MILLER BROOKS
Environmental, Inc.

720 Southpoint Blvd. Suite 207
Petaluma, CA 94954
Phone (707) 765-0466, Fax (707) 765-0366

TRANSMITTAL

TO: Mr. Donald Hwang
Alameda County Dept. of Public Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

DATE: June 23, 2004
PROJECT NO. 06-459-2349-02
SUBJECT: 76 Service Station 82349 (0843)
Alameda, California

From: Jeremy Smith

WE ARE SENDING YOU:

COPIES	DATED	DESCRIPTION
1	6/23/04	Work Plan for Additional Subsurface Site Assessment Activities

THESE ARE TRANSMITTED as checked below:

- ☐ For review and comment
- ☐ As Requested
- ☒ For Approval
- ☐ Approved as submitted
- ☐ Approved as noted
- ☐ Returned for corrections
- ☒ For your files
- ☐ For your use
- ☐ As noted below

COMMENTS:
Attached is a copy of the Work Plan for the above referenced site. Please call with any questions you may have. Thanks.

Signed: _____

COPIES TO: Mr. Thomas Kosel, (electronic copy)

WORK PLAN FOR ADDITIONAL SUBSURFACE SITE ASSESSMENT ACTIVITIES

FORMER 76 STATION NO. 82349 (0843)
1629 WEBSTER STREET
ALAMEDA, CALIFORNIA
COP NO. WNO.2807

Prepared For:

Mr. Thomas Kosel
ConocoPhillips Company
76 Broadway
Sacramento, CA 95818
(916) 558-7666

By:

MILLER BROOKS ENVIRONMENTAL, INC.
720 Southpoint Boulevard, Suite 207
Petaluma, California 94954
(707) 765-0466

Project Number 06-459-2349-04

June 23, 2004

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1.0 INTRODUCTION

Miller Brooks Environmental, Inc. (Miller Brooks), on behalf of ConocoPhillips Company (ConocoPhillips), submits this work plan for additional subsurface site assessment activities at Former 76 Service Station No. 82349 (0843), located at 1629 Webster Street, in Alameda, California (Figure 1). This work plan was prepared at the request of ConocoPhillips in order to delineate the lateral extent of hydrocarbon affected groundwater beneath the site. The proposed scope of work includes:

- obtaining the required drilling permits;
- preparing a site specific site safety plan;
- advancing one soil boring, and constructing a groundwater monitoring well in the boring to delineate the lateral extent of petroleum hydrocarbon impacted groundwater beneath the site;
- developing the newly installed monitoring well;
- contracting a licensed land surveyor to survey the vertical elevation and horizontal location of the new well;
- collecting and submitting select soil and groundwater samples for chemical analysis;
- arranging for disposal of the waste materials;
- preparing a report which presents the findings of the proposed assessment activities.

2.0 SITE DESCRIPTION

The site is a former service station located on the southwest corner of Pacific Avenue and Webster Street in Alameda, California (Figure 1). Currently the site is operating as an auto repair facility. The station is located at an elevation of approximately 16 feet above mean sea level (MSL). The current site features include a building, four onsite groundwater monitoring wells, and two offsite groundwater monitoring wells. Two gasoline underground storage tanks (USTs), one used-oil UST, two dispenser islands, and associated product piping were previously present at the site, but were removed in June 1998. Locations of the current and former site features are shown on Figure 2.

3.0 ENVIRONMENTAL SETTING

3.1 Geologic Features

Based on previous subsurface investigations, subsurface soils are composed of fine to medium grained sand with varying amounts of silt and clay to the maximum depth explored, approximately 21.5 feet below ground surface (bgs). In soil boring MW-3, silt, with trace amounts of sand and clay, was encountered from approximately 0.5 feet bgs to the terminus of the boring, approximately 20.5 feet bgs.

3.2 Hydrogeology

Historically, groundwater has been present at depths ranging from 4.46 to 8.07 feet below the top of casing (TOC) in the monitoring wells. The predominant groundwater flow direction has been reported towards the northeast. During the most recent groundwater monitoring and sampling event, conducted on February 12, 2004, groundwater was present at depths ranging from 5.02 to 6.02 feet below the TOC. The groundwater flow direction was reported towards the north at a gradient of 0.005 ft/ft.

4.0 BACKGROUND

4.1 Site Assessment Activities

In June 1998, Tosco Marketing Company (Tosco, now ConocoPhillips), removed two 10,000-gallon gasoline USTs, one 550-gallon used-oil UST, product lines, and dispensers. Two holes approximately ¾-inch in diameter were observed in the used-oil tank during removal. No holes or other evidence of leakage were observed in the remaining tanks or piping. Low levels of hydrocarbon impact were reported in the soil samples collected during UST removal activities.

In March 1999, Environmental Resolutions Inc. (ERI) installed four on-site groundwater monitoring wells (MW1 through MW4) at the subject site. In December 1999, ERI installed two off-site monitoring wells (MW5 and MW6) at the subject site.

In March 2001, ERI performed an underground utility survey to identify and locate underground utility lines beneath and in the vicinity of the site that may provide potential preferential pathways for groundwater flow. ERI determined that underground utilities may constitute a potential preferential pathway for groundwater flow and the migration of hydrocarbon affected groundwater during periods when the water table is sufficiently high.

In May 2001, ERI advanced five direct-push soil borings (GP1 through GP5), to evaluate whether underground utility trenches in the vicinity of the site may provide preferential pathways for groundwater flow and the migration of dissolved hydrocarbons. The results of the investigation indicated that there was insufficient evidence to suggest that underground utility lines were providing preferential pathways for the off-site migration of dissolved petroleum hydrocarbons.

In December 2001, ERI advanced twelve direct-push soil borings (GP6 through GP17) to further assess the lateral extent of residual hydrocarbons in the vadose zone beneath the site. The results of the investigation indicated that the extent of residual hydrocarbons detected during previous investigations is limited and ERI concluded that remedial action for residual petroleum hydrocarbons at the site was not warranted.

In June and July 2002, ERI conducted a groundwater receptor survey. Three irrigation wells were located within a ½ mile radius of the site. The wells are reportedly located approximately 1,980 feet west, 2,245 feet west, and 2,245 feet southwest of the site, cross or upgradient of the site.

In December 2002, ERI destroyed one on-site monitoring well (MW2), performed a remedial excavation of hydrocarbon-impacted soil in the vicinity of the former eastern dispenser island, and replaced former well MW2 with on-site backfill monitoring well MW2A.

ERI submitted a *Request and Work Plan for Case Closure* to the Alameda County Health Care Services Agency, dated September 10, 2003. The report summarized why ERI concluded that no further action was needed for the site, and detailed plans to destroy the existing wells upon regulatory acceptance for no further action.

Quarterly groundwater monitoring and sampling is currently ongoing at the site. During the most recent groundwater monitoring and sampling event, conducted on February 12, 2004, total petroleum hydrocarbons as gasoline (TPHg), benzene, and methyl tertiary butyl ether (MTBE) were detected at concentrations up to 1,100, 2.6, and 2,800 micrograms per liter (µg/L), respectively.

4.2 Remedial Activities

- Approximately 338 tons of hydrocarbon impacted soil and backfill were removed from beneath the former USTs, dispensers, and product lines during 1998 UST removal activities at the site.
- Approximately 292 tons of hydrocarbon-impacted soil was removed from beneath the former eastern dispenser island during the December 2002 excavation.

5.0 PROPOSED SITE ASSESSMENT ACTIVITIES

Miller Brooks proposes to conduct additional subsurface site assessment activities to determine the lateral extent of groundwater impact in the vicinity of the site by advancing one soil boring and constructing groundwater monitoring well in the boring at the location shown on Figure 2.

Before commencing field operations, drilling permits will be obtained from the Alameda County Public Works Agency (ACPWA). Prior to drilling, Underground Service Alert will be notified as required, and Cruz Brothers Inc., a private utility locating service, will visit the site to clear the proposed drilling location for underground utilities. In addition, the location will be cleared to approximately 5 feet bgs using a hand auger to avoid damage to possible underground utilities. The ACPWA will be notified a minimum of 48 hours prior to commencing field activities. A description of Miller Brooks general field procedures is included in Appendix A.

