GEOMATRIX

HEALTH AND SAFETY PLAN

EXCAVATION MONITORING

Kaiser Construction Services
Kaiser Hospital Site
280 West MacArthur Boulevard
Oakland, California

Geomatrix Consultants

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1.0 INTRODUCTION

This Plan provides health and safety procedures to be followed during removal of soil containing hazardous materials originating for a buried drum located at the Kaiser Hospital site in Oakland, California. The contents were determined to be pentachlorophenol, 2,4,5-trichlorophenol contaminated with dioxin and dibenzofuran isomers. The purpose of this plan is to inform and educate all personnel involved in on-site field work of the potential hazards associated with the site, to assign responsibilities, to establish personnel protective standards and safety procedures, and to provide for contingencies that may arise while activities are conducted at the site.

The provisions of this plan are mandatory for all on-site Geomatrix employees engaged activities associated with excavation monitoring and soil removal and shall be followed without acception unless specifically modified by the Project Manager and Health and Safety Officer. All contractors/ subcontractors shall provide a Health and Safety Plan for their employees, and subcontracting employees shall follow the health and safety procedures designated by their employer. The contractor/subcontractor may choose to use Geomatrix's Health and Safety Plan as a guide in developing its own action plan, or may choose to adopt Geomatrix's plan. In either case, the contractor/subcontractor shall hold Geomatrix harmless and indemnify it against all liability in case of injury.

Grossly inadequate health and safety precautions on the part of the contractor/subcontractor, or the belief that the contractor's/subcontractor's personnel are or may be exposed to an immediate health hazard, can be cause for Geomatrix to suspend further site work and ask that personnel to evacuate the hazard area. The contractor/subcontractor shall provide its own safety

equipment in accordance with its Health and Safety Plan requirements. In addition, the contractor/subcontractor shall comply with all applicable federal, state, and local health and safety regulations.

Field activities that may expose personnel to potential health and safety hazards are identified below:

- o Soil sampling and testing
- o Excavation monitoring

1.1 Site Location

The Kaiser Hospital site is located at 280 West MacArthur Boulevard near the intersection with Broadway in Oakland, California.

1.2 Site History

Geomatrix Consultants, Inc., was contracted by Kaiser Construction Services to assist in the removal of soil containing mineral spirits at the future location of a hospital addition. During excavation of the soil, a rusted buried durm was encountered. The contents of the drum leaked onto the soil within the excavation during removal of the drum. A sample of the soil containing the drum contents was sampled and identified to be pentachlorophenol and 2,4,5-trichlorophenol. Subsequent analysis indicated that the material in the drum also contained low concentrations of hexachloro-, heptachloro-, and octachlorodibenzodioxins and corresponding dibenzofurans.

2.0 ADMINISTRATIVE INFORMATION

Project Number: 1579C
Site Owner: Kaiser Permanante
Address/Location: 280 West MacArthur Boulevard, Oakland, California
Project Manager: Thomas E. Graf
Project Safety Officer: Debra Favre
Site Safety Officer: Cheri Young

3.0 RESPONSIBILITIES

A. Project Manager

The Project Manager (PM) shall: (1) direct all project activities, including contractor selection and site characterization activities; (2) make the Project Health and Safety Officer aware of all pertinent project developments and plans; and (3) make all resources available that are necessary for a safe working environment.

C. Project Safety Officer

The Project Safety Officer (PSO) shall direct all health and safety aspects of the investigation. The PSO has the primary responsibility to:

1. Ensure that all personnel have received required training, are aware of the potential hazards associated with site operations, are instructed in the work practices necessary for personal safety, and are familiar with the plan's procedures for dealing with emergencies.

2. Monitor the safety performance of all personnel and correcting any work practices or conditions that may result in injury or exposure to hazardous substances or safety hazards.

3. Perform required exposure monitoring to evaluate any potential health hazards that personnel could be exposed to at the site.

4. Prepare any accident/incident reports.

5. Make modifications to the Health and Safety Plan as required based on accidents/incidents and findings regarding personnel exposures and work practices.

6. Report all accident/incidents and findings regarding personnel exposure and work practices observed to the Project Manager.

