



ENVIRONMENTAL
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November 16, 1998

WORKPLAN
for a
SOIL AND GROUNDWATER ASSESSMENT
at
Former Chan's Shell Station
726 Harrison Street
Oakland, California

Submitted by:
AQUA SCIENCE ENGINEERS, INC.
208 West El Pintado Road
Danville, CA 94526
(925) 820-9391

INTRODUCTION

This submittal outlines Aqua Science Engineers, Inc. (ASE)'s workplan for a soil and groundwater assessment at the former Chan's Shell Station located at 726 Harrison Street in Oakland, California (Figure 1). The proposed site assessment activities were initiated by Daisy and Kin Chan, owners of the property, as required in letter's from the Alameda County Health Care Services Agency (ACHCSA) dated September 23, 1997 and October 6, 1998 (Appendix A).

BACKGROUND INFORMATION

In October 1995, All Environmental, Inc. removed four gasoline underground storage tanks (USTs) and one waste oil UST from the site. Up to 470 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPH-G) were detected in soil samples collected beneath the former gasoline USTs. 340 ppm total oil and grease (TOG) was detected in the soil sample collected beneath the waste oil UST.

In December 1995, approximately 530 tons of contaminated soil was removed from the UST excavation areas to a depth of 20-feet below ground surface (bgs). This soil was subsequently disposed of at the Vasco Road Sanitary Landfill. Seven confirmation soil samples were collected from the bottom and sidewalls of the excavation. One sample collected near the northern portion of the excavation contained 20 ppm TPH-G, 2.9 ppm benzene, 0.33 ppm toluene, 3.7 ppm ethylbenzene, 22 ppm total xylenes and 16 ppm methyl tertiary butyl ether (MTBE). Another sample collected near the southern portion of the excavation contained 5,100 ppm TPH-G, 15 ppm benzene, 110 ppm toluene, 82 ppm ethylbenzene and 510 ppm total xylenes. All of the other samples contained low or non-detectable concentrations of hydrocarbons. Additional overexcavation was not possible due to the location of the building to the southeast and the street to the northwest.

In July 1997, Lowney Associates drilled one soil boring at the site and installed a groundwater monitoring well in the boring. A soil sample collected from the boring at a depth near the capillary zone contained 650 ppm TPH-G, 1.2 ppm benzene, 2.2 ppm ethylbenzene and 2.8 ppm total xylenes. A groundwater sample collected from the well contained 18,000 parts per billion (ppb) TPH-G, 2,700 ppb benzene, 350 ppb toluene, 450 ppb ethylbenzene, 900 ppb total xylenes and 7,400 ppb MTBE.

PROPOSED SCOPE OF WORK (SOW)

Based on the requirements of the ACHCSA, ASE's proposed SOW is as follows:

- 1) Prepare a workplan and a health and safety plan for approval by the ACHCSA.
- 2) Obtain a drilling permit from the Alameda County Public Works Agency (ACPWA).
- 3) Drill three (3) soil borings to approximately 30-feet bgs at the site.
- 4) Analyze at least one soil sample from each boring at a CAL-EPA certified analytical laboratory for TPH-G by modified EPA Method 5030/8015 and benzene, toluene, ethylbenzene and total xylenes (BTEX) and MTBE by EPA Method 8020.
- 5) Install 2-inch diameter groundwater monitoring wells in each boring described in task 3.
- 6) Develop the monitoring wells.
- 7) Collect groundwater samples from each monitoring well for analyses.
- 8) Analyze the groundwater samples at a CAL-EPA certified analytical laboratory for TPH-G, BTEX and MTBE.
- 9) Survey the top of casing elevation of each well, and determine the groundwater flow direction and gradient beneath the site.
- 10) Prepare a report detailing the methods and findings of this assessment.

Details of the assessment are presented below.

TASK 1 - PREPARE A WORKPLAN AND HEALTH AND SAFETY PLAN

Based on the site history and the analytical results of the soil and groundwater samples collected during the underground storage tank removal and previous assessment at the site, ASE has prepared a site-specific health and safety plan. A nearby hospital is designated in the site safety plan as the emergency medical facility of first choice. A copy of

the site specific Health and Safety Plan is appended to this report (Appendix B).

TASK 2 - OBTAIN NECESSARY PERMITS

ASE will obtain a drilling permit from the Alameda County Public Works Agency (ACPWA). ASE will also notify Underground Service Alert (USA) to have underground utility lines marked in the site vicinity.