5.1 Drilling and Soil/Groundwater Sampling

To assess the lateral extent of hydrocarbon affected groundwater at the site, Miller Brooks proposes to drill one soil boring downgradient of the site (Figure 2). A groundwater monitoring well is proposed to be constructed in the boring. It is anticipated that the well will be installed at a depth of approximately 20 feet bgs. The total depth of the well will be determined in the field, and will be based on encountering saturated soils bearing the shallow aquifer.

The monitoring well will be installed using 8-inch diameter hollow-stem augers advanced by a truck mounted drill rig. Soil samples will be collected every 5 feet for soil description, field hydrocarbon vapor screening, and possible laboratory analyses. It is anticipated that groundwater will first be encountered at a depth of approximately 10 feet bgs.

5.2 Monitoring Well Construction

The groundwater monitoring well is proposed to be constructed of 2-inch diameter schedule 40 PVC well casing and 0.020-inch machine slotted well screen. It is proposed that the well will be installed to a total depth of 20 feet bgs. The well casing will be installed through the hollow-stem

augers. Fifteen feet of well screen is proposed to be installed at the bottom of the well, and the sand pack will extend approximately one foot above the top of screen to allow the shallow groundwater to enter the well. Proposed well construction details are presented on Figure 3.

5.3 Well Monitoring, Development, and Sampling

The newly installed well will be developed by Miller Brooks personnel. An initial "baseline" groundwater sample will be collected immediately after completion of well development activities. The well will be added to the quarterly monitoring and sampling program performed by TRC Companies, Inc. (TRC) personnel.

Depth to groundwater in the well will be measured and the well will be checked for the presence of floating product prior to development. A minimum of 10 well volumes will be removed from the well. After the well is properly developed, a groundwater sample will be collected in a disposable bailer and decanted into appropriate pre-cleaned containers supplied by the laboratory. The groundwater sample will be submitted for chemical analysis under chain-of-custody documentation to STL Laboratories in Pleasanton, California.

5.4 Wellhead Survey

Following installation of the well, the well casing elevation will be surveyed by Tom O. Morrow, Inc. of Sacramento, California, Licensed California Land Surveyor No. 5161. The top of casing and vault box elevation will be measured relative to MSL, and the horizontal location of the well surveyed by global positioning system (GPS). The survey data will be uploaded to the State Water Resources Control Board (SWRCB) database, per the requirements of Assembly Bill (AB) 2886.

5.5 Waste Disposal

Waste materials generated during site investigation activities will be temporarily stored onsite in labeled, Department of Transportation approved, 55-gallon drums. Once the investigation phase has been completed, the drums will be transported by Filter Recycling to their facility in Rialto, California, for treatment and disposal.

5.6 Laboratory Analysis

Select soil and groundwater samples collected during this investigation will be submitted to a state-certified laboratory and analyzed for TPHg, benzene, toluene, ethylbenzene, and xylenes (collectively BTEX), MTBE, tert-Butyl alcohol (TBA), di-isopropyl ether, (DIPE), ethyl tert-butyl ether (ETBE), tert-Amyl methyl ether (TAME), and ethanol using EPA Method 8260B. In addition, for waste profiling purposes, one soil sample will be analyzed for total lead using EPA Method 6010. Chain-of-custody (COC) protocol will be followed for all samples collected for laboratory analysis. The COC form accompanies the samples from the sampling locality to the laboratory, providing a continuous record of possession prior to analysis.

5.7 Site Investigation Report

A report will be prepared upon completion of site investigation activities. The report will include a summary of field activities, results of laboratory analyses of soil and groundwater samples, graphic illustrations of the site and subsurface geology, findings, conclusions, and recommendations. The laboratory data and an updated site plan will be uploaded to the SWRCB database, per the requirements of AB 2886.

6.0 PROJECT SCHEDULE

Following the Alameda County Environmental Health Services review and approval of the proposed scope of work, Miller Brooks will initiate monitoring well permitting activities. Miller Brooks anticipates scheduling of field activities within 30 days of work plan approval, and submittal of the final report within 60 days following completion of assessment activities.

7.0 SITE SAFETY PLAN

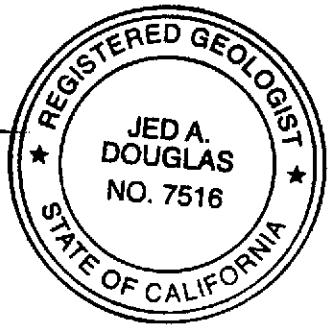
All work activities will be conducted in accordance with requirements of the Miller Brooks Corporate Health and Safety Program. A site safety plan, designed to promote project personnel safety and preparedness during the activities described in this work plan, is included in Appendix B.

If you have any questions regarding this work plan, please call us at (707) 765-0466.

Sincerely,
MILLER BROOKS ENVIRONMENTAL, INC.

Jeremy A. Smith
Senior Staff Scientist

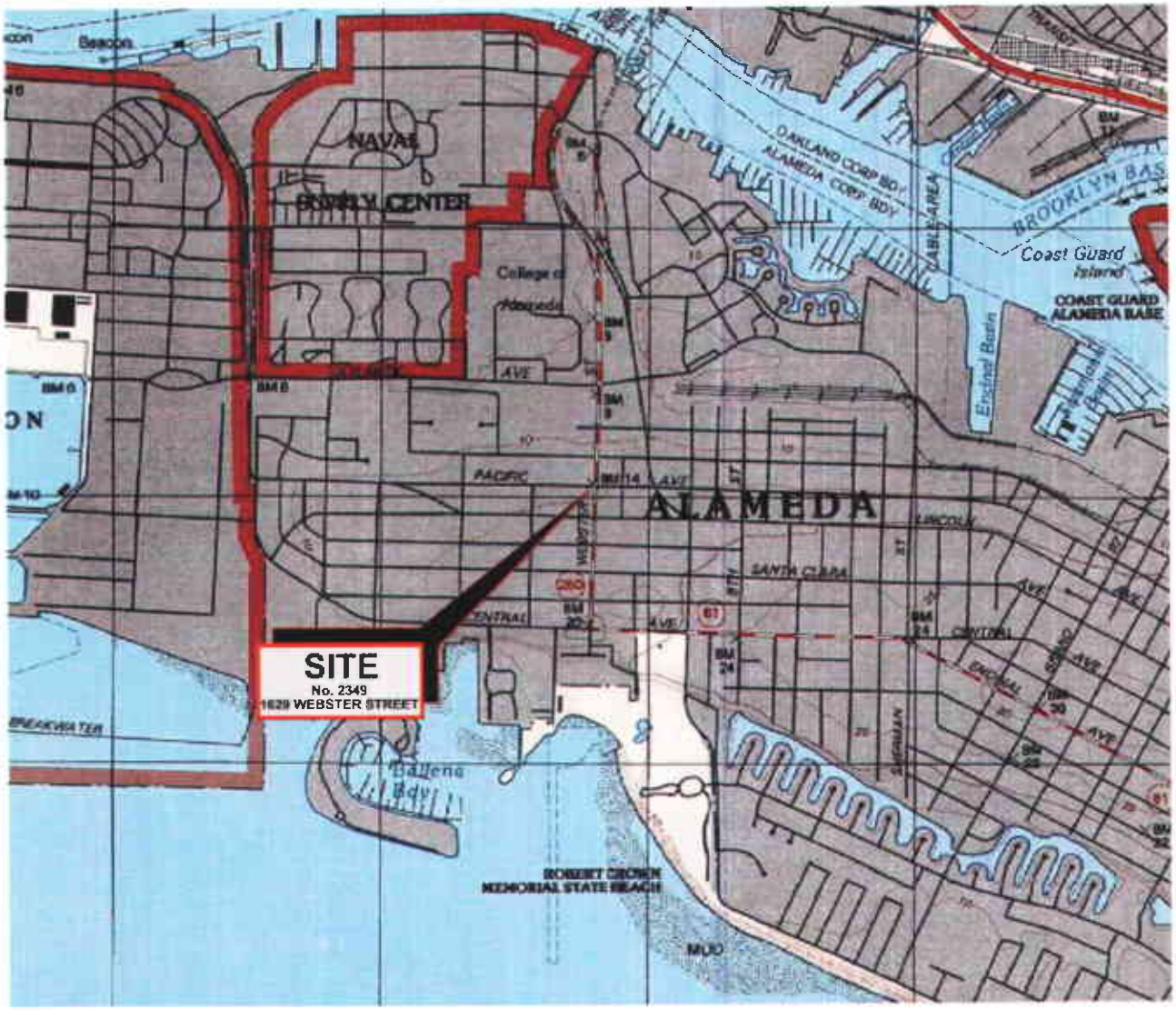
Jed Douglas, R.G. 7516
Senior Geologist



8.0 REFERENCES

TRC Companies Inc., 2004, Quarterly Monitoring Report, January through March 2004, Former 76 Station 0843, 1629 Webster Street, Alameda, California, dated April 13, 2004.

