ALTON GEOSCIENCE

SEP 16 '98 PM 2:55

September 8, 1998

Mr. Brian Oliva
Alameda County Health Care Services
Room 250
1131 Harbor Bay Parkway
Alameda, CA 94502-6577

ATTN: MR. BRIAN OLIVA

SITE: FORMER MOBIL STATION 99-105
6301 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

RE: SUPPLEMENTAL SITE ASSESSMENT WORKPLAN

Dear Mr. Oliva:

Alton Geoscience submits this site assessment workplan for former Mobil Oil Station 99-105 located at 6301 San Pablo Avenue in Oakland, California (Figure 1), in accordance with the Alameda County Health Care Services Agency request, dated January 29, 1998.

## 1.0 OBJECTIVES

The proposed site assessment activities will be performed to:

- characterize the lateral extent of soil and groundwater contamination upgradient and downgradient of the site.

## 2.0 SITE DESCRIPTION

Present Site Use: The property is currently unoccupied and enclosed by a plywood fence. A former service station building exists onsite.

Past Site Use: The site was a Mobil service station from 1951 to 1980 before being used as a car rental lot. The former underground storage tanks (USTs) were not in use after 1980.

Adjacent Property: The site is located on the northwest corner of San Pablo Avenue and 63rd Street in Oakland, California (Figure 1). Commercial properties are to the north and northeast across San Pablo Avenue. To the southeast, across

30A Lindbergh Avenue
Livermore, California 94550
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San Pablo Avenue, is an elementary school, and to the west, south, and southwest are residential properties.

Geography: San Francisco Bay is located approximately 5,000 feet to the west of the site. Topography in the vicinity of the site is relatively flat but slopes gently west towards the bay. The site has an elevation of approximately 22 feet above mean sea level [NGVD 1929].

Regional Hydrogeology: The site is located in the East Bay Plain Groundwater Basin. Generally groundwater flows westward towards the Bay (RWQCB, 1995).

## 3.0 CURRENT SITE CONDITIONS

- Four groundwater monitoring wells (MW-1 through MW-4) and thirteen borings (AB-1 through AB-13) were drilled and/or installed at the site between March 1996 and March 1998 (Alisto 1996 and Alton 1998a).

- The average groundwater depth at the site was approximately 6.0 feet below grade (fbg), based on fluid level measurements collected on April 22, 1998 (Alton 1998b). Historical groundwater depths have ranged from 3.83 fbg (MW-1) measured on January 31, 1997 to 11.52 fbg (MW-3) measured on October 9, 1997. The groundwater gradient was calculated to be 0.005 in April 1998 and groundwater flow direction has varied from the southwest (April 1998) to the northwest (April 1997) (Alton 1998b and Alton 1998c).

- The current extent of the dissolved-phase hydrocarbon plume is characterized onsite, but remains uncharacterized offsite in the upgradient and downgradient directions (Alton 1998a).

- The lateral and vertical extent of hydrocarbon-affected vadose-zone soil was adequately characterized onsite and concentrations were limited to the central portion of the site, located downgradient of the former USTs (Alton 1998a).

- Liquid-phase hydrocarbons have been periodically detected in MW-4 since the third quarter 1996 (Alton 1998a).

## 4.0 PLANNED SITE ASSESSMENT ACTIVITIES:

In order to meet the workplan objectives, two groundwater monitoring wells will be installed at the site; one upgradient and one downgradient of the site. The approximate locations of the proposed wells are shown on Figure 2.

### 4.1 PRE-FIELD WORK ACTIVITIES

Soil boring/monitoring well permits and lane closure (encroachment) permits will be acquired prior to drilling. Underground Service Alert (USA) will be notified approximately 3 days prior to field activities.

### 4.2 DRILLING AND SOIL SAMPLING

Two (2) offsite soil borings will be drilled to approximately 20 fbg, using an 8-inch-diameter hollow-stem auger drill rig. At a minimum, soil samples will be collected at 5-foot depth intervals for soil description, field hydrocarbon vapor testing, and possible laboratory analysis. Refer to Appendix A for general field procedures pertaining to soil sample collection.

Select soil samples will be analyzed for the following:

- total petroleum hydrocarbons (TPH-G) using the EPA Method 8015 modified for gasoline; and
- benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Method 8020;

### 4.3 MONITORING WELL CONSTRUCTION

Each soil boring will be converted into a groundwater monitoring well. The groundwater monitoring well will be drilled to approximately 19 fbg using 10-inch-diameter hollow stem augers. The well will be constructed using 2-inch-diameter PVC casing with an expected screened interval from 4 to 19 fbg. Well construction details and development procedures are outlined in Appendix A.

### 4.4 ELEVATION SURVEY AND FLUID-LEVEL MONITORING AND SAMPLING

The top of well casing elevation will be surveyed relative to existing wells to the nearest 0.01 foot by a licensed surveyor. Fluid levels and groundwater samples will be collected from all

groundwater monitoring wells during the fourth quarter 1998 semi-annual monitoring and sampling event. Field procedures are described in Appendix A.

### 4.6 SOIL AND GROUNDWATER DISPOSAL

Purged groundwater and equipment rinsate, generated during drilling and sampling activities will be temporarily stored onsite in DOT approved drums, pending disposal at an approved disposal/recycling facility. Soil cuttings generated during drilling activities will be stockpiled onsite with a visqueen covering, pending disposal at an approved disposal facility. Waste manifests will be prepared for proper transport and disposal of the generated waste.

### 4.7 SITE ASSESSMENT REPORT

Following the field work and receipt of the laboratory results, a report on the supplementary site assessment activities will be submitted to Alameda County Department of Health Services. The report will contain boring logs, laboratory analysis results, findings, and conclusions, and will be certified by a California Registered Geologist.

## 5.0 WORK SCHEDULE

Planned activities will be performed according to the following estimated completion schedule:

- Expected agency approval of workplan: within three to four weeks of submittal.
- Drill borings/install monitoring wells: within three to four weeks of workplan approval
- Submit site assessment report: within six weeks of completion of field activities.

## 6.0 SITE HEALTH AND SAFETY PLAN

A site health and safety plan designed to promote project personnel safety and preparedness during the activities described in this work plan is included in Appendix B.

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If you have any questions regarding this workplan, please call us at (925) 606-9150.

Sincerely,

ALTON GEOSCIENCE

Kathleen Racke

Kathleen M. Racke
Senior Staff Scientist

Matthew W Katen

Matthew W. Katen, RG
Associate, Northern California Operations Division


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Attachments: References
Figure 1: Vicinity Map
Figure 2: Site Plan with Proposed Boring Locations
Appendix A: General Field Procedures
Appendix B: Site Health and Safety Plan