D. Site Safety Officer

The Site Safety Officer (SSO) shall implement all health and safety aspects of monitoring site characterization activities at the site. The SSO shall:

1. Ensure that appropriate personal protective equipment is available and properly utilized by all on-site personnel.

2. Observe any subcontractor's health and safety procedures/ precautions. If it is the belief of the SSO that subcontractor's personnel are or may be exposed to an immediate health hazard, the SSO shall suspend the subcontractor's site work. If the subcontractor's personnel do not have appropriate equipment to perform work without risking exposure to health hazards, the SSO shall consult with the PM or PSO for further action before proceeding with the work

3. Implement the project Health and Safety Plan, and report any deviation from anticipated site conditions described in the Plan.

4. Calibrate monitoring equipment on a daily basis and properly record and file the results.

5. Maintain monitoring equipment and provide for maintenance as necessary.

6. Assume other duties as directed by the PM and PSO.

7. Report accident/incidents or inadequate work practices observed to the PSO.

E. Project Personnel

Project personnel involved in on-site investigations and operations are responsible to:

1. Take all reasonable precautions to prevent injury to themselves and to their fellow employees.

2. Perform only those tasks that they believe they can do safely, and immediately report accidents and/or unsafe conditions to the SSO or PSO.

3. Implement the procedures set forth in the Health and Safety Plan, and report deviations from the procedures described in the Plan to the SSO and PSO for action.

4.0 SITE CONTROL

The purpose of site control is to minimize the potential for exposure to the chemicals of concern for workers and the public, and to prevent vandalism at the site.

4.1 Site Security

The site is enclosed by fencing and access is restricted by entry through a locked gate. Only authorized personnel and vehicles shall enter the site.

4.2 Hazard Zones

To reduce the accidental spread of contaminated soil by workers from the contaminated area to the clean area and to limit number of workers potentially exposed to chemicals detected, zones will be delineated where different types of work will occur. The flow of personnel between the zones will be controlled through a single access point into each of the zones. The three site zones shall be established as described below.

1. Red Zone - Exclusion zone whre contamination occurs and cleanup activities are conducted. Only persons working directly on cleanup shall be permitted within this zone.

2. Yellow Zone - Contaminant reduction zone, the transiiton zone between the contaminated area and the clean area, and a perimeter around the Red Zone. This area is where personnel and euqipment decontanation occurs. Only personnel directly working on cleanup and helping with decontamination shall be permitted with this zone.

3. Green Zone - The clean zone, where administrative and other support functions are located.

The Yellow and Red Zones shall be identified by either fencing or tape. Within the Yellow Zone, personnel and equipment will be cleaned in a designated decontamination area before moving into the Green Zone. All equipment must be decontaminated in the Yellow Zone before entering the Green zone. All wash wate and disposable clothing and equipment must be collected and stored in drums in the Yellow Zone until transported for disposal.

4.3 Communication

During field activities site personnel shall not work alone. Both partners are responsible for:

Providing the other partner with assistance.

Observing the other partner for signs of chemical or heat exposure.

Checking the integrity of the other partner's protective equipment.

Obtaining emergency assistance, providing first response First Aid and notifying others.

5.0 CHEMICAL HAZARD ASSESSMENT AND REVIEW OF TOXICOLOGY

The relative toxicity of the chemicals suspected to be present in soil and groundwater at the site were evaluated based on the chemical's Threshold Limit Value (TLV) and/or by reviewing toxicity literature. TLV's are developed by the American Conference of Government Industrial Hygienists (ACGIH) and are defined as the airborne concentration of a chemical to which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect. Eight-hour time-weighted average threshold limit value concentration limits are for a normal 8-hour workday and a 40-hour work week. For comparison, applicable California Occupational Safety and Health Administration (CalOSHA) Permissible Exposure Limits (PEL) are also listed. PELs are legal limits for the maximum permitted 8-hour time-weighted average concentration of an airborne contaminant that any worker may be exposed to day after day without adverse effect.

Compound	TLV* (mg/m^3)	PEL** (mg/m^3)
Pentachlorophenol	0.5	0.5
2,4,5-Trichlorophenol	NA	NA
Dioxins	NA	NA
Dibenzofurans	NA	NA
Mineral Spirits	100 ppm	NA

N/A = No Applicable Limit

* = Recommended Limits. Not legally enforceable.
** = Legally enforceable limits.