Environmental Resolutions Inc., 2003, Executive Summary for Request and Work Plan for Case Closure, Former 76 Service Station 0843, 1629 Webster Street, Alameda, California, dated September 10, 2003.



FROM: U.S. GEOLOGICAL SURVEY, 1981
QUADRANGLE: OAKLAND EAST
COUNTY: ALEMEDA
SERIES: 7.5-MINUTE QUAD

NOTE: ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

N
W E
S

0 2000 Feet
SCALE

MILLER BROOKS Environmental, Inc.	DRAWN BY: AIL DATE: 04/12/04 REVISED BY: PEL	SITE LOCATION MAP	FIGURE 1
720 SOUTHPOINT BOULEVARD, SUITE 207 PETALUMA, CA. 94954 (707) 765-0466	REVISED: 04/15/04 APPROVED BY: JAD	76 STATION 2349 1629 WEBSTER STREET ALAMEDA, CA.	
PROJECT NO. 06-459-2349	DATE: 04/15/04	FILE: K:\DWGS\C-P\ NO. 2349 (1629 WEBSTER STREET)\LOCATION MAP DATE PLOTTED: 04/15/04	

EAST OCEAN SEAFOOD

MARTIAL ARTS ACADEMY

LE'S TAILORING

VACANT

ALAMEDA ART CENTER

MW5

MW6

RESIDENTIAL

DRIVEWAY

WIENERSCHNITZEL

SUBWAY

PARKING

GP5

PACIFIC AVENUE

GP4

GP3

GP2

GP1

MW3

MW4

GP14

GP17

GP12

GP8

GP11

MW2

MW2A

GP7

GP9

GP13

GP6

LIMIT OF EXCAVATION

GP10

GP16

GP15

MEXICAN RESTAURANT

SK AUTO REPAIR

VACANT LOT

MW1

MEXICAN RESTAURANT

WEBSTER STREET

HAWTHORN SUITES LTD.
(FORMER GAS STATION)

LEGEND

- MW1 — GROUNDWATER MONITORING WELL
- MW2 — DESTROYED WELL
- GP1 — SOIL BORING
- PROPOSED GROUNDWATER MONITORING WELL
- FORMER DISPENSER ISLAND
- FORMER USED OIL UST
- FORMER GASOLINE UNDERGROUND STORAGE TANK (UST)
- FORMER PRODUCT LINES

N

W E

S

0 30 Feet

SCALE

MILLER BROOKS Environmental, Inc.

720 SOUTHPOINT BLVD., SUITE 207
PETALUMA, CA. 94954
(707) 765-0466

PROJECT NO. 06-459-2349-01

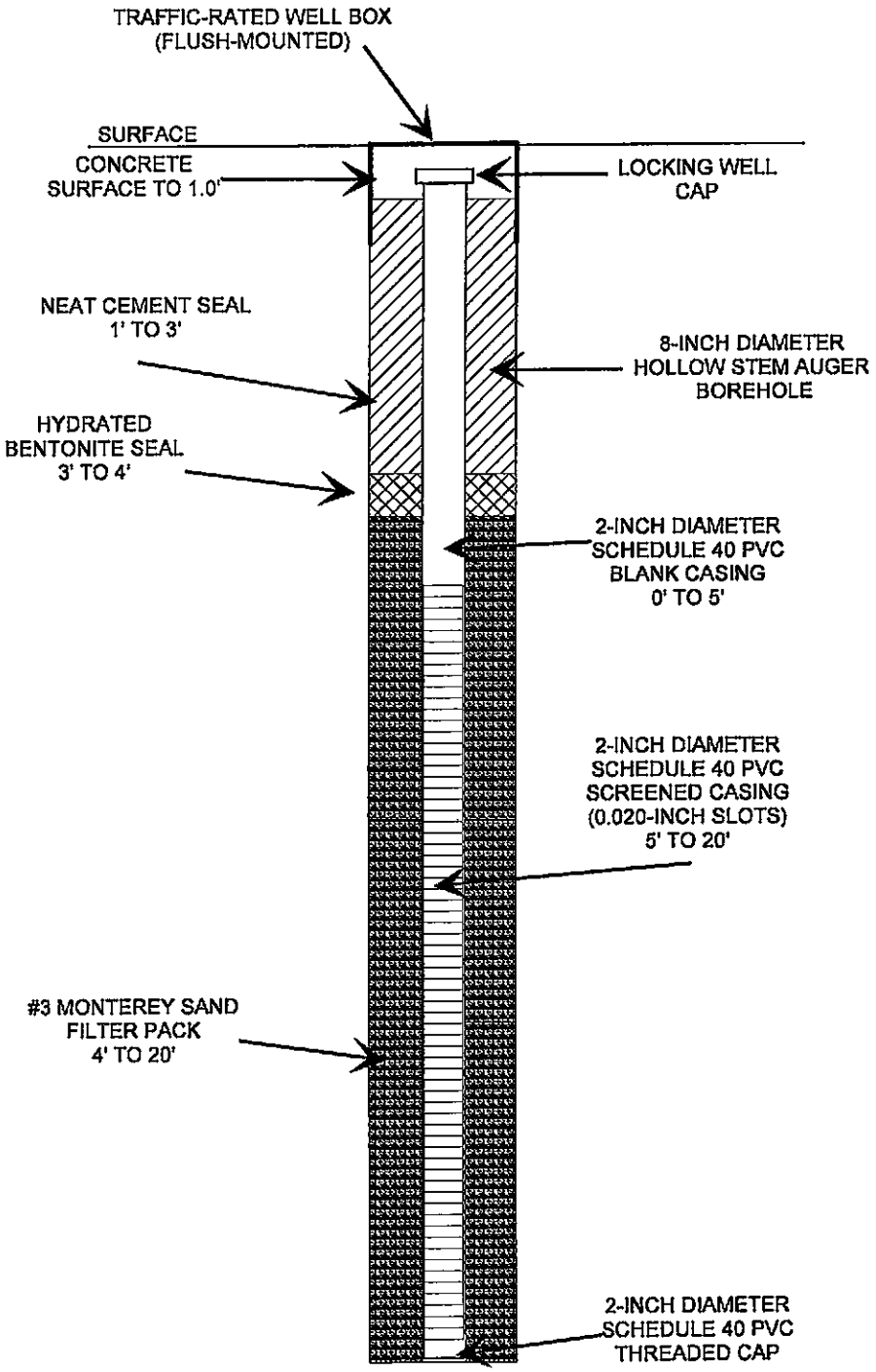
DRAWN BY:	AIL
DATE:	04/12/04
REVISED BY:	DWB
REVISED:	06/22/04
APPROVED BY:	
DATE:	

SITE PLAN

FORMER 76 STATION 82349 (0843)
1629 WEBSTER STREET
ALAMEDA, CA.

FIGURE 2

FILE: K:\DWGS\C-P\NO. 2348 (1629 WEBSTER STREET)\SITE PLAN
DATE PLOTTED: 04/15/04



TOTAL DEPTH = 20 FEET
BELOW GROUND SURFACE

NOT TO SCALE

FORMER 76 SERVICE STATION NO. 82349 (0843)
1629 WEBSTER STREET
ALAMEDA, CALIFORNIA

MILLER BROOKS
Environmental, Inc.

FIGURE 3
PROPOSED GROUNDWATER MONITORING
WELL CONSTRUCTION DETAIL

PROJECT NUMBER 06-459-2349-04

GENERAL FIELD PROCEDURES – WELL INSTALLATION

DRILLING AND SOIL SAMPLING

Soil borings are drilled using a continuous-flight, hollow-stem auger drilling rig. Soil excavated from the borings are contained in labeled, Department of Transportation (DOT) approved, 55-gallon drums or sealed roll-off bins and stored onsite pending appropriate disposal. Borings that are not completed as vadose or groundwater monitoring wells are grouted to within 2 feet of the ground surface with neat cement, and finished to the surface with asphalt or concrete to match the existing grade.

