

JAN 11 1993

HAYWARD FIRE DEPARTMENT

Ultramar

Ultramar Inc.
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525 W Third Street
Hanford, CA 93232-0466
(209) 582-0241

Telecopy: 209-584-6113 Credit & Wholesale
209-583-3330 Administrative
209-583-3302 Information Services
209-583-3358 Accounting

January 8, 1993

Mr. Hugh J. Murphy
Environmental Specialist
Hayward Fire Department
25151 Clawiter Road
Hayward CA 94545-2731

**SUBJECT: FORMER BEACON STATION NO. 546, 29705 MISSION BOULEVARD,
HAYWARD, CA**

Dear Mr. Murphy:

As per our telephone conversation today, January 8, 1993, please find enclosed for your review and files our consultant's Offsite Investigation/Monitoring Well Installation Workplan for the above-referenced facility.

Please do not hesitate to call if you have any questions regarding this information.

Sincerely,

ULTRAMAR INC.

Terrence A. Fox

Terrence A. Fox *TAF*
Senior Project Manager
Marketing Environmental

TAF/jj

Enclosure: Aegis Report dated December 16, 1992

cc w/encl: Mr. Lowell Miller
Alameda County Health
Department of Environmental Health
80 Swan Way Rm 200
Oakland CA 94621

Mr. Eddy So
CRWQCB - San Francisco Bay Region
2101 Webster St Ste 500
Oakland CA 94612



A Member of the Ultramar Group of Companies

BEACON
#1 Quality and Service



AEGIS ENVIRONMENTAL, INC.

1050 Melody Lane, Suite 160, Roseville, CA 95678



916 • 782-2110 / 916 • 969-2110 / FAX 916 • 786-7830

December 16, 1992

Mr. Terrence Fox
Senior Project Manager
Ultramar Inc.
525 West Third Street
Hanford, California 93230-0466

Subject: **Off-Site Investigation/Monitoring Well Installation Workplan**
Former Beacon Station #546
29705 Mission Boulevard, Hayward, California

Dear Mr. Fox:

Aegis Environmental, Inc. (Aegis), has been authorized by Ultramar Inc. (Ultramar), to conduct an investigation of off-site groundwater conditions at the former Beacon gasoline station #546 (site). The site is located at 29705 Mission Boulevard, Hayward, Alameda County, California (Figure 1). This report is based, in part, on information obtained by Aegis from Ultramar, and is subject to modification as newly acquired information may warrant.

BACKGROUND

The site is a former gasoline station, which previously retailed regular-unleaded, regular-leaded, and premium-unleaded gasolines.

- In March 1987, five soil borings were drilled around the underground storage tanks. Hydrocarbons were detected in the soil beneath the site.
- In April 1988, three underground storage tanks and one waste-oil tank were removed.

92-067A.WPN

GEOLOGISTS • ENGINEERS • GROUNDWATER SCIENTISTS

- In June and July 1988, three monitoring wells (MW-1 through MW-3) were installed. Results indicated that petroleum hydrocarbons were present in the groundwater beneath the site.
- In June 1989 and February 1990, a total of five additional wells (MW-4 through MW-8) were installed. Varying concentrations of hydrocarbons have been detected in all the wells through time.
- Quarterly groundwater monitoring at the site began in July 1988 and continues to date.

ADDITIONAL INVESTIGATION

The proposed work will be conducted according to the Aegis standard operating procedures included as Attachment 1, and includes the following:

- One, 2-inch-diameter groundwater monitoring well is proposed off site (monitoring well MW-9). Figure 2 shows the proposed location of the groundwater monitoring well. Groundwater currently flows in a southwesterly direction.
- As the soil boring is advanced, soil samples will be collected at a minimum vertical spacing of 5 feet, and at any lithologic changes or where petroleum hydrocarbon contamination is evident.
- Soil samples will be field-analyzed for the presence of petroleum hydrocarbon vapors with a photoionization detector.
- Based on field observations, selected soil samples will be submitted to a state-certified laboratory for analysis of concentration levels of benzene, toluene, ethylbenzene, and total xylenes (BTEX), and total petroleum hydrocarbons (TPH), as gasoline.
- Proposed monitoring well, MW-9, located southwest of the site, is intended to delineate the downgradient extent of dissolved petroleum constituents in groundwater.
- The proposed off-site well will be drilled and installed as 2-inch-diameter monitoring well. The well will be drilled to an anticipated total depth of 27 feet below grade using, a truck-mounted, hollow-stem auger drill rig, selected.

- The monitoring well will be constructed with Schedule 40 PVC casing. Based on depth to water in the off-site well (MW-8), nearest the proposed well, the well will be screened from 12 to 27 feet below grade. Since no sieve analysis was performed during the initial investigation, #20 slot (0.02 inch slot width) well screen will be used based on lithology encountered during previous monitoring well investigations. Construction details of the proposed monitoring well are illustrated on Figure 3.
- After installation, the monitoring well will be developed and surveyed in accordance with the methods outlined in Attachment 1.
- Drill cuttings will be temporarily stored on site, on and covered with plastic sheeting. A soil pile composite sample will be collected from the drill cuttings and submitted for analysis of TPH, as gasoline, BTEX, and organic lead to a state-certified analytical laboratory. Following receipt of the analytical results, the drill cuttings will be disposed of at an appropriate facility.
- Monitoring well development and purge water will be temporarily stored on-site in 55-gallon, Department of Transportation-approved drums. Following receipt of the analytical results, the development and purge water will be disposed of at an appropriate facility.
- Well permits and fees will be submitted at a later date. The data will be analyzed and a results report of the investigation will be prepared and submitted.

SITE HEALTH AND SAFETY PLAN

A site health and safety plan (SHSP) has been prepared and will be on site during all field activities (Attachment 2). All work will be conducted in accordance with the SHSP. The SHSP contains information on the hazardous properties of materials expected on site. The information is equivalent to that contained within Material Safety Data Sheets.