## REFERENCES

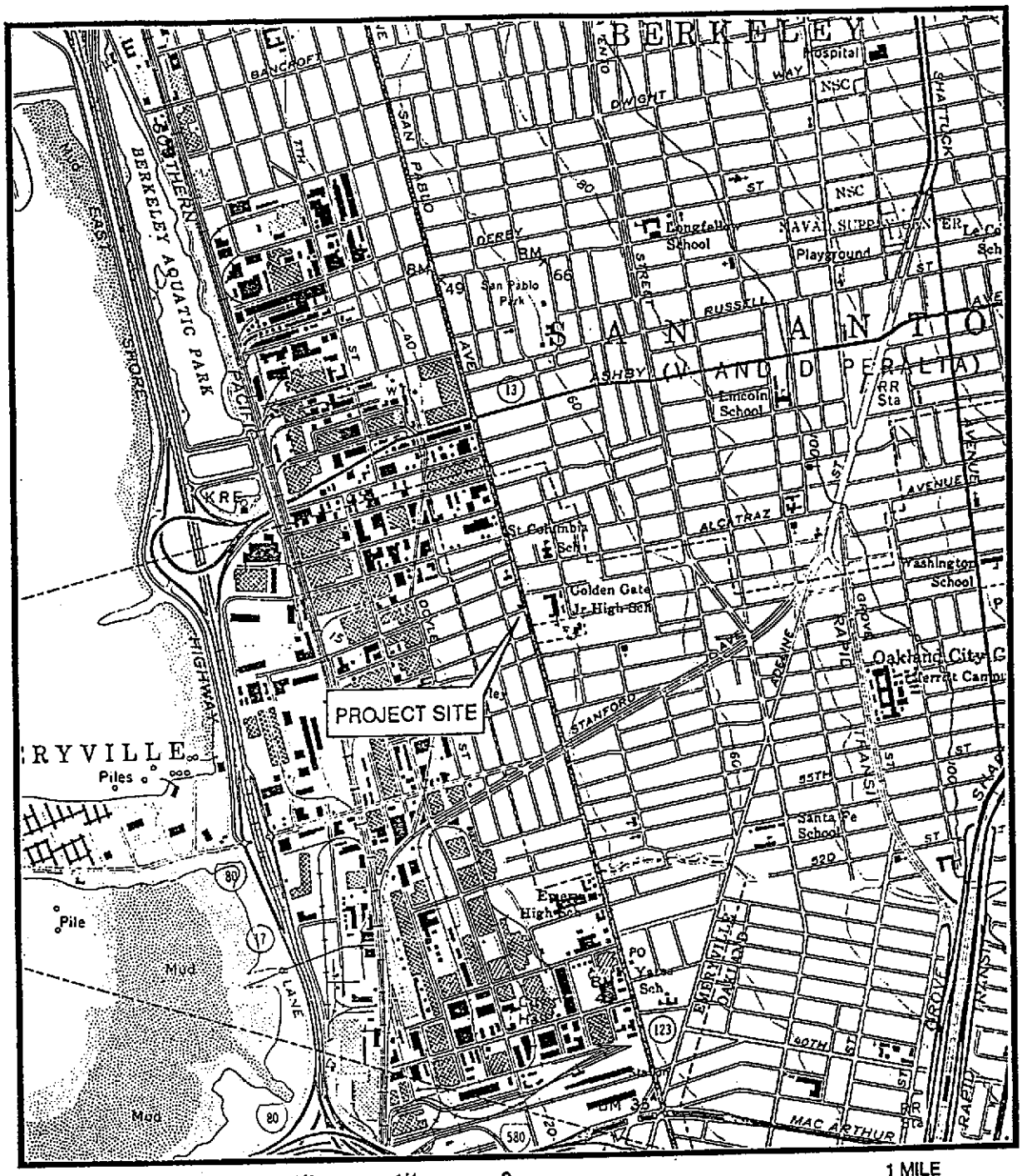
Alisto Engineering Group, 1996. Additional Tank Closure and Preliminary Site Investigation Report, Former Mobil Oil Corporation, Station 99-105, 6301 San Pablo Avenue, Oakland, California. April 15, 1996.

Alton Geoscience. 1998a. Supplemental Site Assessment Report, Former Mobil Station 99-105, 6301 San Pablo Avenue, Oakland, California. July 15, 1998.

Alton Geoscience. 1998b. Quarterly Progress Report, Former Mobil Station 99-105, 6301 San Pablo Avenue, Oakland, California. July 15, 1998.

Alton Geoscience. 1998c. Quarterly Progress Report, Former Mobil Station 99-105, 6301 San Pablo Avenue, Oakland, California. July 15, 1997.

RWQCB, 1995, Water Quality Control Plan, San Francisco Bay Basin (Region 2), June 21.

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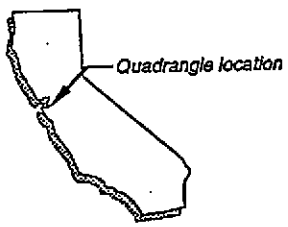


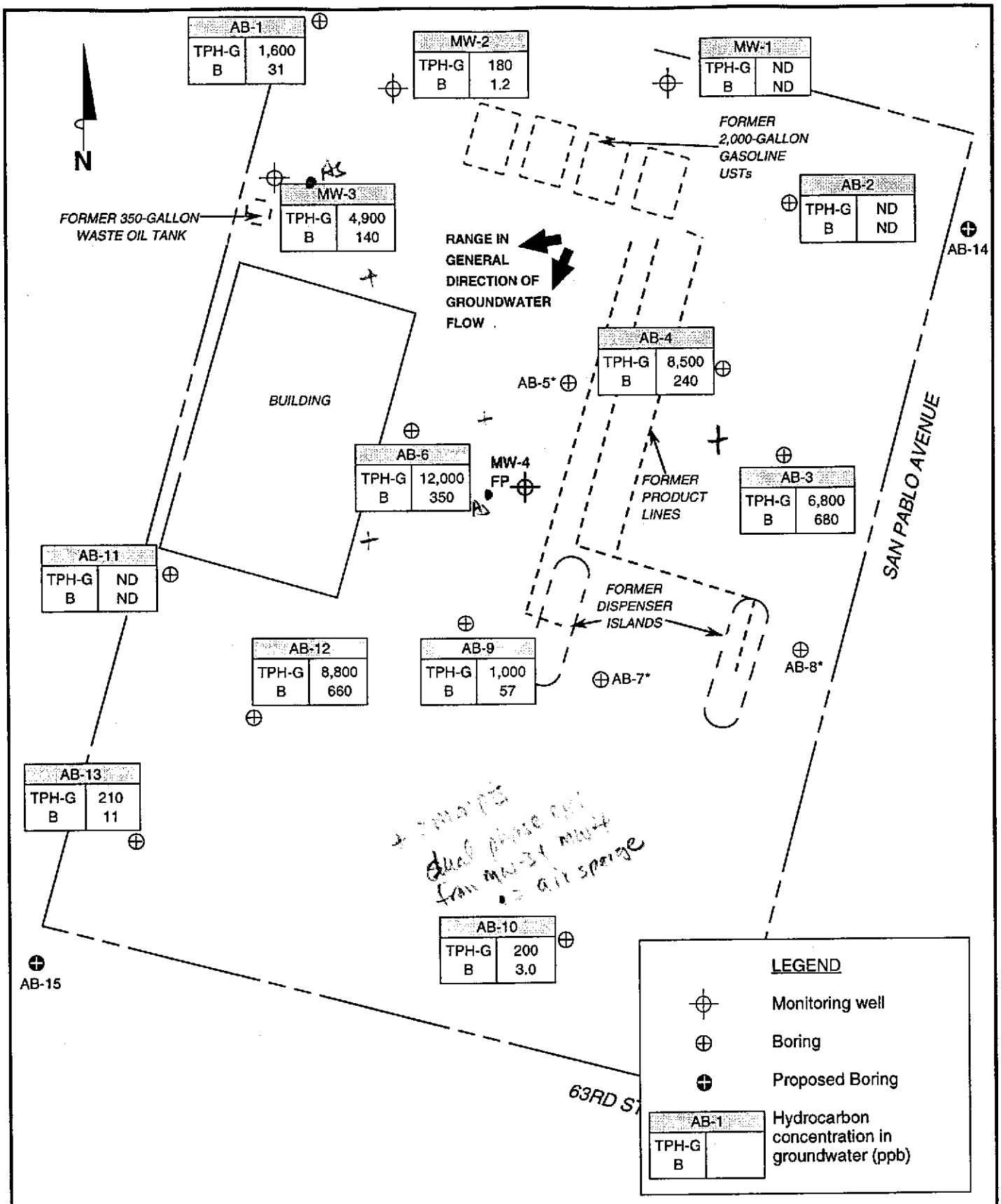

Source: U.S.G.S. Map
Oakland West Quadrangle
California
7.5 Minute Series

**VICINITY MAP**

Former Mobil Station 99-105
6301 San Pablo Avenue
Oakland, California

**ALTON GEOSCIENCE**
**Livermore, California**

**FIGURE 1**




NOTES:
Results based on laboratory analysis of groundwater samples collected from monitoring wells on April 22, 1998 and from soil borings on March 5, 1998. TPH-G = total petroleum hydrocarbons as gasoline; B = benzene; ppb = parts per billion; ND = not detected at or above method detection limits; FP = free product. * = not enough groundwater present for sampling.