Soil samples are obtained from each boring for soil description, field hydrocarbon vapor screening, and possible laboratory analysis. Soil samples are generally retrieved from the borings at 5-foot depth intervals using a standard penetration or California-modified split-spoon sampler lined with three 2-inch diameter brass sample inserts. The sampler is driven approximately 18 inches beyond the lead auger with a 140-pound hammer dropped from a height of 30 inches.

Upon retrieval, soil samples are immediately removed from the sampler and sealed with Teflon sheeting and polyurethane caps. Each sample is labeled with the project number, boring 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 with ice at approximately 4 degrees Celsius for transport to an offsite state-certified laboratory. Samples not selected for immediate analysis may be transported in a cooler with ice and archived in a frostless refrigerator at approximately 4 degrees Celsius for possible future testing.

During sampling activities, soil adjacent to the laboratory sample is screened for organic vapors using a photoionization detector (PID). For each vapor screening event, a sandwich size Ziploc bag is filled approximately 1/3 full with the soil sample. The PID probe is then inserted into the bag, and a reading is taken after approximately 15 seconds and recorded on the boring log. The remaining soil recovered is removed from the sample tube and described in accordance with the Unified Soil Classification System. For each sampling interval, field estimates of soil type, color, density/consistency, moisture, and grading are recorded on the boring logs.

MONITORING WELL INSTALLATION

Groundwater monitoring wells are constructed of 2-inch diameter, flush-threaded, Schedule 40, polyvinyl chloride (PVC) blank and screened casing (0.020-inch screen slot size). Groundwater monitoring wells typically extend up to 10 feet above and at up to 15 feet below the groundwater surface, provided that no competent clay layer is penetrated. The annular space surrounding the screened casing intervals is backfilled with Number 3 Monterey sand (filter pack) to approximately 2 feet above the top of the screened section.

A 2-foot thick hydrated bentonite annular seal is placed above the well filter pack. The remaining annular space is sealed with a neat cement grout to the surface. Utility access boxes are installed slightly above grade at the surface, and locking, watertight caps are installed to prevent unauthorized access to the well and limit infiltration of surface fluids.

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 accompanies the samples from the sampling locality to the laboratory, providing a continuous record of possession prior to analysis.

DECONTAMINATION

Drilling equipment is decontaminated by steam cleaning before being brought onsite. 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 purging and sampling equipment that could come into contact with well fluids is either dedicated to a well or cleaned prior to each use in a Liqui-nox solution followed by two tap water rinses.

SITE SAFETY PLAN

PROJECT-SPECIFIC INFORMATION

Project Site:

76 Station 82349, 1629 Webster Street, Alameda, California

Field Activity/Duration:

- ❑ Install one soil boring to an approximate depth of 20 feet bgs.
- ❑ Construct a groundwater monitoring well in the boring.
- ❑ All work activities will be conducted onsite in accordance with the Alameda County Public Works Agency permits and directives.

Summary of Chemical Hazards:

- ❑ Petroleum hydrocarbons (gasoline and/or diesel fuel)
- ❑ Benzene, toluene, ethylbenzene, xylenes (BTEX), methyl tertiary butyl ether (MTBE) and ethanol

Chemical and physical characteristics of these compounds are presented in Table 1, and Material Safety Data Sheets (MSDS) for these compounds are attached.

Summary of Physical Hazards:

- ❑ Explosion and fire
  Petroleum products are highly flammable. Liquid petroleum product readily vaporizes from standing pools or saturated soil. Ignition sources of any kind (e.g., engines, impact sparking, and heat or arc from inappropriate equipment or instrumentation) pose a major explosion and fire hazard.
- ❑ Injury from operation of excavation equipment.
- ❑ Injury from buried or overhead utilities (electrical, gas, water, etc.)
- ❑ Noise exposure from the operation of equipment
- ❑ Heat stress/Cold Exposure
- ❑ Vehicular Traffic
- ❑ Biologic hazards

Further information on hazard assessment and hazard control are presented in the Appendix.

Personal Protective Equipment (PPE) Required:

- Hard hats
- Half-face air purifying respirators with organic vapor cartridges and dust/mist filters
- Safety glasses with side-shields, or splash goggles
- Suitable work clothing (long pants)
- Chemical-resistant gloves
- Steel-toed boots
- Ear plugs or other suitable hearing protection
- Traffic safety vests with reflective striping

Air Monitoring Plan and Action Levels:

Site work will be initiated in Level D protection (no respiratory protection). A PID will be used to monitor airborne contamination in the breathing zone. Positive breathing zone readings are not expected, but if sustained readings at 1 minute of 50 parts per million (ppm) above background levels are obtained, work will cease until engineering controls are instituted to prevent vapors from reaching the breathing zone. This can be accomplished by increasing air speed (mechanical fans), improving ventilation, or changing work activities (move personnel farther away). If engineering controls cannot reduce breathing zone readings to below 1 ppm above background, the level of protection will be upgraded to Level C. Continuous air monitoring will be conducted in the breathing zone of the workers. If a sustained PID reading of greater than 100 ppm is measured in the breathing zone, work will recess for 15 minutes in an attempt to let the air circulate. Concentrations measured at 100 ppm or greater in the breathing zone will require personnel to upgrade to Level B PPE. If Level B is required, the project will be stopped and the current operating procedures will be assessed by the Site Safety Officer and the Project Manager. If it is determined that Level B PPE is required, a subcontractor may be retained to conduct this supervised work.

The PID used for air monitoring will be calibrated daily prior to the start of field activities by the site safety officer. The PID type and model number, and documentation of daily calibration will be recorded on the attached daily attendance sheet.

List Of Key Personnel

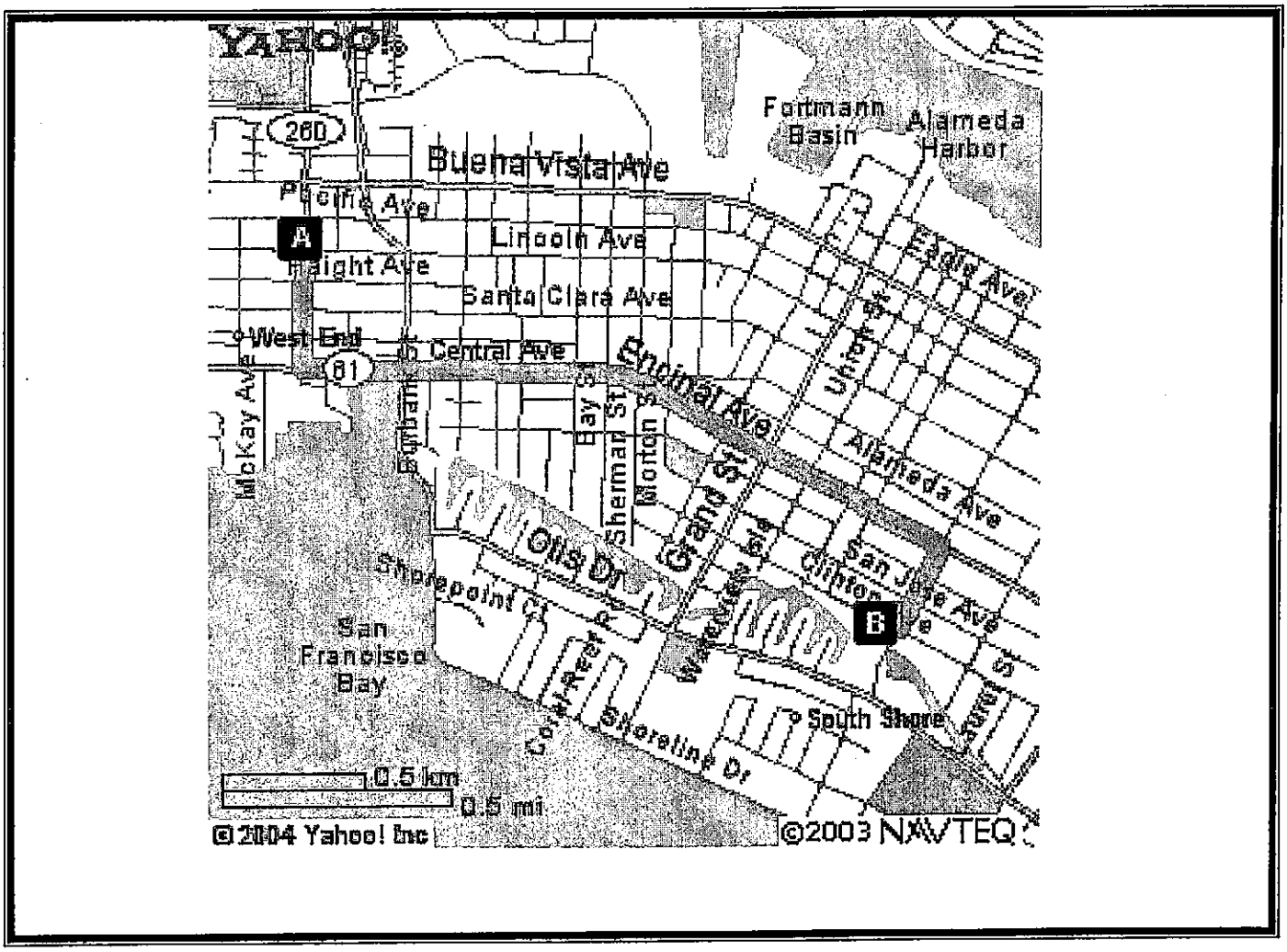
Project Manager:	Jed Douglas Miller Brooks
Authorized Site Safety Officers:	Jeremy Smith Miller Brooks
Supervisor/Offsite Coordinator: (707) 765-0466	Jed Douglas Miller Brooks
Client Contact: (916) 558-7666	Thomas Kosel ConocoPhillips