SCHEDULE

Aegis will proceed with the work outlined in this workplan when approval is obtained from the CHFD. Forty-eight hours notice will be given to the CHFD prior to the commencement of field activities.

REPORTING

A report documenting the groundwater monitoring results will be prepared after completion of all fieldwork. The report will be submitted to the CHFD and the Alameda County Environmental Health Department.

RECOMMENDATIONS

We recommend copies of this report be forwarded to the following agencies:

Mr. Lowell Miller
Alameda County Health
Division of Hazardous Materials
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

Mr. Hugh Murphy
City of Hayward Fire Department
25151 Clawiter Road
Hayward, California 94545-2731

Mr. Eddy So
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

REMARKS/SIGNATURES

The work described in this workplan will be performed in accordance with currently accepted geologic, hydrogeologic, and engineering practices. This workplan has been prepared solely for the use of Ultramar Inc. Any reliance on this report by third parties shall be at their own risk. The work described herein will be performed under the direct supervision of a professional geologist, registered with the State of California, whose signature appears below.

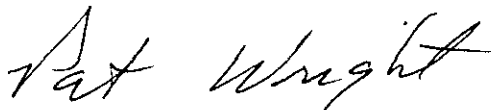
Aegis appreciates the opportunity to provide Ultramar Inc., with geologic, engineering, and environmental consulting services, and trusts this workplan meets your needs. If you have any questions or concerns, please call us at (916) 782-2110.

Sincerely,

AEGIS ENVIRONMENTAL, INC.



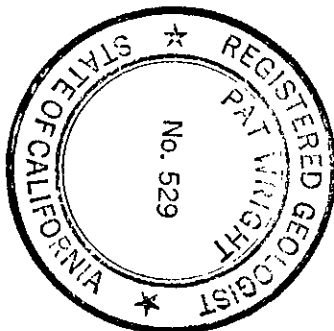
John Giorgi
Staff Geologist



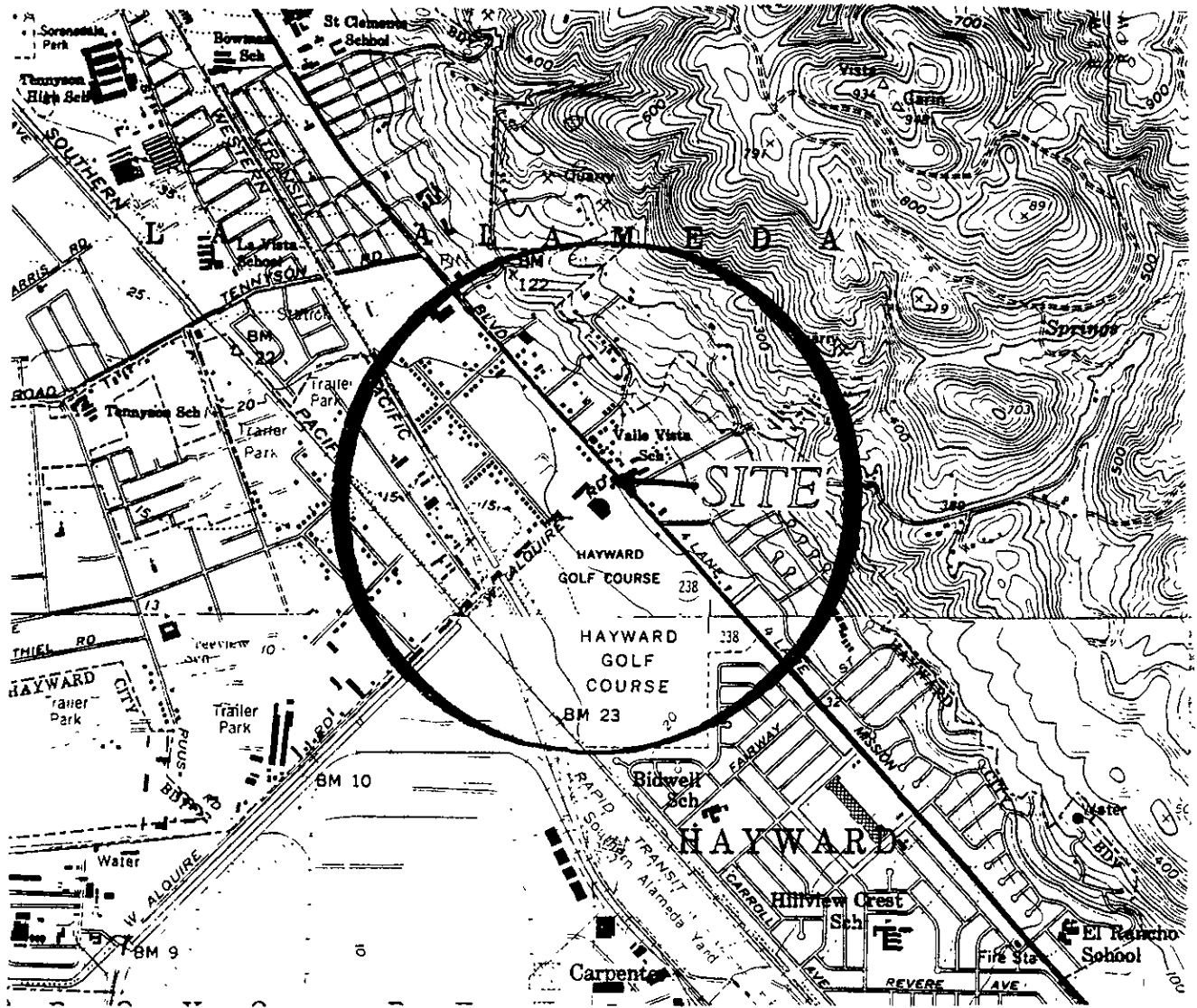
Pat Wright
Registered Geologist
CRG No. 529

12-17-92
Date

JG/PW/law

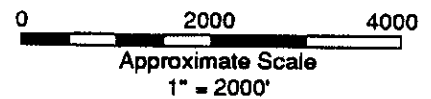


FIGURES



GENERAL NOTES:

BASE MAP FROM USGS
7.5 MINUTE TOPOGRAPHIC
HAYWARD & NEWARK, CA



AEGIS ENVIRONMENTAL, INC.