TASK 3 - DRILL THREE SOIL BORINGS AT THE SITE

ASE will drill three soil borings at the locations shown on Figure 2. The borings will be drilled using a hollow-stem auger drill rig. The drilling will be directed by a qualified ASE geologist. Undisturbed soil samples will be collected at least every 5-feet, at lithographic changes, and from just above the water table for subsurface hydrogeologic description and possible chemical analysis. The samples will be described by the ASE geologist according to the Unified Soil Classification System. The samples will be collected in brass tubes using a split-barrel drive sampler advanced ahead of the auger tip by successive blows from a 140-lb. hammer dropped 30-inches. Each sample will be immediately removed from the sampler, trimmed, sealed with Teflon tape and plastic caps, secured with duct tape, labeled with the site location, sample designation, date and time the sample was collected, and the initials of the person collecting the sample. The samples will be placed into an ice chest containing wet ice for delivery under chain of custody to a CAL-EPA certified analytical laboratory.

Soil from the remaining tubes not sealed for analysis will be removed for hydrogeologic description and will be screened for volatile compounds with an organic vapor meter (OVM). The soil will be screened by emptying soil from one of the tubes into a plastic bag. The bag will be sealed and placed in the sun for approximately 10 minutes. After the hydrocarbons have been allowed to volatilize, the OVM will measure the vapor through a small hole, punched in the bag. These OVM readings will be used as a screening tool only since these procedures are not as rigorous as those used in an analytical laboratory.

All sampling equipment will be cleaned in buckets with brushes and a trisodium phosphate (TSP) or Alconox solution, then rinsed twice with tap water. Rinsates will be contained on-site in 55-gallon steel drums until off-site disposal can be arranged.

TASK 4 - ANALYZE AT LEAST ONE SOIL SAMPLE FROM EACH BORING

At least one soil sample from each boring will be analyzed at a CAL-EPA certified environmental laboratory for TPH-G by modified EPA Method 5030/8015 and BTEX and MTBE by EPA Method 8020. The soil sample to be analyzed will be the sample which appears to be the most contaminated based on odors, staining and/or OVM readings. If there is no indication of contamination in any of the samples, the sample collected from just above the water table (the capillary zone) will be selected for analysis.

TASK 5 - COMPLETE THE BORINGS AS MONITORING WELLS

ASE will complete the borings described in task 3 as 2-inch diameter groundwater monitoring wells. The wells will be constructed with 2-inch diameter, flush-threaded, schedule 40, 0.020-inch slotted PVC well screen and blank casing. The well casing will be lowered through the augers and #3 Monterey sand will be placed in the annular space between the well casing and the borehole to approximately 2-feet above the screened interval. Approximately 1-foot of bentonite pellets will be placed on top of the sand pack and hydrated with deionized water. This bentonite layer will prevent the cement sanitary seal from infiltrating into the sand pack. Cement mixed with 3 to 5 percent bentonite powder by volume will be used to fill the annular space between the bentonite layer and the surface to prevent surface water from infiltrating into the well. The well head will be protected by a locking well plug and an at-grade, traffic-rated well box (See Figure 3 - Typical Monitoring Well).

The well will be screened to monitor the first water-bearing zone encountered. Wells will typically be screened with 5-feet of screen above the water table and 10 to 15-feet of screen below the water table. ASE anticipates the wells to be installed at the site will be screened between 10-feet bgs and 30-feet bgs.

TASK 6 - DEVELOP THE MONITORING WELLS

The monitoring wells will be developed after waiting at least 72 hours after well construction. The wells will be developed using at least two episodes of surge block agitation and bailer or pump evacuation. At least ten well casing volumes of water will be removed during the development, and development will continue until the water appears to be reasonably clear. The well development purge water will be stored temporarily on-

site in sealed and labeled 55-gallon steel drums until off-site disposal can be arranged.

