EXECUTIVE SUMMARY

Designated Property Location

The "Designated Property" for which this Municipal Setting Designation (MSD) Application has been developed is for a development named 8200 Southwest Freeway, LLC and consists of the property located at 8200 Southwest Freeway in Houston, Harris County, Texas (Site). The Designated Property is located northeast of the intersection of South Gessner Road and Southwest Freeway.

The location of the Designated Property is shown on **Figure 1** in **Appendix B** and the layout of the Designated Property is shown on **Figure 2** in **Appendix B**. The Designated Property contains approximately 1.001 acres and includes one parcel.

The building located at 8200 Southwest Freeway was constructed in 1975 with a 11,340 square-foot showroom building. The building had an addition constructed in 1978 with an additional 6,027 square feet added. Both additions remain today. The Site was vacant rangeland before the current development. The Southwest Freeway was developed in approximately 1962 adjacent to the Site.

Property Ownership
8200 Southwest Freeway, LLC
24 Greenway Plaza,
Suite 965
Houston, Texas 77046

Environmental Conditions

Groundwater impacts at the Designated Property have been documented from groundwater data collected from five permanent monitoring wells. The permanent wells were advanced on behalf of 8200 Southwest Freeway, LLC in 2008 by W&M Environmental Group, Inc. (W&M), upon the departure of a long-term tenant, Stubbs Cycle Southwest.

EXECUTIVE SUMMARY

Two 1,000-gallon underground storage tanks (USTs) were installed at the Designated Property by Southwest Honda Suzuki in 1973. The USTs were closed with the Texas Commission on Environmental Quality (TCEQ) after they were filled with a sand slurry and abandoned in place in accordance with the rules for abandoning USTs in place in 1994. The USTs are closed and require no further regulatory oversight. The subsurface investigation conducted by W&M indicated that the USTs are the source of a small amount of residual soil and groundwater impact at the Designated Property. Contamination in groundwater at the Designated Property exceeds the TCEQ Texas Risk Reduction Program (TRRP) Tier 1 residential assessment levels for chemicals of concern (COCs) associated with volatile organic compounds (VOCs).

The following COCs were identified above the TRRP Tier 1 residential assessment levels in groundwater:

- Benzene
- 1,2-Dichloroethane (1,2-DCA)
- 1,1-Dichloroethylene (1,1-DCE)
- Cis-1,2-Dichloroethylene (Cis-1,2-DCE)
- Ethylbenzene
- Methyl Tert-butyl Ether (MTBE)
- Tetrachloroethylene (PCE)
- Toluene
- Vinyl Chloride (VC)

Refer to **Tables 1 and 2** in **Appendix F** for specific values and assessment levels for soil and groundwater. No COCs were reported to exceed the non-ingestion protective concentration levels (PCLs) for soil or groundwater.

Groundwater was first encountered beneath the Designated Property in the shallow water-bearing zone at depths of approximately 14.35 to 16.60 feet below ground surface (bgs), The groundwater flow direction at the Designated Property is generally to the east.

The geology of the Designated Property includes Beaumont formation and alluvium consisting of barrier-island and beach deposits. The formation is dominantly clay and mud of low permeability, high water-holding capacity, poor drainage and high plasticity to approximately 60 to 80 feet. In succession after approximately 80 feet the Montgomery, Bentley, Willis, and the Lissie formations are encountered to an approximate depth of 300 to 400 feet. Many heavy clay lenses located beneath the impacted shallow groundwater-bearing unit help to decrease the potential for vertical migration of COCs to deeper groundwater-bearing units.

EXECUTIVE SUMMARY

Contamination at concentrations above ingestion PCLs have not migrated beyond the Designated Property. The horizontal extent of COCs has been defined to TRRP assessment levels. The suspected source of the documented COCs is the two 1,000-gallon USTs, which were abandoned in place and received regulatory closure.

When the USTs were removed from service, a subsurface investigation consisting of only soil assessment was required. No COCs were identified above regulatory levels and the USTs were closed by the TCEQ. Stubbs Cycle Southwest was vacating the premisses and a new tenant was interested in a rent to own agreement that also included mitigation of any environmental issues. The pending real estate transaction at the Designated Property prompted additional subsurface investigation at the Designated Property. The additional subsurface investigation conducted in October 2007 and June and October 2008 identified COCs in the groundwater. Two temporary monitoring wells were installed at the Designated Property in October 2007. Four monitoring wells were initially installed at the property in June of 2008 and one additional monitoring well was installed in October 2008 to achieve delineation to the residential PCLs on the Designated Property. Soil concentrations exceeding Tier 1 residential PCLs have been identified and include: arsenic, benzene, 1,1-DCE, ethylbenzene, 1,2,4-trimethylbenzene, PCE, and toluene.

Based upon a review of registered water wells within 5 miles of the Designated Property and a 500-foot walking receptor survey, W&M identified no sensitive groundwater receptors in the Designated Property area. The City of Houston provides municipal drinking water service to the Designated Property and a public water supply is available for the entire 5-mile area. There are a number of Municipal water supply wells and residential supply wells within the 5-mile area reviewed.

There are 970 State-registered water wells located within approximately 5-miles of the Designated Property. Five water wells are between 0.34 and 0.5 miles of the Designated Property.

The jurisdictional boundaries of Sugar Land, Meadows Place, Stafford, Missouri City, Bellaire, Bunker Hill Village, Piney Point Village, Hunter's Creek Village, Harris County, and Fort Bend County are located within 5 miles of the Designated Property. There are a total of 62 reported Water Utility Database (WUD) drinking water wells operating within 5 miles of the Designated Property, however, WUD water wells are reported within one-half miles of the Designated Property. There are no municipalities other than the City of Houston located within one-half miles of the Designated Property.

Regulatory Setting

The property was entered into the Texas Voluntary Cleanup Program (VCP ID No. 2323) in October 2008.

