Soil Management Plan

Tech Services Upgrade Project
Bay Center Building B
6455 Christie Avenue
Emeryville, California

17 September 2008

Prepared for:

Novartis Vaccines & Diagnostics, Inc.

EKI A70025.167

Erler & Kalinowski, Inc.

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TABLE OF CONTENTS

ATTACHMENTS

1. Introduction

Erler & Kalinowski, Inc. ("EKI") has prepared this Soil Management Plan ("SMP") on behalf of Novartis Vaccines & Diagnostics, Inc. ("Novartis") to describe procedures and protocols for environmental risk management related to excavation of subsurface soil that will occur during the Tech Services Upgrade Project (the "Project") planned for Building B of the Bay Center Offices located at 6455 Christie Avenue in Emeryville, California. The Bay Center Offices are part of the Bay Center Project, which also included residential apartments located east of Christie Avenue. Collectively, this area is referred to herein as the "Site". Implementation of the Project is currently scheduled to begin in September 2008.

The procedures and protocols described herein are based on the requirements outlined in the post-construction Safety Plan developed for the Site by Earth Metrics, Inc., entitled, *Safety Plan for Bay Center Offices and Apartments in Emeryville, California*, dated 15 September 1987 (Earth Metrics, 1987, included as Attachment A) and in the *Environmental Operations and Monitoring Plan, Bay Center Offices, 6425-6475 Christie Avenue, Emeryville, California, prepared by Stellar Environmental Solutions, Inc.*, dated 2 November 2007 (Stellar, 2007a, included as Attachment B). The purpose of the post-construction Safety Plan was to define actions to be taken to protect persons engaging in subsurface repair, maintenance or inspection work subsequent to construction of the Bay Center offices and apartments. These requirements are summarized, along with other requirements defined in further correspondence with the Alameda County Environmental Health department ("ACEH"), in the Environmental Operations and Monitoring Plan.

The purpose of this SMP is to outline the specific actions to be completed by contractors and utility workers as part of the Project and to provide guidance for the preparation of Site-specific Health and Safety Plans ("HASPs"). The minimum requirements for these Site-specific HASPs are described within the text of this SMP.

1.1. Project Description

The Project consists of subsurface excavation of approximately 50 cubic yards of soil to a depth of approximately three feet below ground surface ("bgs") to install approximately 100 linear feet of process drain line in the northeastern portion of Building B. Based upon available historical information, depth to groundwater on the Site ranges from approximately six to eight feet bgs. Therefore, excavation activities performed as part of the Project should not encounter, or require management of, groundwater.

1.2. Regulated Activities and Required Actions

The following are defined as regulated activities in the post-construction Safety Plan:

- Subsurface construction or repair,
- Landscaping deep work,

- Utility line work,
- Sub slab work, and
- Major subsurface construction.

In accordance with the post-construction Safety Plan, prior to any regulated activity, the following actions must be completed:

- ACEH must be notified in writing of construction activities,
- Contractors and utility workers must be notified in writing and briefed orally about the necessary precautions;
- All workers involved in the activity must review the post-construction Safety Plan; and
- Upon conclusion of the work, ACEH must be provided with written notice of Regulated Work Completion.

Additionally, as defined in the Environmental Operations and Monitoring Plan the following actions must also be completed:

- Each construction activity must maintain its own Health and Safety Plan;
- Stockpiled soils should be covered and maintained on-Site until sampling is conducted to assess disposal criteria;
- Air monitoring should be conducted and dust control methods should be used to prevent exposure to chemicals of potential concern; and
- Appropriate safety equipment and sanitation controls should be used based on the requirements set forth in the post-construction Safety Plan.

Procedures for meeting these requirements during implementation of the Project are described herein.

2. Site Background

2.1. Site Description and History

The Site is bounded by 65th Street to the north, 64th Street to the south, Interstate 80 to the east, and La Coste Street to the west. The Site is bisected by Christie Avenue, with the Bay Center Offices located to the west of Christie Avenue and residences to the east. Building B is the center-most of three office buildings located within the Bay Center Offices. EKI understands that the Bay Center Offices are currently owned by Bay Center Investor, LLC. Novartis, formerly Chiron Corporation, is the current lease-holder for Building B of the Bay Center Offices.

During the late 1950s through 1970s the Site was used for truck transportation. Both Delta Truck and Garrett Freightlines operated truck terminals on the Site. Ancillary facilities included several underground fuel storage and waste oil tanks.

Groundwater at the Site was recorded between six and eight feet below ground surface (5.5 feet above mean sea level) in July 1986 (Earth Metrics, 1986).

Additional descriptions of the Site is provided in prior environmental studies performed at the Site. A complete list of these studies is included in the Section 5. Copies of the post-construction Safety Plan and the Environmental Operations and Monitoring Plan are included with this SMP attached as Attachments A and B, respectively.

2.2. Known Environmental Conditions and Controls

2.2.1 Known Environmental Conditions

During previous site investigations several chemicals of concern were identified on the Site, including metals, pesticides, and polychlorinated biphenyls ("PCBs") in soil, methane in soil gas, and petroleum hydrocarbons in groundwater (Earth Metrics, 1986).

Analytical data from environmental sampling conducted in 1986 as part of the Bay Center Project reported that maximum concentrations of lead and zinc detected in soil were 30,000 milligrams per kilogram ("mg/kg") and 17,000 mg/kg, respectively. State of California hazardous waste criterion for these metals are 1,000 mg/kg and 5,000 mg/kg, respectively. Dichlorodiphenyltrichloroethane residuals ("DDTr") were detected in one soil sample at a concentration of 10.1 mg/kg and its presence was inferred for other samples based on concentrations of total chlorine in soil. Earth Metrics (1986) notes, however, that detected chlorine in soil may also be indicative of PCBs or different organochlorine pesticides, other than DDTr. PCBs were detected in samples collected from stockpiled soils generated during the reconstruction of Christie Avenue. Methane was detected in soil-gas at concentrations of 2,700 to 4,700 parts per million ("ppm"). Total petroleum hydrocarbons ("TPH") and benzene, toluene, ethylbenzene, and xylenes ("BTEX") have been detected in groundwater samples collected at the Site. Free product TPH is present beneath the eastern portion of the Site and groundwater is currently being treated and monitored on a regular basis.

Additional information regarding the magnitude and distribution of chemicals of concern detected in samples collected at the Site are identified in Soils and Groundwater Contamination Characterization of Bay Center Site (Earth Metrics, 1986) and summarized in recent documents prepared by Stellar (2007a and 2007b).

2.2.2 Institutional Controls

In response to the identified presence of chemicals of concern at the Site, numerous institutional controls were implemented for the protection of human health and the environment. These controls, described by Stellar (2007a), included:

- Raised planters, imported fill soil, and an asphalt cap were used to prevent human contact with contaminated soil;
- An active methane monitoring system and venting mechanisms were implemented for sub grade pits (such as elevator pits and electrical rooms in the Bay Center Offices) to prevent vapor intrusion of methane into buildings; and

- A groundwater pump and treatment system and groundwater monitoring wells were installed to remediate and monitor groundwater (on the eastern portion of the Site).

Additionally, the post-construction Safety Plan (described above in Section 1) was developed for future subsurface construction activities. A deed restriction was executed for the Site in March 1990 to protect future Site workers and Site users and to require implementation of the post-construction Safety Plan during future subsurface activities.

3. Exposure Pathways and Risk Criteria

Exposure pathways and risk criteria for chemicals of concern at the Site are included in the post-construction Safety Plan and the Environmental Operations and Monitoring Plan included as Attachments A and B, respectively.

4. Construction Risk Management Measures

4.1. Worker Protection Requirements

This SMP provides general requirements for appropriate planning for worker protection. The Site will be a multi-employer worksite. In light of the California Occupational Safety and Health Regulations for Multi-Employer Worksites (California Code of Regulations; "CCR", Title 8, Sections 336.10 through 336.11), each earthwork construction contractor or remediation contractor ("Contractor") with workers who will disturb or who may directly contact soils on the Site will prepare its own Site-specific HASP and conduct employee safety awareness training.

4.1.1 Minimum Requirements for Site-Specific Health and Safety Plans

At a minimum, HASPs for the Project will include descriptions of:

- Potential job hazards on the Site including descriptions of chemicals of concern detected in samples collected at the Site;
- Health and safety training and medical monitoring requirements, if necessary, for on-Site personnel;
- Levels of personal protective equipment ("PPE") and methods of worker exposure monitoring, if any, to be used for certain circumstances; and
- Any other applicable or recommended precautions to be undertaken to minimize workers' direct contact with contaminated soil or exposures of other persons on or near the Site.

Workers who may directly contact potentially contaminated soil at the Site must have the appropriate level of health and safety training, and access to, and use of, the appropriate level of PPE.

4.1.2 Minimum Safety Awareness Training

Per the requirements of Title 8 CCR 1532.1 Lead and Title 8 CCR 5194 Hazard Communication, information concerning the anticipated soil contamination hazards must be provided to personnel who are anticipated to have direct contact with soils at the Site. At a minimum, safety awareness training will be provided to Project earthwork contractors. Such safety awareness training will include, at a minimum, the following:

- The potential health hazards of worker exposure to Site contaminants;
- The operations and activities that may result in skin, eye and/or inhalation exposures;
- Protective measures and work practices that will be used to minimize exposure hazards;
- The provisions and requirements of the Site-specific HASP; and
- Employee access to training materials and to exposure and medical records.

4.1.3 Personal Protective Equipment

Field personnel will wear equipment to protect against the potential physical and chemical hazards that have been identified herein and those that become apparent in the field. At a minimum, for all excavation activities at the Site, PPE will include:

- Hard hat,
- Coveralls (Tyvek or cotton coveralls),
- Chemical resistant disposable gloves (nitrile), and
- Boots that can be decontaminated or Tyvek booties worn over work boots.

4.1.4 Site Control and Work Zones

To reduce the accidental spread of potentially contaminated soil from the immediate work area to other areas of the Site, zones will be delineated on the Site for different types of operations that will occur and the flow of personnel among the zones will be controlled as necessary. The establishment of work zones will help ensure that personnel are properly protected against potential hazards in the work areas and that workers and potentially contaminated soil are confined to the appropriate area. Specified work zones may also be established as needed by the Contractor during soil excavation activities in accordance with its respective HASP. Work zones will be clearly marked with cones or barrier tape. The Contractor will be required to control entry to such zones.

4.1.5 Exposure and Monitoring

Work zone air monitoring to be performed during excavation and construction activities at the Site is described below.

Without soil mitigation controls, excavation activities may generate some dust and result in increased airborne chemical concentrations in the vicinity of such work areas. However, with dust control, the chemical concentrations of lead and other chemicals in the breathing zone are not likely to exceed appropriate Cal/OSHA Action Levels or

Permissible Exposure Limit ("PELs") for on-Site workers as long as visible dust clouds are not generated.

This conclusion is based on the following example calculation and assumptions. The maximum concentration of lead detected in soil samples collected at the Site is 30,000 mg/kg (Earth Metrics, 1986). If a total concentration of airborne dust of 1 mg/m^3 is generated during excavation activities (1 mg/m^3 is considered the concentration of visible dust), the maximum concentration of airborne lead is 0.03 mg/m^3, which is equal to the Cal/OSHA 8-hour time-weighted Action Level for lead (Title 8 CCR, Section 5216).

$$(1\ mg/m^3)^* (30{,}000\ mg/kg) * (1 \times 10^{-6}\ kg/mg) = 0.03\ mg/m^{3)}$$

However, Site-wide average concentrations of lead in soil are expected to be lower than the reported maximum concentration and airborne levels of total dust will be maintained below 1 mg/m^3 by controlling the occurrence of visible dust using the procedures described below in Section 4.2.1. Therefore, expected time-weighted average airborne lead concentrations (and other metals, which were detected in significantly lower concentrations) are likely to be lower than the Cal/OSHA Action Level and, based upon the calculation above, likely to be lower than the Cal/OSHA PEL which, for lead, is 0.05 mg/m^3 for 8hr/day, 40 hr/week (Title 8 CCR Section 5155).

To minimize the presence of visible dust, field personnel will look for the presence of visible dust clouds (e.g., approximately 1 mg/m^3) and if sustained, visible dust clouds are observed, field activities will be suspended and appropriate corrective measures to control visible dust will be implemented. In addition, dust monitoring using direct-reading aerosol monitors will also be performed during excavation activities.