**ALTON GEOSCIENCE**
**Livermore, California**

SCALE (feet)
0 5 10 20

Source: ALISTO Engineering

**SITE PLAN SHOWING PROPOSED BORINGS**

Former Mobil Station 99-105
6301 San Pablo Avenue
Oakland, California

# FIGURE 2

99-105/Site plan

# APPENDIX A

# GENERAL FIELD PROCEDURES

## APPENDIX A

## GENERAL FIELD PROCEDURES

A description of the general field procedures used during site investigation and monitoring activities is presented below. For an overview of protocol, refer to the appropriate section(s).

### DRILLING AND SOIL SAMPLING

Soil borings are drilled using continuous-flight, hollow-stem augers. Borings that are not completed as monitoring wells are grouted to within 2 feet of the ground surface with a cement/bentonite slurry. The remaining 2 feet is filled with concrete.

Soil samples are obtained for soil description, field hydrocarbon vapor screening, and possible laboratory analysis. Soil samples are retrieved from the borings by one of two methods: 1) continuously, using a 5-foot-long, continuous-core barrel sampler advanced into the soil with the lead auger; sample tubes are driven into the core with a mallet, or 2) at 2.5- or 5-foot intervals, using a standard split-spoon sampler lined with three 1.5-inch-diameter stainless steel or brass sample inserts. The split-spoon sampler is driven approximately 18 inches beyond the lead auger with a 140-pound hammer dropped from a height of 30 inches.

For hand auger borings and hand-held, power-driven auger borings, soil samples are retrieved using a hand-driven slide hammer lined with a 1.5-inch-diameter stainless steel sample tube.

During drilling activities, soil adjacent to the laboratory sample is screened for combustible vapors using a combustible gas indicator (CGI) or equivalent field instrument. For each hydrocarbon vapor screening event, a 6-inch-long by 2.5-inch-diameter sample insert is filled approximately 1/3 full with the soil sample, capped at both ends, and shaken. The probe is then inserted through a small opening in the cap, and a reading is taken after approximately 15 seconds and recorded on the boring log. The remaining soil recovered is removed from the sample insert or sampler, and described in accordance with the Unified Soil Classification System. For each sampling interval, field estimates of soil type, density/consistency, moisture, color, and grading are recorded on the boring logs.

### SOIL SAMPLE HANDLING

Soil sample handling follows the same basic protocol for both drilling and excavation activities. Upon retrieval, soil samples are immediately removed from the sampler, sealed with Teflon sheeting and polyurethane caps, and wrapped with tape. Each sample is labeled with the project number, boring/well number, sample depth, geologist's initials, and date of collection. After the samples have been labeled and documented in the chain of custody record, they are placed in a cooler maintained at approximately 4 degrees Celsius (°C) with ice, prior to and during transport to a state-certified laboratory for analysis. Samples not selected for immediate analysis may be transported in a cooler with ice and archived in a frostless refrigerator at approximately 4°C for possible future testing.

## MONITORING WELL INSTALLATION

Monitoring wells are constructed of 4- or 2-inch-diameter, flush-threaded Schedule 40 PVC blank and screened (0.020-inch slot size) casing. Where possible, the screened interval will extend at least 10 feet above, and 10 to 20 feet below, the top of the groundwater table. The annular space surrounding the screened casing is backfilled with No. 3 Monterey sand (filter pack) to approximately 2 feet above the top of the screened section.

During well construction, the filter pack is completed by surging with a rig-mounted surge block. A 1- to 2-foot thick bentonite annular seal is placed above the filter pack. The remaining annular space is grouted with Portland cement and/or bentonite grout to the surface. Utility access boxes are installed slightly above grade. Locking, watertight caps are installed to prevent unauthorized access to the well, and limit infiltration of surface fluids.

## FLUID LEVEL MONITORING

Fluid levels are monitored in the wells using an electronic interface probe with conductance sensors. The presence of liquid-phase hydrocarbons is verified using a hydrocarbon-reactive paste. The depth to liquid-phase hydrocarbons and water is measured relative to the well box top or top of casing. Well box or casing elevations are surveyed to within 0.02 foot relative to a county or city bench mark.

## GROUNDWATER PURGING AND SAMPLING

Groundwater monitoring wells are purged and sampled in accordance with standard regulatory protocol. Typically, monitoring wells that contain no liquid-phase hydrocarbons are purged of groundwater prior to sampling so that fluids sampled are representative of fluids within the formation. Temperature, pH, and specific conductance are typically measured after each well casing volume has been removed. Purging is considered complete when these parameters vary less than 10% from the previous readings, or when four casing volumes of fluid have been removed. Samples are collected without further purging if the well does not recharge within 2 hours to 80% of its volume before purging. The purged water is either pumped directly into a licensed vacuum truck or temporarily stored in labeled drums prior to transport to an appropriate treatment or recycling facility. If an automatic recovery system (ARS) is operating at the site, purged water may be pumped into the ARS for treatment.

Groundwater samples are collected by lowering a 1.5-inch-diameter, bottom-fill, disposable polyethylene bailer just below the static water level in the well. The samples are carefully transferred from the check-valve-equipped bailer to 1-liter and 40-milliliter glass containers. The sample containers are filled to zero headspace and fitted with Teflon-sealed caps. Each sample is labeled with the project number, well number, sample date, and sampler's initials. Samples remain chilled at approximately 4°C prior to analysis by a state-certified laboratory.

## CHAIN OF CUSTODY PROTOCOL

Chain of custody protocol is followed for all soil and groundwater samples selected for laboratory analysis. The chain of custody form(s) accompanies the samples from the sampling locality to the laboratory, providing a continuous record of possession prior to analysis.

## DECONTAMINATION

### Drilling and Soil Sampling

Drilling equipment is decontaminated by steam cleaning before being brought onsite. The augers are also steam cleaned before each new boring is commenced. Prior to use, the sampler and sampling tubes are brush-scrubbed in a Liqui-nox and potable water solution and rinsed twice in clean potable water. Sampling equipment and tubes are also decontaminated before each sample is collected to avoid cross-contamination between borings.

### Groundwater Sampling

Purging and sampling equipment that could contact well fluids is either dedicated to a particular well or cleaned prior to each use in a Liqui-nox solution followed by two tap water rinses.

# APPENDIX B

# SITE HEALTH AND SAFETY PLAN

# SITE HEALTH AND SAFETY PLAN

Monitoring Well Installation
Former Mobil Station 99-105
Oakland, California

## 1.0 PLAN SUMMARY

This Site Health and Safety Plan (SHSP) establishes responsibilities, requirements, and procedures for the protection of personnel while performing activities at the above-referenced site. This site-specific plan conforms with the Alton Geoscience Corporate Health and Safety Plan, Hazard Communication Program, and Injury and Illness Prevention Program (IIPP).

During site work, the use of proper health and safety procedures, in accordance with applicable Cal/OSHA regulations shall be required. Site-specific conditions may necessitate modification of the SHSP; however, except in emergency situations no deviations from the plan may be implemented without the prior notification and approval of the Site Safety Officer (SSO).