TASK 7 - SAMPLE THE MONITORING WELLS

After waiting 72 hours after the well development, ASE will sample the monitoring wells. Prior to purging and sampling, the groundwater surface in each well will be checked for sheen or free-floating hydrocarbons. The thickness of any free-floating hydrocarbons will be measured with an acrylic bailer which will be lowered slowly to the groundwater surface and filled approximately half full for direct observation. ASE will also measure the depth to groundwater in all site wells prior to purging water from any well. Prior to sampling, each well will be purged of at least four well casing volumes of groundwater. The temperature, pH and electrical conductivity of evacuated water will be monitored during the well purging, and purging will continue beyond four well casing volumes if these parameters have not stabilized. Groundwater samples will be collected from each well using disposable polyethylene bailers. Groundwater will be decanted from the bailers into 40-ml glass volatile organic analysis (VOA) vials, sealed in the VOA vials without headspace, preserved with hydrochloric acid and labeled with the site location, sample designation, date and time the samples were collected, and the initials of the person collecting the samples. The samples will then be placed on ice for transport to the analytical laboratory under chain of custody. Purged groundwater will be stored temporarily on-site in sealed and labeled 55-gallon steel drums until off-site disposal can be arranged.

TASK 8 - ANALYZE THE GROUNDWATER SAMPLES

The groundwater samples will be analyzed by a CAL-EPA certified analytical laboratory for TPH-G by modified EPA Method 5030/8015 and BTEX and MTBE by EPA Method 8020.

TASK 9 - SURVEY THE TOP OF CASING ELEVATION OF EACH WELL

ASE will survey the top of casing elevation of each well casing relative to mean sea level. These elevations will be used with the depth to groundwater measurements to determine the groundwater flow direction and gradient beneath the site.

TASK 10 - PREPARE A SUBSURFACE ASSESSMENT REPORT

ASE will prepare a subsurface assessment report outlining the methods and findings of this assessment. This report will include a summary of the results, the site background and history, description of the well construction, development and sampling, tabulated soil and groundwater analytical results, conclusions and recommendations. Formal boring logs, analytical reports, and chain of custody documents will be included as appendices. This report will be submitted under the seal of a California registered civil engineer or geologist.

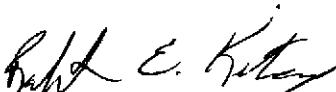
SCHEDULE

ASE plans to begin field activities immediately upon approval of this workplan by the ACHCSA.

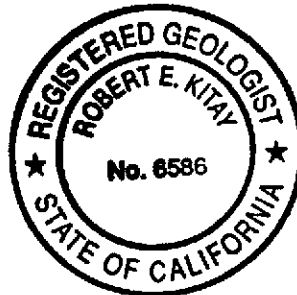
Should you have any questions or comments, please call us at (925) 820-9391.