Air monitoring for petroleum hydrocarbons and volatile organic compounds ("VOCs") will also be routinely conducted with a direct reading organic vapor meter ("OVM") during excavation activities. A landfill gas meter will also be used to monitor for the lower explosive limit ("LEL") of combustible gases, including methane, which may be present in work area.

4.2. Construction Impact Mitigation Measures

This section outlines minimum measures that will be implemented to mitigate potential impacts to human health and the environment during excavation and other construction activities involving contact with soils at the Site. Measures will be implemented during construction to mitigate the following impacts:

- Dust generation associated with excavation and/or loading activities;
- Tracking potentially contaminated soil out of the immediate work area or off-Site with excavation or construction equipment;
- Managing construction waste, excess soil, and other wastes generated or encountered during excavation and construction on the Site.

The mitigation measures for these potential impacts will include, but are not limited to, the following:

- Implementing dust control measures;
- Decontaminating personnel and excavation and construction equipment;
- Implementing proper procedures for handling, storage, sampling, and transportation and disposal of wastes.

The requirements for planning of these mitigation measures are discussed generally below.

4.2.1 Dust Control

Dust control measures will be implemented during all excavation, construction, and soil transfer activities at the Site to minimize the generation of dust from exposed soil areas or from soil stockpiles on the Site. Contractors will minimize exposure of on-Site workers to dust from potentially contaminated soil and will prevent dust from migrating to other areas of the Site or off-Site.

Dust generation during earthwork will be minimized by all appropriate measures. These measures may include, but are not limited to, the following:

- Misting or spraying water while performing soil excavation, soil compaction activities, and loading of soil into containers;
- Controlling the area or rate of excavation activities to minimize the generation of dust; and
- Covering with plastic sheeting or tarps any temporary soil stockpiles that may be generated.

Additional dust control measures may be identified and implemented by construction contractors, as necessary.

4.2.2 Decontamination of Personnel and Equipment

Reasonable care will be taken to prevent the transfer of potentially contaminated soil to other areas of the Site or off-Site by personnel or equipment. Decontamination procedures will be conducted for all personnel and equipment prior to leaving the active work zone.

4.2.2.1 Personal Decontamination

Personal decontamination measures will be specified in the required HASPs and will include, at a minimum:

- Removal of disposable PPE, such as booties, gloves, or coveralls and disposal of these items in containers placed in the decontamination area;
- Washing of the hands and face by all personnel before eating, drinking, smoking, using the restroom, or leaving the Site; and

- Wet brush cleaning or washing with deionized water and Alconox solution of small equipment and tools.

4.2.2.2 Equipment Decontamination

Excavation and construction equipment that contact potentially contaminated soil at the Site will be visually inspected and decontaminated, if needed. Decontamination procedures will be developed and implemented to minimize the possibility that any equipment transfers potentially contaminated soil to other areas of the Site.

4.3. Soil Management Protocols

Excavated soil will be visually inspected for evidence of discoloration or staining, the presence of noticeable chemical odors, and screened with an OVM as needed for presence of measurable VOCs. Soil that is discolored or stained, has noticeable odor, or appears to contain VOCs based upon OVM screening will be segregated and characterized for off-Site disposal. Soil that is not discolored or stained, does not have noticeable odor, or does not appear to contain VOCs based upon OVM screening may be segregated and evaluated for potential reuse on-Site (e.g., for backfilling purposes).

4.3.1 Temporary Storage of Excavated Soil

Soil excavation will be conducted with hand tools (e.g., shovels) and excavated soil will be temporarily stockpiled or placed into containers (e.g., drums) in the active work area. Temporary stockpiles or containers will be covered when not in use. Excavated soil will then be transferred to containers (e.g., roll-off bins) located outside of the building.

If temporary stockpiles are used in the active work area, excavated soil will be placed on plastic sheeting and covered with plastic sheeting to reduce dust generation. During transfer of excavated soil from the work area to the containers located outside of the building, excavated soil will be containerized or covered with plastic sheeting to prevent dust generation.

4.3.2 Sampling of Excavated Soil

At a minimum, one representative soil sample will be analyzed for each approximately 50 cubic yards of excavated soil. Each representative soil sample may consist of up to four discrete soil samples collected in pre-cleaned stainless steel tubes or other appropriate pre-cleaned sample container and composited in the laboratory prior to analysis.

Samples collected from excavated soil may be analyzed for the following analytes:

- VOCs using Environmental Protection Agency (“EPA”) Method 8260B;
- Semi-volatile organic compounds (“SVOCs”) by EPA Method 8270;
- Total extractable petroleum hydrocarbons (“TEPH”) as diesel using EPA Method 8015m with silica gel cleanup;
- Total purgeable petroleum hydrocarbons (“TPPH”) as gasoline using EPA Method 8015m;

- CCR Title 22 metals[1] using EPA Methods 6020 and 7471;
- PCBs using EPA Method 8082;
- Organochlorine pesticides using EPA Method 8081;
- Hexavalent chromium using EPA Method 7196A;
- pH using EPA Method 9040B;
- Waste Extraction Test ("WET") and Toxicity Characteristic Leaching Procedure ("TCLP") leachate extractions (to be performed on all samples); and
- Analysis of WET and TCLP leachate extractions for selected metals (if required - see text below).

A sample label will be attached to each sample and the label will include a unique sample identification number, the stockpile or container number and location, and the time and date the sample was collected. Samples will be placed in zip-closure plastic bags then placed on ice in a cooler for temporary storage and transport to the laboratory for chemical analysis. Chain-of-custody records will be initiated.

4.3.3 Off-site Disposal of Excavated Soils

Excavated soil designated for off-Site disposal will be handled and disposed in accordance with applicable laws and regulations. Such waste soil will be disposed of at appropriately permitted off-Site facilities with appropriate documentation, including waste profiling and hazardous waste manifests, if required, in accordance with applicable laws and regulations and acceptance testing required by the selected disposal facility. If any excavated soil is determined to be a hazardous waste, it will be appropriately classified and disposed within 90 days of excavation.

Novartis shall be notified in advance of any planned disposal of excavated soil to be classified as California or Federal hazardous wastes from the Site. Appropriate documentation, including all laboratory analyses, waste profile forms, hazardous waste manifests, if needed, will be completed with copies provided to Novartis, along with complete disposal cost information and basis for valid measurements of quantities.

4.3.4 Tracking of Excavated Soil for Disposal

Records will be prepared and maintained for tracking of all quantities of soil disposed off-Site. Such tracking will, at a minimum, include estimated volumes based on excavation size, or measured tonnage with certified weight tickets for soils removed from the Site. A map of the Site showing locations where excess soils were placed on the Site, noting the soils' origins and all associated representative soil sample analyses documenting the quality of the excess soil will also be prepared and provided to Novartis.

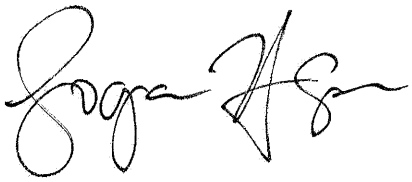
[1] Title 22 metals include antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

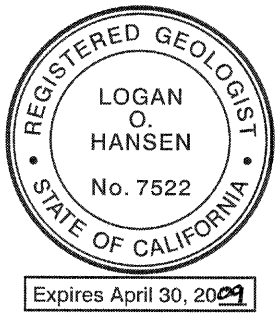
4.4. Import of Clean Fill for Backfilling Purposes

Soil may be imported onto the Site for backfilling of the excavated area as part of the Project. The type and origin of all clean fill imported for use on-Site will be recorded and provided to Novartis.

5. Signatures

Prepared by:





Logan O. Hansen, P.G.

Project Geologist

Vera H. Nelson, P.E.

Vice President

6. References

Earth Metrics, 1986. *Soils and Groundwater Contamination Characterization of Bay Center Site in Emeryville, California,* dated 20 August 1986, prepared by Earth Metrics Inc.

Earth Metrics, 1987. *Safety Plan for Bay Center Offices and Apartments in Emeryville, California*, dated 15 September 1987, prepared by Earth Metrics Inc.

PES, 2005. *Intrusive Earthwork Guidance Plan for the Bay Center Offices and Apartments, Christie Avenue and 64th Street*, Emeryville, California, dated 24 June 2005, prepared by PES Environmental Inc.

Stellar, 2007a. *Environmental Operations and Monitoring Plan, Bay Center Offices 6425-6475 Christie Avenue, Emeryville, California*, dated 2 November 2007, prepared by Stellar Environmental Solutions, Inc.

Stellar, 2007b. *Phase I Environmental Site Assessment, Bay Center Offices 6425-6475 Christie Avenue, Emeryville, California*, dated 20 April 2007, prepared by Stellar Environmental Solutions, Inc.

ATTACHMENTS

ATTACHMENT A

Safety Plan for Bay Center Offices and Apartments in Emeryville, California, dated 15 September 1987, prepared by Earth Metrics Inc.

earth metrics incorporated

SAFETY PLAN
FOR
BAY CENTER OFFICES
AND
APARTMENTS
IN EMERYVILLE, CALIFORNIA

Prepared for:

County of Alameda

September 15, 1987

SAFETY PLAN

FOR

BAY CENTER OFFICES

AND

APARTMENTS

IN EMERYVILLE, CALIFORNIA

Prepared for:

County of Alameda

September 15, 1987

Prepared by:

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TABLE OF CONTENTS

1. INTRODUCTION

BACKGROUND. This report is a postconstruction safety plan for Bay Center, Emeryville. Preparation of this report is in satisfaction of a County of Alameda requirement of the Bay Center offices and apartments.

The postconstruction safety plan addresses known subsurface soils contamination at the Bay Center site. The objective of the safety plan is to protect the safety of any persons who, subsequent to construction of the Bay Center offices and apartments, may engage in subsurface repair maintenance or inspection work.

Soils contamination is the subject of previous reports prepared for the Alameda County Hazardous Materials Unit. These previous reports are: Draft Work Plan for Soils Contamination Characterization of Bay Center Site (May 19, 1986) and Soils and Groundwater Contamination Characterization of Bay Center Site (August 20, 1986).

Construction phase Worker Safety and Hygiene is the subject of another report administered by Earth Metrics Incorporated. The latter report also was prepared for the Alameda County Hazardous Materials Unit.

AREAS OF CONCERN. Lead contamination is a primary factor to be considered in any subterranean activity at Bay Center. Lead levels in soil are known to range from 50 ppm to over 10,000 ppm. Lead contamination does not occur at the surface in the parking lots or landscaped areas, but is confined to the areas beneath the parking garage, Christie Street, building slab, parking lots, and landscaping areas.

At the level of 1,000 ppm to 10,000 ppm, casual contact with Bay Center soil is not an immediate concern. Rather, prolonged exposures, infiltration of lead-bearing dust, or repeated occupational exposures are potential concerns.

Lead facts from the State of California Department of Health Services are provided for information in Appendix A. The lead fact sheet addresses primarily handling of lead containing compounds used in manufacturing environments. The facts concerning effects of long term occupational exposure to lead are relevant.

2. PLAN ELEMENTS, CONTINGENCIES, AND PROCEDURES

The following definitions and procedures shall apply.

2.1 RESPONSIBLE PERSON

The "Responsible Persons" charged with administering the postconstruction safety plan are defined herein to be the Building Owners and Managers of the Bay Center offices or apartments. These "Responsible Persons" shall keep available a copy of the postconstruction safety plan and shall implement the plan as directed in this section.

2.2 SCOPE/INTENT

It is the intent of the postconstruction safety plan to protect the public and workers involved in potential subgrade maintenance, repair, and inspection or other activity involving subgrade work. No work order shall be given or work authorized involving the above subgrade activities, without prior review of the applicability of this safety plan.

2.3 APPLICABILITY DETERMINATION

Applicability can be determined by the "Responsible Persons". In the event that applicability cannot be ascertained or determined by the Responsible Persons -- owing to ambiguity, questions, or unavailability of the Responsible Persons -- then the regulated work shall be deferred until a determination can be made by the Responsible Persons or County of Alameda Hazardous Materials Unit.

2.4 REGULATED WORK

The following subgrade activities constitute regulated work under this postconstruction safety plan.