When airborne contaminant levels are above detection, respiratory protection will be required for all personnel.

Of the chemicals suspected to be present at the site, pentachlorophenol, 2,4,5-trichlorophenol, dioxin isomers and dibenzofuran isomers are subject to warning requirements under the California Safe Drinking Water and Toxic Enforcement Act (also known as Proposition 65). These chemical which may be present at the site, are known to the State of California to cause cancer.

6.0 PHYSICAL HAZARD ASSESSMENT

A. Safety and Physical Hazards

In addition to potential chemical hazards, the ~~Eureka Waterfront~~ site ~~Property~~ may contain a number of physical safety hazards such as:

- Falling/flying objects
- Holes, uneven ground surface
- Slippery surfaces
- Buried underground conduits
- Heavy equipment and train traffic

All personnel will be aware of these hazards and take all practical measures to reduce the risk of accidents.

B. Electrical Hazards

Overhead power lines, underground power cables and electrical equipment used on-site may pose a danger of shock, electrocution or fire if contacted or severed during site activities.

Prior to commencing any subsurface work such as drilling, check for underground utilities (electricity, gas, water, telephone, sewer, storm drain), and the locations of overhead power lines. The following are minimum clearances from overhead high voltage lines:

Nominal Voltage (phase to phase)	Minimum Required Clearance (feet)
750 - 50,000	10
50,000 - 75,000	11
75,000 - 125,000	13
125,000 - 175,000	15
250,000 - 350,000	21
370,000 - 550,000	27
550,000 - 1,000,000	42

It is desirable to entirely avoid working under overhead high voltage lines when possible. Many experienced drillers consider these minimum clearances unacceptable, especially the distances for the higher voltage lines. A driller should not be required to set up his equipment against his better judgement.

C. Noise

Work around large heavy equipment, such as drilling rigs, earth movers, etc., often creates excessive noise. The effects of noise can include:

Workers being startled, annoyed or distracted.

Physical damage to the ear, pain, and temporary and/or permanent hearing loss.

Communication interference that may increase potential hazards due to the inability to warn of danger and the proper safety precautions to be taken.

Hearing protection shall be worn when noise levels exceed 85 dba.

D. Heat Stress

In its early stages, heat stress can cause rashes, cramps, discomfort and drowsiness, resulting in impaired functional ability that threatens the safety of both the individual and co-workers. Continued heat stress can lead to heat stroke and death.

To avoid heat stress, frequently replace fluids by drinking water and taking rests periodically. At the first sign of heat stress remove affected personnel from the hazard and evaluate the need for medical attentional and/or modifications in work schedule or equipment.

E. Ultraviolet Radiation

Exposure of skin to ultraviolet radiation can pose a hazard of sunburn. Clothing or sunscreen should be used to protect against sunburn if weather is clear.

F. Other

No confined spaces are anticipated at the site. If a confined space problem is identified in the field, the PM shall be notified immediately and no personnel shall enter the space until a confined space entry plan is developed.

7.0 AIR MONITORING PROGRAM

Air sampling may be conducted as part of the site health and safety program. Air sampling will consist of monitoring at the site perimeter and in Red Zone. The Project Health and Safety Officer will determine the frequency of air sampling required.

8.0 EDUCATION AND TRAINING

Each employee assigned to participate in field activities will complete health and safety training before field work begins. The training program will include:

a. Chemical toxicity

b. Use of personal safety equipment

c. Site work zones.

d. Site work areas...

e. Hazard recognition

f. Decontamination procedures

Upon completion of the training, each participant will sign a training record.

9.0 CORPORATE HEALTH AND SAFETY PROGRAM

As a corporate policy, all Geomatrix employees assigned to participate in field activities will complete a 40-hour health and safety training course before fieldwork begins. The training program includes information about:

Work safety rules

Personal safety equipment

Review of physical and chemical hazards that may be encountered

Recognition of signs and symptoms of injury/chemical exposure/ environmental (heat, noise) exposure

Chemical toxicity

Respirator use and care, and qualitative fit testing of respirator

Decontamination procedures

Emergency response procedures

All Geomatrix field personnel shall participate in the Geomatrix medical monitoring program and have medical clearance prior to participating in field activities.