SITE LOCATION MAP

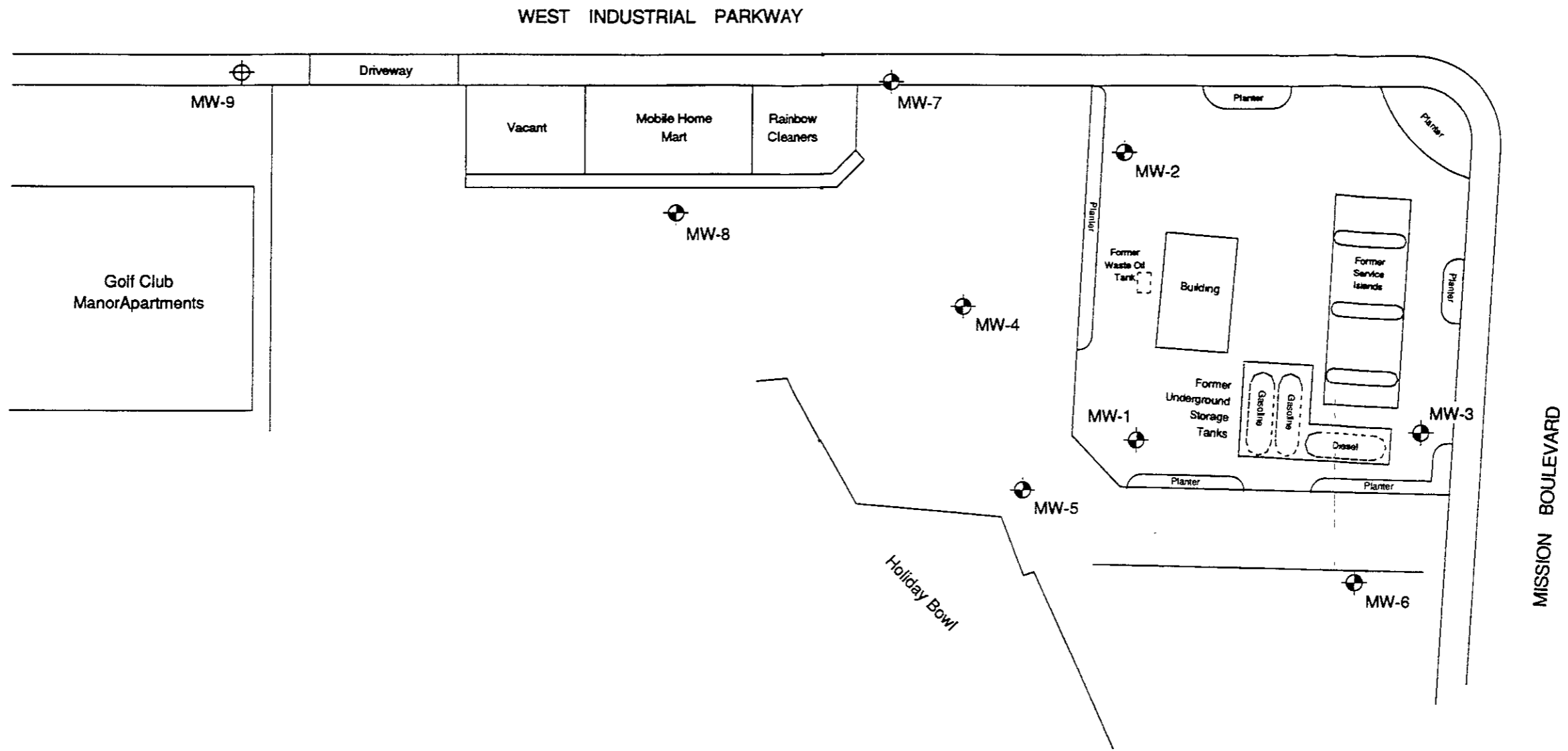
FIGURE

DRAWN BY: Ed Bernard	DATE: September 29, 1992
REVISED BY:	DATE:
REVIEWED BY:	DATE:



Beacon Station # 546
20705 Mission Boulevard
Hayward, CA

PROJECT NUMBER:
10-92067

1



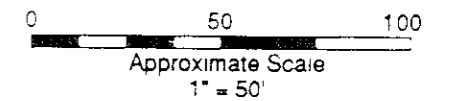
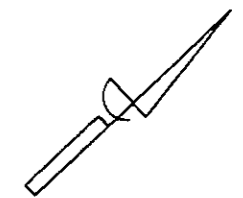
LEGEND