Appendix B

MUNICIPAL SETTING DESIGNATION APPLICATION
8200 SOUTHWEST FREEWAY
HOUSTON, TEXAS

SITE MAPS

Seven maps are attached in this section depicting relevant Designated Property information. The Designated Property is located along the Southwest Freeway in southwest Houston, Texas as presented on **Figure 1**. There is currently one building that encompasses a majority of the Site. **Figure 2** depicts the local topography around the Designated Property, which is generally level, sloping to the southwest towards Bray's Bayou, approximately 4,000 feet to the southwest. **Figure 3** is a Federal Emergency Management Agency (FEMA) flood map showing that the Designated Property is in Flood Zone X, which implies, "an area of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees for 1% annual chance flood." **Figure 4** presents the Site layout, property boundaries, and the locations of all sampling locations on the Designated Property.

W&M Environmental Group, Inc. (W&M) installed five monitoring wells at the Designated Property in June and October, 2008 to fully delineate impacted groundwater on the Site and determine the groundwater gradient. Separation Systems Consultants, Inc. (SSCi) previously advanced four soil borings and 2 temporary monitoring wells. Groundwater elevations, gradient, and approximate flow direction are presented on **Figure 5**. The groundwater gradient is predominantly to the east and the impacted groundwater does not migrate off the Site. Groundwater impact at the Designated Property is limited to the vicinity of monitoring well MW-04, SB-02, and SB-03.

The following chemicals of concern (COCs) were identified in soil samples at concentration above the Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Tier 1 protective concentration levels (PCLs) for soil (ingestion PCL): arsenic, benzene, 1,1-dichloroethylene (1,1-DCE), ethylbenzene, 1,2,4-trimethylbenzene (1,2,4-TMB), tetrachloroethylene (PCE), and toluene. The zone of impacted soil above ingestion PCLs (also referred to as the PCL exceedance [PCLE] zone) is depicted on **Figure 6.**

The COCs identified in groundwater at concentrations above the TCEQ TRRP Tier 1 PCLs for groundwater ingestion include: benzene, 1,2-dichloroethane (1,2-DCA), 1,1-DCE, cis-1,2-dichloroethylene (cis-1,2-DCE) , ethylbenzene, methyl tert-butyl ether (MTBE) PCE, toluene, and vinyl chloride (VC). The PCLE zone of impacted groundwater above ingestion PCLs is depicted on **Figure 7.**

Figure 1
Site Location
8200 Southwest Freeway
Houston, Texas

01-30-09 MSD W&M Project No.: 908.002.005

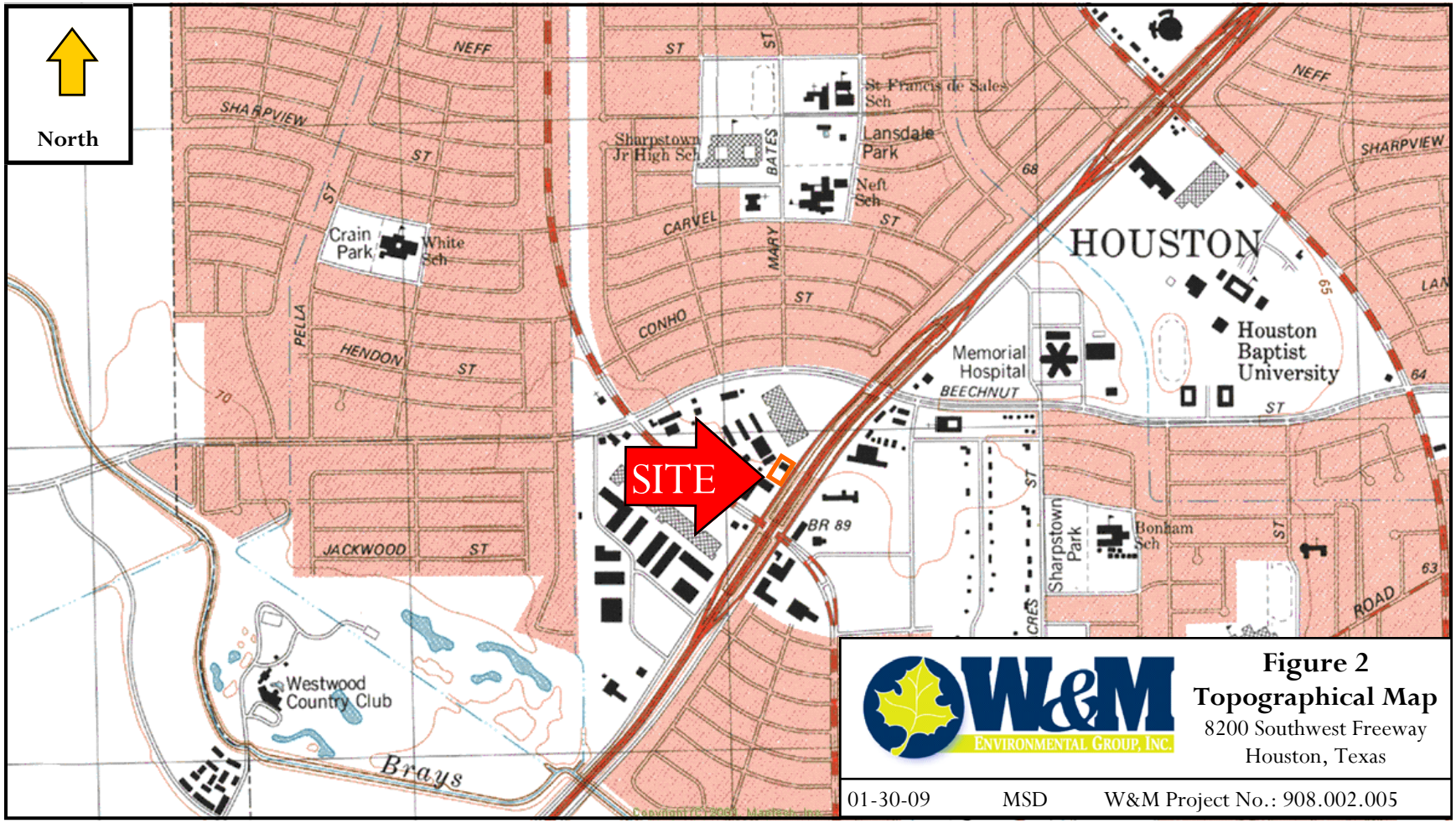
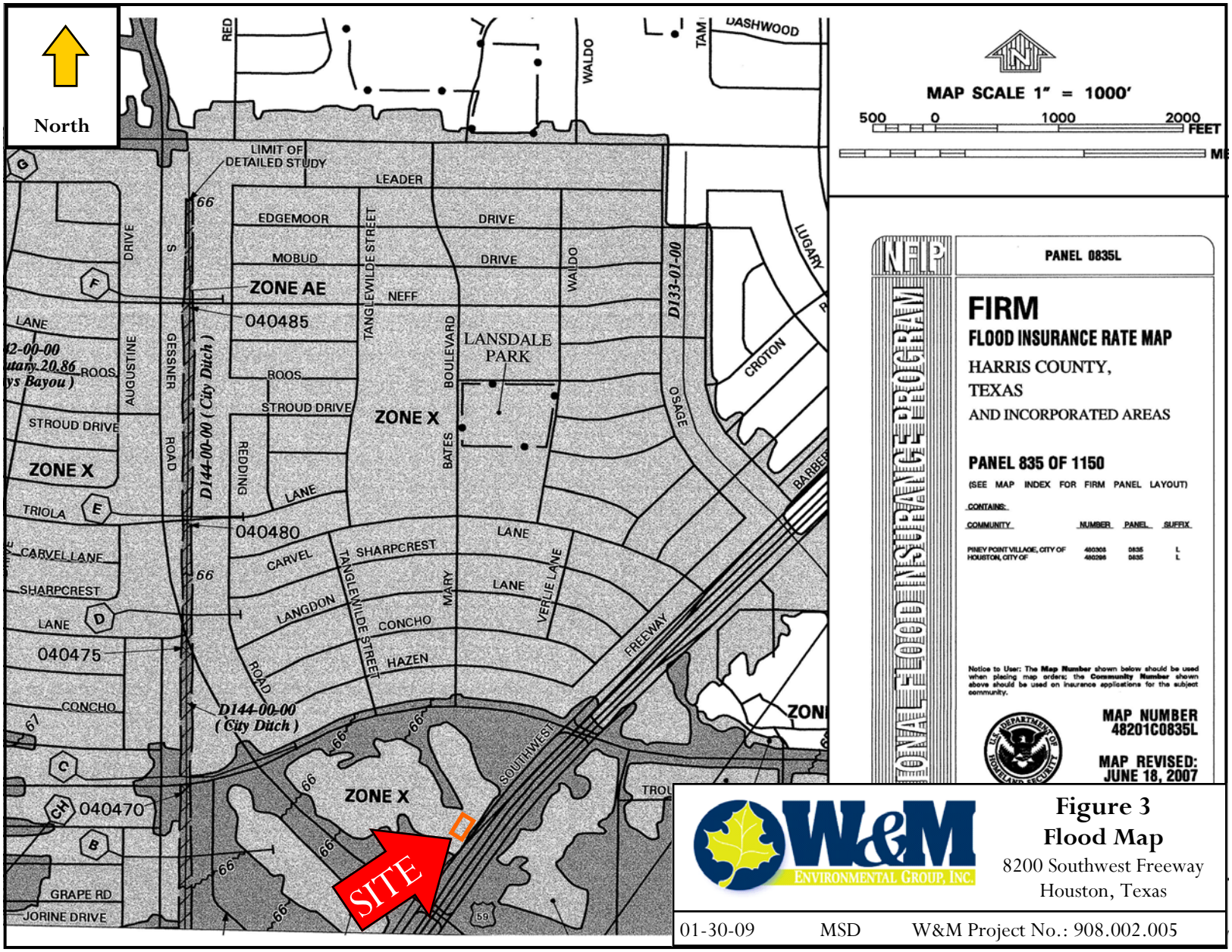