Emergency Contacts

Police Department:	911
Fire Department:	911
Ambulance:	911
Poison Control Center:	(800) 777-6476
Chemical Transportation Emergency Center (CHEMTREC):	(800) 424-9300
Office of Emergency Services (OES):	(800) 852-7550
National Response Center (NRC):	(800) 424-8802

Figure 1

Hospital Route Map



Directions to Hospital:

Alameda Hospital
2070 Clinton Ave.
Alameda, CA 94501
(510) 522-3700

Directions:

Starting at on **WEBSTER ST** going towards **LINCOLN AVE** - go **0.3** mi

Turn **L** on **CENTRAL AVE** - go **0.7** mi

Bear **R** on **ENCINAL AVE** - go **0.8** mi

Turn **R** on **WILLOW ST** - go **0.2** mi

Turn **R** on **CLINTON AVE** - go **< 0.1** mi

Arrive at Alameda Hospital - Follow signs to Emergency Room

Certification

This HASP has been reviewed and approved by the Health and Safety Officer. The plan satisfies the requirements of the Occupational Safety and Health Act 1910.120 as implemented by the Health and Safety Committee for hazardous waste site activities. No changes may be made to this plan without the written approval of the Health and Safety Officer.

_____

Jed Douglas
Health and Safety Officer

Statement of Qualifications for Health and Safety Officer and Site Safety Officers

The Health and Safety Officer, and the Site Safety Officer have completed a 40-hour hazardous materials training course, as required by the Code of Federal Regulations (CFR) 1910.120, and the 8-hour Site Supervisor training course. Thereafter, these personnel annually complete an 8-hour refresher course.

ATTACHMENTS:

Tailgate Safety Meeting Form & Air Monitoring Equipment Calibration

Table 1 – Occupational Health Guidelines & Toxicological Information

MSDS Sheets: Gasoline, Diesel, Benzene, Toluene, Xylenes, MTBE, Ethanol

Site Safety Plan

TAILGATE SAFETY MEETING FORM

Date:_____ Time:_____ Project No.:___06-459-2349-04____

Site:__76 Station 82349, 1629 Webster Street, Alameda, California _____

Presented by:_____Signature:_____

Air Monitoring Equipment: _____

Calibrated on: _____ by_____to 100ppm isobutylene

Topics Covered:

- ☐ Chemical Hazards
- ☐ Physical Hazards
- ☐ Equipment Hazards
- ☐ Personal Protective Equipment
- ☐ Emergency Procedures
- ☐ Other_____

ATTENDANCE

The undersigned have read the Site Safety Plan and are familiar with its provisions:

NAME (print)	SIGNATURE	DATE

ConocoPhillips

Incident Report Data

Name of Person Involved:	**Type:** **Date Occurred:**	☐ Injury ☐ Prop Damage ☐ Environmental ☐ Near Miss
Company Name:	**Time Occurred:** **Time Reported:**	_____ a.m. _____ a.m.
Employee Address: **City, State, ZIP:** **Phone #:**	**Location:** **Name:** **City, State, ZIP:**	**Site #** (if applicable)

Description of Incident:

Actions Taken: **Seen by Physician:** ☐ **Hospitalized:** ☐ **Doctor's Name:** **Lost Work Days:** ☐ **From** _____ **to** _____	**Treatment/Medication:**

Preventive Steps Taken:

Report Submitted By: **Date:**

Title:

Company:

Table 1

Occupational Health Guidelines and Toxicological Information

Chemical	OSHA PEL (ppm)	STEL (ppm)	NIOSH REL (ppm)	IDLH (ppm)	Ionization Potential (eV)	Routes of Exposure	Known or Suspected Carcinogen	Symptoms	1997 NIOSH Page Reference
Benzene	1	1	0.1	500	9.24	Inhalation, Ingestion, Absorption, Contact	Yes	Irritation to eyes, skin, nose, and resp system; giddiness; headache; nausea; staggered gait; fatigue; anorexia; weakness/exhaustion; dermatitis	26
Toluene	200	150	100	500	8.82	Inhalation, Ingestion, Absorption, Contact	No	Irritation to eyes & nose; dilated pupils; insomnia; fatigue; weakness; dizziness; headache; tears; confusion, euphoria; muscle fatigue; dermatitis; nervousness; parethesia; liver & kidney damage	310
Ethylbenzene	100	125	100	800	8.76	Inhalation, Ingestion, Contact	No	Irritation to eyes, skin, and mucous membrane; headache; dermatitis; narcosis; coma	132
Xylenes (o,m,p)	100	150	100	900	Range of 8.44 - 8.56	Inhalation, Ingestion, Absorption, Contact	No	Irritation to eyes, skin, nose, & throat; vomiting; dizziness, excitement; drowsiness; abdominal pain; incoordination; staggering gait; dermatitis; nausea	334-336
Methyl Tertiary Butyl Ether	not available	not available	not available	not available	not available	Inhalation, Ingestion	Yes	Cough, dizziness, unconsciousness, weakness; dry skin; eye redness & pain, abdominal pain, nausea, vomiting.	not applicable
Ethanol (Ethyl alcohol)	1000	Not available	1000	3300	10.47	Inhalation, Ingestion, Contact	No	Irritation to eyes, skin, nose; headache, drowsiness, fatigue, narcosis; cough; liver damage; anemia; reproductive & teratogenic effects	132

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Gasoline with Ethanol

Product Code: Multiple

Synonyms: Conventional Unleaded Gasolines - All Grades - Ethanol @ 5.7, 7.7, 8.0, 8.2, 10.0%
OPRG 87, 89, 90, 91, 92 Octane - Ethanol @ 6.0%
RFG - All Grades - 7.4, 8.3, 11.5, 13.5, 15.0 - Ethanol @ 5.7%

Generic Name: Unleaded Gasoline

Responsible Party: Tosco Corporation
72 Cummings Point Road
Stamford, CT
06901

For further information contact Help Desk
8am - 4pm Pacific Time, Mon-Fri: 1-800-762-0942

EMERGENCY OVERVIEW

24 Hour Emergency Telephone Numbers:

For Chemical Emergencies:	For Health Emergencies:
Spill, Leak, Fire or Accident	California Poison
Call CHEMTREC	Control System
North America: (800)424-9300	Cont. US: (800)356-3129
Others: (703)527-3887 (collect)	Outside US: (415)821-5338

Health Hazards: May be harmful or fatal if swallowed. Aspiration hazard. Possible cancer hazard based on animal data. Vapor harmful. Causes moderate to severe skin irritation. Causes eye irritation. A component is a birth defect hazard. Use ventilation adequate to keep exposure below recommended limits, if any. Avoid exposure during pregnancy. Avoid breathing vapor or mist. Avoid contact with eyes, skin and clothing. Do not taste or swallow. Wash thoroughly after handling.