2.4.1. SUBSURFACE CONSTRUCTION OR REPAIR. Refers to any activity occurring beneath the grade level of existing pavement, concrete, or Christie Street grade.

2.4.2. LANDSCAPING DEEP WORK. Refers to any activity related to landscaping lower than 18 inches beneath existing grade.

2.4.3. UTILITY LINE WORK. Refers to any subterranean inspection, excavation, or repair of electrical, telephone, water, sanitary sewer, or storm drains occurring outside of existing vaults.

2.4.4. SUB SLAB WORK. Refers to any working occurring beneath the slab of Bay Center offices, apartments, or parking garage.

2.4.5. MAJOR SUBSURFACE CONSTRUCTION. Refers to any construction or maintenance involving the subgrade level beneath asphalt, building slab, concrete walkway and enduring for one (1) month or longer.

2.4.6. OTHER. Other subgrade activities not expressly listed above, such as, for example, groundwater well installation.

2.4.7. EXEMPTIONS. Routine landscape maintenance not involving tree planting or removal of loam shall be expressly exempt from this Safety Plan.

2.5 PROCEDURES

The Responsible Persons shall, after determining the applicability of the Safety Plan to a regulated work activity, assure implementation of necessary safety precautions outlined in Section 3. Implementation of the Safety Plan shall consist of i) Written Notification of Alameda County Hazardous Materials Unit of Intended Subgrade Activity and Precautionary Measures and ii) Written and Oral Briefing of Contractors or Utilities Workings Concerning Necessary Precautions. At the conclusion of regulated work, the Responsible Persons shall iii) provide Written Notice of Regulated Work Completion to the Alameda County Hazardous Materials Unit.

If, during the performance of any regulated work, odorous smell, buried drums, or other suspicious materials are encountered, these observations shall be telephoned immediately to the County of Alameda at (415) 874-7237. The County of Alameda then may, at its discretion, send an inspector to respond to the call and make a field inspection.

3. SAFETY PRECAUTION CHECKLIST

The following checklist is provided to assist the "Responsible Persons" with their written and oral briefing of contractors prior to start of regulated work. In the event of major subsurface construction, the adopted Worker Hygiene and Safety Plan appended to Soils and Groundwater Contamination Characterization of Bay Center Site (August 20, 1986).

SAFETY PRECAUTION CHECKLIST

	LANDSCAPING DEEP WORK	SUB SLAB OR SLAB REPAIR	SUB GRADE UTILITY WORK	SUB-SURFACE CONSTRUCTION OR REPAIR	MAJOR SUB-SURFACE ACTIVITY *	OTHER
All personnel will be made aware of the possible health related problems associated with unmitigated exposure to lead.	X	X	X	X	X	X
All field personnel will be instructed to thoroughly wash their hands and face upon leaving the work area.	X	X	X	X	X	X
No materials/debris are to be removed from the site without prior approval of the Alameda County Hazardous Materials Unit unless said materials have been found not to be above any state threshold values.	X	X	X	X	X	X
Personnel will be required to report to the "Responsible Person" odorous or strange appearing materials if any are encountered.	X	X	X	X	X	X
Workers will be required to report any unexpected or irregular occurrences which may be encountered during work to the "Responsible Party."	X	X	X	X	X	X
A first aid kit, eye wash kit, 20 pound ABC fire extinguisher, stretcher and blanket, and potable water will be available at the work site.	X	X	X	X	X	X
Coveralls, rubber boots, gloves and, where necessary, chemical-resistant Tyvek-type clothing, or equivalent will be worn by personnel as conditions require.	NA	NA	NA	NA	X	X
Where necessary, air purifying respirators approved by NIOSH for toxic dusts and mists will be worn by personnel in immediate work vicinity, subject to determination by an on site Industrial Hygienist.	NA	NA	NA	NA	X	X

NA Not Applicable

X Required Safety Precaution

* Of one month duration or more; work should be performed according to the adopted construction Hygiene and Safety Plan (see Appendix B).

5. REPORTAGE TO THE COUNTY OF ALAMEDA

The following form letters could be used by the "Responsible Persons" to notify Alameda County of subterranean work regulated by the Postconstruction Safety Plan.

[date]

Mr. Rafat Shahid
Hazardous Materials Unit
Alameda County Health Care Services
470 27th Street, Third Floor
Oakland, CA 94612

Subject: Notice of Intent to Perform Subterranean Work, Bay Center Project, Emeryville, California

Dear Mr. Shahid:

This letter is to notify your unit of intended subterranean work beginning on [date]. Work will be performed in accordance with the Postconstruction Safety Plan dated September 11, 1987.

The nature of this work is [description] and is expected to conclude by [date]. Please call me at (415) - , if you have any questions about this proposed work.

Sincerely,

[date]

Mr. Rafat Shahid
Hazardous Materials Unit
Alameda County Health Care Services
470 27th Street, Third Floor
Oakland, CA 94612

Subject: Subterranean Work Termination Notice, Bay Center Project, Emeryville, California

Dear Mr. Shahid:

This letter is to notify you of completion of subterranean work at Bay Center on [date].

Sincerely,

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
DEPARTMENT OF INDUSTRIAL RELATIONS\CAL/OSHA

HESIS
2151 Berkeley Way
Berkeley, California 94704

FACT SHEET #4

HAZARD EVALUATION SYSTEM AND INFORMATION SERVICE

PHM
JS
MP
PH

Lead

Health Hazard Summary: The most common effects of lead poisoning are damage to the nervous system, blood-forming system, digestive system, kidneys and reproductive system.

HOW TO FIND OUT IF YOU ARE WORKING WITH LEAD

Lead Compounds: Lead and lead compounds have many industrial uses. Workers are exposed to lead fumes and dusts in smelting, battery manufacture, radiator repair, soldering and foundry work, ink manufacture, electronics, and manufacture of cans. Since lead has been widely used as a pigment, exposure may also result from the sanding, stripping, cutting, welding, or demolition of objects covered with lead-based paint. In addition, artists involved in stained glass, pottery, or painting with lead-based materials may be exposed.

Under California Law (General Industry Safety Orders [GISO] 5194), your employer must tell you if you are working with any hazardous substances, including lead, and train you to use such substances safely. If you think you may be exposed to lead, ask to see the Material Safety Data Sheets (MSDSs) for the products you are using.

An MSDS lists the chemical contents of a product, its health and safety hazards, and methods for its safe use, storage and disposal. It should also include information on fire and explosion hazards, reactivity, first aid, and procedures in case of leaks and spills. Your employer is required to have an MSDS for any workplace product that contains a hazardous substance, and must make the MSDS available to employees on request.

This fact sheet is an aid for worker training programs. It is not intended to take the place of a Material Safety Data Sheet. Some of the information in this fact sheet, and in MSDSs, is technical in nature. The HESIS booklet, Understanding Toxic Substances, is intended to help you better understand this technical information (see Resources, page 5).

HOW LEAD ENTERS AND AFFECTS YOUR BODY

Lead enters your body when you breathe it as dust, fume or mist present in the air. You can inhale lead fumes when you smoke a cigarette contaminated with lead dust, and you can swallow lead when you consume food or drink contaminated with lead particles. For this reason it is important to keep food and cigarettes out of the work area and to wash your hands before eating or smoking if you are working with lead or other toxic substances. When lead gets into your body, only part of it is eliminated in urine. The majority is stored in your bones and other tissues, and the total amount in your body gradually increases. Consequently, exposure to low-levels of lead over time can cause lead to accumulate in the body and lead poisoning may result. Lead interferes with the chemical balance of the body; therefore, it affects many organ systems.

The main health effects of lead poisoning are damage to the nervous system, blood-forming system, digestive system, kidneys, and reproductive system as described below.

Nervous System: The most important effects of lead occur in the nervous system. The blood lead level (BLL), at which these effects occur, varies widely from person to person but generally is in the range of 40 to 60 micrograms of lead per 100 grams of blood (also written 40 to 60 µg/100 g = µg/dl = µg/%) (see Legal Exposure Limits). Common symptoms of overexposure are fatigue, headache, irritability, sleeplessness, anxiety, slowed reaction time, and hearing difficulties. Lead may affect your peripheral nervous system, the nerves reaching your arms and legs. If your blood lead level is in the 40 to 60 µg/dl range, you might feel decreased hand-grip strength, fine tremors, or weakness in the wrists or ankles. A very high blood lead level (120 µg/dl) due to a long period of exposure or a short period of high-level exposure may cause vomiting and poor short-term memory. Extreme overexposure may lead to seizure, coma, and even death. The effects of lead on the nervous system may not be reversible even after the blood lead level drops.

Blood-Forming System: One of the first indications of damage due to lead overexposure (BLL above 30-40 µg/dl) is a decrease in your body's ability to form red blood cells. These changes do not have noticeable symptoms. Your physician can conduct several tests to measure these effects. At blood lead levels above 60 µg/dl, your body may not produce enough red blood cells to supply your muscles, brain and other tissues with the oxygen they need (anemia). Symptoms of anemia include fatigue, lack of energy and weakness.

Kidneys: Long-term overexposure to lead may cause irreversible damage to the kidneys. Because you show no symptoms until the damage is substantial, detection of kidney damage is done by urine and blood analysis.

Skin, Eyes, Nose, Throat: Some forms of lead can irritate the eyes and skin. Exposure over a long period may cause a blue line to form on the gums.

Gastro-intestinal Tract: High blood lead levels can cause sharp pains in the stomach or intestines, called lead colic. You may also experience constipation, loss of appetite, nausea or diarrhea. These effects generally do not occur at blood levels below 50 µg/dl.

Reproduction: Lead affects the reproductive systems of both men and women. In men, overexposure can cause impotence, decreased sex drive and sterility. Also, lead is reported to alter the structure of sperm cells. This effect has occurred at blood lead levels below those which cause other symptoms.

Lead overexposure in women may result in abnormal menstrual cycles, decreased sex drive, and decreased fertility. There is evidence that stillbirth and miscarriage may be more likely if either the woman or the man is exposed to lead before or during pregnancy. Children born of parents exposed to excess lead levels are more likely to have abnormalities in mental development. They are also more likely to die during the first year of childhood. Although lead has been shown to cause birth defects in animals, there is insufficient evidence to say whether lead causes birth defects in humans.

Cancer: Several laboratory tests have shown that soluble lead compounds, such as lead phosphate, cause changes in genetic material. In addition, some soluble lead compounds cause cancer in animals. Chemicals which cause genetic changes in test systems and cancer in animals are thought to pose a cancer risk to humans.

Most workers are exposed to metallic lead or lead oxides. No animal tests for cancer have been conducted on these compounds. Studies of cancer in exposed workers have been inconclusive. If metallic lead does cause cancer in humans, it is not a potent (strong) cancer-causing agent. This means that extremely large doses would be required to cause cancer.

LEGAL EXPOSURE LIMITS AND MEDICAL MONITORING

The California Division of Occupational Safety and Health (Cal/OSHA) sets and enforces workplace exposure limits. If you have any of the symptoms described on page 2 while you are working with lead, you may be exposed to lead at more than the legal limit. Talk to your supervisor and/or your union. If lead is present in any quantity in your workplace, your employer must measure the amount of lead in the air in the work area. You have the right to see the results of such monitoring (Cal/OSHA regulation GISO 3204).

You and your union representative have the right to see and copy your medical records and records of your exposure to toxic substances. These records are important in determining whether your health has been affected by your work. If your employer has such records, he/she must keep them and make them available for at least 30 years after the end of your employment.

The Cal/OSHA Lead Standard (GISO 5216) contains a number of important provisions which are summarized in Appendix B of the Standard (see Resources, page 5). The Lead Standard sets the Permissible Exposure Limit (PEL) for the amount of lead measured in your breathing zone. The PEL for lead in most workplaces is 50 micrograms of lead per cubic meter of air (50 $\mu g/m^3$).

Your exposure may legally be above 50 $\mu g/m^3$ at times, but only if it is below 50 $\mu g/m^3$ at other times, so that your average exposure for any 8-hour workshift is 50 $\mu g/m^3$ or less.

Respirators may be used to supplement engineering and work practices, bringing exposure levels within the PEL. Even so, airborne lead must not exceed 100 ug/m in smelting and battery manufacture and 50 ug/m in all other industries. In addition, Cal/OSHA requires that workplaces covered by the Standard be monitored for at least one full shift for each lead job classification in each work area. If measured levels are at or above what is termed the "action level" of 30 ug/m , air monitoring must be repeated.