Figure 2
Topographical Map
8200 Southwest Freeway
Houston, Texas

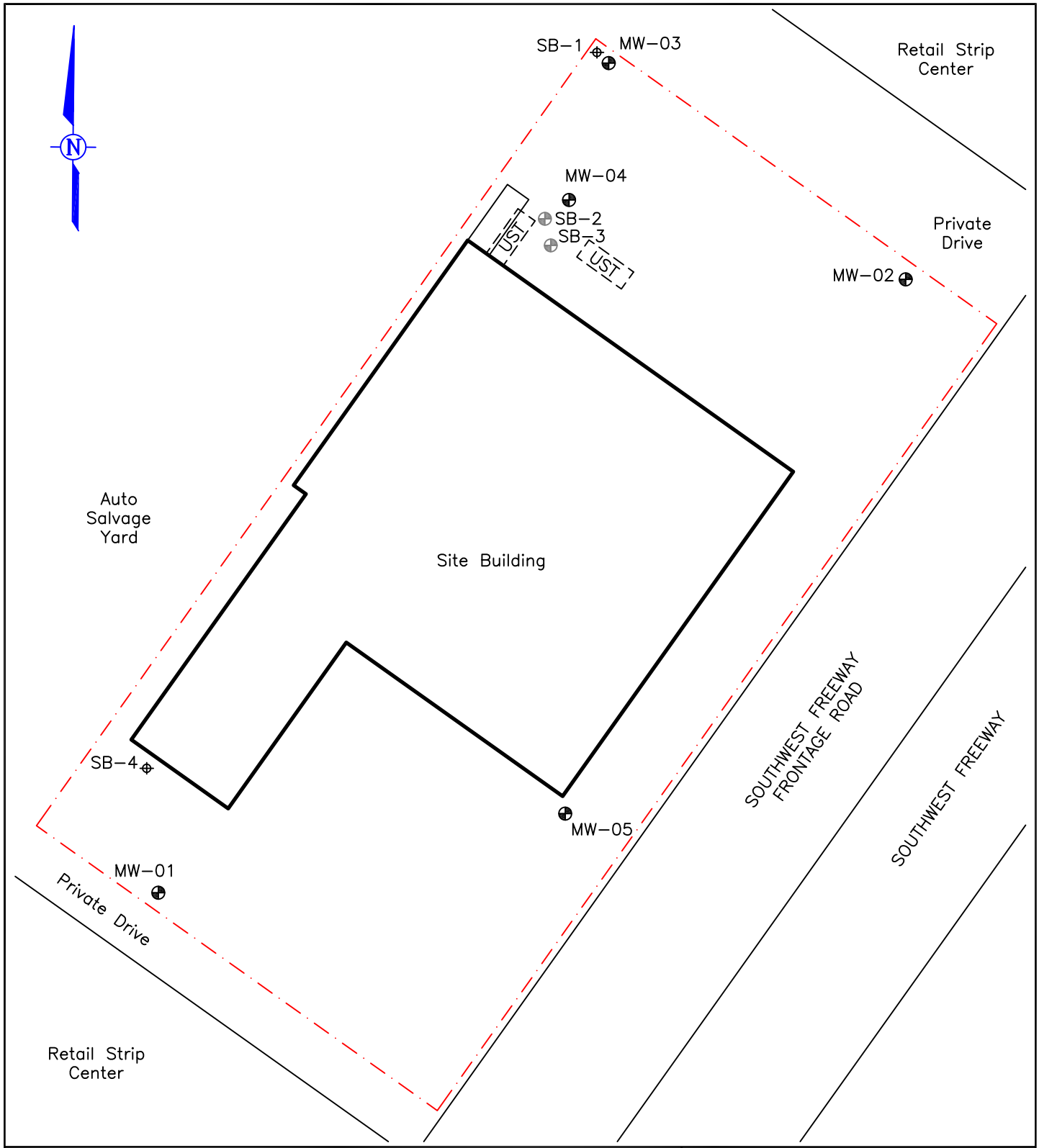
01-30-09 MSD W&M Project No.: 908.002.005