10.0 SAFETY PRACTICES

For chemical hazards, the four basic routes of exposure (inhalation, skin absorption, ingestion and eye contact) must be protected. Section 11.0 specifies the personal protective equipment or controls that shall be used for the activities to be performed at the site.

A. Respiratory Protection

To protect against the inhalation of toxic concentrations of particles and vapors, a respirator with a combination high-efficiency filter and an organic vapor adsorption cartridge will be available to Geomatrix personnel.

The respirator(s) shall be the full-face type approved by NIOSH/MSHA. Only respirator cartridges manufactured by the same manufacturer as the respirator being worn shall be used. Each person required to use a respirator shall have medical clearance from a licensed physician and have been trained to use a respirator prior to initiating the project. All persons required to wear a respirator shall be clean shaven and contact lenses shall not be worn when wearing a respirator.

B. Skin Absorption

Skin exposure to on-site chemical can result in skin irritation and/or penetration. The following safety rules shall be followed when working with soil, mud, groundwater or other materials that may be contaminated with hazardous chemicals:

1. Protect skin areas that may come in contact with the hazardous material. Skin protection includes wearing rubber boots, work clothes, and gloves.

2. After completing work, decontaminate boots in the designated area in the Yellow Zone using an non-ionic decontamination solution. Use gloves during decontamination.

3. Bag all contaminated rags and other disposable items, such as gloves and coveralls, and dispose in designated on-site drums in the Yellow Zone.

4. Avoid walking through potentially contaminated puddles, mud, and other discolored surfaces.

C. Ingestion

Eating, drinking, chewing gum or tobacco, or smoking, are prohibited on-site. Furthermore, liquids will not be pipetted or syphoned by mouth under any circumstances.

The hands and face must be thoroughly washed upon leaving the work areas and before any eating, drinking or smoking occurs.

D. Eye Contact

The following precautions will be taken to avoid eye injury:

1. Wear appropriate safety goggles or glasses when near rotating, vibrating or other heavy equipment.

2. Do not rub eyes.

3. Do not wear contact lenses when working in areas where hazardous materials may be encountered. OSHA regulations do not allow contact lenses to be worn while using respirators.

E. General Safety Rules

1. Wear protective equipment and clothing provided, when required.

2. Wear approved hard hats in all construction areas and during drilling activities.

3. Wear safety glasses or face shields whenever the situation poses an eye hazard.

4. Wear hearing protection when performing tasks around heavy equipment which emit noise levels greater than 85 dBA. (This is likely to occur around soil compacting equipment, drilling rigs, and other impact equipment.)

5. Wear sturdy work boots or shoes at the site. Steel-toed boots are preferred.

6. Prevent, to the extent possible, spillage of hazardous material. In the event that a spill occurs, contain the material if possible, initiate cleanup, and report the spill to the project manager.

7. Prevent splashing of contaminated materials.

8. Prevent back injury by never lifting or carrying a load that is more than you can comfortably handle. When lifting heavy objects, bend the knees and use the leg muscles.

9. Keep all heat sources away from combustible liquids, gases or any flammable materials. When working in areas where combustible gases are present, use only intrinsically safe equipment (no-sparking).

10. Field crew members shall be familiar with the physical characteristics of investigations, including:

    Wind direction in relation to contamination areas

    Accessibility of other personnel, equipment and vehicles

    Areas of known or suspected contamination

    Site access

    Nearest water sources

11. The number of personnel and equipment in the contaminant areas should be minimized to the extent necessary to perform the task at hand.

12. All wastes generated during investigative activities at the site shall be disposed of as directed by the PM.

13. Inspect power cords for damage such as cuts or frays. Suspend cords with nylon rope or plastic ties only.

14. When in doubt of your safety, it is better to over-protect.

15. Practice defensive driving.

16. A first-aid kit shall be kept on-site in a field vehicle when performing field work.

F. In the event that unusual circumstances arise during the performance of field activities, the Site Safety Officer shall interview personnel involved to determine whether any exposure may have occurred, or if personnel are experiencing any symptoms related to the possible exposure. If any employee experiences any adverse effects, or in the judgment of the Site Safety Officer such adverse effects are apparent or probable, the Site Safety Officer shall require that personnel seek immediate medical attention. See Section 14.0 for procedures to follow for emergencies or medical attention. Such evaluations shall be documented in the daily field record.