## 2.0 SITE INFORMATION

This SHSP considers the physical, chemical, and environmental hazards that may be encountered during work activities at the site. Operations associated with this SHSP will be conducted in accordance with an approved workplan. Any changes required or made to the planned activities will be immediately communicated to site personnel by the SSO. Summary information for this project is provided in the following table.

| | |
|---|---|
| Workplan dated: | September 3, 1998 |
| Principal activities: | Installation of two monitoring wells |
| Site description (see Attachment A for site map): | Vacant former auto repair facility and service station |
| Approximate depth to groundwater: | Approximately 10 fbg |
| Contaminants of concern (see Attachment B): | Gasoline Hydrocarbons |

## 3.0 SITE SAFETY AUTHORITY

Contact information and names of authorized personnel are listed below. A description of responsibilities follows.

| Role | Name | Company | Telephone |
|---|---|---|---|
| Site Safety Officer | Katy Racke | Alton Geoscience | pgr. (925) 806-6077 |
| Alternate Site Safety Officer | | Alton Geoscience | |
| Project Manager | Katy Racke | Alton Geoscience | (925) 606-9150 |
| Supervisor/Offsite Coordinator | Matthew Katen | Alton Geoscience | (925) 606-9150 ext. 102 |
| Local IIPP Coordinator | Chris Smiga | Alton Geoscience | (925) 606-9150 ext. 105 |
| Client Contact | Cherine Foutch | Mobil Oil Corporation | (510) 625-1173 |

**Site Safety Officer**: The SSO is responsible for briefing site personnel on potential physical and chemical hazards prior to work start-up, during operations, and whenever other health and safety matters need to be addressed. The SSO will be in charge of conducting the daily Tailgate Safety Meetings. The SSO will see that this SHSP is available onsite and is understood and signed by personnel entering the site. The SSO is also responsible for implementing emergency response procedures when necessary. In the event the SSO is unable to perform these duties, the Alternate SSO will be responsible.

**Project Manager**: The Project Manager (PM), in coordination with the SSO, is responsible for implementing health and safety requirements, including seeing that the SHSP is prepared and available onsite. The PM is the central point of contact for the SSO, Client, and Field Personnel, and has overall responsibility for site operations.

**Field Personnel**: Field Personnel are responsible for understanding and complying with this SHSP. Field Personnel include both Alton employees and Subcontractors hired by Alton Geoscience. Field Personnel are required to participate in briefings prior to commencement of site work; attend daily Tailgate Safety Meetings; and acknowledge receipt and understanding of the SHSP by signing the Compliance Log at the end of this plan.

**Supervisor/Offsite Coordinator**: The Supervisor/Offsite Coordinator, typically the Alton branch manager, should be contacted when mobilization of support from an Alton office is needed, and in case of an emergency requiring offsite assistance.

## 4.0 SITE CONTROL

Site control requires the establishment of a regulated area with designated work zones, evacuation protocol, location of medical assistance, site security, and communication guidelines that include a "Buddy System."

### 4.1 REGULATED AREA(S)

Each site will have an established Exclusion Zone with controlled access, and a Support Zone. Supervision and strict control of access to regulated areas is necessary to protect site personnel as well as the public.

**Exclusion Zone:** (*a.k.a. "Hot Zone"*) This is the area where personnel may be subject to chemical or physical hazards. It is the zone of known or suspected contamination, where equipment operation and/or environmental sampling will take place. The Exclusion Zone is to be clearly identified and isolated with cones, barricades, or high visibility caution tape. Personnel working in the Exclusion Zone will at a minimum use Level D personal protective equipment as described in **Section 7.0.**

The outer boundary of the Exclusion Zone *("Hot Line")* will be established by the SSO, so that sufficient area is available to conduct operations while providing a protective buffer for persons and property outside the zone.

**Support Zone:** *(a.k.a. "Safe Zone")* This is the area outside the Exclusion Zone where administrative and other support functions are located. Adverse exposure to contaminants and physical hazards are unlikely in the Support Zone.

### 4.2 EVACUATION PROTOCOL

Evacuation protocol and routes from the site will be established by the SSO, and communicated to Field Personnel during the Tailgate Safety Meeting(s) prior to initiating work. Evacuation protocol will be implemented as needed in emergency situations. In the event of an evacuation, personnel will meet at a preestablished location and the SSO will do a "head count" to see that everyone has left the hazard area.

Emergency Response procedures are outlined in **Section 12.0.** Directions to the nearest medical facilities are provided in **ATTACHMENT C.**

## 4.3 SITE SECURITY

Appropriate security measures will be established in coordination with the site owner/operator and communicated to site personnel. The objective of these measures is to (1) protect the public from potential exposure to physical/chemical hazards; (2) avoid public interference with personnel and safe work practices; and (3) prevent theft or vandalism of equipment at the site.

## 4.4 COMMUNICATION

Communication is an important aspect of the site control program as well as the entire SHSP. Personnel should keep in mind that hazard assessment is a continuous process, and any potentially unsafe condition must be reported immediately to the SSO.

Onsite personnel will use the "Buddy System" and maintain communication or visual contact between team members during site operations. The Buddy System is used to provide assistance, monitor for chemical exposure and heat stress, and obtain emergency assistance for coworkers when necessary. Site personnel will be familiar with the following emergency hand signals:

| | |
|---|---|
| Hand gripping throat: | Can't breathe. Respirator problems. |
| Grip team member's wrist or both hands on team member's waist: | Leave site immediately, no debate! |
| Thumbs up: | Yes. I'm alright. I understand. |
| Thumbs down: | No. Negative. |

# 5.0 HAZARD ASSESSMENT

Hazard assessment is essential for establishing hazard reduction measures. Hazard assessment will consist primarily of site inspections and monitoring. Known operational hazards (heavy equipment, overhead lines, etc.) and site characterization data (contaminant location, concentration, etc.) are also considered in the assessment. The following is a list of potential hazards associated with the activities planned for this site:

| | |
|---|---|
| **Physical Hazards** | Drilling equipment<br>Tripping, slipping, and falling<br>Head, foot, eye, and back injuries<br>Sharp objects |
| **Chemical Hazards** | Gasoline / benzene, toluene, ethylbenzene, xylenes (BTEX)<br>Diesel,<br>Stove oil, |
| **Environmental Hazards** | Noise exposure<br>Weather - heat, cold, rain, fog<br>Biological - plants, animals/insects, pathogens |

Walk-though safety inspections will be conducted by the SSO daily and as conditions change. Inspection results will be communicated to the work crews during the morning Tailgate Safety Meetings and as needed.

## 6.0 HAZARD REDUCTION

Personnel are required to exercise reasonable caution at all times during work activities. Failure to follow safety protocols and/or continued negligence of health and safety policies will result in expulsion of a crew member from the site and may result in termination of employment. In general, the potential for hazardous situations will be reduced by the following activities:

***Implementing engineering controls***

***Using personal protective equipment***

***Performing air monitoring***

Engineering Controls, corresponding to the hazard assessment for work at this site, are outlined below in **Sections 6.1 through 6.4**. Personal protective equipment (PPE) and air monitoring guidelines are outlined in **Sections 7.0 and 8.0**, respectively.

### 6.1 PHYSICAL HAZARDS AND CONTROLS

Drilling Equipment

The operation and use of drilling equipment presents the greatest potential for injury to personnel. To minimize these hazards, designated routes and specific traffic patterns will be established. Trucks will use spotters for backing. If personnel need to approach drilling equipment during operation, they will observe the following protocols: make eye contact with the operator, and then approach the equipment to inform operator of intentions.