W&M ENVIRONMENTAL GROUP, INC.

Figure 3
Flood Map
8200 Southwest Freeway
Houston, Texas

01-30-09 MSD W&M Project No.: 908.002.005



LEGEND

- Property Boundary
- Monitoring Well
- Temporary Monitoring Well
- Soil Boring
- Extent of Site Building
- Abandoned UST

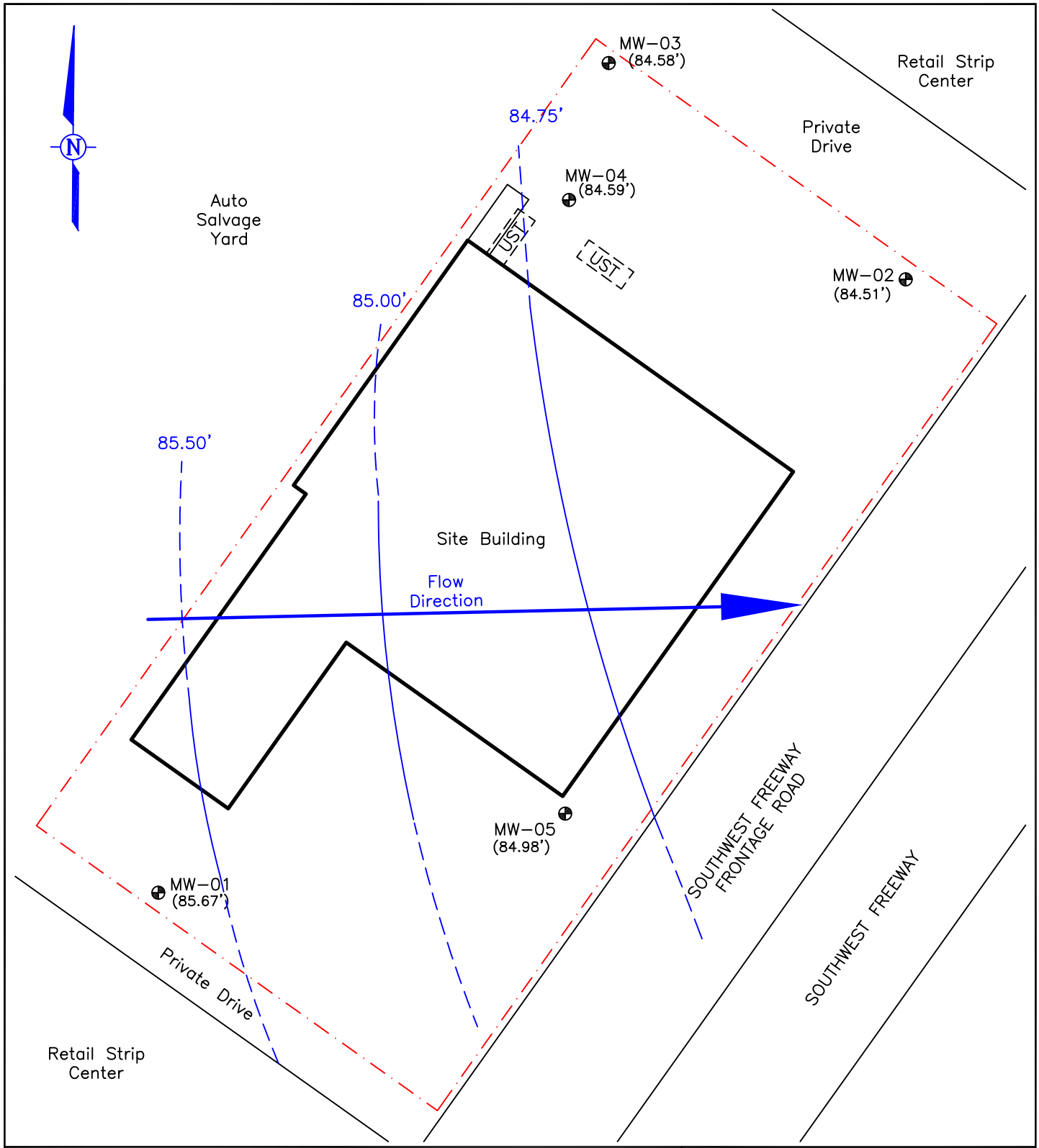
0 25 50

APPROXIMATE SCALE IN FEET

Figure 4
Site Layout
8200 Southwest Freeway
Houston, Texas

W&M ENVIRONMENTAL GROUP, INC.
www.wh-m.com

2-19-09	W&M Project No. 908.002	Drawn: PF	MSD



LEGEND

- Property Boundary
- Monitoring Well
- Extent of Site Building
- Abandoned UST
- Groundwater Flow Direction