Although lead is eventually stored in the bones, making it difficult to measure, blood lead levels (BLL) can be used to get a fairly accurate measure of recent exposure. Therefore, Cal/OSHA also requires that workers, who are exposed to lead at or above the action level for more than 30 days per year, have regularly scheduled medical examinations, including measurement of blood lead levels. Zinc protoporphyrin (ZPP), a substance involved in the formation of blood cells, must also be measured. Other tests for lead exposure and health effects should be selected by a health practitioner on a case by case basis (see Appendix C - Medical Surveillance Guideline - of the lead standard).

If your BLL is above 40 ug/dl, you must be notified and blood sampling must be repeated every two months until your BLL drops. The following conditions require that you be removed from the workplace with full protection of earnings, seniority, and benefits until your BLL returns to an acceptable level: 1) a BLL of 60 ug/dl or greater is obtained and confirmed or 2) the average of your last three blood samples (or the average of all blood sampling tests conducted over the previous six months, whichever is longer) indicates that your BLL is 50 ug/dl or greater. However, if your most recent sample indicates a BLL at or below 40 ug/dl, you are not required to leave the workplace.

Where exposure exceeds the PEL, Cal/OSHA requires employers to furnish protective work clothing and equipment and clean change rooms, lunchrooms, and end-of-shift shower facilities at no cost to the worker. In addition, employers must assure that food, beverage, tobacco products and cosmetics are not present or used except in the proper facilities provided, and that workers wash their hands and face before such use.

REDUCING YOUR EXPOSURE

Employers are required to use control methods to reduce exposures that are above the PEL.

Engineering Controls: Primary control methods include changing work practices, changing the work process, and installing ventilation. Containers and vats should be tightly covered to prevent evaporation. Some work processes can be isolated, enclosed or automated to reduce exposures.

Local exhaust ventilation systems are the most effective type of ventilation control. These systems "capture" or draw contaminated air from its source before it spreads into the air and your breathing zone.

The proper work practice for removing lead dust accumulation from floors is vacuuming the floor rather than dry sweeping or blowing the dust away with compressed air. The vacuum must be fitted with a high efficiency particulate filter to prevent fine lead dust particles from re-entering the work room air in the vacuum cleaner's exhaust stream.

Personal Protective Equipment: When engineering controls are not possible or do not sufficiently reduce exposures, a respirator must be worn, and a respiratory protection program as outlined by Cal/OSHA regulations (GISO 5144 and 5126) must be developed. Additional protective clothing may also be required. An industrial hygienist or other knowledgeable person (e.g., Cal/OSHA Consultation) should be consulted to ensure that the equipment is appropriate and is used correctly.

If lead dust is brought home on your clothes, your children may also be exposed. A child's nervous system can be damaged at even lower levels than yours; so, take special care in your personal hygiene.

Substitution: Another way to control hazardous exposures is to substitute safer chemicals for more toxic ones. This control method may not be feasible for many uses of lead. The physical and health hazards of substitutes must also be carefully considered, however, to ensure that they truly are safer. As an example, iron oxide pigment has been substituted for lead chromate pigment in some paints, since the former is less toxic.

RESOURCES

This Fact Sheet is available in Spanish. Also available from HESIS are A Guide to Industrial Solvents, in English and Spanish, and Understanding Toxic Substances: An Introduction to Chemical Hazards in the Workplace. These publications may be obtained at no charge by calling 415/540-3138.

- For information about the health effects of lead or other workplace chemicals contact HESIS at 415/540-3014 (call collect from within California).

- Employees who need information or assistance concerning workplace health and safety regulations, or who want to file a complaint may contact:

  Cal/OSHA Division of Occupational Safety and Health. See your local phone book under "California, State of, Industrial Relations."

- Employers who want free assistance on evaluating and improving workplace health and safety may contact:

  The Cal/OSHA Consultation Service. See your local phone book under "California, State of, Industrial Relations" or call 800/652-1476.

- To obtain a copy of the Cal/OSHA lead standard (GISO 5216) contact:

  The Cal/OSHA Communications and Publications Unit at 415/557-2237.

- In a medical emergency, contact:

  Your regional Poison Control Center. See your local phone book under "Other Emergency Phone Numbers" listed on the inside front cover.

APPENDIX B

HYGIENE AND SAFETY PLAN
BAY CENTER SITE, EMERYVILLE

INTRODUCTION

This Hygiene and Safety Plan has been prepared for use during the soil Excavation Phase of the construction project for The Martin Company Bay Center Site in Emeryville. The Plan represents an effort of the sub contractor, Thermo Analytical, Inc. (EAL). The Plan describes the procedures to be implemented to protect the health and safety of the employees performing the work.

In general, preliminary investigations have indicated that the hazard potential at the site is low and primarily associated with potential contact with lead containing dust. Personal and area air samples for lead and organic vapors will be collected during the different construction processes and locations to insure safe working conditions. Personal air samples will be collected during excavation of a "worst case" area to determine whether or not respirators are necessary.

The purpose of the Plan is to provide construction personnel with adequate protection against possible contamination in the area of Emeryville, California, located in the northeast quadrant of 64th Street/Lacoste Street.

The types of exposure hazards that may potentially be encountered during this investigation are: lead dust and organic vapor exposures. The safety plan will address these two types of hazards.

The prime contractor will assign an Industrial Hygienist to implement the Plan. The Industrial Hygienist is trained in appropriate industrial hygiene and safety information. Training includes, but is not limited to: safety awareness and response, use of respiratory protection equipment, qualitative fit testing of respiratory protection equipment, explosive conditions and lower explosive limits, confined space entry, eye and head protection, skin protection, and use of impervious clothing. Before work at the site begins, the Industrial Hygienist will review the Hygiene and Safety Plan to become

acquainted with the Draft Work Plan and contingency emergency response, requisite for safe work at the site. The Industrial Hygienist will remain on-site during soil excavation activities in order to assess changing exposure conditions and to initiate emergency response plans, if required.

MEDICAL INFORMATION

The preliminary investigation of probable airborne lead levels indicates that levels are not expected to exceed the 30 microgram per cubic meter 8 hour time weighted average, 30 days per year, CAL/OSHA "action level." However, the owner and Industrial Hygienist have agreed that, as a precaution, before and after blood lead tests will be made available to affected workers, if desired, at the owners expense.

In the event that unusual circumstances arise during the performance of field work, the Industrial Hygienist will interview involved employees at the site to determine whether any exposure may have occurred and if the employees are experiencing any symptoms which may be related to contaminant exposure. If the employees indicate any adverse effects or, in the judgement of the Industrial Hygienist, such adverse effects are apparent or probable, the Industrial Hygienist will require each of the involved employees to be evaluated by competent medical personnel. Such evaluation will be noted in the Industrial Hygienist's daily log. Emergency care will be provided.

EDUCATION AND TRAINING PROGRAM

Each employee involved in the plan will be trained in the necessary hygiene and safety precautions. The safety requirements for this type of work are largely dependent upon the professional judgement of the Industrial Hygienist. Two different types of potential hazards are associated with the plan. These are: potential lead exposure and potential exposure to unknown hazardous wastes that are associated with the disposal sites within the general Emeryville area. An Industrial Hygienist, trained in conducting this type of field work, will be responsible for instructing each of the affected construction personnel in the appropriate health and safety measures for corresponding job functions.

All personnel involved in excavation of contaminated soil will be trained in the following aspects:

- Health Hazards - All personnel will be made aware of the possible health related problems associated with unmitigated exposure to lead.
- All employees who will wear personal protective equipment will be instructed in the use, care and fitting of personal protective equipment and of the necessity for wearing the equipment, its effectiveness and limitation.
- The Industrial Hygienist will also be responsible for training affected construction personnel concerning the necessity for protection from the adverse effects of hazards associated with contaminated areas. Affected personnel will be advised of the potential hazards and precautions which are to be taken in the event such materials are encountered.
- Proper hygiene, which will include use of wash facilities as appropriate.

The Industrial Hygienist will be responsible for training construction personnel. Personnel will be advised of the notification procedures which are to be followed in the event that odorous or strange appearing materials are encountered.

The Industrial Hygienist will be on-site to oversee all operations and to ensure that proper hygiene and safety measures are being maintained. Construction workers will be required to report any unexpected or irregular occurrences which may be encountered during the field work to the Industrial Hygienist. Such occurrence include, for example, unearthing of drums, pockets of darkened or wet soil, and odors.

In this former landfill site, the fill materials are generally below the surface of the existing asphalt soil. If the activities at the site cause considerable disturbance, the Industrial Hygienist will adjust procedures and protection levels accordingly, making notes of any such changes in the daily log. This procedure will provide continued safety to all personnel on-site.

Since the identities and extent of potential chemical contamination other than lead are not well known, avoidance procedures, monitoring, and personal protection will be required. Added safety precautions will be taken for the inherent hazards of groundwater monitor well drilling and of other drilling procedures.

Specific Hazards and Risks

There is a potential hazard associated with lead-containing dust inhaled during subsurface soil excavation. The greatest risk of inhalation will occur with those activities which disturb surface soil in contaminated area causing causing airborne dust. There are secondary exposure routes of skin absorption and ingestion. Skin absorption will be reduced or eliminated by the use of gloves and coveralls.

Site Entry Procedures

Eating, drinking, smoking and any other practice which increases the probability of hand-to-mouth transfer is prohibited in the work zones. All field personnel will be instructed to thoroughly wash their hands and face upon leaving the work area. The Industrial Hygienist will be responsible for designating a wash area at each work site.

A first aid kit, eye wash kit, 20 pound ABC fire extinguisher, stretcher and blanket, and potable water will be available at the work site.

Levels of Protection

The site will be considered a Zone D work area. Level D Personal Protection will be required. This designation is based upon the existing knowledge that airborne concentrations of lead are expected to be below the present premisible exposure limit (PEL) of 50 microgram/cubic meter of air time-weight average established by CAL/OSHA. The Zone D designation will exist at all operations. Zone D safe guards will include:

- Where necessary, air purifying respirators approved by NIOSH for toxic dusts, and mists.
- Coveralls and gloves and, where necessary, chemical-resistant Tyvek-type clothing, or equivalent.

- Rubber boots with steel toes, or equivalent.
- Hard hat.

All drilling activities will start at Level D protection (Level D protection is described in the U.S. EPA Standard Operating Safety Guides, November 1984) with continuous organic vapor monitoring. Disposable latex gloves, hard hat, and eye protection will be used to minimize injury from engine-driven drilling equipment and to minimize illnesses from skin contact of chemicals. The ground around drilling activities will be wetted to prevent entrainment of airborne dust.

The level of protection will be upgrades to Level C if the drilling encounters irregular materials or, if organic vapor levels exceed 0.5 ppm above background levels continuously for more than five minutes. Personal protective equipment at Level C will include, at a minimum, the following:

- Double cartridge respirator for organic vapors
- Escape masks
- Underwear - cotton
- Coveralls - chemical resistant
- Apron - PVC, butyl rubber, or other material impervious to chemicals
- Gloves - PVC, butyl rubber, or other material impervious to chemicals
- Safety boots - neoprene or other material imprevious to chemicals
- Boots - chemical resistant, steel toes and shank
- Hard hat with face shield
- Safety glasses when face shield not used

CONTAMINATION REDUCTION

All disposable protective clothing will be put into plastic bags, sealed, and provided with a label describing the contents before field personnel leave the sampling area. The plastic bags will be retained on-site until chemical analyses are performed on the field samples. Disposable cothing shall not be re-used from day to day.

PERSONAL MONITORING

Lead Monitoring

Air samples will be taken in the breathing zone for peak exposures during digging and soil handling operations and long-term exposures in high activity operations. All samples will be taken as personal samples worn by the individuals.

Site perimeter samples will be taken in a similar fashion, except that the samples will be collected as fixed source area samples. The monitors will be set at approximately 5-feet above the ground at the site boundary. These samples will be analyzed by NIOSH Method P & CAm 173.