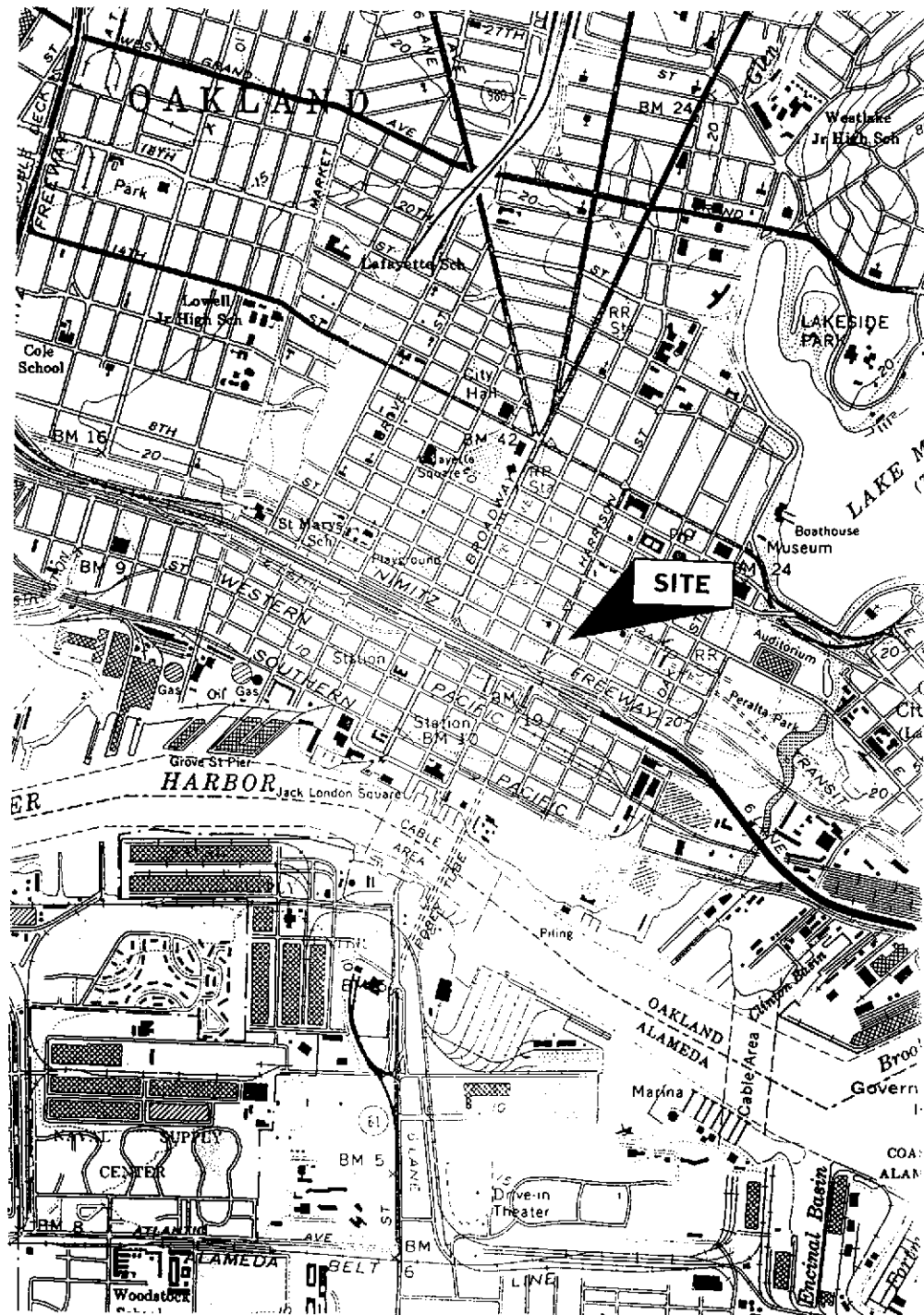
Respectfully submitted,

AQUA SCIENCE ENGINEERS, INC.



Robert E. Kitay, R.G., R.E.A.
Senior Geologist



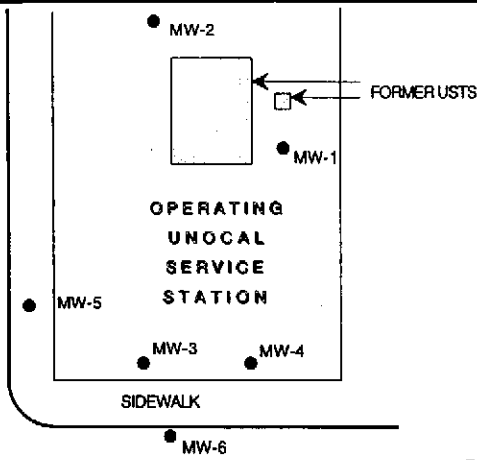


SITE LOCATION MAP	
FORMER CHAN'S SHELL STATION 726 HARRISON STREET OAKLAND, CALIFORNIA	
Aqua Science Engineers	Figure 1



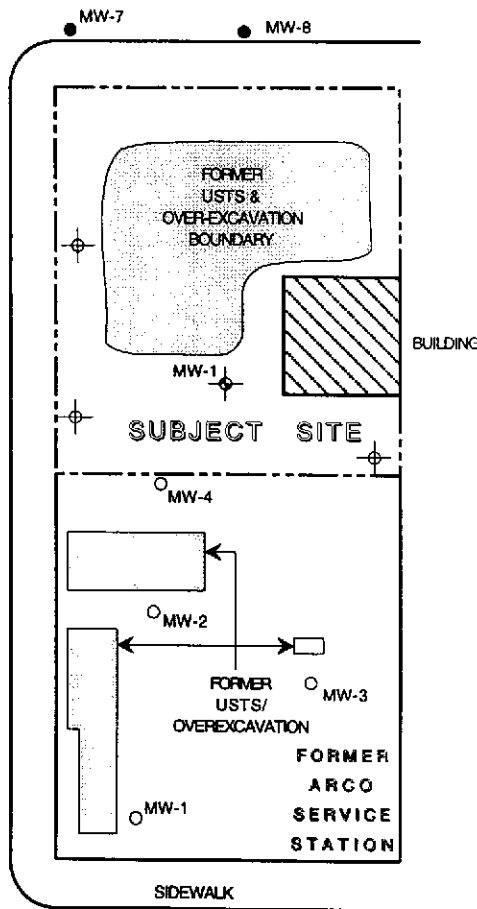
NORTH

SCALE
1" = 50'