Physical Hazards: Extremely flammable liquid and vapor. Vapor can cause flash fire. Keep away from heat, sparks, flames, static electricity or other sources of ignition.

▶ Physical Form: Liquid

- Appearance: Clear to amber
- Odor: Gasoline

NFPA HAZARD CLASS: Health: 1 (Slight)
Flammability: 3 (High)
Reactivity: 0 (Least)

2. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS	% Weight	EXPOSURE GUIDELINE		
		Limits	Agency	Type
Gasoline	90-100	300 ppm	ACGIH	TWA
CAS# None		500 ppm	ACGIH	STEL
Xylenes	1-14	100 ppm	ACGIH	TWA
CAS# 1330-20-7		150 ppm	ACGIH	STEL
		100 ppm	OSHA	TWA
		1000 ppm	NIOSH 1990	IDLH
Ethanol	<10	1000 ppm	ACGIH	TWA
CAS# 64-17-5		1000 ppm	OSHA	TWA
Toluene	1-9	50 ppm	ACGIH	TWA-SKIN
CAS# 108-88-3		200 ppm	OSHA	TWA
		500 mg/m3	OSHA	STEL
		300 ppm	OSHA	CEIL
		2000 ppm	NIOSH 1990	IDLH
1,2,4-Trimethyl Benzene	1-5	25 ppm	ACGIH	TWA
CAS# 95-63-6				
Ethyl Benzene	1-5	100 ppm	ACGIH	TWA
CAS# 100-41-4		125 ppm	ACGIH	STEL
		100 ppm	OSHA	TWA
		2000 ppm	NIOSH 1990	IDLH
n-Hexane	<4	50 ppm	ACGIH	TWA
CAS# 110-54-3		500 ppm	OSHA	TWA
		5000 ppm	NIOSH 1990	IDLH
Cyclohexane	<2	300 ppm	ACGIH	TWA
CAS# 110-82-7		400 ppm	OSHA	TWA
		10000 ppm	NIOSH 1990	IDLH
Benzene	<1.2	0.5 ppm	ACGIH	TWA-SKIN
CAS# 71-43-2		2.5 ppm	ACGIH	STEL-SKIN

1 ppm	OSHA	TWA
5 ppm	OSHA	STEL
3000 ppm	NIOSH 1990	IDLH

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Contains benzene. If exposure concentrations exceed the 0.5 ppm action level, OSHA requirements for personal protective equipment, regulated areas and training may apply (29CFR1910.1028). Also see Section 4.

3. HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS:

Eye: Eye irritant. Contact may cause stinging, watering, redness, and swelling.

Skin: Skin irritant. Contact may cause redness, itching, and burning of the skin. Prolonged or repeated contact may cause drying and cracking of the skin, burns, and severe skin damage. Contact may result in skin absorption but symptoms of toxicity are not anticipated by this route alone under normal conditions of use.

Inhalation (Breathing): Low to moderate degree of toxicity by inhalation.

Ingestion (Swallowing): Low degree of toxicity by ingestion. ASPIRATION HAZARD - This material can enter lungs during swallowing or vomiting and cause lung inflammation and damage.

Signs and Symptoms: Effects of overexposure may include irritation of the nose and throat, irritation of the digestive tract, nausea, vomiting, flushing, transient excitation followed by signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, and fatigue), blurred vision, drunkenness, stupor, tremors, respiratory failure, unconsciousness; convulsions and death.

Cancer: A component is a known cancer hazard (see Section 11).

Target Organs: Overexposure may cause injury to the central nervous system, stomach, liver, male reproductive system and heart (see Section 11).

Developmental: A component is a potential hazard to the fetus (see Section 11).

Other Comments: Most adverse health effects associated with ethanol, a component of this material, are related to the chronic ingestion of alcoholic beverages. Alcoholism has been associated with liver, stomach, heart, and nervous system damage, cancer, adverse reproductive effects, and effects on the developing fetus. Many of these effects may be related to the profound metabolic changes that result from constantly high blood levels of alcohol. This exposure pattern is significantly different from that of persons handling industrial ethanol in the workplace or from refueling cars with gasoline containing ethanol.

Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage (sometimes referred to as Solvent or Painters' Syndrome). Intentional misuse by deliberately concentrating and inhaling this material may be harmful or fatal.

Pre-Existing Medical Conditions: Conditions aggravated by exposure may include skin disorders, respiratory (asthma-like) disorders and liver disorders.

Exposure to high concentrations of this material may increase the sensitivity of the heart to certain drugs. Persons with pre-existing heart disorders may be more susceptible to this effect (see Section 4 - Note to Physicians).

4. FIRST AID MEASURES

Eye: Move victim away from exposure and into fresh air. If irritation or redness develops, flush eyes with clean water and seek medical attention. For direct contact, hold eyelids apart and flush the affected eye(s) with clean water for at least 15 minutes. Seek medical attention.

Skin: Remove contaminated shoes and clothing, and flush affected area(s) with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, cleanse affected area(s) thoroughly by washing with mild soap and water. If irritation or redness develops, seek medical attention.

Inhalation (Breathing): If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure

and into fresh air. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

Note To Physicians: Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias.

High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing external wound. Often these injuries require extensive emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury.

Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

5. FIRE FIGHTING MEASURES

Flammable Properties: Flash Point: -49°F/-45°C
OSHA Flammability Class: Flammable Liquid
LEL%: 1.4 / UEL%: 7.6
Autoignition Temperature: 833°F/444°C

Unusual Fire & Explosion Hazards: This material is extremely

flammable and can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, or mechanical/electrical equipment). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, or alcohol-resistant foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Instructions: For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by DOT, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk.

Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

6. ACCIDENTAL RELEASE MEASURES

Extremely flammable. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended.

Stay upwind and away from spill/release. Notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including

respiratory protection as conditions warrant (see Section 8).

Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors (see Section 5). Use water sparingly to reduce disposal requirements. Spilled material may be absorbed into an appropriate absorbent material.

Notify fire authorities and appropriate federal, state, and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, notify the National Response Center (phone number 800-424-8802).

7. HANDLING AND STORAGE

Handling: Open container slowly to relieve any pressure. Bond and ground all equipment when transferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignited by static discharge. The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-704 and/or API RP 2003 for specific bonding/grounding requirements.

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits (see Sections 2 and 8).

Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames. Use good personal hygiene practice.

High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty"

drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1 and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Storage: Keep container(s) tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Post area "No Smoking or Open Flame." Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

Portable Containers:
Static electricity may ignite gasoline vapors when filling portable containers. To avoid static buildup do not use a nozzle lock open device. Use only approved containers for the storage of gasoline. Place the container on the ground before filling. Keep the nozzle in contact with the container during filling.

Do not fill any portable container in or on a vehicle or marine craft.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits (see Section 2), additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

Personal Protective Equipment (PPE):

Respiratory: A NIOSH certified air purifying respirator with an organic vapor cartridge may be used under conditions where airborne concentrations are expected to exceed exposure limits (see Section 2).

Protection provided by air purifying respirators is limited (see manufacturer's respirator selection guide). Use a positive pressure air supplied respirator if there is potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

Skin: The use of gloves impervious to the specific material handled is advised to prevent skin contact, possible irritation, absorption, and skin damage (see glove manufacturer literature for information on permeability). Depending on conditions of use, apron and/or arm covers may be necessary.

Eye/Face: Approved eye protection to safeguard against potential eye contact, irritation, or injury is recommended. Depending on conditions of use, a face shield may be necessary.

Other Protective Equipment: A source of clean water should be available in the work area for flushing eyes and skin. Impervious clothing should be worn as needed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm).

Flash Point: -49°F / -45°C
Flammable/Explosive Limits (%): LEL: 1.4 / UEL: 7.6
Autoignition Temperature: 833°F / 444°C
Appearance: Clear to amber
Physical State: Liquid
Odor: Gasoline
pH: Not applicable
Vapor Pressure (mm Hg): 350-760 @ 100°F
Vapor Density (air=1): >1
Boiling Point/Range: 80-430°F / 26-227°C
Freezing/Melting Point: No Data
Solubility in Water: Approx 10%
Specific Gravity: 0.72-0.75 @ 60°F
Percent Volatile: 100 vol.%

Evaporation Rate (nBuAc=1): >1
Bulk Density: 6.17 lbs/gal

10. STABILITY AND REACTIVITY

Chemical Stability: Stable under normal conditions of storage and handling. Extremely flammable liquid and vapor. Vapor can cause flash fire.