Organic Vapor Monitoring

The Industrial Hygienist will monitor for ambient levels of organic vapors using a Century Organic Vapor Analyzer (GC/FID). The Industrial Hygienist will be notified if organic vapor levels exceed ambient levels. Drilling will cease, equipment will be shut down, and personnel will withdraw from the area if any of the following conditions occur:

- The organic vapor concentrations in the operator's breathing zone exceeds 5 ppm
- The organic vapor concentration 2-feet above the bore hole exceeds 5,000 ppm or 50% of the lower explosive limit

The Industrial Hygienist will determine when personnel may return to the work area.

In the event low levels of organic vapors are detected, personnel will wear appropiate respirators until construction activities at the location are completed and the Industrial Hygienist determines that respirators are not needed. The Industrial Hytienist will attempt to identify the nature and source of the vapors. If industrial debris is apparent in the boring, drilling at the locations will be terminated.

CONTINGENCY PLAN

The Industrial Hygienist designated by the contractor will be present at sampling sites during all drilling and environmental sampling operations. The

Industrial Hygienist will be knowledgeable of expected contaminants, hazards, and risks, and will be responsible for coordinating emergency responses. It will also be the responsibility of the Industrial Hygienist to inform and train the work party members before the work begins at each site. Training will include information on the risks that may be encountered, and techniques to minimize exposures from these hazardous materials. The Industrial Hygienist will also implement the safety plan, hold safety meetings with employees, evaluate employees understanding of risks and preventive measures, inform all employees of designated escape routes and locations of all emergency medical aid.

Before site work begins, the Industrial Hygienist will notify emergency response personnel who may be called upon to respond to emergency situations if they occur, and will brief them on the nature of anticipated hazard and potential emergency scenarios. The groups to be notified will include local clinics and/or hospitals, and fire personnel. The name of the clinics and/or hospitals which have been designated to serve construction personnel shall be posted on-site and made available to construction personnel.

The Industrial Hygienist's primary responsibility in the event of an accident will be evacuation, first aid, and decontamination of injured team members. The Industrial Hygienist will determine safe evacuation areas and begin first aid, and decontamination of injured team members. Injured parties will be taken through decontamination procedures, if possible. However, the procedure will be omitted when it may aggravate or cause more harm to the injured party. A qualified member of the work team will accompany the injured party to the medical facility to advise on matters concerning contamination. A specific evacuation route will be selected based on traffic congestion at the time of the emergency.

Emergency Procedures

In the event of a medical emergency, the injured party will be taken through decontamination procedures, if necessary and possible. However, the procedure will be omitted when it may aggravate or cause more harm to the injured party. A qualified member of the work team will accompany the injured party to the medical facility to advise on matters concerning potential contamination.

RECORD KEEPING

The Industrial Hygienist will maintain a record of all health and safety related matters in a daily log. Air monitoring data and any unusual field data will be recorded in the daily log. In addition, the Industrial Hygienist will maintain pertinent medical records of all field personnel, safety and health documentation, contingency plans, and communications and contracts on-site. These records will be available to all employees upon request.

HYGIENE AND SAFETY PLAN
ADDENDUM

This addendum has been prepared to respond to several questions about hygiene practices and to provide additional background information about the site's history and testing program. The addendum also explains certain terms used in the Hygiene and Safety Plan.

SITE HISTORY. Originally, the construction site was part of the San Francisco Bay. During the period 1935 to 1955 several bay sites, including this site, were filled by the City of Emeryville Public Works Department. The fill consisted of a variety of materials including soil, rock, building debris, and refuse items such as bottles, batteries, wood and wire.

The whole site was covered with asphalt sometime in the late 1950s, and two truck terminal buildings were built. The first was Delta Truck and the second was Garrett Freight lines.

TEST PROGRAM. Samples of the site beneath the asphalt cap were collected by a geotechnical firm retained by the owners as early as March 1985. Additional samples of surface and subsurface materials have been collected and analyzed during January 1986 to June 1986. The test program has identified the following materials:

- A variety of metals (including lead, zinc, and iron) throughout the site.
- A low level herbicide (weed killer) just beneath the asphalt cap.
- A low level of elemental chlorine which may originate from a variety of sources such as battery acid.

Test results have not indicated the presence of toxic pesticides or herbicides, aldrin, PCBs, DDT or harmful hydrocarbon vapors. The test program is continuing, so that additional tests of subsurface material will continue to demonstrate the presence or absence of potential hazards. The continuing test program will address both subsurface soils and airborne particles.

Test results have demonstrated the presence of lead in excess of the State of California Department of Health Services (DOHS) criterion level of 1,000 ppm. Airborne lead levels have been measured to be far below the CAL/OSHA permissible exposure limit. Avoidance of contact with and/or ingestion of soil containing lead, therefore, is an important objective of the Hygiene and Safety Plan.

HYGIENE AND SAFETY PLAN. The following information is provided to amplify and clarify several questions about the plan:

1. What are the objectives of the plan?

   Answer. The plan is designed to minimize worker contact with lead to an acceptable level and to monitor construction site conditions.

2. Will wash facilities be provided?

Answer. Yes, by The Martin Company (Owner) and DEVCON (General Contractor). These are operative now.

3. What is a "worst case" area?

Answer. The hazard potential is low throughout the site.

Tests four feet below the surface along the Christie Street alignment demonstrated the absence of volatile organics and permissible levels of airborne lead. Tests were performed by the Industrial Hygienist and scientists before street construction began.

Based upon these tests, it was determined by the Industrial Hygienist that respirators are not necessary. Work site monitoring will continue, so that new test results will be available as work progresses.

4. What is "emergency response" or "contingency planning"?

Answer. Past tests cannot predict unexpected, unknown events. Therefore, the Hygiene and Safety Plan includes measures for proper response to unexpected conditions (e.g., encountering any material of unusual appearance) and work-related accidents.

5. What about work site presence by the Industrial Hygienist?

Answer. The Industrial Hygienist will be present during sampling of airborne dust levels and during drilling operations. Presence of the Industrial Hygienist after initial grading, trenching, or other underground activity will be at the discretion of the Industrial Hygienist. At all times, the Industrial Hygienist will be available on call from either of two offices in Emeryville and Richmond, California.

6. Will "adjusted" procedures be given in writing?

Answer. Generally, procedures in the Hygiene and Safety Plan and Addendum will not be adjusted. Procedures will be subject to the interpretation of the Industrial Hygienist, who may decide upon such matters as appropriate levels of protection, appropriate times of his work place monitoring, and environmental sampling (e.g., sampling for airborne lead levels).

7. What is the basis of the procedures?

Answer. Again, the Hygiene and Safety Plan and Addendum have been prepared by the Industrial Hygienist. The plan is in compliance with CAL/OSHA requirements and was prepared with due regard for known or potential conditions at the site.

8. Are blood tests to be given to each employee?

Answer. No. Blood tests are being offerred to each employee, if desired, at the owner's expense. However, the tests are optional and are not required based upon the CAL/OSHA regulations.

9. Who will provide, distribute, and collect disposable protective clothing?

Answer. This clothing will be provided by The Martin Company and distributed on the work site by DEVCON. DEVCON will also provide a disposal receptacle.

10. What is the contingency measure if groundwater is encountered?

Answer. If groundwater is encountered, work should be stopped in the immediate vicinity by those workers who would otherwise contact the groundwater. The Industrial Hygienist will be called to sample the water and test it on a "fast turnaround" basis, before the water is discharged to the storm drain system.

11. Who is the "prime contractor" mentioned in the Hygiene and Safety Plan?

Answer. "Prime Contractor" here refers to the firm of Earth Metrics Incorporated, which has been retained by The Martin Company. Earth Metrics Incorporated is under contract to The Martin Company to perform tests of subsurface and excavated soils, in the context of a hazardous materials characterization study for the County of Alameda. The county has received a copy of this Hygiene and Safety Plan.

Thermo Analytical, Inc. is the subcontractor to Earth Metrics Incorporated, which has been retained by Earth Metrics Incorporated to prepare the Hygiene and Safety Plan and provide the services of an Industrial Hygienist. Thermo Analytical, Inc. has offices in Richmond and Emeryville, California.

_____ _____

Certified Industrial Hygienist
THERMO ANALYTICAL

Date

ATTACHMENT B

Environmental Operations and Monitoring Plan, 6425-6475 Christie Avenue, Emeryville, California, dated 2 November 2007, prepared by Stellar Environmental Solutions, Inc.

ENVIRONMENTAL OPERATIONS AND MONITORING PLAN

BAY CENTER OFFICES
6425-6475 CHRISTIE AVENUE
EMERYVILLE, CALIFORNIA

Prepared for:

BAY CENTER INVESTOR LLC
AND HARVEST PROPERTIES

November 2007

STELLAR
ENVIRONMENTAL SOLUTIONS, INC.
GEOSCIENCE & ENGINEERING CONSULTING

ENVIRONMENTAL OPERATIONS AND MONITORING PLAN

BAY CENTER OFFICES
6425-6475 CHRISTIE AVENUE
EMERYVILLE, CALIFORNIA

Prepared for:

BAY CENTER INVESTOR LLC
C/O HARVEST PROPERTIES
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EMERYVILLE, CALIFORNIA 94608

Prepared by:

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November 2, 2007

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GEOSCIENCE & ENGINEERING CONSULTING

November 2, 2007

Ms. Sarah Irving
Bay Center Investor LLC
6475 Christie Avenue, Suite 550
Emeryville, CA 94608

Subject: Environmental Monitoring and Operations Plan
6425-6475 Christie Avenue, Emeryville, California

Dear Ms. Irving:

This report is being provided to Bay Center Investor LLC and Harvest Properties as a summary of the current environmental monitoring and remediation activities at the Bay Center Offices and Emery Bay Condo Phase I Parking Garage. The report provides an overview of environmental issues for prospective tenants, and documents current restrictions and future monitoring requirements to assist building maintenance and engineering personnel. Information is presented on air, soil, and groundwater restrictions; monitoring; and equipment maintenance (where applicable). The report also contains a brief assessment of the current potential pathways of exposure. Information summarized in this report is from previous historical environmental documents that have been approved by the historic lead regulatory agency (Alameda County Health Care Services Agency, Hazardous Materials Unit) and the current lead agency (Alameda County Department of Environmental Health).

We declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of our knowledge. Please call the undersigned at (510) 644-3123 if you have any questions.

Sincerely,

Teal Glass

Teal Glass, R.E.A.
Senior Environmental Scientist

Richard S. Makdisi

Richard Makdisi, R.G., R.E.A.
Principal

TABLE OF CONTENTS

APPENDICES

TABLES AND FIGURES

1.0 INTRODUCTION

PROJECT DESCRIPTION

Stellar Environmental Solutions, Inc. (SES) was retained by Bay Center Investor LLC to complete this report summarizing environmental issues for prospective tenants and documenting current restrictions and future monitoring activities to assist building maintenance and engineering personnel. This report includes information on air, soil and groundwater restrictions; monitoring; and equipment maintenance (where applicable). This report also covers all of the elements of environmental monitoring currently being conducted on-site. The foundation document for the monitoring requirements was designed and codified in the deed restriction before the office building was constructed in 1987.

During a broad-based site investigation in 1985/1986, several potential chemicals of concern were identified: methane in soil-gas, heavy metals in soil, and petroleum hydrocarbons in groundwater. The remedies and post-remedy monitoring were designed to address these concerns and all remedial actions were approved by the regulatory agencies. Several updated reports on monitoring and maintenance, prepared since the construction of the building, outline maintenance, health and safety, and construction issues on various areas of the subject property site. This report summarizes those documents to create one guidance document for use by prospective tenants and building maintenance personnel.

PURPOSE AND SCOPE OF WORK

The objective of this report is to synthesize into one comprehensive guidance document, information on all of the onsite environmental monitoring activities currently being conducted. At this time, three elements of environmental monitoring/maintenance activities are operating at the Bay Center Offices and Emery Bay Condo Phase I Parking Garage. These include: 1) methane monitoring in stairwell, electrical rooms, and elevator pits in the Bay Center Offices; 2) earthwork restrictions and capping of contaminated soil by means of the asphalt parking lot at the Bay Center Offices; and 3) groundwater monitoring and free product extraction in the Emery Bay Condo Phase I Parking Garage.

This guidance document outlines the maintenance procedures, sampling/maintenance schedules, emergency protocols, and tenant requirements agreed on by the subject property owner, in conjunction with the lead regulatory agency for the site, the Alameda County Department of Environmental Health (ACEH).