-  Monitoring Well
-  Proposed Monitoring Well

NOTES

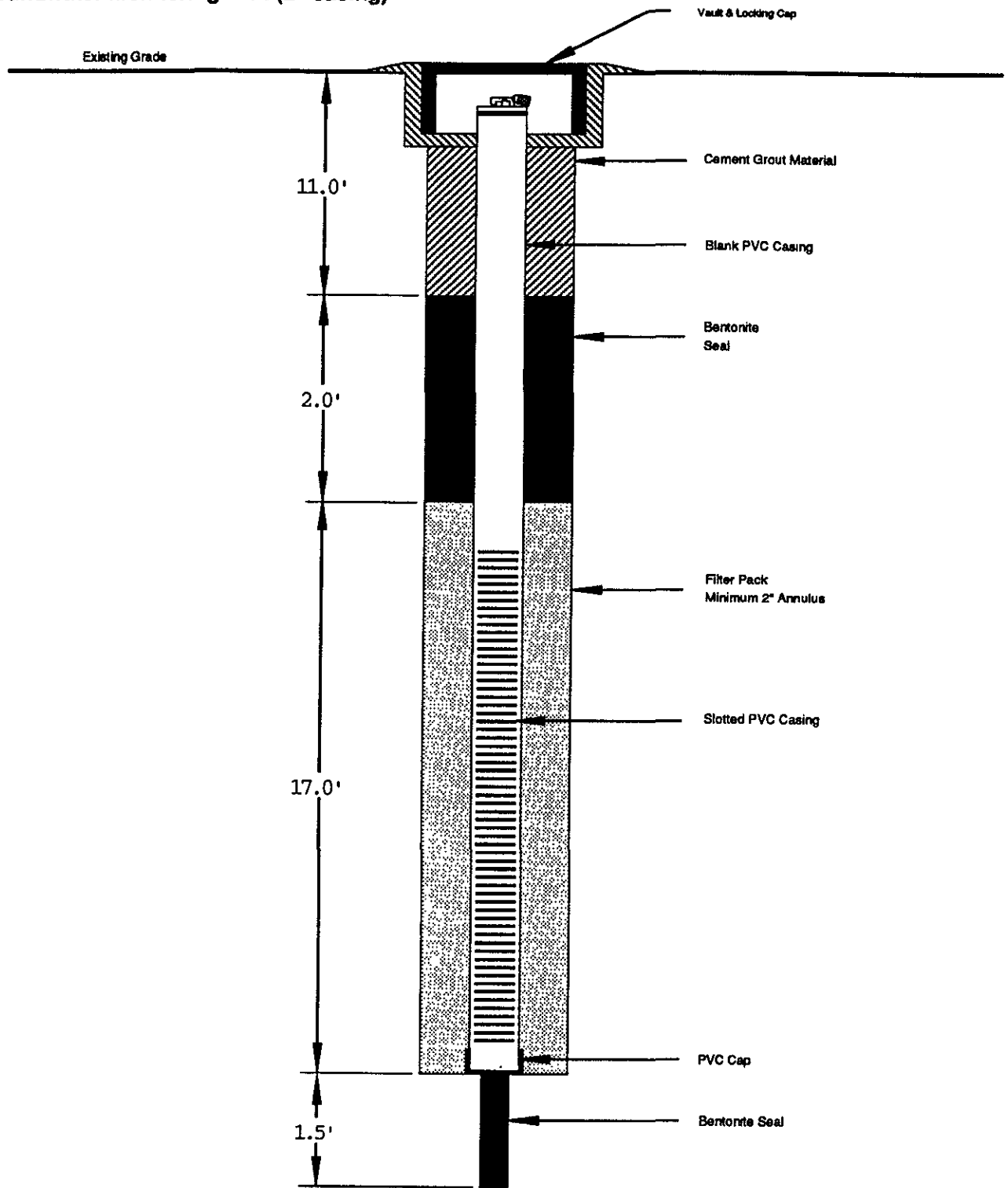
Site Sketch After
 Site Map By Ultramar
 August 5, 1992

All locations Are Approximate



	AEGIS ENVIRONMENTAL, INC.		SITE VICINITY MAP	FIGURE	
	DRAWN BY	D. Hada	DATE	Beacon Station # 546 20705 Mission Boulevard Hayward, CA	
	REVISD BY		DATE		
REVIEWED BY		DATE			
				2	
				PROJECT NUMBER 10-92067	

Groundwater Monitoring Well (2" casing)



(NOT TO SCALE)



Typical Groundwater Monitoring Well
Construction Details (2" Casing)

Ultramar, Inc.
20705 Mission Boulevard
Hayward, CA

JOB NUMBER 10-92067
FIGURE 3

ATTACHMENT 1
STANDARD OPERATING PROCEDURES

AEGIS ENVIRONMENTAL, INC.
STANDARD OPERATING PROCEDURES
RE: SOIL EXCAVATION AND SAMPLING
SOP-2

Excavation and subsequent soil sampling is performed under the direction of a registered geologist or civil engineer. To reduce the potential for cross-contamination, all excavation equipment is either steam cleaned or washed prior to use and between excavations. Soil samples for chemical analysis are collected in cleaned, thin-walled brass tubes of varying diameters and lengths (e.g., 6 inches long by 2 inches outside diameter) or other appropriate cleaned sample container. If used, one tube may be set in a 2-inch inside diameter, hand-driven sampler. To reduce the potential for cross-contamination between samples, the sampler is washed in a solution and doubly rinsed between each sampling event.

Upon recovery, a portion of the soil sample is sealed for later screening with either a portable photoionization detector, flame ionization detector, or an explosimeter. Another portion of the sample is used for description of the excavated materials. A third portion of the sample is hermetically sealed, labeled and refrigerated for delivery, under strict chain-of-custody, to the analytical laboratory. These procedures minimize the potential for cross-contamination and volatilization of volatile organic compounds prior to chemical analysis.

In the event the soil samples cannot be submitted to the analytical laboratory on the same day they are collected (e.g., due to weekends or holidays), the samples are temporarily stored until the first opportunity for submittal either on ice in a cooler, such as when in the field, or in a refrigerator at Aegis' office.

AEGIS ENVIRONMENTAL, INC.
STANDARD OPERATING PROCEDURES
RE: SAMPLE IDENTIFICATION AND CHAIN-OF-CUSTODY PROCEDURES
SOP-4

Sample identification and chain-of-custody procedures ensure sample integrity, and document sample possession from the time of collection to its ultimate disposal. Each sample container submitted for analysis is labeled to identify the job number, date, time of sample collection, a sample number unique to the sample, any in-field measurements made, sampling methodology, name(s) of on-site personnel and any other pertinent field observations also recorded on the field excavation or boring log.