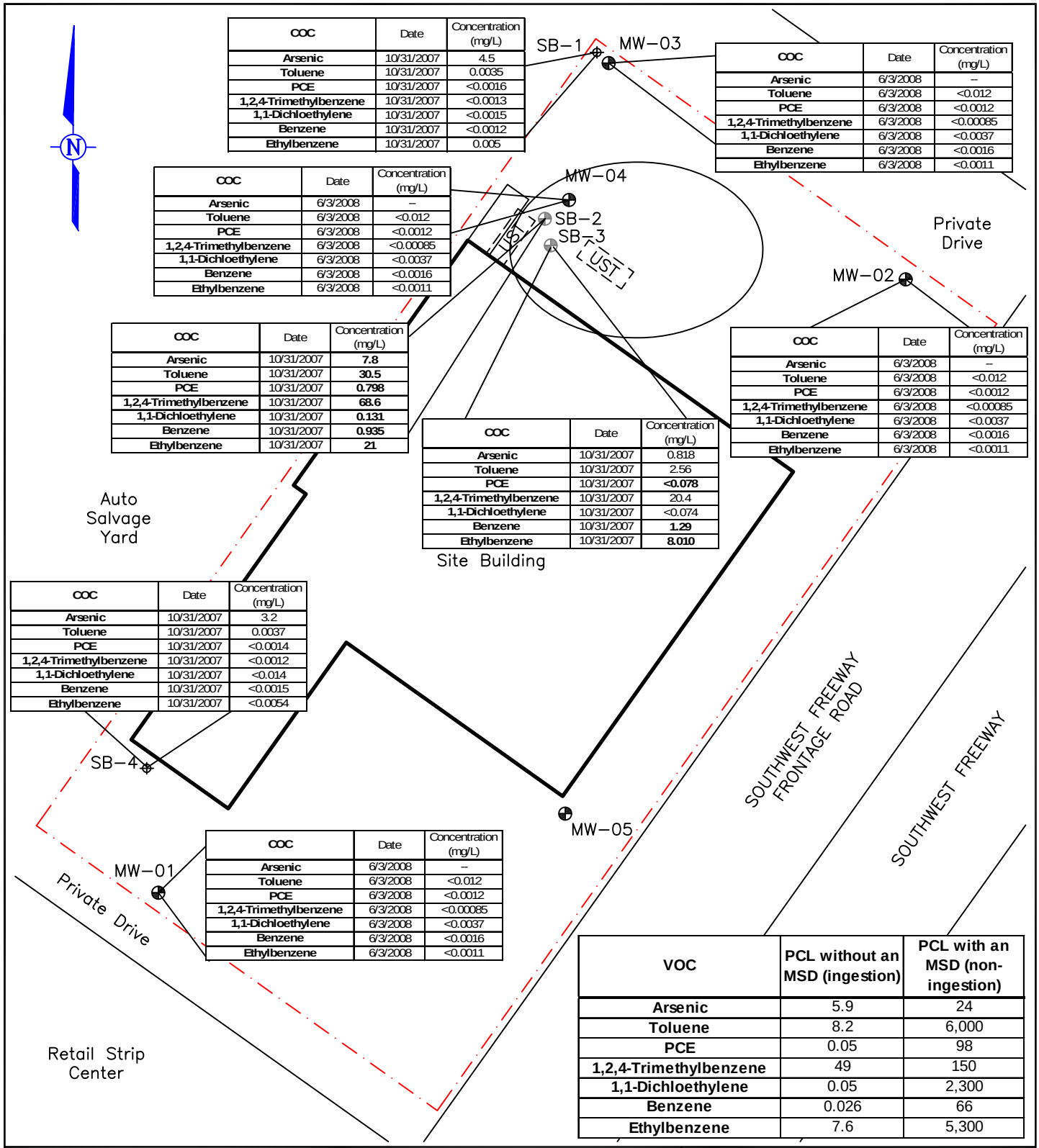
0 25 50

APPROXIMATE SCALE IN FEET

Figure 5
Groundwater Flow Map
October 22, 2008
8200 Southwest Freeway
Houston, Texas

1–30–09	W&M Project No. 908.002	Drawn: SC	MSD

W&M ENVIRONMENTAL GROUP, INC.
www.wh-m.com



COC	Date	Concentration (mg/L)
Arsenic	10/31/2007	4.5
Toluene	10/31/2007	0.0035
PCE	10/31/2007	<0.0016
1,2,4-Trimethylbenzene	10/31/2007	<0.0013
1,1-Dichloethylene	10/31/2007	<0.0015
Benzene	10/31/2007	<0.0012
Ethylbenzene	10/31/2007	0.005

COC	Date	Concentration (mg/L)
Arsenic	6/3/2008	–
Toluene	6/3/2008	<0.012
PCE	6/3/2008	<0.0012
1,2,4-Trimethylbenzene	6/3/2008	<0.00085
1,1-Dichloethylene	6/3/2008	<0.0037
Benzene	6/3/2008	<0.0016
Ethylbenzene	6/3/2008	<0.0011

COC	Date	Concentration (mg/L)
Arsenic	6/3/2008	–
Toluene	6/3/2008	<0.012
PCE	6/3/2008	<0.0012
1,2,4-Trimethylbenzene	6/3/2008	<0.00085
1,1-Dichloethylene	6/3/2008	<0.0037
Benzene	6/3/2008	<0.0016
Ethylbenzene	6/3/2008	<0.0011

COC	Date	Concentration (mg/L)
Arsenic	10/31/2007	**7.8**
Toluene	10/31/2007	**30.5**
PCE	10/31/2007	**0.798**
1,2,4-Trimethylbenzene	10/31/2007	**68.6**
1,1-Dichloethylene	10/31/2007	**0.131**
Benzene	10/31/2007	**0.935**
Ethylbenzene	10/31/2007	**21**