This report is organized as follows:

- Section 1.0: Project Description and Purpose
- Section 2.0: Environmental Background History and Regulatory Involvement
- Section 3.0: Methane Air Quality System Maintenance and Monitoring
- Section 4.0: Earthwork Restrictions and Monitoring Requirements
- Section 5.0: Groundwater Monitoring and Remediation at the Emery Bay Condo Phase I Parking Garage
- Section 6.0: Exposure Pathways and Risk Criteria
- Section 7.0: Limitation
- Section 8.0: References

2.0 SUBJECT PROPERTY DESCRIPTION AND HISTORY

This section describes the subject property and discusses the current and historical environmental issues. The subject property description and history are based on a previous April 2007 Phase I completed (SES, 2007) and several historical environmental documents (a complete listing is included in Section 8.0).

SUBJECT PROPERTY DESCRIPTION

Figure 1 is an aerial photograph showing the general location of the subject property. Figure 2 shows the subject property and adjacent land uses. Figure 3 presents the subject property site layout.

The property is located at 6425-6475 Christie Avenue (Assessor's Parcel Numbers 049-1491-004, 049-1491-007, 049-1491-008, and 049-1491-011), on the west side of the street, with parking fronting Interstate Highway 80 (I-80), in Emeryville, Alameda County, California. The property encompasses approximately 7.63 acres, and is improved by three office buildings (with a total area of 327,750 square feet). The remainder of the subject property is covered with asphalt parking lots, hardscape, and landscaping.

The subject property is located adjacent to San Francisco Bay in western Emeryville, and the Bay Center office buildings are located on a historical shellmound above the relatively flat area to the immediate east and south. As Emeryville expanded, the tidal flats adjacent to the San Francisco Bay were filled, often with construction-type debris. The current I-80 that fronts the subject property to the west is on fill that sits over original tidal flats. The Bay Center Offices and the adjacent Emery Bay Condos were developed in approximately 1987 and 1989 respectively. The site gradient is relatively flat, with a gently sloping east and west region. The mean elevation of the property is about 13 feet above mean sea level (amsl). The site is on partial fill and alluvial sediments (silt, sand, and clay) overlying bedrock at an uncertain depth. The site is located approximately 700 feet east of the San Francisco Bay, and about 2.5 miles west of the Oakland hills that rise to approximately 1,000 feet amsl. Rainwater runoff drains onto the asphalt parking lot, from where it is conveyed to the municipal storm sewer system, and subsequently discharged untreated into the San Francisco Bay.

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SITE LOCATION ON AERIAL PHOTO

6425-6475 Christie Ave. Emeryville, CA	By: MJC	APRIL 2007
	Figure 1	

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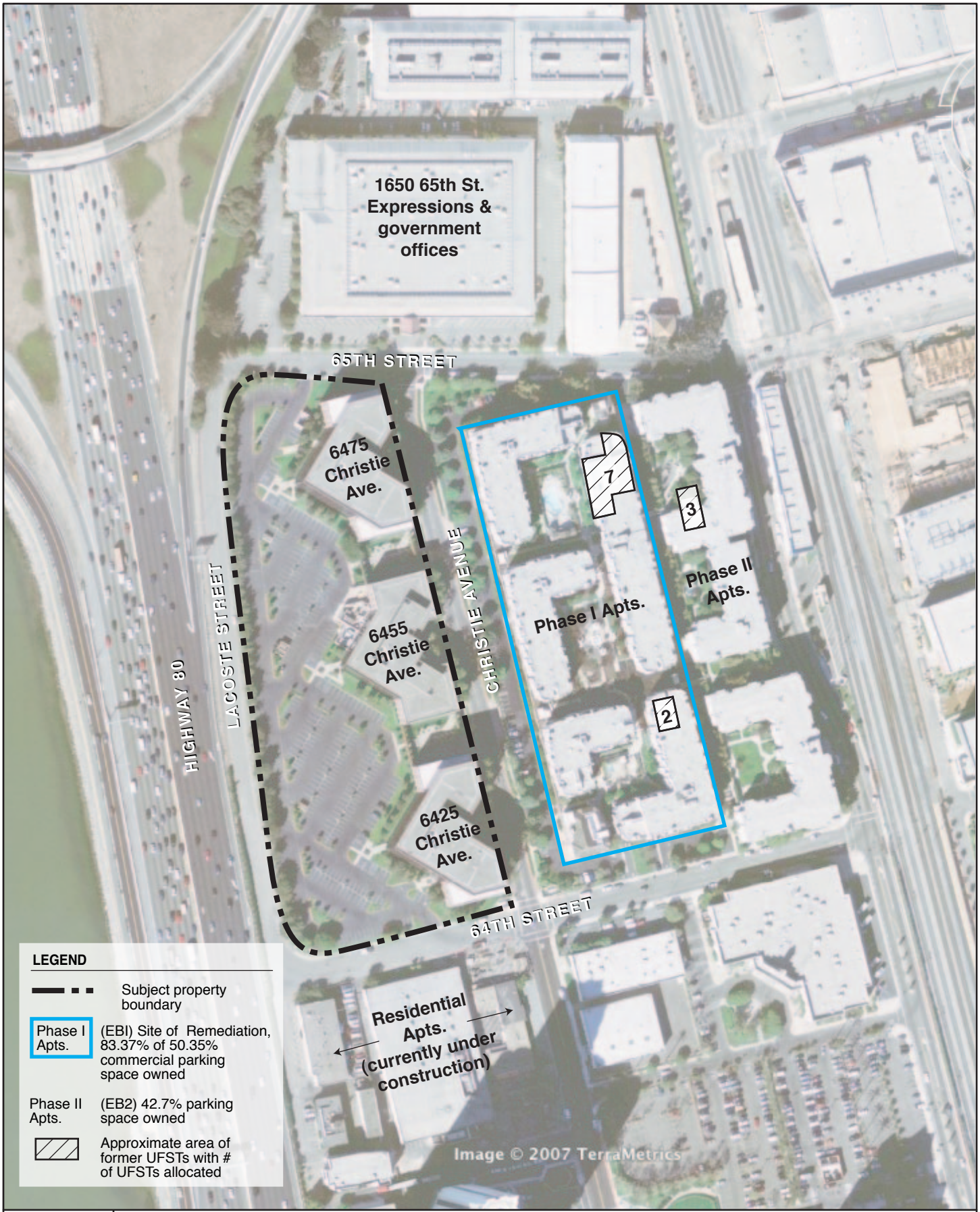
2007-19-01



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SITE MAP AND ADJACENT LAND USE

6425-6475 Christie Ave. Emeryville, CA	By: MJC	APRIL 2007
	Figure 2	

STELLAR ENVIRONMENTAL SOLUTIONS, INC
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2007-19-02

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SITE MAP AND ADJACENT LAND USE

6425-6475 Christie Ave. Emeryville, CA	By: MJC	APRIL 2007
	Figure 3	

STELLAR ENVIRONMENTAL SOLUTIONS, INC
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2007-19-03

MONITORING LOCATIONS

6425-6475 Christie Ave.
Emeryville, CA

By: MJC | AUGUST 2007

Figure 4

STELLAR ENVIRONMENTAL SOLUTIONS, INC
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2007-53-02

The Bay Center Offices property also utilizes the adjacent parking structure and retains 83.3 percent ownership of 50.35 percent of the commercial section of the Emery Bay Condo Phase I Parking Garage (and 42 percent of the joint parking area not under remediation). These percentages correspond to the share in the fiscal responsibility to complete site cleanup activities associated with an active underground fuel storage tank (UFST) site in the parking structure area. The lead regulatory agency providing oversight of the active cleanup and monitoring project is ACEH.

SUBJECT PROPERTY ENVIRONMENTAL HISTORY

The subject property parcel was developed as early as 1958 with the Motor Freight Station associated with Delta Lines, Inc. The Delta Lines, Inc. company complex contained another structure, the "Oil and Gas" building, at the location of the present-day Emery Bay Condo Phase I Parking Garage across Christie Avenue and to the east. This building continued to occupy the subject property when the Garrett Freight Lines Company's building was constructed on the southern end of the subject property in approximately 1967. The two buildings remained on the property until 1986, when they were demolished to build the present-day structures. Twelve UFSTs containing diesel and gasoline were removed from the Emery Bay Condo Phase I Parking Garage parcel in 1987. Contaminated soil and groundwater was discovered during the UFST excavation. Remediation began in 1991, and the system is currently operating toward full remediation. Surrounding areas were in industrial use from the 1900s to the late 1980s. Land use in the area has changed, and continues to change, from industrial to commercial and residential.

The Bay Center Offices utilizes the adjacent parking structure and retains part ownership of the commercial section of the Emery Bay Condo Phase I Parking Garage. Subsurface contamination beneath the Emery Bay Condo Phase I Parking Garage, discovered during construction activities, originated from the trucking terminal that was operated by the Garrett Freight Lines Company and Delta Lines, Inc. and existed at the site of the Emery Bay Condos before their development in the late 1980s. In response to the contamination, a groundwater pump and treat system was installed in 1990 and replaced in 2006. Several monitoring wells were subsequently installed to monitor contaminant concentrations in groundwater. Remediation is currently ongoing. Monitoring well locations, extraction systems, and sampling schedules are discussed in Section 5.0; and Figure 5 (in Section 5.0) shows the location of the petroleum plume. Exposure pathways, symptoms, and toxicity levels for petroleum hydrocarbons and daughter products are addressed in Section 6.0.

In the late 1980s, high concentrations of lead were discovered in soil during construction activities of the Bay Center Offices. To remedy the problem, all exposed soil was covered with

an asphalt cap. Landscaped areas were not to be in direct contact with the contaminated soil at ground level, and were placed in raised beds or planters using uncontaminated loam fill. An earthwork safety plan was developed concerning construction activities around the contaminated soil (Earth Metrics, 1987a); this plan was reviewed and placed on file with the ACEH, and is considered the basic protocol for all subsurface activity on the subject property. In 2007, the safety plan was also utilized by PES Environmental, Inc. (PES) to address the encroachment of the cap during recent construction activities. Cap maintenance protocols, as well as earthwork management, are discussed in Section 4.0. Exposure pathways, symptoms, and toxicity levels for lead are addressed in Section 6.0.

Relatively high levels of methane gas (often associated with areas of landfilling of organic waste) were found—on both the Bay Center Office Complex site and the Emery Bay Condo sites. Based on the elevated methane levels, ACEH required active methane monitoring systems and venting mechanisms for any subgrade "pits." Such pits are required to be sealed off from contaminated soil if these systems are not in place. Both the Phase I and Phase II Emery Bay Condo complexes contain methane alert systems in the elevator pit areas of the Emery Bay Condo Phase I Parking Garage; however, these pits are not a part of the required monitoring for the Bay Center Offices. Each of the three Bay Center Offices office buildings has a methane monitoring device in the elevator pit, electrical room, north stairs, and south stairs. Both of these buildings have active ventilation systems to support the methane systems. Maintenance, alert systems, and inspection schedules are discussed in Section 3.0. Exposure pathways, symptoms, and toxicity levels for methane are addressed in Section 6.0.

REGULATORY HISTORY

A letter from Alameda County Health Care Services, Hazardous Materials Division to the Martin Company (i.e., the historical owner) indicates that this agency was involved from the beginning of construction on the Bay Center Offices site (Alameda County Health, 1986). This letter requested further soil characterization, health and safety plans for contaminated soil, gas well installation to monitor methane levels, and remedial options for characterized contamination. Subsequent letters from the Martin Company to Alameda County Health Care Services Agency, Hazardous Materials Division indicate that workplans were developed for contaminated soil, and that methane systems were installed due to high accumulations of methane in gas wells (Martin Company, 1986a and 1986b). The parking area was covered with 18 inches of fill soil and asphalt to encapsulate contaminated soil (Martin Company, 1987a). A deed restriction was recorded in 1990 for both the Bay Center Offices Complex and the Emery Bay Condos.

Twelve UFSTs were removed from the Emery Bay Condo Phase I Parking Garage site in the late 1980s. Treatment systems and monitoring wells were originally installed at the Emery Bay Condos in 1990 to satisfy requirements for wastewater and air discharge permits by the East Bay

Municipal Utilities District (EBMUD) and Bay Area Air Quality Management District. Subsequent monitoring event reports were submitted to EBMUD as a condition of the permit until construction was complete in approximately 1992. Groundwater monitoring and extraction resumed in 2004 after it was recommended in a 2004 Phase I Site Assessment (LFR, 2004).