Chain-of-custody forms are used to record possession of the sample from time of collection to its arrival at the laboratory. During shipment, the person with custody of the samples will relinquish them to the next person by signing the chain-of-custody form(s) and noting the date and time. The sample-control officer at the laboratory will verify sample integrity, correct preservation, confirm collection in the proper container(s), and ensure adequate volume for analysis.

If these conditions are met, the samples will be assigned unique laboratory log numbers for identification throughout analysis and reporting. The log numbers will be recorded on the chain-of-custody forms and in the legally-required log book maintained in the laboratory. The sample description, date received, client's name, and any other relevant information will also be recorded.

AEGIS ENVIRONMENTAL, INC.
STANDARD OPERATING PROCEDURES
RE: LABORATORY ANALYTICAL QUALITY ASSURANCE AND CONTROL
SOP-5

In addition to routine instrument calibration, replicates, spikes, blanks, spiked blanks, and certified reference materials are routinely analyzed at method-specific frequencies to monitor precision and bias. Additional components of the laboratory Quality Assurance/Quality Control program include:

1. Participation in state and federal laboratory accreditation/certification programs;
2. Participation in both U.S. EPA Performance Evaluation studies (WS and WP studies) and inter-laboratory performance evaluation programs;
3. Standard operating procedures describing routine and periodic instrument maintenance;
4. "Out-of-Control"/Corrective Action documentation procedures; and,
5. Multi-level review of raw data and client reports.

ATTACHMENT 2
SITE SAFETY PLAN

**FIELD INVESTIGATION TEAM
SITE HEALTH AND SAFETY PLAN**

A. GENERAL INFORMATION

Client: Ultramar, Inc.

Aegis Project Number: 92-067

Site Name: Beacon Station No. 546

Client Project Number: N/A

Street Address: 29705 Mission Boulevard, Hayward, California

Plan Prepared by: John Giorgi

Date: 11/19/92

Approved by: Tom E. Landwehr

Date: 11/23/92

Objectives:

Phase II - Install a groundwater monitoring well
downgradient of the site.

Proposed Date of excavating/treatment: Undecided.

Hazard Summary/Level of Protection

A: _____ B: _____ C: _____ D: X (with modifications)

B. SITE/WASTE CHARACTERISTICS

Waste/Contaminant Type(s): Liquid Soil Solid Sludge Gas

Characteristic(s): Corrosive Ignitable Radioactive
 Volatile Toxic Reactive
 Unknown Other (Name):

Contaminant Source (type and location): Gasoline leaked from fuel storage tank.

Surrounding Features (residences, power lines, terrain, surface water bodies, etc.): Commercial.

Status (active, inactive, unknown): Inactive and fenced.

History (worker or non-worker injury; complaints from public; previous agency action): Not Applicable.

C. HAZARD EVALUATION

Have all contaminants been identified that may be present on site?
Yes X No _____

List all chemicals below that have been identified or are suspected on site and their maximum concentrations in soil/water. Information on hazardous properties are listed in Section G. For chemicals not shown in Section G, enter the hazardous property information in the spaces provided.

<u>Chemical Name</u>	<u>Maximum Concentration: (ppm)</u>	
	<u>In Soil</u>	<u>In Water</u>
TPH gasoline	8,900	
Benzene	710	

(ppm) = parts per million.
NA = Not analyzed.

Free product present? _____ Yes X No

Type of product present: _____ Leaded X Unleaded _____ Diesel

P= results pending

D. SITE SAFETY WORKPLAN

PERSONNEL

<u>Team Member</u>	<u>Title</u>	<u>Responsibility</u>
Tom L. Landwehr	Project Geologist	Site Coordinator
John Giorgi	Staff Geologist	Site Safety Officer

PERIMETER ESTABLISHED

Map/Sketch Attached?	Yes <u>X</u>	No <u> </u>
Site Secured?	Yes <u> </u>	No <u>X</u>
Perimeter Identified?	Yes <u>X</u>	No <u> </u>
Contamination zones identified? line defined?	Yes <u> </u>	No <u>X</u>
Free Product?	Yes <u> </u>	No <u>X</u>
Dissolved Product?	Yes <u>X</u>	No <u> </u>

INVESTIGATION-DERIVED MATERIAL DISPOSAL:

Soil from drill cuttings will be stockpiled and stored on site until analyses are available to describe the levels of petroleum hydrocarbons. Soil stockpiled on site will be underlain by plastic sheeting. Upon receipt of analytical results, the drill cuttings will be disposed of at an appropriate facility.

D1. PERSONAL SAFETY

SITE ENTRY PROCEDURES: Not Applicable.

PERSONNEL PROTECTION:

Level of protection: A _____ B _____ C _____ D X

Modifications:

1. All personnel must wear hard hat, safety shoes, safety glasses and/or face shield.
2. Neoprene gloves and tyvek/saranax suit should be worn if contact with contaminated water or soil is likely.
3. Hearing protection must be worn if noise levels prevent normal conversation at a distance of three feet. No smoking, eating, or drinking is allowed on site.
4. Respiratory protection is dependent on conditions listed in next section.
5. **No personnel are to enter or approach any excavation area where there is a danger of wall collapse or confined space entry.**

CONFINED SPACES

Monitor organic vapors and oxygen before entering. If following value exceeded, do not enter:

Oxygen <20.0%

Total hydrocarbons > 5 ppm above background, if all air contaminants have not been identified.

Concentrations of specific air contaminants exceeding action levels in Section D, if all air contaminants have been identified.

If entering a confined space, monitor oxygen and organic vapors continuously.