Only equipment that is in safe working order will be used. Only qualified personnel will be allowed to operate drilling equipment. Subcontractors will supply proof of qualifications to operate the equipment. Those crew members directly involved in spotting for the operator will be the only personnel allowed within the operating radius of the drilling equipment. Other personnel will remain at a safe distance from these operations.

Explosion and Fire

Liquid petroleum products readily vaporize from standing pools or saturated soil. Ignition sources pose an explosion and fire hazard (e.g., engines, impact sparking, and heat or arc from inappropriate equipment or instrumentation). A direct-reading combustible gas indicator (CGI) will be used to evaluate the possible formation of flammable atmospheres in and around the work area. **See Section 8.0: Air Monitoring.**

Emergency services (911) are to be called immediately in case of a fire or explosion. A portable fire extinguisher will be kept onsite for use on small fires only. Only personnel trained in the proper use of fire extinguishers are authorized to use the onsite fire extinguisher.

Tripping, Slipping, and Falling

Personnel will be reminded daily to maintain sure footing on all surfaces. Use of safety harnesses is required for personnel working ***6 feet or more*** above any surface that does not have handrails (includes riding on manlifts). Work surfaces of unknown or suspect integrity will be strengthened or overlaid with a work platform capable of supporting personnel and equipment working in the area. To minimize tripping hazards caused by construction and other debris, material will be removed daily from the work areas and stockpiled in appropriate designated storage areas. This "housekeeping" effort will be enforced by the SSO at the end of each day.

Head, Foot, Eye, and Back Injuries

Hard hats, steel toe boots, and safety glasses will be worn during site operations. To avoid back injuries, personnel will be trained in and required to use proper equipment and lifting techniques for manual material handling.

Sharp Objects

Nails, wires, saws, and cutting equipment pose potential hazards such as cuts and punctures during site work. *Only appropriate work tools are to be used.* Personnel are required to exercise caution, and should wear leather work gloves when handling or operating cutting tools, saws, and other sharp objects. A consistent housekeeping effort at the site will also help to reduce hazards from sharp objects.

## 6.2 CHEMICAL HAZARDS AND CONTROLS

Chemical Characteristics

Hazardous chemicals that may be encountered at this site include gasoline, diesel, stove oil, hydraulic oil hydrocarbons. These chemicals may be volatile, flammable, moderately to extremely toxic, or carcinogenic when inhaled, ingested, or absorbed above certain concentrations. See **ATTACHMENT B** for specific exposure limits and basic toxicology information.

Personnel will use engineering controls and PPE (based on hazard assessment) to prevent chemical exposure.

Sample Collection

Workers who must come in direct contact with known or suspected contaminated soil or groundwater to collect samples are required to wear protective gloves and other PPE, as needed, to reduce the potential for exposure. Safety glasses will be worn to avoid potential splashing of chemicals into the eyes.

Soil Cuttings, Decontamination Water, and Dust

As with sample collection, precautions are to be followed for handling materials such as soil cuttings and cleaning/decontamination water. Exposure and potential inhalation of dust (nuisance, silica) will be minimized by wearing dust masks or other appropriate PPE/respiratory protection.

Disposition of Materials

Excavated soil will be stockpiled and covered, or stored in closed drums or roll-off bins. Purged water will be stored in closed drums or tanks. Drums, tanks, and/or roll-off bins containing soil or water will be labeled in accordance with the hazard communication standard and removed from the site in accordance with client-approved protocol.

Hygiene

Eating, smoking, and drinking is NOT ALLOWED in the work area. Site personnel will wash their hands, arms, and faces thoroughly prior to eating or drinking, and at the end of their shift. Food should never be stored where it may come into contact with, or be contaminated by, petroleum products, pesticides, or other toxic materials.

## 6.3 ENVIRONMENTAL HAZARDS AND CONTROLS

Noise Exposure

Hearing protection (ear plugs or ear muffs) will be worn when project personnel enter high-noise areas. The SSO should see that extra ear plugs are available onsite.

Heat Stress

Heat stress may be caused by the combination of ambient factors such as high air temperature, high relative humidity, and low air movement. This condition can result in heat rash, heat cramps, heat exhaustion, and/or heat stroke. It can impair worker coordination and judgement and directly impact health and safety. Heat stress is more likely when PPE is worn. Personnel are to drink plenty of water and take breaks (in shaded rest areas) as needed to help prevent heat stress. As part of the Buddy System, personnel should watch for signs and symptoms of heat stress in coworkers as well as themselves.

Cold Exposure

To guard against cold injury (frostbite and hypothermia), which is a danger when the temperature and wind-chill factor are low, employees will wear appropriate clothing, have warm shelter readily available, and maintain carefully scheduled work and rest periods.

Biological Hazards

Personnel will assess their surroundings for potential biological hazards, which may be posed by poisonous plants, insects, animals, and indigenous pathogens. Protective clothing and respiratory equipment can help reduce the chances of exposure. Thorough washing of any exposed body parts and equipment will help protect against infection from biological hazards. ***"Universal Precautions"*** (e.g., wearing latex gloves) must be taken any time there is potential for exposure to human blood, such as when an employee renders first aid to a coworker.

## 6.4 CONFINED SPACE HAZARDS

Confined space entry is NOT ANTICIPATED during the course of these operations. However, if such a situation is encountered, workers are prohibited from entering confined spaces until the company plan dealing with confined spaces has been implemented.

# 7.0 PERSONAL PROTECTIVE EQUIPMENT

## 7.1 LEVEL OF PROTECTION

Personnel are required to wear PPE appropriate for the task and anticipated exposure to known contaminants. Selection of PPE will be based on hazard assessment, task performance, and air monitoring. Based on the history of this site, the initial level of protection will be Level D. At a minimum, Level D PPE will consist of the following:

- Hardhat
  *at all times in work area*
- Boots: chemical-resistant, steel toe and shank
  *at all times in work area*
- Safety glasses, splash goggles, or hardhat with face shield
  *when there is risk of hazardous substances (sampling) or flying particles (drilling, excavation, etc.) getting into eyes*
- Ear plugs / hearing protection
  *when high-noise equipment/drill rig is in operation*
- Gloves: chemical-resistant
  *when handling soil cuttings or soil/water samples*

Site personnel also are required to *be prepared* with the following items:

- Respirators: half-face, air-purifying with appropriate cartridges
- Dust masks
- Tyvek coveralls and other suitable protective clothing
- Traffic safety vest
- Leather work gloves and back brace/lifting belt

Air monitoring information will dictate when and if a site will be upgraded to Modified Level D (Level D plus respirator).

## 7.2 RESPIRATOR SELECTION

For operations that require the use of a respirator, the SSO must verify that Field Personnel are medically approved to use respiratory equipment, fit tested, and trained in the proper use of air-purifying respirators. Site personnel are required have their respirator available and ready to use onsite. Only respirators that are NIOSH/MSHA approved are to be used.

Air monitoring will be performed to assess airborne contaminant levels onsite, and to evaluate suitable respiratory protection. Workers will be required to wear half-face, air-purifying respirators with organic vapor cartridges under the following circumstances, as indicated by onsite air monitoring:

- If volatile organic compound (VOC) vapors in the work area continuously exceed the threshold limit value - time-weighted average (TLV-TWA) for gasoline (300 parts per million [ppm]).

- If, at any time, VOC vapors in the work area exceed the threshold limit value - short-term exposure limit (TLV-STEL) for gasoline (500 ppm).

TLV values for gasoline are derived from American Conference of Governmental Industrial Hygienists (ACGIH) standards. Similar precautions will be taken with regard to other toxic chemicals, such as BTEX components. See **ATTACHMENT B** for additional information and regulatory exposure limits.