COC	Date	Concentration (mg/L)
Arsenic	6/3/2008	–
Toluene	6/3/2008	<0.012
PCE	6/3/2008	<0.0012
1,2,4-Trimethylbenzene	6/3/2008	<0.00085
1,1-Dichloethylene	6/3/2008	<0.0037
Benzene	6/3/2008	<0.0016
Ethylbenzene	6/3/2008	<0.0011

COC	Date	Concentration (mg/L)
Arsenic	10/31/2007	0.818
Toluene	10/31/2007	2.56
PCE	10/31/2007	**<0.078**
1,2,4-Trimethylbenzene	10/31/2007	20.4
1,1-Dichloethylene	10/31/2007	<0.074
Benzene	10/31/2007	**1.29**
Ethylbenzene	10/31/2007	**8.010**

COC	Date	Concentration (mg/L)
Arsenic	10/31/2007	3.2
Toluene	10/31/2007	0.0037
PCE	10/31/2007	<0.0014
1,2,4-Trimethylbenzene	10/31/2007	<0.0012
1,1-Dichloethylene	10/31/2007	<0.014
Benzene	10/31/2007	<0.0015
Ethylbenzene	10/31/2007	<0.0054

COC	Date	Concentration (mg/L)
Arsenic	6/3/2008	–
Toluene	6/3/2008	<0.012
PCE	6/3/2008	<0.0012
1,2,4-Trimethylbenzene	6/3/2008	<0.00085
1,1-Dichloethylene	6/3/2008	<0.0037
Benzene	6/3/2008	<0.0016
Ethylbenzene	6/3/2008	<0.0011

VOC	PCL without an MSD (ingestion)	PCL with an MSD (non-ingestion)
Arsenic	5.9	24
Toluene	8.2	6,000
PCE	0.05	98
1,2,4-Trimethylbenzene	49	150
1,1-Dichloethylene	0.05	2,300
Benzene	0.026	66
Ethylbenzene	7.6	5,300

LEGEND

- Property Boundary
- Monitoring Well
- Temporary Monitoring Well
- Soil Boring
- Extent of Site Building
- Abandoned UST
- PCLE Zone

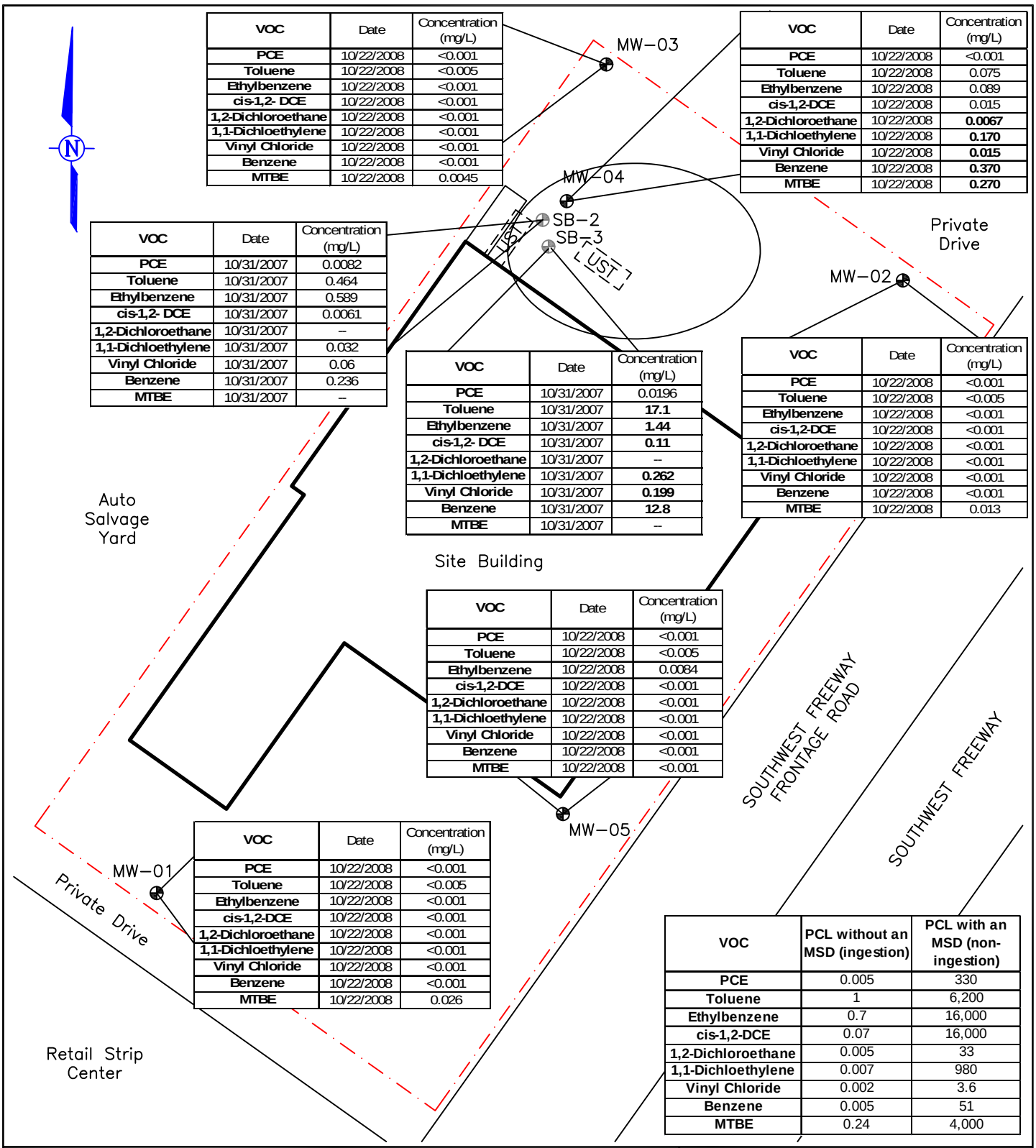
0 25 50

APPROXIMATE SCALE IN FEET

Figure 6
Soil PCLE Zone Map
8200 Southwest Freeway
Houston, Texas

W&M ENVIRONMENTAL GROUP, INC.
www.wh-m.com

2-19-09	W&M Project No. 908.002	Drawn: PF	MSD



VOC	Date	Concentration (mg/L)
PCE	10/22/2008	<0.001
Toluene	10/22/2008	<0.005
Ethylbenzene	10/22/2008	<0.001
cis-1,2- DCE	10/22/2008	<0.001
1,2-Dichloroethane	10/22/2008	<0.001
1,1-Dichloethylene	10/22/2008	<0.001
Vinyl Chloride	10/22/2008	<0.001
Benzene	10/22/2008	<0.001
MTBE	10/22/2008	0.0045