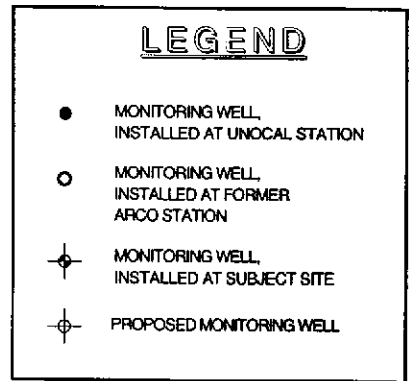
GROUNDWATER
FLOW DIRECTION
BASED ON
NEIGHBORING SITES

8TH STREET



HARRISON STREET

7TH STREET



FORMER UNOCAL SERVICE STATION

MW-7

MW-6

MW-5

**PROPOSED MONITORING
WELL LOCATION MAP**

11/16/98

726 HARRISON STREET
OAKLAND, CALIFORNIA

AQUA SCIENCE ENGINEERS, INC.

Figure 2

APPENDIX A

Alameda County Health Care Services Agency Letter

ALAMEDA COUNTY
HEALTH CARE SERVICES

AGENCY
DAVID J. KEARS, Agency Director



Certified Mailer # Z 115 363 869

October 6, 1998

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION (LOP)
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

Kin & Daisy Chan
4328 Edgewood Ave.
Oakland, CA 94602
STID 39

NOTICE OF VIOLATION

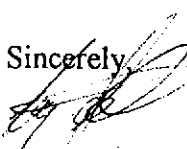
RE: Shell, 726 Harrison Street, Oakland, CA 94607

Dear Mr. & Ms. Chan:

A letter dated September 23, 1997 requested a workplan be submitted to this office to delineate the extent of contamination on your site. The State Water Board and this office are concerned that hydrocarbons from your site are migrating onto your neighbor's site at 706 Harrison Street, Oakland. Your consultant, David Allen of Aqua Science Engineers Inc. faxed me a draft of the proposed locations for the installation of three additional monitoring wells on February 9, 1998. I have not received the formal workplan as of this date. **Please submit an additional subsurface workplan approval within 30 days of the receipt of this letter.**

If you have any questions, please contact me at (510) 567-6774.

Sincerely,


Larry Seto
Sr. Hazardous Materials Specialist

Cc: David Allen, Aqua Science Engineers, 208 West El Pintado Road,
Danville, CA 94526
Bo Gin, 288 11th Street, Oakland, CA 94706
Bob Chambers, Alameda County District Attorney's Office,
Consumer & Environmental Protection
Files

ALAMEDA COUNTY
HEALTH CARE SERVICES

AGENCY
DAVID J. KEARS, Agency Director



ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION (LOP)
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

September 23, 1997

Daisy & Kin Chan
4328 Edgewood Ave.
Oakland, CA 94602

STID 39, 726 Harrison St., Oakland, 94607

Dear Daisy & Kin Chan:


This office has received and reviewed a Soil and Groundwater Evaluation Report dated July 31, 1997 by Lowney Associates. The following are comments concerning this report:

1. The levels of TPHg, benzene, and MTBE discovered in your new well MW-1 are very high and certainly indicate that your tanks leaked. However, all data is basically linear in a downgradient direction. To adequately characterize your plume you need to have more data points, especially in both cross gradient directions. You will need to submit another workplan for this continued investigation. You are reminded that quarterly monitoring of the existing well is required.
2. It would be very wise for you to work together with the two other sites that you already researched and cited in your report. Simultaneous monitoring is best to see what is actually happening. It is not reasonable to compare contaminant numbers in the shallow zone from over a year apart.
3. You should **not** submit reports to the Regional Board as the report suggests on page 6.
4. Your figure 2 portrays the sample results for off-site wells MW-7 and MW-8 as being taken on 7-9-97 when they were actually taken on 7-9-96. This should be corrected.

Please be advised that this letter constitutes a formal request for technical reports pursuant to California Water Code Section 13267(b) and the Health and Safety Code Sections 25299.37 and 25299.78.

This case will be assigned to Larry Seto of this office. Please contact him at (510) 567-6774 if you have any questions regarding this letter.