There is a lack of documented correspondence regarding the 1990 deed restriction between owners and the Alameda County Health Care Services, Hazardous Materials Division—until a 2007 letter notifying ACEH of the subsurface work for the Jamba Juice Pit (PES, 2007b). In 2007, SES contacted Mr. Barney Chang, the then current case officer with ACEH, regarding the possibility of modifying the deed restriction to exclude the Emery Bay Condos. (As of the date of this report, the case manager for the subject property is currently being reassigned). However, more information (including an upload of all technical environmental documentation to the State Water Resources Control Board's GeoTracker website) was requested by ACEH in June 2007. The Bay Center Offices and Emery Bay Condos are currently combined, with one site identification number—RO0002799 and Global ID SLT2O05561 under the Garrett Freight Lines/Bay Center, 64th & Lacoste, Emeryville, CA 94608. As of August 2007 Mr. Barney Chang of ACEH is no longer the case officer for the subject property since it is to be reassigned to another case officer.

3.0 METHANE AIR QUALITY MONITORING

INTRODUCTION

As discussed in Section 2.0, the subject property is located on an area that had been filled to increase the shoreline. Fill materials often consisted of off-site soils, wood, refuse, and construction debris.

As such materials naturally degrade, methane is produced, sometimes at levels considered harmful for humans or that pose a potential for ignition. Methane enters the body through inhalation, and can therefore be mitigated through engineering controls such as asphalt parking lots and building slabs.

To ensure that levels of methane do not reach a level of concern at the subject property, methane monitoring systems were installed in below-ground areas or areas that have access to below-ground systems (such as electrical rooms). Section 6.0 discusses toxic exposure levels and pathways of exposure for methane.

METHANE MONITORING LOCATIONS

As discussed in Section 2.0, four monitoring locations were established for each of the Bay Center Offices: the north stairs, south stairs, elevator pit, and electrical room. See the deed restriction, attached in Appendix A, for the original drawing of monitoring locations (Earth Metrics, 1987b). Appendix E contains the Methane Monitoring descriptions. Each elevator pit in the Phase I and Phase II Emery Bay Condos contain methane monitors; however, the monitoring for these systems is being completed by the owner of the Emery Bay Condo building, and is not the responsibility of the Bay Center Offices or Bay Center Investor LLC.

SES verified each of the Bay Center Office monitoring locations during the site inspection. Figure 4 shows their approximate locations.

SYSTEM DESIGN AND MAINTENANCE

System Design

The Solvent Vapor Alarm is a warning system for toxic or flammable gases or vapors in a work space. The ambient atmosphere is monitored and, if vapor concentrations exceed a preset level, audible and visual signals are activated. The multi-channel dual level alarm has a provision for up to six independent points of detection, each of which may be independently calibrated for a high- and low-alarm level. All channels maintain the same audible signal and two common alarm relays (for the high and low concentrations), and have a common trouble relay. Appendix E contains system schematics, recommended settings, and instruction manuals per specific model. Currently, the monitors are calibrated to set off the alarm when 10 percent of the lower explosive limit (LEL) for methane is reached, and again if 20 percent of the LEL is reached. The LEL for methane occurs when 5 percent (or 50,000 parts per million [ppm]) of the ambient air is composed of methane gas. This system was approved by the Emeryville Fire Department prior to installation in 1986.

Although the models themselves do not require routine maintenance, such maintenance is recommended to ensure the machines and alarms are working properly. The following is a list of routine tasks and schedules to ensure proper alarm functioning.

<u>Daily</u>

- Verify that amber light is visible (if the amber light is out, the system is not functioning)
- Verify recorder operation

<u>Weekly</u>

- Check for meter reading on zero

<u>Quarterly (recommended by trained staff or personnel)</u>

- With a known calibration gas sample, recheck and reset sensitivity
- Expose detector to combustible gas, and confirm operability of indication and alarm systems

<u>As Required (recommended by trained staff or personnel)</u>

- Readjust zero whenever meter drifts more than 5 percent
- Replace detector whenever it becomes impossible to complete zero or calibration steps

CURRENT METHANE MONITORING SCHEDULE

The onsite engineering staff is conducting methane maintenance on a daily and weekly basis. Quarterly monitoring and system upkeep is being conducted by Thermo Environmental Systems, Inc. Appendix E contains the quarterly monitoring reports. Subsequent monitoring event reports should be added to Appendix E as they are provided. A list of contact names is included in Appendix G.

No methane has been detected above the LEL since the installation of the system.

4.0 EARTHWORK RESTRICTIONS AND MONITORING

High levels of lead were discovered in soil stockpiles during the construction of the Bay Center Offices. The origin of the contamination is unclear, but is most likely due to the historic activities from the Garrett Freight Lines and fill at the site. At the time of the historic activities, the appropriate method of control recommended by the then lead agency, the Alameda County Hazardous Materials Unit, was to cap the soil and prevent exposure. Humans are exposed to toxic levels of lead through digestion and sometimes inhalation. By covering the contaminated soil with at least 18 inches of clean soil fill, and then asphalt, there is no direct contact between the contaminated soils and human interaction. The lead agency also required that native soil not be used in landscaped areas, and that landscape beds (containing clean soil fill) be placed above the asphalt surface. A 1990 deed restriction specifically addressed the high levels of heavy metals, and stated that any future subsurface work first be approved by ACEH. A copy of the deed restriction is included in Appendix A.

INTRODUCTION

A detailed Safety Plan was developed in 1987 (Earth Metrics, 1987a), and approved by the Alameda County Hazardous Materials Unit, to address any future construction work at the Bay Center Offices. The levels of lead in soil are not hazardous with regard to casual encounters; however, they would be hazardous with prolonged exposures (which would occur during maintenance or construction activities). Therefore, the Safety Plan is to be kept onsite by the "responsible person," which is defined as the building owner or manager, and must be provided to any workers involved in subgrade construction or maintenance activities. A copy of the Safety Plan is included in Appendix C, and its key points are summarized below.

SUBGRADE CONSTRUCTION OR MAINTENANCE

The purpose of the 1987 Safety Plan was to prevent prolonged exposure by maintenance, construction, or inspection workers to lead contaminated soil. Therefore, it is specifically stated that no regulated work may be completed without a review of the Safety Plan by those workers involved. The following activities are considered regulated work:

- **Subsurface Construction or Repair.** This refers to any activity that occurs below grade level of the existing pavement, concrete, or Christie Street.

- **Landscaping Deep Work.** This refers to any landscaping activity below the level of the 18 inches of clean fill.
- **Utility Line Work.** This refers to any subterranean inspection, excavation, or repair of electrical, telephone, water, sanitary sewer, or storm drains that occurs outside the existing vaults.
- **Sub Slab Work.** This refers to any work that takes place beneath the slab of the Bay Center offices, Emery Bay Condos, or Emery Bay Condo Phase I Parking Garage.
- **Major Subsurface Construction.** This refers to any construction or maintenance involving the subgrade level beneath the asphalt, building slab, or concrete walkway, and that continues for 1 month or longer.
- **Other.** This refers to other subgrade activities not expressly listed above—e.g., groundwater well installation.
- **Exemptions.** Exemptions from the Safety Plan include routine landscaping maintenance not involving tree planting or removal of loam.

After determining the applicability of the activity by the responsible person, the following must be completed by the responsible person prior to any regulated activity:

- Per written notification, notify ACEH of the construction activity;
- Per written and oral briefing, notify any contractors or utility workers concerning necessary precautions; and
- At the conclusion of the work, provide written notice of Regulated Work Completion to ACEH.

Each construction activity shall maintain its own Health and Safety Plan (such as that written for the Jamba Juice pit installation in 2006) to specifically address the planned activity. Stockpiled soils should be covered and maintained on site, until sampling may be conducted to assess disposal criteria. The air should be monitored, and dust control methods used to prevent exposure. Appendix B contains a list of activity specific required safety gear and sanitation controls.

ASPHALT CAP MAINTANANCE

Assuming that the existing cap is in good condition, and no cracks are observed, the following maintenance tasks should be followed to ensure the integrity of the cap. All of these activities should be documented in a cap maintenance log, a copy of which is included in Appendix D.

Quarterly

- Maintenance staff should conduct a general walk-through of the Bay Center offices parking area, to ensure that no breaches or cracking have occurred in the asphalt cap; such faults may cause permeation through the cap and inadequate drainage.
- Breaches or cracking should be immediately reported to the responsible person, and repairs should be immediately addressed using the procedures listed above.

Yearly

- Landscaped areas should be topped with clean fill soil.
- The cap should be inspected by trained personnel, and should include documentation of cracking and breaching, as well as the integrity of sloping and grading to ensure proper drainage.

5.0 GROUNDWATER MONITORING AND REMEDIATION

INTRODUCTION AND BACKGROUND

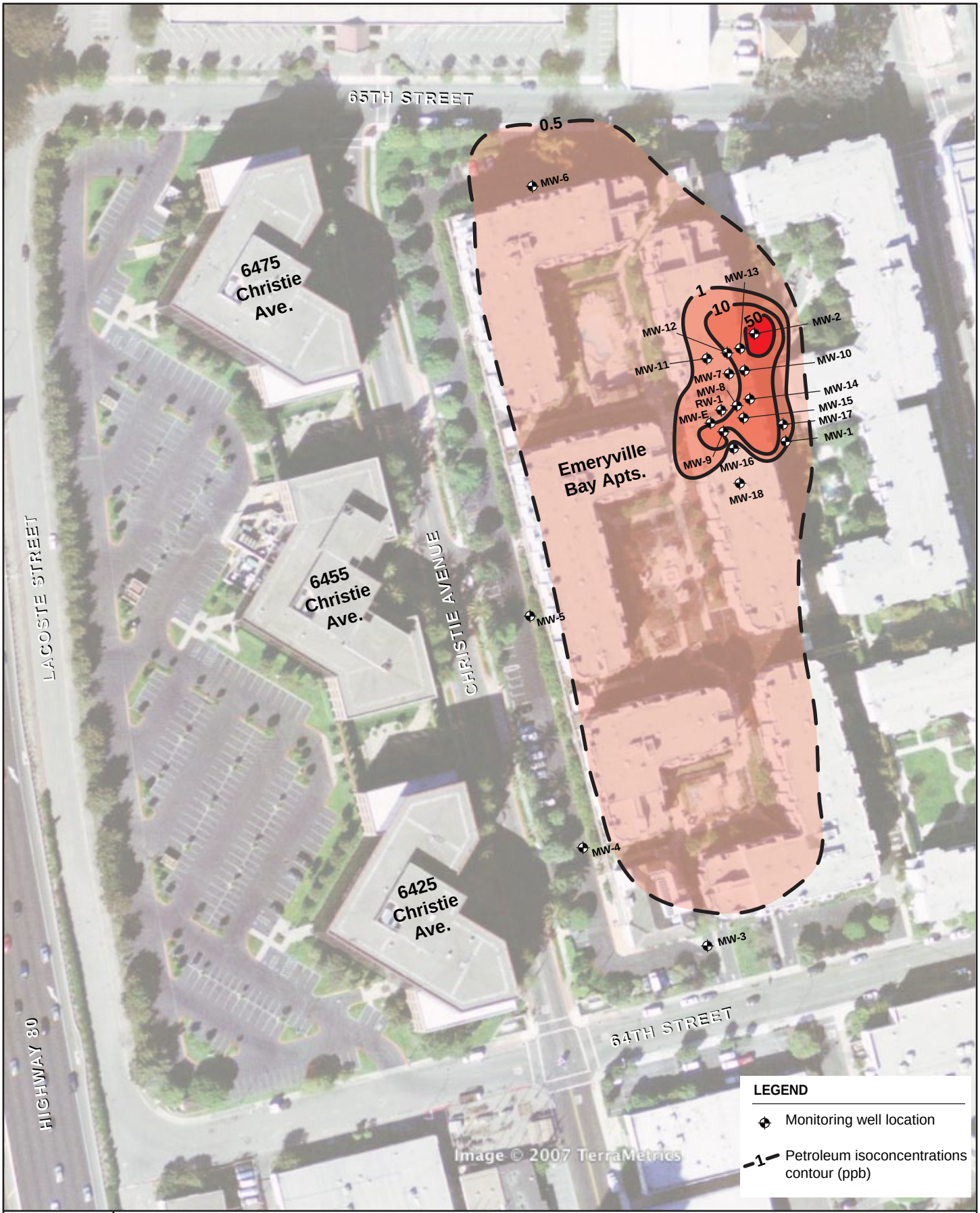
The subsurface contamination underneath the Emery Bay Condo Phase I Parking Garage originated from the operations at a trucking terminal operated by two trucking companies that existed at the site of the Emery Bay Condos before their current development in 1986. Site investigations identified UFSTs in three areas of the trucking terminal. These UFST areas were referred to as Tank Pits A and B (each of which contained one 10,000-gallon diesel tank) and Tank Pit TC-1 (which contained four 12,000-gallon diesel tanks, two 10,000-gallon diesel tanks, and one 6,000-gallon gasoline tank). Seven tanks were originally located on the northern portion of the Phase I Emery Bay Condo property; two tanks were originally located on the southern portion. Three tanks were located on the northern portion of the Phase II Emery Bay Condo property. A total of 12 tanks were removed from the Phase I and Phase II complexes.