VOC	Date	Concentration (mg/L)
PCE	10/22/2008	<0.001
Toluene	10/22/2008	0.075
Ethylbenzene	10/22/2008	0.089
cis-1,2-DCE	10/22/2008	0.015
1,2-Dichloroethane	10/22/2008	**0.0067**
1,1-Dichloethylene	10/22/2008	**0.170**
Vinyl Chloride	10/22/2008	**0.015**
Benzene	10/22/2008	**0.370**
MTBE	10/22/2008	**0.270**

VOC	Date	Concentration (mg/L)
PCE	10/31/2007	0.0082
Toluene	10/31/2007	0.464
Ethylbenzene	10/31/2007	0.589
cis-1,2- DCE	10/31/2007	0.0061
1,2-Dichloroethane	10/31/2007	--
1,1-Dichloethylene	10/31/2007	0.032
Vinyl Chloride	10/31/2007	0.06
Benzene	10/31/2007	0.236
MTBE	10/31/2007	--

VOC	Date	Concentration (mg/L)
PCE	10/31/2007	0.0196
Toluene	10/31/2007	**17.1**
Ethylbenzene	10/31/2007	**1.44**
cis-1,2- DCE	10/31/2007	**0.11**
1,2-Dichloroethane	10/31/2007	--
1,1-Dichloethylene	10/31/2007	**0.262**
Vinyl Chloride	10/31/2007	**0.199**
Benzene	10/31/2007	**12.8**
MTBE	10/31/2007	--

VOC	Date	Concentration (mg/L)
PCE	10/22/2008	<0.001
Toluene	10/22/2008	<0.005
Ethylbenzene	10/22/2008	<0.001
cis-1,2-DCE	10/22/2008	<0.001
1,2-Dichloroethane	10/22/2008	<0.001
1,1-Dichloethylene	10/22/2008	<0.001
Vinyl Chloride	10/22/2008	<0.001
Benzene	10/22/2008	<0.001
MTBE	10/22/2008	0.013

VOC	Date	Concentration (mg/L)
PCE	10/22/2008	<0.001
Toluene	10/22/2008	<0.005
Ethylbenzene	10/22/2008	0.0084
cis-1,2-DCE	10/22/2008	<0.001
1,2-Dichloroethane	10/22/2008	<0.001
1,1-Dichloethylene	10/22/2008	<0.001
Vinyl Chloride	10/22/2008	<0.001
Benzene	10/22/2008	<0.001
MTBE	10/22/2008	<0.001

VOC	Date	Concentration (mg/L)
PCE	10/22/2008	<0.001
Toluene	10/22/2008	<0.005
Ethylbenzene	10/22/2008	<0.001
cis-1,2-DCE	10/22/2008	<0.001
1,2-Dichloroethane	10/22/2008	<0.001
1,1-Dichloethylene	10/22/2008	<0.001
Vinyl Chloride	10/22/2008	<0.001
Benzene	10/22/2008	<0.001
MTBE	10/22/2008	0.026

VOC	PCL without an MSD (ingestion)	PCL with an MSD (non-ingestion)
PCE	0.005	330
Toluene	1	6,200
Ethylbenzene	0.7	16,000
cis-1,2-DCE	0.07	16,000
1,2-Dichloroethane	0.005	33
1,1-Dichloethylene	0.007	980
Vinyl Chloride	0.002	3.6
Benzene	0.005	51
MTBE	0.24	4,000

LEGEND

- Property Boundary
- Monitoring Well
- Temporary Monitoring Well
- Extent of Site Building
- Abandoned UST
- PCLE Zone

0 25 50

APPROXIMATE SCALE IN FEET

Figure 7
Groundwater PCLE Zone Map
8200 Southwest Freeway
Houston, Texas

W&M ENVIRONMENTAL GROUP, INC.
www.wh-m.com

2-19-09	W&M Project No. 908.002	Drawn: PF	MSD

Appendix C

MUNICIPAL SETTING DESIGNATION APPLICATION
8200 SOUTHWEST FREEWAY
HOUSTON, TEXAS

PROPERTY USE INFORMATION

The Designated Property consists of one property located at 8200 Southwest Freeway comprising approximately 1.001 acres. The Designated Property currently houses one single-story commercial building, consisting of 43,954 square feet. The commercial building was constructed in 1975 with an addition constructed in 1978. The property was formerly occupied by Stubbs Cycle Southwest who recently ended their lease. Stubbs Cycle Southwest was a retail seller and repairer of motorcycles for Honda and Suzuki along with other associated brands. A new tenant is currently on a lease-to-own contract and operates an adult novelty store at the property. The future use of the Designated Property is anticipated to remain commercial.

Currently, the land surrounding the Designated Property is used primarily for commercial buildings. The 500-foot radius circle surrounding the Designated Property is bisected by the raised Southwest Freeway. The Designated Property is located on the northwestern side of Southwest Freeway. Other properties on the northwestern edge of Southwest Freeway are developed with commercial retail centers. The west-adjacent property is occupied by an automobile parts resale facility. The Southwest Medical Center is located on the southeastern side of Southwest Freeway along the access road. A residence and a condominium association are located further eastward along the access road. A parking lot and a retail center adjacent to South Gessner are located southeast of the residential properties. The Applicant is not aware of future changes to the use of the surrounding properties that would include the use of the shallow groundwater bearing unit.