## 7.3 REASSESSMENT OF PPE

The levels of protection listed above will be upgraded (or downgraded) based on changes in activities, changes in site conditions, measurements of direct-reading instruments (compared to action levels for contaminants), or other findings. Changes in the level of protection require the approval of the SSO.

# 8.0 AIR MONITORING

Monitoring will be conducted as needed to characterize airborne contaminant levels. The potential hazards associated with the presence of hydrocarbons include (1) personnel exposure to chemicals, and (2) possible formation of flammable atmospheres in and around the work area. Air sampling will be conducted in accordance with NIOSH, OSHA, or EPA methods. The SSO will check to see that air monitoring equipment brought onsite is properly calibrated prior to operation and recalibrated during the course of the day, as necessary.

## 8.1 FLAME IONIZATION DETECTOR

A flame ionization detector (FID) will be used for the monitoring of VOCs in the work area in accordance with the requirements outlined in Title 8 CCR 5192. Air monitoring will be conducted in the breathing zone of workers, and the data collected will be used to evaluate suitable respiratory protection against chemicals encountered. Refer to the Respirator Selection guidelines in **Section 7.2** for personal protection measures. Measurements will also be obtained periodically at the top of boreholes or excavation cavities, and during any construction activities in which hydrocarbon-affected soil is encountered; however, only breathing zone measurements will be used to determine whether PPE should be used or discontinued.

## 8.2 COMBUSTIBLE GAS INDICATOR

A direct-reading, portable CGI that measures VOC concentrations in ppm, or as a percentage of the lower explosive limit (LEL), will be used to monitor airborne concentrations of VOCs and evaluate the possible formation of flammable atmospheres in and around the work area. Data will be used to monitor and evaluate vapor concentrations within or emanating from well bores, excavations, and contaminated soil that is stockpiled, moved, or loaded on or about the site. Measurements will be obtained periodically at the top of boreholes or excavation cavities throughout drilling or excavation operations, and during any construction activities in which hydrocarbon-affected soil is encountered. Periodic measurements also will be taken in areas that may contain an accumulation of combustible vapors.

In the event that CGI readings on the site exceed 10 percent of the LEL, work will be suspended, monitoring will be continued as needed to isolate the area of concern, and the following applicable environmental controls will be implemented:

1. Vapors from pooled petroleum product will be suppressed (if necessary) by spraying with foam, appropriate chemical suppressant, or carbon dioxide in gas form or dry ice.

2. Air movers will be used to ventilate the areas of concentration to below 10 percent LEL.

3. Contaminated soil will be covered with clean soil and/or sprayed with water or deodorizing chemicals in order to reduce vaporization of VOCs.

# 9.0 DECONTAMINATION

Due to the expected low levels and types of contaminants at the site, it is anticipated that personnel will not perform routine decontamination procedures when leaving the Exclusion Zone. Project activities will be initially conducted in Level D PPE. When decontamination is necessary, it will consist of the following:

- Removal of contaminated garments in an "inside out" manner at a designated decontamination station located at the step-off location where personnel routinely enter/exit the Exclusion Zone.

- Placement of contaminated garments in designated plastic bags or drums prior to disposal or transfer offsite. Labels in compliance with the hazard communication standard will be affixed to containers of contaminated debris and clothing.

## 10.0 PERSONNEL TRAINING

Personnel who will perform field activities shall meet the training requirements specified in the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard [29 CFR 1910.120 (e)]. Prior to commencement of work, the SSO will discuss the potential physical and chemical hazards associated with site operations, and review safe work practices with personnel. Personnel are required to acknowledge their understanding and willingness to comply with this SHSP before admission to the site by signing the Compliance Log at the end of the SHSP.

Other job-specific training required to perform tasks within this operation will be verified by the SSO. This training may include, but is not be limited to respirator fit testing, safe lifting techniques, confined spaces, hearing conservation, and proper fire fighting procedures.

## 11.0 MEDICAL PROGRAM

The site medical program has two main components: a baseline medical surveillance program, and emergency medical assistance procedures.

### 11.1 BASELINE MEDICAL SURVEILLANCE

Alton Geoscience has established a medical surveillance program to assess, monitor, and help protect the health of employees, in particular, employees who may be exposed to potentially hazardous substances during site work. Personnel will undergo medical examinations as follows:

**Initial:** Pre-employment / prior to any assignment involving work in a hazardous or potentially hazardous environment. The initial examination is used to establish a baseline picture of health against which future changes can be measured, and to identify any underlying illnesses or conditions that might be aggravated by chemical exposures or job activities.

**Periodic:** At least once every 12 months to measure changes in health status.

**Upon notification:** As soon as possible upon notification by an employee that they have developed signs or symptoms indicating possible overexposure to hazardous substances, or in response to an injury or exposure during an emergency situation.

**Exit:** At termination of employment.

11.2 EMERGENCY MEDICAL ASSISTANCE

An emergency medical assistance network will be established prior to work start-up. The nearest fire department, police, ambulance service, and hospital with an *emergency room* will be identified. **See ATTACHMENT C** for Emergency Services contact information. A vehicle shall be available onsite during work activities to transport injured personnel to the identified emergency medical facilities, if necessary. Company vehicles are to be equipped with a fire extinguisher and first aid kit.

## 12.0 EMERGENCY RESPONSE PLAN

The SSO will have controlling authority during an emergency. In the SSO's absence, the Alternate SSO will be in charge. See ATTACHMENT C for the name, location, and telephone number of emergency response organizations in the vicinity of the project site, and a map to the nearest hospital(s).

12.1 EMERGENCY PROCEDURES

In the event of an accident, injury, or other emergency, remember to:

**Stop work and REMAIN CALM.**

**Move personnel to a safe location (evacuation plan).**

**Call 911 or notify other emergency facilities.**

**Address medical emergencies and apply first aid, if necessary.**

**Contain physical hazards.** (NOTE: Act only if hazard is minimal and you are trained to deal with the situation. Otherwise evacuate and wait for emergency services to arrive.)

**Notify offsite supervisor and client, and initiate accident reporting procedures.**

## 12.2 ACCIDENT REPORTING

In case of an accident, the SSO (or Alternate) will immediately notify the Supervisor/Offsite Coordinator at the nearest Alton office and later provide a report to the PM describing the following:

1. A description of the event (including date and time) that required notification of offsite personnel (i.e., medical facilities, fire department, police department) and the basis for that decision.

2. Date, time, and names of persons/agencies notified, and their response.

3. Details regarding personal injury and property damage, if any.

4. Resolution of incident and the corrective action involved.

All incidents and near misses are to be investigated in accordance with Alton's IIPP. The Supervisor's Report of Accident is to be completed and submitted to the Human Resources department within 24 hours following any accident or injury.

## SITE HEALTH AND SAFETY PLAN
## COMPLIANCE LOG

I have reviewed this Site Health and Safety Plan and understand the contents of the plan. I hereby agree to comply with all safety requirements outlined herein.

Signature: _____ Date: _____Site Safety Officer,
Alton Geoscience, Inc.

Signature: _____ Date: _____Alternate Safety Officer,
Alton Geoscience, Inc.