Figure 4 presents the approximate locations of the UFSTs. Figure 5 shows the generalized location of the petroleum plume based on the most recent 2006 monitoring data.

In response to the contamination, in 1990, a light non-aqueous phase liquid (LNAPL) groundwater pump and treat system was installed by Groundwater Technology, Inc. However, corrosion and other mechanical problems in 1990 caused the system to fail. Recovery of LNAPL continued manually on RW-1 until 1991; in 1994, the original system was removed.

Subsequently, PES began conducting regularly scheduled manual product removal on the recovery well the same year. PES completed the installation of a new LNAPL system (including three trench areas) from April 18 to May 2, 2006 to enhance the remediation process (PES, 2007a).

In 2004, PES installed an additional 10 groundwater monitoring wells, bringing the current total to 19 monitoring wells and 1 extraction well in the Emery Bay Condo Phase I Parking Garage.



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GROUNDWATER PETROLEUM HYDROCARBON PLUME

6425-6475 Christie Ave.
Emeryville, CA

By: MJC | AUGUST 2007

Figure 5

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2007-53-03

MONITORING SCHEDULE AND MAINTENANCE

The 20 monitoring wells are currently being sampled on a biannual basis per agreement with ACEH. Annual groundwater monitoring reports are required to be uploaded to the State GeoTracker database and are available for public viewing. The monitoring wells themselves do not require maintenance, but are evaluated during each sampling event as to their overall condition.

The LNAPL system is operated approximately every 3 to 4 weeks as needed (PES, 2007a). Any product removed is sampled and properly disposed of in accordance with landfill requirements. The LNAPL system does not require routine maintenance, but its condition is evaluated on a biannual basis.

6.0 EXPOSURE PATHWAYS AND RISK CRITERIA

The primary contaminants of concern at the Bay Center Offices and Emeryville Bay Parking Structure are:

- lead in soil
- methane in ambient air
- total petroleum hydrocarbons as gasoline (TPHg); total petroleum hydrocarbons as diesel (TPHd); total petroleum hydrocarbons as motor oil (TPHmo); methyl tertiary-butyl ether (MTBE); and benzene, toluene, ethyl benzene, and total xylenes (BTEX); all in groundwater

Each of these chemicals and metals exhibit different exposure pathways and have unique toxicity levels based on their inherent characteristics. Table 1 contains a list of these chemicals/metals, along with their primary routes of exposure, exposure characteristics, and toxicity levels. The contaminants are discussed in detail below.

LEAD IN SOIL

The primary routes of exposure to lead—and zinc to a lesser degree—are through the skin and/or by ingestion of particulates. There is little effect from short-term exposure to lead; however, long-term particulate exposure (such as that exhibited during subgrade construction activities) may pose a significant health risk. According to the U.S. Environmental Protection Agency (EPA), ambient air should not exceed 1.5 micrograms per cubic meter ($\mu g/m^3$) in an average month. According to the Occupational Safety and Health Administration (OSHA), work place lead levels in air should not exceed 50 $\mu g/m^3$, or 30 $\mu g/m^3$ in an 8-hour period as the recommended action level. There has been no indication that particulate levels of lead in ambient air have exceeded the recommended levels during construction activities at the subject property.

METHANE IN AIR

Methane levels in soil at the Bay Center Offices site originally were at concentrations of 2,700 to 4,700 ppm, or 10 percent of the LEL. The LEL for methane is 5 percent in ambient air, or 50,000 ppm. Subsequent investigations at the subject property found little material that could create

Table 1
Exposure Pathways and Risk Criteria

Contaminant Name	Exposure Pathways	Exposure Symptoms	Toxicity
Lead	inhalation, ingestion, and dermal contact	decreased libido, depression/mood changes, headache, diminished cognitive performance, diminished hand dexterity, diminished reaction time, dizziness, fatigue, forgetfulness	400 ppm by weight and 1,200 ppm for non-play areas for lead in soil
Methane	inhalation	nausea, vomiting, difficulty breathing, irregular heartbeat, headache, drowsiness, fatigue, dizziness, disorientation, mood swings, tingling sensation, loss of coordination, suffocation, convulsions, unconsciousness, coma	50,000 ppm or 5% of LEL; asphyxiation at 500,000 ppm
TPHd, TPHg, TPHmo	inhalation, ingestion, skin absorption, eye contact	dizziness, drowsiness, headache, nausea, eye irritation	430 mg/L for groundwater
MTBE	inhalation, ingestion, skin and/or eye contact	irritation to nasal passages, vertigo, nausea, headache, dyspnea	1.5 mg/L for groundwater
Xylenes	inhalation, ingestion, skin absorption, skin and/or eye contact	dizziness, excitement, drowsiness, incoordination, staggering gait, eye irritation, nose irritation, throat irritation, corneal vascularization, anorexia, nausea, vomiting, abdominal pain, dermatitis	31 mg/L for groundwater
Ethyl Benzene	inhalation, ingestion, skin and/or eye contact	eye irritation, mucous membrane irritation, headache, dermatitis, narcosis, coma	14 mg/L for groundwater
Toluene	inhalation, skin absorption ingestion, skin and/or eye contact	fatigue, weakness, confusion, euphoria, dizziness, headache, dilated pupils, lacrimation, nervousness, muscle fatigue, insomnia, paresthesia, dermatitis, photophobia	4.4 mg/L for groundwater
Benzene	inhalation, skin absorption, ingestion, skin and/or eye contact	eye irritation, nose irritation, respiratory system irritation, giddiness, headache, nausea, staggered gait, fatigue, anorexia, lassitude, dermatitis, depression, abdominal pain	6.7 mg/L for groundwater

Notes:

MTBE = methyl tertiary-butyl ether; TPHd = total petroleum hydrocarbons as diesel; TPHg = total petroleum hydrocarbons as gasoline; TPHmo = total petroleum hydrocarbons as motor oil

LEL = lower explosive limit

mg/L = milligrams per liter; ppm = parts per million

Toxicity levels were obtained from the U.S. Environmental Protection Agency.

landfill gas, and emissions were deemed most likely due to petroleum hydrocarbons (see the Petroleum Hydrocarbon and Daughter Product subsection below). However, because the subject property is constructed on known fill material, the gas monitoring and ventilation system was installed as an extra precaution to protect occupants from dangerous accumulations that could create explosion or fire. OSHA has no Permissible Exposure Limit (PEL) for methane because ignition is considered the driving risk factor.

The risk of explosion or fire is considered very unlikely; however, the current ventilation system (located in areas of foundation penetration) circulates the air at a rate of five exchanges per hour. This is sufficient to keep gas accumulation well below 20 percent of the LEL.

PETROLEUM HYDROCARBONS IN GROUNDWATER

A large part of the contaminated soil found beneath the Emery Bay Condos was extracted and disposed of during construction; however, some levels of contamination remain in subsurface groundwater. Figure 5 shows the location of the petroleum plume. The toxicity levels for the chemicals of concern (TPHg, TPHd, TPHmo, MTBE, and BTEX) are applicable for direct contact with the contaminant. The groundwater is located approximately 6 to 11 feet below ground surface, covered by soil and the concrete slab of the building. Direct contact with groundwater will only be applicable for environmental consultant personnel actually sampling the wells and removing free product. Any environmental firm working with groundwater onsite should have their own Health and Safety Plan that discusses the appropriate health and safety measures necessary for working with these contaminants.

The EPA has published Environmental Screening Level (ESL), which are guidelines for indoor air intrusion by chemical vapors. The ESLs determine a level at which further testing of indoor air is required in relation to the contaminants present in groundwater. According to the latest groundwater monitoring data for December 2006, the highest concentrations found for xylenes (3,500 µg/L), ethyl benzene (480 µg/L), toluene (1,100 µg/L), and MTBE (<400) were well below their respective ESLs of 160,000 µg/L, 170,000 µg/L, 380,000 µg/L, and 80,000 µg/L, respectively.

The concentration of benzene in groundwater measuring 18,000 µg/L was above the ESL of 1,800 µg/L; however, this does not pose an issue to the tenants of the Bay Center Offices. The parking area is open air; therefore, the rate of air exchange is much higher than it would be in an interior space. Based on the quantity of time a tenant would spend in the Emery Bay Condo Phase I Parking Garage area (presumably less than 8 hours), the elevated concentration would not be a concern. There are no levels published comparing petroleum hydrocarbon contamination in groundwater to indoor air intrusion (levels are compared only for soil-gas samples); however, elevated levels should not be a concern for the reasons stated above.

7.0 LIMITATIONS

This report has been prepared for the use of Bay Center Investor LLC and its members, property manager, tenants, and all of their authorized representatives. This summary document did not include any sampling or monitoring of the systems described.

The summaries and documentation presented in this report are based on a review of site-specific documents provided by the property owner and its agents such as historical environmental assessments, monitoring, and communication with regulatory agencies. This report has been prepared in accordance with generally accepted methodologies and standards of practice of the area. The personnel performing this assessment are qualified to perform such investigations and have accurately reported the information available, but cannot attest to the validity of that information. No warranty, expressed or implied, is made as to the findings included in the report.

The findings of this report are valid as of the date of this report. Subject property conditions may change with the passage of time, natural processes, or human intervention, which can invalidate the findings and conclusions presented in this report. As such, this report should be updated as needed with monitoring reports, inspection reports, contact information, and monitoring schedules.

8.0 REFERENCES

Alameda County Health Care Services Agency (Alameda County Health), 1986. Letter to the Martin Company requesting further site characterization, health and safety plans, and remedial options. May 1.

Earth Metrics, Inc., 1987a. Safety Plan for Bay Center Offices and Apartments in Emeryville, CA. September 15.

Earth Metrics, Inc., 1987b. Gas Detection, Alarm, and Ventilation System Safety Manual for Bay Center, Emeryville. December 1.

Levine-Fricke Recon, Inc. (LFR), 2004. Limited Phase I Environmental Site Assessment, 6400-6475 Christie Avenue, Emeryville, CA. April 20.

Martin Company, 1986a. Letter to Lowell Miller of Alameda County Health Care Services Agency documenting agreements for the construction workplan involving contaminated soil. June 5.

Martin Company, 1986b. Letter to Tom Owens of Emeryville Community Developers, Inc. documenting recognized contamination issues. May 21.

Martin Company, 1986c. Letter to Alameda County Health Care Services Agency, Hazardous Materials Unit regarding agreement to install methane venting systems and detectors. November 3.

Martin Company, 1987a. Letter to Alameda County Health Care Services Agency, Hazardous Materials Unit asserting that all exposed soil will be covered with asphalt, and that landscaped areas will be covered with 16 to 18 inches of clean soil. March 23.

Martin Company, 1987b. Letter to Department of Health Services, Toxic Substances Control Division stating that lead-contaminated soil will remain underneath the parking garages, and an environmental restriction will be placed on the property. March 26.

Martin Company, 1987c. Letter to Department of Health Services, Toxic Substances Control Division agreeing to methane ventilation systems, pit liners, and asphalt capping with a deed restriction. March 30.

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