Sincerely,



Thomas Peacock, Manager

c: Brock Foster, Lowney Associates, 405 Clyde Ave., Mountain View, CA 94043-2209
Gordon Coleman - Files

APPENDIX B

Health and Safety Plan

HEALTH & SAFETY PLAN

for the

Former Chan's Shell Station Jobsite

726 Harrison Street
Oakland, California

prepared by

Aqua Science Engineers, Inc.
208 West El Pintado Road
Danville, California 94526
(925) 820-9391

AQUA SCIENCE ENGINEERS, INC.
HEALTH & SAFETY PLAN
for the
FORMER CHAN'S SHELL STATION JOBSITE

A. GENERAL DESCRIPTION

Site: 726 HARRISON STREET, OAKLAND, CALIFORNIA

Work Scope: AQUA SCIENCE ENGINEERS WILL INSTALL THREE
GROUNDWATER MONITORING WELL AT THE ABOVE
REFERENCED SITE.

SAFETY POLICY:

This Health and Safety Plan is written specifically for the Former Chan's Shell Station jobsite. All persons on site will follow OSHA safe operating practices as outlined in 29 CFR 1910 and 1926, as well as established guidelines from their respective companies or organizations.

Plan Prepared by: Robert Kitay Date: 11/18/98

Plan Approved by: David Schultz Date: 11/18/98

Background Review Done? Complete: 11/18/98
Preliminary:

Overall Hazard Level: Serious: Low: XXX
Moderate: Unknown:

Project Organization:

Site Manager for A.S.E.: Robert Kitay
A.S.E. Safety Officer: David Allen
Other A.S.E Personnel: Greg Schramm

B. SITE/WASTE CHARACTERISTICS

Waste Type(s): Solid: XXX Sludge: Liquid: XXX Gas:

Characteristics: HYDROCARBON RESIDUALS, TOXIC

Site Parameter:

THE MONITORING WELL LOCATIONS ARE IDENTIFIED AS AN EXCLUSION ZONE. A MINIMUM BOUNDARY OF THREE FEET IS TO BE MAINTAINED AS MUCH AS IS POSSIBLE.

C. HAZARD EVALUATION

CHEMICAL HAZARDS

Potential chemical hazards include skin and eye contact or inhalation exposure to potentially toxic concentrations of hydrocarbon vapors. The potential toxic compounds that may exist at the site are listed below, with descriptions of specific health effects of each. The list includes the primary potential toxic constituents of gasoline and waste oil known to be on site. Exposure levels and symptoms are taken from the NIOSH Pocket Guide to Chemical Hazards.

1. BENZENE

- a. Colorless, clear, highly flammable liquid with characteristic odor.
- b. High exposure levels may cause acute restlessness, convulsions, depression, respiratory failure. BENZENE IS A KNOWN CARCINOGEN.
- c. Permissible exposure level (PEL) for a time weighted average (TWA) over an eight hour period is 1.0 ppm.

2. TOLUENE

- a. Colorless liquid with a benzene-like odor.
- b. High exposure levels may cause fatigue, euphoria, confusion, dizziness. TOLUENE IS LESS TOXIC THEN BENZENE.
- c. PEL for a ten hour TWA is 100 ppm.

3. XYLENE

- a. Colorless, flammable liquid with aromatic odors.
- b. high exposure levels may case dizziness, drowsiness, narcosis.
- c. PEL for a ten hour TWA is 100 ppm.

4. ETHYLBENZENE

- a. Clear, colorless, highly flammable liquid with characteristic odor.
- b. High exposure levels may cause irritation to skin, nose and throat, dizziness, constriction in chest, loss of consciousness, respiratory failure.
- c. PEL for an eight hour TWA is 100 ppm.

ALL SUBSTANCES AS THEY EXIST ON SITE ARE EXPECTED TO BE STABLE.

PHYSICAL HAZARDS

Personnel shall maintain the maximum distance possible from the borings while performing their activities. Other on-site hazards include physical injuries due to the proximity of workers to engine-driven heavy equipment and tools. Heavy equipment used during drilling includes a drill rig. Only trained personnel will operate machines, tools and equipment; all will be kept clean and in good repair. Minimum safety apparel required around heavy equipment will include a hardhat, steel-toed boots and hearing conservation devices. ALL WORK WILL BE PERFORMED IN ACCORDANCE WITH OSHA GUIDELINES.

Inspections of well location, the adjacent areas, and protective systems are to be made by a qualified person while personnel are on site.

1. USE SAFETY EQUIPMENT, MASK RESPIRATORS WITH NIOSH APPROVED C-21 CARTRIDGES FOR ORGANIC VAPORS, AS NECESSARY.
2. HAVE AT LEAST ONE DRY CHEMICAL MODEL PA-200 A-B-C FIRE EXTINGUISHER PRESENT.

