazardous waste generated as a result of the project could be managed at facilities that do not comply with some standards deemed appropriate by California.

Radioactive Waste. As the number of Kaiser's membership increases, its demand for low-level, typically short-lived radioactive materials (radioactive materials whose half-lives are less than 90 days) for therapeutic purposes would also increase. The need for sealed sources with longer half-lives (greater than 90 days) would not necessarily increase because sealed sources serve long-term uses and are not routinely discarded as radioactive waste.

The Radiologic Health Branch of the California Department of Health Services issues permits that allow radioactive materials users to hold short-lived radioactive waste for decay. Dry long-lived radioactive waste is to be disposed of at a low-level radioactive waste landfill. The availability of radioactive waste landfills to serve California's low-level radioactive waste generators is unreliable. California belongs to the Southwestern Low-Level Radioactive Waste Disposal Compact, a group of four states that, together, are responsible for disposing of their

low-level radioactive waste. Since the early 1980s, California has attempted to construct a low-level radioactive waste disposal facility at Ward Valley, California, to serve the compact. At this time, the project is delayed pending transfer of the disposal site property from the federal government to State control. For this reason, California must rely on one out-of-state disposal facility, located in Barnwell, South Carolina, to accept its low-level radioactive waste. South Carolina decides each year whether it will accept out-of-state radioactive wastes.

As shown in Table 3.7-2, the radioactive materials the Medical Center uses in the course of patient treatment all have half-lives less than 90 days. Therefore, their radioactivity disappears within a relatively short period (no longer than a couple years), during which the radioactive waste can be safely stored on site. Cobalt-57 has a half-life of 270 days, and the Medical Center handles no more than about 35 millicuries of it each year. The Cobalt-57 is a sealed source used for calibration and marking, resulting in no radioactive waste for the Medical Center disposal. Cobalt-57's half-life is relatively short (compared to many years for some radioactive materials); therefore, its radioactivity does not persist for long periods.

Medical Waste. Project-related medical waste would be shipped off site for disposal by an authorized hauler. Medical waste treatment facilities have been sited regionally with success. As with most hazardous waste disposal technologies, incineration involves potentially hazardous air emissions, including dioxins, and residuals that must be landfilled. Project-related medical waste would continue to be shipped to off-site disposal facilities, unless other arrangements are made.

Hazardous Waste Summary. The project would increase the Medical Center's generation of hazardous waste and, therefore, its demand for hazardous waste disposal services. This increase in demand would, by itself, have little observable effect on the levels of existing hazards that waste disposal poses to people, or to animal or plant populations, either near the Medical Center or elsewhere. Therefore, the impact of the project would be less than significant, and no mitigation would be necessary.

HM-5. Hazardous Materials Exposure *- Both the proposed project and the Higher Occupancy Scenario would increase the number of individuals exposed to, but not the nature of, physical safety hazards at the Medical Center. Existing safety programs minimize the potential for physical hazards to pose significant impacts. (LTS)*

With the proposed project, as well as the Higher Occupancy Scenario, potential physical safety hazards would exist at the Medical Center, just as they do now. These hazards would include, among others, electrical shock hazards from high voltage equipment, safety risks posed by compressed gas cylinders (including those filled with inert gases), radiation hazards from x-ray equipment (regulated as radioactive material), and exposure to magnetic fields, intense light, or lasers. Other more common hazards would include slips, falls, and overexertion. Workers engaged in activities that present special hazards, such as those mentioned above, are to be adequately trained in accordance with Kaiser's *Injury and Illness Prevention Plan* (as required under California State law). Although more individuals would be exposed to physical safety

hazards with the project, compliance with occupational safety regulatory requirements would minimize the potential risks that physical hazards could pose to people. Accordingly, this potential impact would be considered less than significant, and mitigation would be unnecessary.

HM-6. Cumulative Hazardous Waste and Disposal *- Project-related hazardous materials use under the proposed project or the Higher Occupancy Scenario would not contribute to cumulative human and environmental health and safety issues, including hazardous waste generation and disposal. (LTS)*

The health and safety hazards posed by most hazardous materials are typically local in nature. They generally do not combine in any cumulative sense with the hazards of other projects. Possible exceptions, however, include potential toxic air contaminant emissions, transportation of hazardous materials, and waste disposal. The need to respond to hazardous materials emergencies could also increase as a result of cumulative development.

Toxic Air Contaminant Emissions. Cumulative development could increase the overall concentrations of toxic air contaminants in the San Francisco Bay Area, and project-related stationary and mobile emissions sources could contribute to this increase. Cumulative issues related to toxic air emissions are discussed in Section 3.5 – Air Quality.

Transportation. Hazardous materials are transported on virtually all public roads, particularly since all motor vehicles contain hazardous materials (e.g., fuel) in addition to any hazardous cargo that may be on board. The project would contribute little to cumulative transportation hazards. The cumulative effects of transporting hazardous materials would continue to be addressed by regulatory requirements. Packaging requirements for hazardous materials and wastes established by DOT, USPS, and EPA minimize the potential consequences of possible accidents during transport. Also, the vehicle accident rate in California is relatively low compared to other states and not all accidents release hazardous materials.[4] For these reasons, the cumulative impact of potential transportation-related accidents would be less than significant.

Emergency Response. The project and future development in Redwood City could cumulatively increase demands for hazardous materials emergency response services. The increase would not be sufficiently large that two major hazardous materials incidents would be substantially more likely to occur simultaneously. Furthermore, cumulative development would not be expected to interfere with emergency response plans or emergency evacuation plans. Hazardous materials emergency response times would be unchanged.

With or without cumulative development, a major catastrophe could generate demand for emergency response services in excess of available resources, and in Redwood City, a major

[4] California Department of Transportation, *1996 Accident Data on California State Highways (Road Miles, Travel, Accidents, Accident Rates)*, 1997.

earthquake is a catastrophe posing realistic concerns. During an earthquake, structures containing hazardous materials could be damaged. Non-structural seismic safety (e.g., the potential for falling containers and shelves holding hazardous materials) would be of particular concern. Chemical spills and splashes could harm individuals working in the vicinity of the hazardous materials. Safety requirements enforced by the CSMHSA (e.g., securing certain types of containers and installing lips on shelves where hazardous materials are stored) would serve to minimize such risks. Isolated hazardous materials incidents would likely pose limited threats because the Medical Center operations typically involve relatively small quantities of materials. New construction proposed as part of the project, built to current code requirements, would be expected to perform at least as well as, or better than, existing hospital facilities in the San Francisco Bay Area. In this way, the proposed project would likely be an asset to the community following a catastrophe; therefore, this cumulative impact would be less than significant.

Hazardous Waste Disposal. As cumulative development occurs in Redwood City and at the State and regional levels, more hazardous wastes will be generated. Project-related hazardous waste generation would contribute to cumulative increases in hazardous waste generation (although most of the Medical Center's radioactive waste would decay on site). The incremental environmental effects of expected increases in hazardous waste generation and off-site hazardous waste recycling, treatment, and disposal would also contribute to cumulative effects. Hazardous waste disposal affects the environment by releasing contaminants to land, air and/or water. Cumulative increases in waste generation could also contribute to the potential for some wastes to be mismanaged at any point in the disposal process in a manner that poses potential hazards to people, or to animal and plant populations. Since the project's contribution to this cumulative impact would be a small increment, the project's contribution would be less than cumulatively considerable, and, thus less than significant.[5]

[5] CEQA Guidelines. Section 15130(a)(3).