11.0 PERSONAL PROTECTIVE EQUIPMENT

To prevent exposure to chemicals contained in soil at the site, the following protection leves shall be used as described below.

1. Red Zone - EPA Protection Level B for workers with continual exposures for longer than one hour. EPA Protection Level C for workers with brief intermittent exposure, less than one hour duration.

   Self-contained breathing apparatus or full-face respirators with combination high-efficiency particulate filter and carbon adsorption cartidges.

   Tyvek inner liner with Saranak outer suit.

   Double glove, inner liner of latex and outer glove of butyl nitrile chemical resistant gloves.

   Chemical resistant boots.

   Hard hat.

2. Yellow Zone - EPA Protection Level C.

Full-face respirators with combination high-efficiency particulate filter and carbon adsorption cartridges.

Saranak suit.

Double glove as described above for Red Zone.

Chemical resistant boots.

Hard Hat.

3. Green Zone - EPA Protection Level D.

Work long-sleeved shirt and long pants.

Hard Hat.

12.0 DECONTAMINATION PROCEDURES

Personnel, equipment and sample exteriors leaving the site shall be thoroughly decontaminated in the designated area within the Yellow Zone.

Equipment (soil samplers, backhoe, trucks, etc.,)

Detergent wash, tap water rinse and final rinse with deionized water.
Scrub or scrape using a brush, scrapper or sponge with detergent wash for adhering contaminants.

Protective Equipment

Respirators - Remove filters or chemical cartridges, wash with a mild detergent in warm water using a brush. Thoroughly rinse with a disinfectant solution and then air dry in a clean place. Care should be taken to prevent rough handling.

Gloves - discard.

Coveralls - discard.

Boots - detergent wash, tap water rinse.

Personnel

Thorough bathing with soap and water after leaving site.

Vehicles

Thorough wash down of exterior with tap water.

13.0 REPORTING REQUIREMENTS

Employees are required to report to the Project Safety Officer any unexpected or irregular occurrences relating to health and safety which may be encountered during the course of work on the project, including accidents, injuries, spills, etc.

Comments relating to the general safety procedures followed each day will be included in the daily field record by the Site Safety Officer.

14.0 EMERGENCIES

In the event of an accident or emergency conditions, the procedure listed below shall be followed immediately. Emergency conditions are:

An accident (physical or chemical) involving any field personnel, or if anyone experiences adverse effects or symptoms of exposure while onsite.

Discovery of a situation more hazardous than anticipated.

Accidental release of hazardous materials or waste.

The Site Safety Officer shall take charge and follow the emergency procedures listed below:

1. Remove the injured or exposed person(s) from immediate danger if possible.

2. If a serious injury or life-threatening condition exists CALL AN AMBULANCE and alert the St. Joseph Hospital that an injury has occurred. Clearly describe location, injury and conditions to the ambulance dispatcher. Designate a person to direct emergency equipment to the injured person.

3. Provide emergency first aid, if possible.

4. If there is any question as to the nature of injury or what should be done, call an ambulance or appropriate emergency numbers.

5. Call the Project Manager — Office - (415) 957-9557, Home - (415) 863-6239

   or Project Safety Officer (Debra Favre) — Office - (415) 957-9557, Home - (415) 751-1825

6. Evacuate other on-site personnel to a safe place until the Assistant Project Manager or Project Safety Officer determines that it is safe for work to resume.

7. Immediately implement steps to prevent recurrence of the accident. Emergency telephone numbers for the Oakland area are:

Kaiser Hospital Emergency Room — (415) 956-7600

Ambulance, Fire Department and Police Department — 911

Kaiser Hospital is located adjacent to the site.

15.0 APPROVALS

3/6/90
Date

Debra Favre
Project Safety Officer
Geomatrix Consultants

3/6/90
Date

Thomas E. Graf
Project Manager
Geomatrix Consultants

3/6/90
Date

Chad Young
Site Safety Officer
Geomatrix Consultants

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