LEVEL OF PROTECTION

A contamination Reduction Zone (CRZ) will be maintained and adjusted as work proceeds and moves around the site. The workers on-site will wear level 'D' protective clothing. (This protection level may be upgraded after on-site conclusions of data are completed). THE LEVEL OF PROTECTION FOR PERSONNEL WORKING IN THE AREA WILL BE UPGRADED IF: THE ORGANIC VAPOR LEVELS IN THE OPERATOR'S BREATHING ZONE EXCEEDS 5 PPM ABOVE BACKGROUND LEVELS CONTINUOUSLY FOR MORE THAN FIVE MINUTES (to be monitored by a hand-held OVM). In this event, personnel protective equipment will include full face respirators with double-cartridge filters for organic vapors and particulates, in addition to hardhat, steel-toed boots and

coveralls. If work proceeds in an environment where vapor concentrations exceed 200 ppm, a self contained breathing apparatus or airline respirator will be utilized by the personnel.

Levels of Protective Clothing are defined on the following pages as described in the "EPA Standard Operating Safety Guidelines":

LEVEL A PROTECTION

Components:

- 1) Pressure-demand, supplied air respirator that is MSHA and NIOSH approved. Respirators may be pressure demand, self contained breathing apparatus (SCBA), or pressure demand, airline respirator with an escape bottle for atmospheres with an extreme IDLH.
- 2) Fully encapsulating chemical resistant suit.
- 3) Inner, chemical resistant gloves.
- 4) Disposable gloves and boot covers, worn over the fully encapsulating suit.
- 5) 2-way radio communications is highly recommended.

LEVEL B PROTECTION

Components:

- 1) Pressure-demand, supplied air respirator that is MSHA and NIOSH approved. Respirators may be pressure demand, self contained breathing apparatus (SCBA), or pressure demand, airline respirator with an escape bottle for atmospheres with an extreme IDLH.
- 2) Chemical resistant clothing which includes overalls and long sleeved jacket or, hooded one or two piece chemical splash suit or disposable chemical resistant one piece suit..
- 3) Outer chemical resistant gloves.
- 4) Inner chemical resistant gloves.
- 5) Chemical resistant, steel toed and shank boots.
- 6) Disposable chemical resistant boot covers.

7) Hardhat.

8) 2-way radio communications is highly recommended.

LEVEL C PROTECTION

Components:

- 1) Air purifying respirator, full face, with twin cartridge or cannister equipped filters, that are MSHA and NIOSH approved.
- 2) Chemical resistant clothing which includes coveralls or, hooded one-piece or two-piece chemical splash suit or chemical resistant hood and apron; disposable chemical resistant coveralls.
- 3) Outer chemical resistant gloves.
- 4) Inner chemical resistant gloves.
- 5) Chemical resistant, steel toed and shank boots.
- 6) Disposable chemical resistant boot covers.
- 7) Hardhat.
- 8) 2-way radio communications is recommended.

LEVEL D PROTECTION

Components:

- 1) Coveralls.
- 2) Gloves.
- 3) Leather boots, shoes or chemical resistant, with steel toe and shank.
- 4) Safety glasses or chemical splash goggles.
- 5) Hardhat or face shield.

SITE ENTRY PROCEDURES

Any personnel entering the site will observe all conditions set forth by the owners/operators of the property, including vehicle travel speeds,

restricted areas and conduct. Eating, drinking, smoking and other practices which increase the probability of hand-to-mouth transfer of contamination is prohibited in the work zone. All field personnel will be instructed to thoroughly wash their hands and face upon leaving the work area for breaks or cessation of day's activities.

DECONTAMINATION PROCEDURES

If required, equipment and personnel decontamination areas will be designated by the Project Manager at the start of the project. To prevent the transfer of contamination from the work site into clean areas, all tools will be cleaned adequately prior to final removal from the work zone. Disposable protective clothing such as Tyvek coveralls, latex gloves, boot covers, etc. will be changed on a daily basis or at the discretion of the Project Manager on site. All disposable protective clothing will be put into plastic bags and disposed of in a proper manner. All respirator cartridges will be discarded and replaced with fresh units on a daily basis, disposal will be in the same manner as the protective clothing. Excavated material and drill cuttings will be stockpiled in an area designated by the Project Manager, to be handled as agreed upon in the scope of work contract with the client.