Signature: _____ Date: _____
Print Name: _____
Company: _____

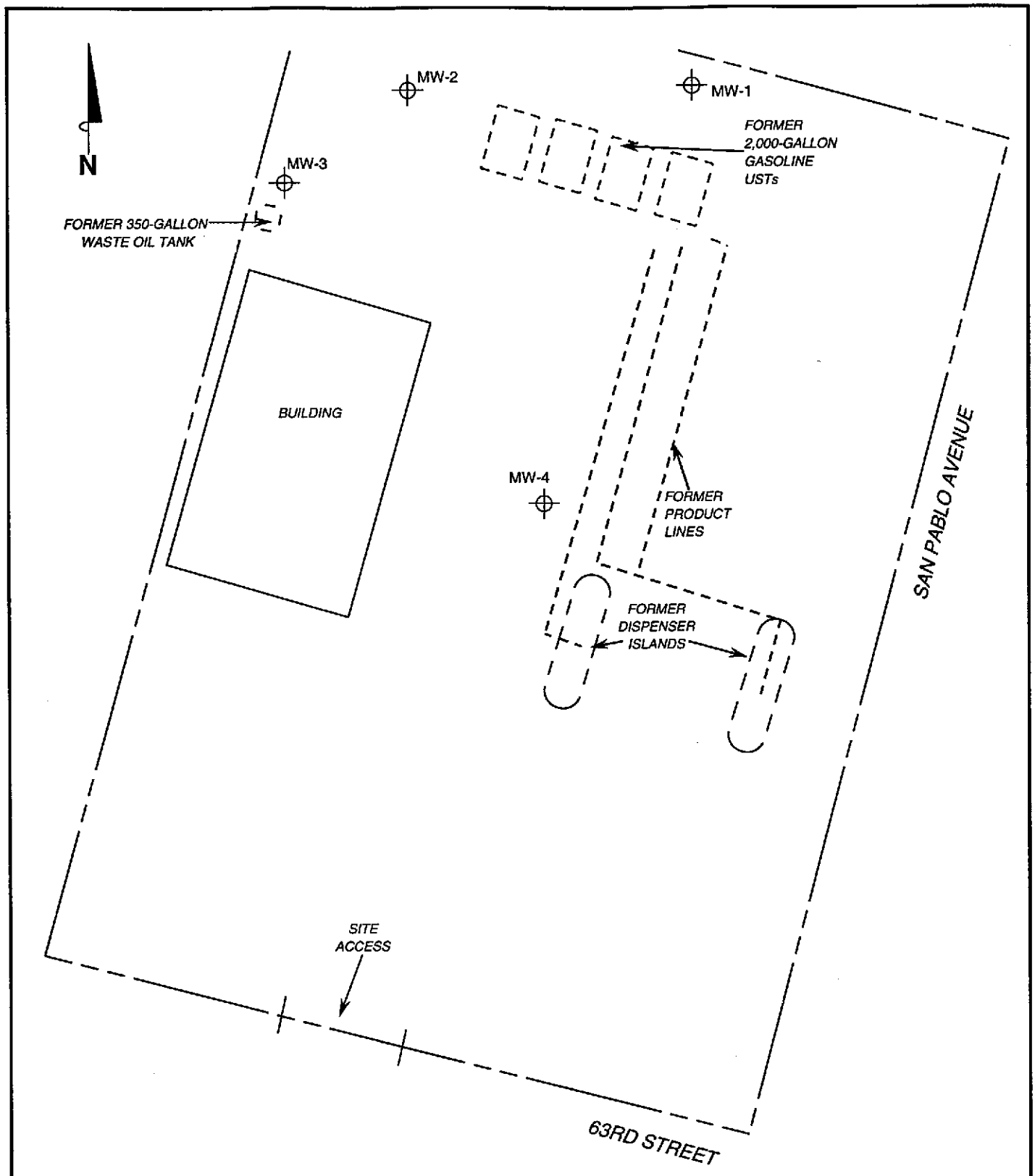
Signature: _____ Date: _____
Print Name: _____
Company: _____

Signature: _____ Date: _____
Print Name: _____
Company: _____

Signature: _____ Date: _____
Print Name: _____
Company: _____

Signature: _____ Date: _____
Print Name: _____
Company: _____

Signature: _____ Date: _____
Print Name: _____
Company: _____




**LEGEND**

MW-4 Groundwater monitoring well

**SITE PLAN**

Former Mobil Station 99-105
6301 San Pablo Avenue
Oakland, California

**FIGURE**

**ALTON GEOSCIENCE**
**Livermore, California**

SCALE (feet)
0 5 10 20

Source: ALISTO Engineering

99-105/Site plan

# ATTACHMENT B

# OCCUPATIONAL HEALTH GUIDELINES AND TOXICOLOGICAL INFORMATION

## Table B-1

## OCCUPATIONAL HEALTH GUIDELINES AND TOXICOLOGICAL INFORMATION

| Contaminant | ACGIH TLV-TWA (ppm) | NIOSH REL (ppm) | STEL (ppm) | OSHA PEL (ppm) | IDLH (ppm) | Routes of Exposure | Known or Suspected Carcinogen | Symptoms |
|---|---|---|---|---|---|---|---|---|
| Diesel (as Stoddard solvent) | for Diesel fuel/ Kerosene 14.4 (skin only) | Approx. 60-98 | 250-500 (NIOSH ceiling) | 500 | Approx. 3000-5600 | Inhalation, Ingestion, Contact | No | Irritation to eyes, skin, mucous membrane; dermatitis, headache, fatigue, blurred vision, dizziness, slurred speech, confusion, convulsions, aspiration, weakness, restlessness, incoordination |
| Gasoline | 300 | n/a | 500 | n/a | n/a | Inhalation, Absorption, Ingestion, Contact | Yes | Irritation to eyes, skin, mucous membrane; dermatitis, headache, fatigue, blurred vision, dizziness, slurred speech, confusion, convulsions, aspiration |
| Benzene | 0.5 | 0.1 | 1 | 1 | 500 | Inhalation, Absorption, Ingestion, Contact | Yes | Irritation to eyes, skin, nose, resp system, giddiness, headache, nausea, staggered gait, fatigue, anorexia, weakness/exhaustion, dermatitis |
| Toluene | 50 | 100 | 150 | 200 | 500 | Inhalation, Absorption, Ingestion, Contact | No | Irritation to eyes, nose; fatigue, weakness, confusion, euphoria, dizziness, headache, dilated pupils, tears, nervousness, muscle fatigue, insomnia, dermatitis |
| Ethylbenzene | 100 | 100 | 125 | 100 | 800 | Inhalation, Ingestion, Contact | No | Irritation to eyes, skin, mucous membranes; headache, dermatitis, narcosis, coma |
| Xylenes (o,m,p,) | 100 | 100 | 150 | 100 | 900 | Inhalation, Absorption, Ingestion, Contact | No | Irritation to eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait, nausea, vomiting, abdominal pain, dermatitis |
| Methyl tert butyl ether (MTBE) | 40 | n/a | n/a | n/a | n/a | n/a | n/a | n/a |

## TABLE KEY

| | |
|---|---|
| ACGIH TLV-TWA: | American Conference of Governmental Industrial Hygienists, Threshold Limit Value-Time Weighted Average |
| NIOSH REL: | National Institute of Occupational Safety & Health, Recommended Exposure Limit |
| STEL: | Short Term Exposure Limit (Gasoline STEL is by ACGIH; BTEX STELs are by NIOSH) |
| OSHA PEL: | Occupational Safety and Health Administration, Permissible Exposure Limit |
| IDLH: | Immediately Dangerous to Life and Health |
| ppm: | parts per million |
| CNS: | Central Nervous System |
| n/a: | not available (i.e., no value has been established) |

## DEFINITIONS

**Threshold Limit Value:** Threshold limit values (TLVs) refer to airborne concentrations of substances and represent conditions under which it is believed nearly all workers may be repeatedly exposed, day after day, without adverse health effects.

**Threshold Limit Value - Time Weighted Average:** The time weighted average (TWA) is a concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. TLV-TWAs are established by the ACGIH.

**Recommended Exposure Limit:** Unless otherwise noted, the recommended exposure limit (REL) is a TWA concentration for up to a 10-hour workday during a 40-hour workweek. RELs are established by NIOSH to reduce or eliminate adverse occupational health effects.