Conditions To Avoid: Avoid all possible sources of ignition (see Sections 5 and 7).

Incompatible Materials: Contact with strong oxidizing agents such as chlorine, dichromates, or permanganates can cause fire or explosion.

Hazardous Decomposition Products: The use of hydrocarbon fuel in an area without adequate ventilation may result in hazardous levels of combustion products (e.g., oxides of carbon, sulfur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels. See Section 11 for additional information on hazards of engine exhaust, if any.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Gasoline (CAS# None)

Carcinogenicity: Two year inhalation studies of wholly vaporized unleaded gasoline produced increased incidences of kidney tumors in male rats and liver tumors in female mice. Follow-up studies suggest that occurrence of the kidney tumors may be linked to alpha-2-u-globulin nephropathy, and most likely unique to the male rat. Epidemiology data collected from a study of more than 18,000 petroleum marketing and distribution workers showed no increased risk of leukemia, multiple myeloma, or kidney cancer from gasoline exposure. Unleaded gasoline has been identified as a possible carcinogen by IARC.

Because solvent extracts of gasoline exhaust particulates caused skin cancer in laboratory animals, IARC has categorized gasoline engine exhaust as a possible human cancer hazard.

Target Organ(s): A two year inhalation study of wholly vaporized unleaded gasoline produced nephropathy in male rats,

characterized by the accumulation of alpha-2-u- globulin in epithelial cells of the proximal tubules, and necrosis and hyperplasia of surrounding cells. Follow-up studies have demonstrated that these changes are unique to the male rat. Although prolonged exposure to n-hexane, a component of gasoline, has resulted in adverse male reproductive effects in experimental animal studies, no adverse male reproductive effects were found in studies conducted with gasoline.

Developmental: No evidence of developmental toxicity was found in pregnant laboratory animals (rats and mice) exposed to up to 9,000 ppm vapor of unleaded gasoline via inhalation.

Xylenes (CAS# 1330-20-7)

Target Organ(s): A six week inhalation study with xylene produced hearing loss in rats.

Developmental: Both mixed xylenes and the individual isomers produced limited evidence of developmental toxicity in laboratory animals. Inhalation and oral administration of xylene resulted in decreased fetal weight, increased incidences of delayed ossification, skeletal variations and resorptions.

Ethanol (CAS# 64-17-5)

Carcinogenicity: Ingestion of alcoholic beverages has been classified by IARC as "carcinogenic to humans" (Group 1). Occupational exposures to ethanol and exposures other than by ingestion (i.e., dermal and inhalation) have not been associated with cancer in humans.

Target Organ(s): Chronic alcoholism has been associated with damage to the liver in humans (e.g., cirrhosis of the liver). Excessive consumption of alcoholic beverages has also been associated with adverse effects on the central nervous system, digestive system, cardiovascular system, and the reproductive system including reduced sperm count and motility and loss of libido in men, abnormal menstrual function, and decreased plasma estradiol and progesterone levels in women.

Developmental: Excessive consumption of alcoholic beverages during pregnancy has been associated with effects on the developing fetus referred to collectively as the fetal alcohol syndrome. The effects most frequently manifested include psychomotor dysfunction, growth retardation and a characteristic cluster of facial anomalies.

Mutagenicity: Excessive consumption of alcoholic beverages has been associated with chromosomal aberrations in white blood cells. Depending on the animal species being tested, ethanol may produce chromosomal damage, DNA damage and mutation in both somatic and germ cells.

Toluene (CAS# 108-88-3)

Target Organ(s): Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Subchronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system (brain) damage in laboratory animals. Intentional misuse by deliberate inhalation of high concentrations of toluene has been shown to cause liver, kidney, and central nervous system damage, including hearing loss and visual disturbances.

Developmental: Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. The effects seen include decreased fetal body weight and increased skeletal variations in both inhalation and oral studies.

Ethyl Benzene (CAS# 100-41-4)

Carcinogenicity: Rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study demonstrated limited evidence of kidney, liver, and lung cancer. Ethyl benzene has not been listed as a carcinogen by NTP, IARC, or OSHA.

Target Organ(s): In rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study there was mild damage to the kidney (tubular hyperplasia), liver (eosinophilio foci, hypertrophy, necrosis), thyroid (hyperplasia) and pituitary (hyperplasia).

n-Hexane (CAS# 110-54-3)

Target Organ(s): Excessive exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesias of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone.

Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) has resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Benzene (CAS# 71-43-2)

Carcinogenicity: Benzene is an animal carcinogen and is known to produce leukemia in humans. Benzene has been identified as a human carcinogen by NTP, IARC and OSHA.

Target Organ(s): Human exposure to benzene has been linked to bone marrow toxicity which can result in blood disorders such as leukopenia, thrombocytopenia, anemia, and aplastic anemia.

Developmental: Exposure to benzene during pregnancy demonstrated limited evidence of developmental toxicity in laboratory animals. The effects seen include decreased body weight and increased skeletal variations in rodents. Alterations in hematopoeisis have been observed in the fetuses and offspring of pregnant mice.

Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells, and DNA damage in mammalian cells in vitro.

12. DISPOSAL CONSIDERATIONS

This material, if discarded as produced, would be a RCRA "characteristic" hazardous waste due to the characteristic(s) of ignitability (D001) and benzene (D018). If the material is spilled to soil or water, characteristic testing of the contaminated materials is recommended. Further, this material, once it becomes a waste, is subject to the land disposal restrictions in 40 CFR 268.40 and may require treatment prior to disposal to meet specific standards. Consult state and local regulations to determine whether they are more stringent than the federal requirements.

Container contents should be completely used and containers should be emptied prior to discard. Container rinsate could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum reconditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities.

13. TRANSPORT INFORMATION

DOT Proper Shipping Name / Technical Name: Gasoline
Hazard Class or Division: 3
ID #: UN1203
Packing Group: II

14. REGULATORY INFORMATION

This material contains the following chemicals subject to the reporting requirements of **SARA** 313 and 40 CFR 372:

COMPONENT	CAS NUMBER	WEIGHT %
Xylenes	1330-20-7	1-14
Toluene	108-88-3	1-9
1,2,4-Trimethyl Benzene	95-63-6	1-5
Ethyl Benzene	100-41-4	1-5
n-Hexane	110-54-3	<4
Cyclohexane	110-82-7	<2
Benzene	71-43-2	<1.2

Warning: This material contains the following chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm, and are subject to the requirements of **California Proposition 65** (CA Health & Safety Code Section 25249.5):

COMPONENT	EFFECT
Benzene	Cancer, Developmental and Reproductive Toxicant
Toluene	Developmental Toxicant
Unleaded Gasoline (wholly vaporized)	Cancer

Unleaded gasoline has been identified as a carcinogen by IARC. For carcinogenicity information on individual components, see Section 11.

EPA (CERCLA) Reportable Quantity: --None--

15. DOCUMENTARY INFORMATION

Issue Date: 03/29/99
Previous Issue Date: 03/26/98
Product Code: Multiple

Previous Product Code: Multiple

16. DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. **HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE.** No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

SITE SAFETY PLAN

1.0 INTRODUCTION

This plan has been prepared in conformity with the Miller Brooks Environmental, Inc. (Miller Brooks) Health and Safety Program. It addresses those activities associated with site assessment and will be implemented during the site investigations and related field work. Compliance with this site safety plan (SSP) is required of all Miller Brooks personnel and subcontractors who enter the site. The subcontractors may elect to modify these provisions, but only to upgrade or increase the safety requirements, and only with the concurrence of Miller Brooks. The requirements and parameters identified in this SSP will be subject to modification as warranted by existing site conditions or as work progresses. However, no changes will be made without the prior approval of the Site Safety Officer.

2.0 AUTHORITY FOR SITE SAFETY

The Miller Brooks Project Manager, as site safety officer, has overall responsibility for the development, coordination, and implementation of the SSP and its conformity with the Miller Brooks Corporate Health and Safety Plan. The Project Manager is also responsible for field implementation of the SSP. This will include communicating the site-specific requirements to the project personnel and subcontractors working at the site, and assuring compliance with the Corporate Health and Safety Plan. In the event that the Project Manager is unable to perform these duties, site safety responsibilities may be delegated to a designated alternate safety officer. The Project Manager and/or alternate safety officer may suspend or modify work practices or dismiss subcontractors whose conduct does not meet the requirements specified in this SSP. The site safety officer will be responsible for initiating emergency response procedures, if necessary.