E. EMERGENCY INFORMATION

LOCAL TELEPHONE NUMBERS (provide area codes):

Ambulance	911
Hospital Emergency Services	911
St. Rose Hospital, 27200 Calaroga Avenue, near Hwy 880, Hayward, California	(510) 782-6200
Poison Control Center	800-342-9293
Fire Department	911
Explosives Unit	911

SITE RESOURCES:

Water supply available on site:	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Telephone available on site:	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Bathrooms available on site:	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Other resources available on site:	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>

If yes, identify:

If you answered "no" to any of the above questions, identify the closest available facility, and provide directions.

The nearest telephone to the site will either be a mobile phone or at various near by businesses within 500 feet from the working area. Travel time to these businesses is within 5 minutes. Drinking water will be available in containers on site.

EMERGENCY CONTACTS

PHONE NO.

1. Aegis President: Clarke H. Owen	(916) 782-2110
2. Health and Safety Officer: Tom E. Landwehr	(916) 782-2110
4. Site Contact: John Giorgi	(916) 782-2110
5. Regulatory Contacts: Lowell Miller	(510) 271-4320

F. EMERGENCY ROUTES

(Give name address, telephone number, directions, distance and time estimate, and map.)

HOSPITAL: St. Rose Hospital-27200 Calaroga Ave.,
near Hwy 880 & Tennyson Road, Hayward, California (916) 782-6200

Take Mission Boulevard north from the site to Tenneyson Road, approximately 3/4 mile. Turn left onto Tenneyson Road and go to Calaroga Avenue, approximately 2 1/4 miles. Just before you get to Calaroga Ave., you will pass under highway 880. Turn right onto Calaroga Ave., the hospital is immediately on the right side.

G. HAZARD EVALUATION

<u>PARAMETER</u>	<u>TLV</u> <u>(ppm)</u>	<u>OT</u> <u>(ppm)</u>	<u>IDLH</u> <u>(ppm)</u>	<u>VOLA-</u> <u>TILITY</u>	<u>SKIN</u> <u>HAZARD</u>	<u>EXPLO-</u> <u>SIVITY</u>
Benzene	0.1	4	2,000	H	L	H
Ethylbenzene	100	NS	2,000	M	L	H
Toluene	100	2	2,000	M	L	H
Xylene	100	<1	10,000	H	M	H
Gasoline	300	NS	NS	H	L	H

KEY: OT = Odor threshold
TL = Threshold limit value (Worker - 8 hours)
IDLH = Immediately dangerous to life and health
NS = None specified
H = High
M = Medium
NR = Not reported
L = Low
U = Unknown

APPENDIX A: HAZARDOUS PROPERTY INFORMATION

Explanations and Footnotes

Water solubility is expressed in different terms in different references. Many references use the term "insoluble" for materials that will not readily mix with water, such as gasoline. However, most of these materials are water soluble at the part per million or part per billion level. Gasoline for example, is insoluble in the gross sense, and will be found as a discreet layer on top of the ground water. But certain gasoline constituents, such as benzene, toluene, and xylene will also be found in solution in the ground water at the part per million or part per billion level.

- A. Water solubility expressed as 0.2g means 0.2 grams per 100 grams water at 20°C.
- B. Solubility of metals depends on the compound in which they are present.
- C. Several chlorinated hydrocarbons exhibit no flash point in conventional sense, but will burn in presence of high energy ignition source or will form explosive mixtures at temperatures above 200°F.
- D. Practically non-flammable under standard conditions.
- E. Expressed as mm Hg under standard conditions
- F. Explosive concentrations of airborne dust can occur in confined areas.
- G. Values for Threshold Limit Value - Time Weighted Average (TLV-TWA) are OSHA Permissible Exposure Limits (PEL) except where noted in H. and I.
- H. TLV - TWA adopted by the American Conference of Government Industrial Hygienists (ACGIH) which is lower than the OSHA PEL.
- I. TLV - TWA recommended by the National Institute for Occupational Safety and Health (NIOSH). A TLV or PEL has not been adopted by the ACGIH or OSHA.

- J. A. - Corrosive
- B. - Flammable
- C. - Toxic
- D. - Volatile
- E. - Reactive
- F. - Radioactive
- G. - Carcinogen
- H. - Infectious
- K. - Dermal Toxicity data is summarized in the following three categories:

Skin penetration

- A. - negligible penetration (solid-polar)
- B. - slight penetration (solid-nonpolar)
- C. - moderate penetration (liquid-nonpolar)
- D. - high penetration (gas/liquid-nonpolar)

Systemic Potency

- E. - slight hazard - $LD_{50} = 500-15,000$ mg/kg
lethal dose for 70 kg man = 1 pint-1 quart
- F. - moderate hazard - $LD_{50} = 50-500$ mg/kg
lethal dose for 70 kg man = 1 ounce-1 pint
- G. - extreme hazard - $LD_{50} = 10-50$ mg/kg
lethal dose for 70 kg man = drops to 20 ml

Local Potency

- H. - slight - reddening of skin
- I. - moderate - irritation/inflammation of skin
- J. - extreme - tissue destruction/necrosis

1. Acute Exposure Symptoms

- A. - abdominal pain
- B. - central nervous system depression
- C. - comatose
- D. - convulsions
- E. - confusion
- F. - dizziness
- G. - diarrhea
- H. - drowsiness
- I. - eye irritation
- J. - fever
- K. - headache
- L. - nausea
- M. - respiratory system irritation
- N. - skin irritation
- O. - tremors
- P. - unconsciousness
- Q. - vomiting
- R. - weakness