**Short Term Exposure Limit:** A short term exposure limit (STEL) is defined as a 15-minute TWA exposure that should not be exceeded at any time during a workday. When compared to the REL (or TLV-TWA for ACGIH standards), the STEL allows the worker to be exposed to a higher concentration, BUT for a shorter period of time. Exposures above the REL up to the STEL should not be longer than 15 minutes and should not occur more than four times per day.

**Permissible Exposure Limit:** Permissible exposure limits (PELs) are TWA concentrations that must not be exceeded during any 8-hour work shift of a 40-hour workweek. PELs are established by OSHA (29 CFR 1910.1000).

**Immediately Dangerous to Life and Health:** Immediately dangerous to life and health (IDLH) values are established as concentrations from which a worker can escape within 30 minutes without suffering loss of life, irreversible health effects, or other deleterious effects that could prevent him/her from escaping the hazardous environment. The purpose of establishing an IDLH exposure concentration is to ensure that workers can escape from a given contaminated environment in the event of failure of respiratory protection equipment.

# ATTACHMENT C

## EMERGENCY SERVICES
## PHONE NUMBERS, DIRECTIONS, AND LOCAL AREA MAP

## EMERGENCY SERVICES

| FACILITY / LOCATION | TELEPHONE |
|---|---|
| **Emergency Situation** | **911** |

Medical Facility *(with Emergency Room)*

Alta Bates Medical Center (510) 540-4444
2450 Ashby Ave.
Berkely, California

Directions: From the site turn left onto San Pablo Avenue and drive one mile and make a right onto Ashby Ave. Drive 3 miles, Alta Bates is on the right at 2450 Ashby Avenue.

Fire Department:

Oakland Fire Department (510) 444-1616

Police Department:

Oakland Police Department (510) 238-3211

Poison Control Center:

Poison Center - Regional (24-hour) (800) 523-2222

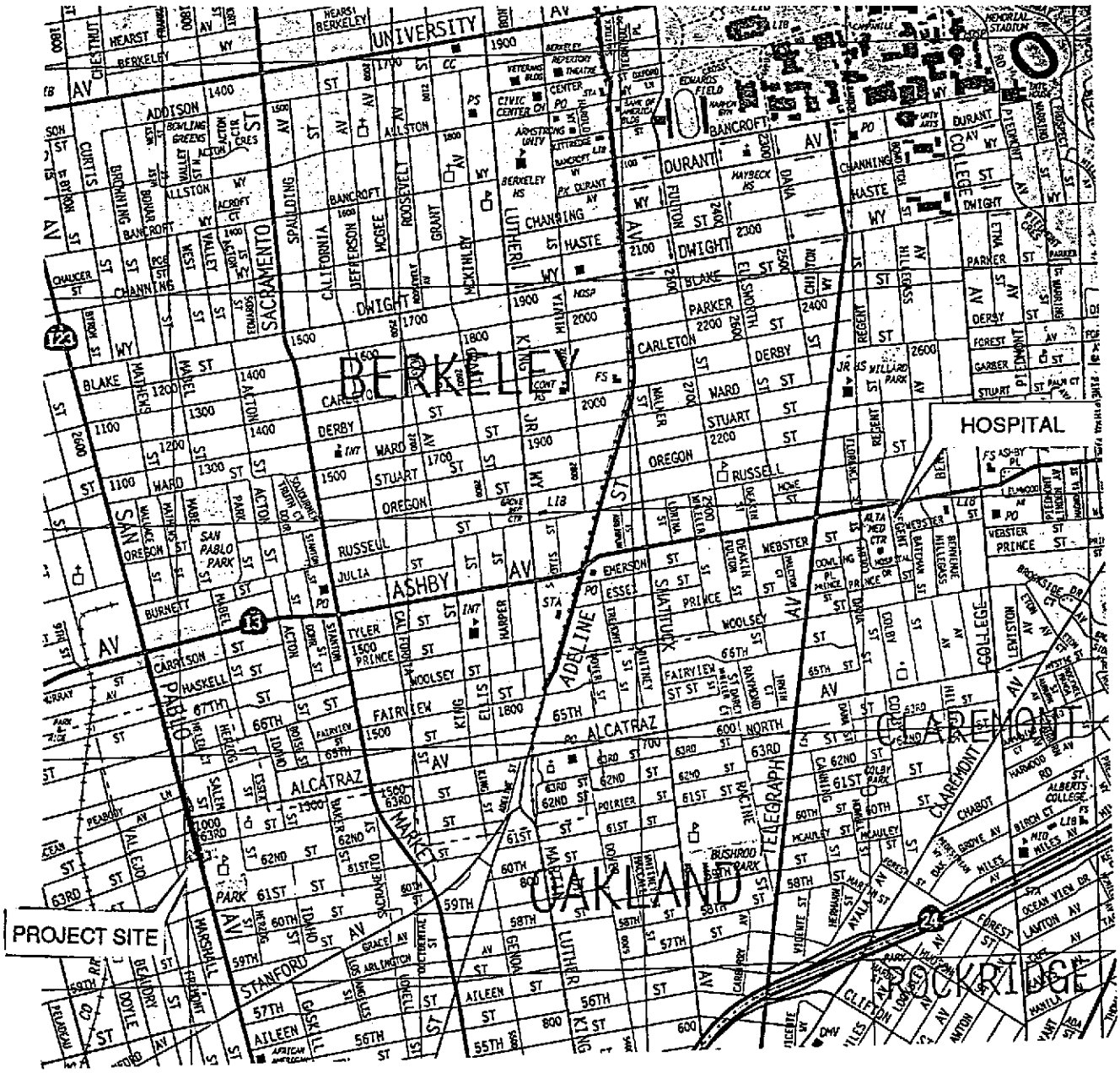
Office of Emergency Services: (800) 852-7550

Alameda County Office of Environmental Protection: (707) 567-6700

USA Dig Alert: (800) 227-2600

**LOCAL AREA MAP**
**with routes to hospital**

# LOCAL AREA MAP
## with routes to hospital



## TAILGATE SAFETY MEETING CHECKLIST

**Topics Covered**
(Check off as discussed)

____ **Personnel training/qualifications:** Check cards for OSHA HAZWOPER 40-hour certification/8-hour-refresher training (other if appropriate).

____ **Supplies:** Indicate location of first aid kit, fire extinguisher, clean water supply (drinking, eye wash), and Site Health and Safety Plan (SHSP).

____ **Emergency services:** Discuss location of nearest telephone and directions to hospital. Map, directions, phone numbers provided at end of SHSP (Attachment C).

____ **Site background:** Discuss types, locations, and concentrations of chemicals found onsite, presence of free product, depth to groundwater, etc.

____ **Work activities:** Discuss scope of work for the day and activities to be performed.

____ **Potential hazards:** Discuss physical hazards (lifting, pinch points, traffic, working around machinery, etc.); chemical hazards (exposure limits, symptoms, air monitoring); and environmental hazards (heat stress, etc.).

____ **Air monitoring:** Necessary equipment is onsite and calibrated. Circle: CGI PID

____ **Personal protective equipment (PPE):** Discuss required level of protection. See that workers have appropriate PPE onsite; includes, but is not limited to, hardhat, steel-toe boots, safety glasses, ear plugs / hearing protection, respirator (with cartridges), gloves, traffic safety vest (other _____).

____ **Utilities:** Utilities have been cleared/marked by appropriate divisions.

____ **Traffic control** (vehicular and pedestrian): Work area is properly delineated and cordoned off from traffic.

____ **Compliance log:** SHSP has been reviewed and signed by site personnel.