In the event of a medical emergency, the injured party will be taken through decontamination procedures, if possible. However, the procedures may be omitted when it may aggravate or cause further harm to the injured party. member of the work team will accompany the injured party to the medical facility to advise on matters concerning chemical exposure. The injured person will not transport themselves to the medical facility!

Personnel Protection Level will be Level 'D'. Protective clothing levels may be upgraded in the event that on site conclusions determine a greater than anticipated danger to personnel.

Site Entry: BARRICADES, CONES, OR BANNER GUARD MAY BE ERECTED TO CONTROL FOOT TRAFFIC AWAY FROM THE WORK ACTIVITY.

Decontamination-

Personnel and Equipment: IF REQUIRED, PERSONNEL AND EQUIPMENT WILL BE DECONTAMINATED AS PER USEPA STANDARD OPERATING SAFETY GUIDELINES. A SMALLER MODIFIED DECONTAMINATION LINE MAY BE USED DUE TO SPACE RESTRICTIONS.

Work Limitations (time, weather):

NONE ARE ANTICIPATED; HOWEVER, PERSONNEL WORKING ON SITE MAY EXPERIENCE ELEVATED TEMPERATURES DURING THE WORK DAY. IN THE EVENT THAT AMBIENT TEMPERATURES REACH OR EXCEED 80 DEGREES FAHRENHEIT, THE FOLLOWING GUIDELINES ARE RECOMMENDED.

1. Periods of work should be reduced to no less than one hour time frames and separated by breaks intended to reduce personnel stress due to reduced natural ventilation from wearing protective clothing.

2. All personnel wearing level C protective clothing or greater, will be subject to medical monitoring of body temperature after work periods, by the following guidelines;

a. Heart Rate (HR) should be measured by counting the radial pulse rate for 30 seconds and doubling count for the correct pulse rate. This should be done as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by 10 minutes, while the length of the rest period remains the same. If the HR is 100 beats per minute at the beginning of the next rest period, the following work period should be shortened by an additional 10 minutes.

b. Body temperatures should be measured orally with a clinical thermometer as soon as possible in each resting period. Oral Temperatures (OT) should not exceed 99 degrees Fahrenheit. If it does, the next work period should be reduced by 10 minutes while the length of the resting period remains the same. If the OT exceeds 99 degrees Fahrenheit at the beginning of the next work period, the following work period should be reduced by an additional 10 minutes. OT should be measured at the end of each rest period to ensure that the body's temperature has dropped below 99 degrees Fahrenheit.

Body Water Loss (BWL) from sweating, could result in dehydration and further complications and stress on personnel working in protective clothing under adverse weather conditions. It is strongly recommended that plenty of stress relief beverages be available on site to replace body fluids. Commercial drink mixes that provide electrolyte balancing solutions or water are adequate for replacing body fluids.

Alternate methods of heat stress reduction can be made available such as,

Portable showers or hose-down facilities,
Shelter cover to protect against direct sunlight,
Rotating teams of personnel wearing protective clothing,
Performing extremely arduous tasks early in the workday.

EMERGENCY INFORMATION

In the event of an injury or suspected chemical exposure, the first responsibility of the project Manager will be to prevent any further injury. This objective will normally require an immediate stop to work until the situation is remedied. The Project Manager may order the evacuation of the work party. Other primary responsibilities in the event of an accident will be the first aid and decontamination of the injured team member(s). The injured party will be moved to a designated safe area and initial first aid will be rendered.

Employees are asked to make every effort and take personnel responsibility to prevent accidents involving machinery or any other aspect of the job, either by individual action or by notifying the Project Manager immediately of any unsafe condition that may exist.

In the event of an unexpected hazardous material discovery on site, the following actions will be taken by any employee involved;

1. The person having uncovered the unexpected material will notify the Project Manager and other workers of the danger. The site will be cleared of personnel if deemed necessary by the Project Manager. If site evacuation is required, appropriate local agencies such as the Fire Department or Health Department will be notified as well.
2. Immediate action will be taken to contain the hazardous material, provided the workers involved are properly attired with adequate protective clothing to avoid exposure.
3. Proper containment procedures will be determined for the hazardous material encountered prior to cleanup commencing. All personnel involved in the containment effort will be properly protected to prevent exposure. Backup personnel will be similarly protected while monitoring the work being done for any additional dangers.
4. The container(s) will be staged on-site, away from the major activity areas and in such a way that if loss of containment occurs, the