3.0 SITE PERSONNEL

Onsite personnel must initially complete a 40-hour hazardous materials training course, as required by the Code of Federal Regulations (CFR) 1910.120. Thereafter, personnel are required to annually complete an 8-hour refresher course. Additionally, personnel will be required to document their full understanding of this SSP before admission to the site, by signing the compliance log at the end of this SSP. Appropriate personal protective equipment will be available and used, as necessary, by onsite project personnel.

4.0 SAFETY AND ORIENTATION MEETING

Prior to commencement of work, the designated site safety officer will conduct a site-specific training session (tailgate meeting) to review project tasks before beginning work, and to make personnel aware of potential physical hazards, chemical hazards, and safe work practices. Material Safety Data Sheets (MSDS) will be made available, as appropriate.

5.0 POTENTIAL SITE HAZARDS

Specific site investigation activities to be performed are listed at the beginning of this SSP. In general, physical and chemical hazards that may be encountered include those associated with operating mechanical equipment and dealing with potentially hazardous chemicals. The most immediate hazard is likely that of physical injury to onsite personnel from machinery. Petroleum hydrocarbons (gasoline) may be present in soil and groundwater beneath the site. The hazard potential associated with the presence of hydrocarbons includes vapor build-up in, and/or escaping from, well bores, excavations, and/or contaminated soil stockpiled and moved around the site.

Petroleum hydrocarbons (gasoline) may be encountered in the subsurface during this investigation. These chemicals are volatile, flammable, and moderately to extremely toxic. Potential hazards associated with petroleum hydrocarbons include inhalation, ingestion, and skin absorption of toxic vapors, liquids, or dusts.

Gasoline vapors in high concentrations (greater than 300 parts per million [ppm]) can cause eye, nose, and throat irritation, headaches, dizziness, and anesthesia. Skin contact with liquid gasoline may result in irritation and dermatitis, and absorption of specific toxic petroleum fractions. Toxic petroleum hydrocarbon substances include the following volatile organic compounds (VOCs): benzene, toluene, ethylbenzene, and total xylenes (BTEX), and methyl tertiary butyl ether (MTBE). Benzene is a suspected human carcinogen and, along with toluene and xylenes, can cause damage to an unprotected individual's liver, kidneys, and central nervous system. Ethylbenzene is a skin irritant in vapor and liquid form.

6.0 HAZARD ASSESSMENT

Consistent efforts will be made throughout the project to evaluate the chemical and physical hazards identified for the specific scope of work. Fire, explosion, and VOC exposure hazards will be evaluated in the field using a Photoionization Detector (PID). Periodic measurements will be obtained at the top of each borehole and in any confined areas that may contain and accumulate combustible vapors. The calibration and maintenance of all monitoring equipment will be conducted in accordance with the manufacturer recommendations.

7.0 HAZARD REDUCTION

7.1 SAFETY INSPECTIONS

Walk-through safety inspections of the work area will be conducted daily before the start of work and as conditions warrant. The results of these surveys will be communicated to the work crews during regularly scheduled "tailgate" safety meetings. The safety procedures and the day's planned operations will be discussed at these meetings.

7.2 ENVIRONMENTAL CONTROLS

In the event that PID readings anywhere on the site exceed 300 ppm, work will be suspended, monitoring will be continued as necessary to isolate the area of concern, and any or all of the following environmental controls will be implemented as appropriate:

1. Borings emitting excessive VOC concentrations will be ventilated, capped, or shut in as necessary.

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

3. Drilling equipment will be bonded and grounded during the operations to control ignition sources.

7.3 GENERAL PROCEDURES AND ENGINEERING CONTROLS

Access to work areas will be limited by the site safety officer to essential personnel. Underground utilities will be located and identified prior to any operation; power lines and pipelines will be shut down, locked out, and tagged, as appropriate. Work areas will be cordoned off with delineators, barriers, and/or taping, as appropriate.

During onsite work activities, unpaved work areas will be watered down (if necessary) until the surface is moist, and maintained in a moist condition to minimize dust. In addition, workers shall not be permitted underneath loads handled by excavation or loading equipment.

Stockpiled soil will be temporarily stored onsite in sealed, roll-off bins or labeled, Department of Transportation (DOT) approved, 55-gallon drums pending transport to an appropriate soil recycling facility. Decontamination water will be stored in labeled, DOT approved, 55-gallon drums. Drums containing soil or water will be clearly labeled. Hydrocarbon-affected soil or water will be stored in an onsite location approved by the station owner/operator, and will be removed from the site at the earliest opportunity.

7.4 PERSONAL PROTECTIVE EQUIPMENT

Field personnel involved in site assessment activities are required to be prepared with the following personal protective equipment:

- Hard hats
- Half-face air purifying respirators with organic vapor cartridges and dust/mist filters
- Safety glasses with side-shields, or splash goggles
- Suitable work clothing
- Chemical-resistant gloves
- Steel-toe boots or boot covers
- Ear plugs or other suitable hearing protection
- Traffic safety vests with reflective striping

Personnel involved in onsite work activities, as described in Section 5.0 above, will be required to wear personal protective equipment for safety Level D (no respiratory protection). Based upon the results of hydrocarbon vapor monitoring conducted during work activities, the level of safety protection may be upgraded to include respiratory protection (Level C).

7.5 PROTECTION FROM AIRBORNE TOXIC CHEMICALS

Workers will be required to wear half-face air purifying respirators with organic vapor cartridges under the following circumstances:

1. If the worker is continuously exposed throughout the day to VOC vapors that exceed the permissible exposure level - time-weighted average (PEL-TWA) for gasoline (300 ppm).

2. If the worker is exposed at any time to VOC vapors that exceed the permissible exposure level - short-term exposure limit (PEL-STEL) for gasoline (500 ppm).

Similar precautions will be taken with regard to other toxic chemicals, such as benzene, toluene, ethylbenzene, and total xylenes. If VOC vapors exceed 1,000 ppm, full-face air purifying respirators with organic vapor canisters will be worn.

7.6 OTHER PHYSICAL HAZARDS

In general, accidents will be prevented by personal protective equipment, environmental controls, engineering controls, and the exercise of reasonable caution during work activities. Other potential hazards and corresponding precautions include the following:

Physical Contact with Contaminated Soil

Workers who must come in direct contact with VOC-contaminated soil or ground water for sampling purposes will be required to wear protective gloves and/or necessary protective clothing to prevent skin contact.

Noise Exposure
Project personnel entering high-noise areas will be required to wear hearing protection (ear plugs or muffs).

Heat Stress
Heat stress can impair worker coordination and judgement, and directly impact health and safety. Heat stress is more likely to occur when personal protective equipment is in use. Project personnel will be provided with beverages, shaded rest areas, and breaks, as needed, to prevent heat stress.

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.

Vehicular Traffic
Cones, delineators, and caution tape will be used to define the work area, and the work area will be set up such that vehicular traffic directly adjacent to the work area is minimized. If work equipment blocks the line of sight of vehicular traffic, access to such areas will be cordoned off to prevent entry of vehicles and possible accidents resulting from reduced visibility.

Biological Hazards
The only biological factors anticipated during operations would be those 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.

8.0 EMERGENCY RESPONSE

The site safety officer will have controlling authority during an emergency. In the event that this person is not available, the alternate safety officer will be in charge. Emergency response organizations, locations, and contacts are listed in the site-specific portion of this SSP.

9.0 GENERAL SAFETY REQUIREMENTS

The following requirements will also be observed:

- The designated site safety officer has the authority to correct unsafe site conditions. Accidents, injuries, and potentially unsafe working conditions shall be reported to the site safety officer immediately.
- Eating, smoking, and drinking will be allowed only in designated offsite areas. Site personnel will wash their hands and faces thoroughly prior to eating or drinking.
- Respirators will be cleaned, sanitized, inspected, and maintained by employees after each use.
- Fire extinguishers will be onsite for use on equipment or small fires only.
- An adequately stocked first aid kit will be onsite during work activities.

Practical engineering and geological information, experience, and accepted practices will be employed, as necessary, to control site safety while carrying out the proposed site remediation work.