HAZARDOUS PROPERTY INFORMATION - FUELS

<u>Material</u>	<u>Water^a Solubility</u>	<u>Specific Gravity</u>	<u>Vapor Density</u>	<u>Flash Point °F</u>	<u>Vapor^c Pressure</u>	<u>LEL UEL</u>	<u>LD₅₀ mg/kg</u>	<u>TLV-TWA^c</u>	<u>IDLH Level</u>	<u>Odor Threshold or Warning Concentration</u>	<u>Hazard^d Property</u>	<u>Dermal^k Toxicity</u>	<u>Accute^l Exposure Symptoms</u>
Diesel Fuel	insoluble	0.81-0.90	---	130	---	0.6-1.3 6.0-7.5		none established	NE	0.008 ppm	BCD	CI	BCEFHIKL MNP
Gasoline	insoluble	0.72-0.76	3-4	-45	variable	1.4% 7.6%		300 ppm	NE	< 1 ppm	BCDG	CI	BCEFHIKL MNP
Kerosene	insoluble	0.83-1.0	---	100-165	5	0.7% 5.0%		none established	NE	0.008 ppm	BCD	CI	BCEFHIKL MNP

HAZARDOUS PROPERTY INFORMATION - VOLATILE ORGANIC PRIORITY POLLUTANTS

Material	Water ^A Solubility	Specific Gravity	Vapor Density	Flash Point °F	Vapor ^C Pressure	LEL UEL	LD ₅₀ mg/kg	TLV-TWA ^E	IDLH Level	Odor Threshold or Warning Concentration	Hazard ^J Property	Dermal ^K Toxicity	Accute ^L Exposure Symptoms
Acrolein	22%	0.8410	1.9	-15	214 mm	2.8% 31.0%	46	0.1 ppm	5 ppm	0.1-16.6 (0.21-0.5)	BCED	BJ	ABDFGHK LMNOPQR
Acrylonitrile	7.1%	0.8060	1.8	30	83 mm	3.0% 17.0%	82	2.0 ppm	4,000 ppm	19-100	BCEGD	DIG	FGIKLMN Q R
Benzene	820 ppm	0.8765	2.8	12	75 mm	0.339% 7.1%	3800	10.0 ppm	2,000 ppm	4.68	BCGD	CIG	BCDFHIK LMNOPQR
Bromomethane	0.1 g	1.732	3.3	none	1.88 atm	13.5% 14.5%		5.0 ppm	2,000 ppm	no odor	CD		BCDEIJK LMNOPQR
Bromodichloromethane	insoluble	1.980	--	none	n/a	non- flam.	916	none established	none specified		CGD		BIMN
Bromoform	0.01 g	2.887	--	none	5 mm	non- flam.	1147	0.5 ppm	n/a	530	CD		BCDKMN
Carbon Tetrachloride	0.08%	1.5967	5.3	none	91 mm	non- flam.	2800	5.0 ppm	300 ppm	21.4-200	CD	JGH	ABCDFGHK LMNOPQR
Chlorobenzene	0.01 g	1.1058	3.9	84	8.8 mm	1.3% 9.6%	2910	75.0 ppm	2,400 ppm	0.21-60	BCD	CIF	BCDFIKLM NOPQR
Chloroethane	0.6 g	0.8978	2.2	-58	1.36 atm	3.8% 15.4%		1000.0 ppm	20,000 ppm		BCD		BFHIKMNP
2-Chloroethylvinyl Ether	insoluble	1.0475	3.7	80	30 mm	--	250	none established	none specified		BCD		HIM
Chloroform	0.8 g	1.4832	4.12	none	160 mm	non- flam.	800	10.0 ppm	1,000 ppm	50-307 fatigue (>4096)	CD		BCEGIKLM NOPQR
Chloromethane	0.74%	0.9159	1.8	32	50 atm	7.6% 19.0%		50.0 ppm	10,000 ppm	10-100 no odor (500-1000)	BCD	DHF	ABCDEFGHI JKLMNOPQR
Dibromochloromethane	insoluble	2.451	--	--	--	--	848	none established	none specified		BCD		BFHIMNPQ

HAZARDOUS PROPERTY INFORMATION - VOLATILE ORGANIC PRIORITY POLLUTANTS (CONTINUED)

Material	Water ^a Solubility	Specific Gravity	Vapor Density	Flash Point °F	Vapor ^e Pressure	LEL UEL	LD ₅₀ mg/kg	TLV-TWA ^c	IDLH Level	Odor Threshold or Warning Concentration	Hazard ^d Property	Dermal ^e Toxicity	Accute ^f Exposure Symptoms
1,1-Dichloroethane (DCA)	0.1 g	1.1757	8.4	22	182 mm	6.0% 16.0%	725	100.0 ppm	4,000 ppm	5 ppm	BCD		ABHIMNO
1,2-Dichloroethane	0.8%	1.2554	3.4	55	87 mm	6.2% 16.0%	670	10.0 ppm ^h	1,000 ppm	6 ppm	BCDG		BCFGLMNO
1,1-Dichloroethylene (DCE)	2250 mg/l @ 77°F	--	3.4	3	591 mm	7.3% 16.0%	200	5.0 ppm ^h	none specified		BCD		BTMN
Trans-1,2-Dichloroethylene	slightly soluble	1.2565	--	36	400 mm	9.7% 12.8%		none established	none specified	.0043 mg/l	BCD		ABFILOQ
1,2 Dichloropropane	0.26%	1.1583	3.9	60	40 mm	3.4% 14.5%	1900	75.0 ppm	2,000 ppm	50	BCD		ABGHKMN Q
Cis-1,3-Dichloropropane	insoluble	1.2	3.8	83	28 mm	5.0% 14.5%	250	1.0 ppm ^h	none specified		BCD		ABGHIKLM NP
Trans-1,3-Dichloropropane	insoluble	1.2	3.8	83	28 mm	5.0% 14.5%		1.0 ppm ^h	none specified		BCD		ABGHIKLM NP
Ethylbenzene	0.015 g	0.867	3.7	59	7.1 mm	1.0% 6.7%	3500	100.0 ppm	2,000 ppm	0.25-200 (200)	BCD	CIF	ABFHKLM NPQR
Methylene Chloride	slightly soluble	1.335	2.9	none	350 mm	12.0% ^c unavailable	167	100.0 ppm ^h	5,000 ppm	25-320 (5000)	CED	CIF	BCIKLMNP R
1,1,2,2-Tetrachloroethane	0.19%	1.5953	5.8	none	5 mm	non- flam.		1.0 ppm ^h	150 ppm	3-5	CD		ABCFHIKL MNOQ
Tetrachloroethylene	0.15 g/ml	1.6227	5.8	none	15.8 mm	non- flam.	8850	50.0 ppm ^h	500 ppm	4.68-50 (160-690)	CD		ACFHKLM NP
1,1,1-Trichloroethane (TCA)	0.07 g	1.3390	4.6	none	100 mm	8.0% ^c 10.5%	10300	350.0 ppm	1,000 ppm	20-400 (500-1000)	BCED		ABEFHIKL NOP
1,1,2-Trichloroethane	0.45	1.4397	4.6	none	19 mm	6.0% ^c 15.5%	1140	10.0 ppm	500 ppm	0	C		BEFGHIKL MNO PQ

HAZARDOUS PROPERTY INFORMATION - VOLATILE ORGANIC PRIORITY POLLUTANTS (CONTINUED)

Material	Water ^a Solubility	Specific Gravity	Vapor Density	Flash Point °F	Vapor ^c Pressure	LEL UEL	LD ₅₀ mg/kg	TLV-TWA ^e	IDLH Level	Odor Threshold or Warning Concentration	Hazard ^d Property	Dermal ^f Toxicity	Accute ^g Exposure Symptoms
Trichloroethylene (TCE)	0.1%	1.4642	4.5	90	58 mm	12.5% 90.0%	4920	50.0 ppm ^h	1,000 ppm	21.4-400	BC		BFKLNOPQ
Trichlorofluoromethane	0.11 g	1.494	--	none	0.91 atm	non- flam.		1000.0 ppm	10,000 ppm	135-209	CD		BFHKLQ
Toluene	0.05 g	0.866	3.2	40	22 mm	1.3% 7.1%	5000	100.0 ppm	2,000 ppm	0.17-40 fatigue (300-400)	BC	BHE	BEFHKL NOPQ
Vinyl Chloride	negligible	0.9100	2.24	-108	3.31 atm	3.6% 33.0%	500	1.0 ppm	none specified	260	BCEG	DJG	ABFHKL R

HAZARDOUS PROPERTY INFORMATION - HEAVY METALS

Material	Water ^A Solubility	Specific Gravity	Vapor Density	Flash Point °F	Vapor ^C Pressure	LEL UEL	LD ₅₀ mg/kg	TLV-TWA ^C	IDLH Level	Odor Threshold or Warning Concentration	Hazard ^D Property	Dermal ^E Toxicity	Accute ^F Exposure Symptoms
Arsenic	B	5.727	n/a	none	n/a	F		10.0 ug/m ³	none specified		CEG	CJG	ACDGJLMO QR
Beryllium	B	1.85	n/a	none	n/a	F		2.0 ug/m ³	none specified		C		IJMNR
Cadmium	B	8.642	n/a	none	n/a	F	225	0.5 mg/m ³	40/mg ³		C		ABGIKLMN QR
Chromium	B	7.20	n/a	none	n/a	F F		0.5 mg/m ^{3H}	500/mg ³				FMNQ
Copper	B	8.92	n/a	none	n/a	F		0.1 mg/m ³	none specified		C		FGIJLMOQ R
Lead	B	11.3437	n/a	none	n/a	F		50.0 ug/m ³	none specified		C		ACDFGOQR
Mercury	B	13.5939	7.0	none	0.0012 mm	F		50.0 ug/m ^{3H}	28 mg/m ³		C		AGLMNQ
Nickel	B	8.9	n/a	none	n/a	F		1.0 mg/m ³	none specified		C		DGJLMNQ
Silver	B	10.5	n/a	none	n/a	F		0.01 mg/m ³	none specified		C		IN
Thallium	B	11.85	n/a	none	n/a	F		0.1 mg/m ³	20 mg/m ³		C	BG	ADGLNOQ
Zinc	B	7.14	n/a	none	n/a	F		none established	none specified		C		DF

HAZARDOUS PROPERTY INFORMATION - MISCELLANEOUS

Material	Water ^a Solubility	Specific Gravity	Vapor Density	Flash Point °F	Vapor ^c Pressure	LEL UEL	LD ₅₀ mg/kg	TLV-TWA ^c	IDLH Level	Odor Threshold or Warning Concentration	Hazard ^d Property	Dermal ^e Toxicity	Acute ^f Exposure Symptoms
Acetone	soluble	0.8	2.0	-4	400 mm	2.5% 12.8%	9750	750 ppm	10,000 ppm	100	BCD	DI	N
Asbestos	insoluble	2.5	n/a	none	n/a	non- flam.		0.2-2 fibers/cc	none specified		CG		MN
Chromic Acid	soluble	1.67-2.82	n/a	none	n/a	non- flam.		none established	none specified		ACEG		GIN
Cyanides	58-72%		n/a	none	n/a	non- flam.		5 mg/m ³	50 mg/m ³		CE		FKLN PQ
PCB (Generic)	slightly soluble	--	n/a	none	n/a	non- flam.		1.0 ug/m ³ ¹¹	none specified		CG		CHLPQ
Phenol	8.4%	1.0576	3.2	175	0.36 mm	1.8% 8.6%	414	5 ppm	100 ppm	0.047-5 (48)	C		ABCDGIKM NOQ
Xylene	0.00003%	0.8642	3.7	84	9.0 mm	1.1% 7.0%	5000	100 ppm	10,000 ppm	0.5-200 (200)	BCD		ABFHILM NPQ