Appendix D

MUNICIPAL SETTING DESIGNATION APPLICATION
8200 SOUTHWEST FREEWAY
HOUSTON, TEXAS

PROPERTIES OF CHEMICALS of CONCERN WITHIN INGESTION PCL EXCEEDANCE ZONE

There are no non-ingestion Protective Concentration Level Exceedance (PCLE) zones at the Site.

Ingestion PCLE zones exist for the following COCs in soil or groundwater:

- Arsenic
- Benzene
- Ethylbenzene
- 1,2-Dichloroethane (1,2-DCA)
- 1,1-Dichloroethylene (1,1-DCE)
- Cis-1,2-Dichloroethylene (Cis-1,2-DCE)
- Methyl tert-butyl ether (MTBE)
- Tetrachloroethylene (PCE)
- 1,2,4-Trimethylbenzene (1,2,4-TMB)
- Toluene
- Vinyl Chloride (VC)

Soil and groundwater analytical data tables are presented in **Table 1 and Table 2, respectively** (presented in **Appendix F**). The analytical data tables present the concentrations of each COC in soil and groundwater in comparison to their respective ingestion and non-ingestion PCLs.

Figure 7 (previously presented in **Appendix B**) depicts the horizontal extent of the groundwater ingestion PCLE zone for benzene, ethylbenzene, 1,2-DCA, 1,1-DCE, Cis-1,2-DCE, MTBE, PCE, toluene, and VC. The ingestion PCLE zone is fully delineated and contained within the Designated Property. The PCLE zone is located on the northeast central portion of the property and is limited to an area of groundwater impact approximately 14.35 feet below ground surface (bgs) to an estimated 50 feet bgs where an aquitard is encountered that reduces the potential for the migration of COCs. The area of impact is delineated on-Site and encompasses an area of approximately 0.076 acres. Impacted groundwater has been identified at monitoring well MW-4 and is delineated to the east and down-gradient by monitoring well MW-2 on the Designated Property. The source area for the plume has been defined as two 1,000-gallon underground storage tanks (USTs) which were abandoned and closed in place, in accordance with TCEQ guidelines at the time of regulatory closure. Two groundwater flow events were conducted in June and October. The groundwater flow directions varied between east and slightly southeast.

Appendix D

Benzene was identified in the groundwater PCLE zone at a maximum concentration of 0.37 mg/L, which exceeds the ingestion PCL of 0.005 mg/L. No reported concentrations exceed the non-ingestion PCL of 51 mg/L for benzene in groundwater. 1,2-DCA was identified in the groundwater PCLE zone at a maximum concentration of 0.0067 mg/L, which exceeds the ingestion PCL of 0.005 mg/L. No reported concentrations exceed the non-ingestion PCL of 33 mg/L for 1,2-DCA in groundwater. 1,1-DCE was identified in the groundwater PCLE zone at a maximum concentration of 0.170 mg/L, which exceeds the ingestion PCL of 0.007 mg/L in groundwater. No reported concentrations exceed the non-ingestion PCL of 980 mg/L for 1,1-DCE. Cis-1,2-DCE was identified in the groundwater PCLE zone at a maximum concentration of 0.110 mg/L, which exceeds the ingestion PCL of 0.07 mg/L. No reported concentrations exceed the non-ingestion PCL of 16,000 mg/L for cis-1,2-DCE in groundwater. Ethylbenzene was identified in the groundwater PCLE zone at a maximum concentration of 1.44 mg/L, which exceeds the ingestion PCL of 0.7 mg/L. No reported concentrations exceed the non-ingestion PCL of 16,000 mg/L for ethylbenzene in groundwater. MTBE was identified in the groundwater PCLE zone at a maximum concentration of 0.27 mg/L, which exceeds the ingestion PCL of 0.24 mg/L. No reported concentrations exceed the non-ingestion PCL of 4,000 mg/L for MTBE in groundwater. PCE was identified in the groundwater PCLE zone at a maximum concentration of 0.0196 mg/L, which exceeds the ingestion PCL of 0.005 mg/L. No reported concentrations exceed the non-ingestion PCL of 330 mg/L for PCE in groundwater. Toluene was identified in the groundwater PCLE zone at a maximum concentration of 17.6 mg/L, which exceeds the ingestion PCL of 1.0 mg/L. No reported concentrations exceed the non-ingestion PCL of 6,200 mg/L for toluene in groundwater. VC was identified in the groundwater PCLE zone at a maximum concentration of 0.015 mg/L, which exceeds the ingestion PCL of 0.002 mg/L. No reported concentrations exceed the non-ingestion PCL of 3.6 mg/L for VC in groundwater.

The total estimated surface area of the ingestion PCLE zone for benzene, 1,2-DCA, 1,1-DCE, cis-1,2,-DCE, ethylbenzene, MTBE, PCE, toluene, and VC is not expected to be more than 0.076 acres on the Designated Property.

The chemical properties of benzene, 1,2-DCA, 1,1-DCE, cis-1,2-DCE, ethylbenzene, MTBE, PCE, toluene, and VC are provided in the chemical abstract and fact sheet located in this section. In general, benzene, 1,2-DCA, 1,1-DCE, cis-1,2-DCE, ethylbenzene, MTBE, PCE, toluene, and VC are somewhat soluble in water to many parts per million. 1,2-DCA, 1,1-DCE, cis-1,2-DCE, PCE, VC, and similar chlorinated VOCs are denser than water and will tend to sink in groundwater if present above the solubility limit. Benzene, ethylbenzene, MTBE, toluene, and similar gasoline constituents are less dense than water and will tend to float in groundwater if present above the solubility limit. VC, MTBE and similar VOCs are totally miscible with groundwater and will not form non-aqueous phase liquid (NAPL). Based on concentrations reported in the groundwater, there is no indication that a dense or light NAPL is present at the Designated Property.

Drinking Water and Health Basics
Frequently Asked Questions
Local Drinking Water Information
Drinking Water Standards
List of Contaminants & MCLs
Regulations & Guidance
Public Drinking Water Systems
Source Water Protection
Underground Injection Control
Data & Databases
Drinking Water Academy
Safe Drinking Water Act
National Drinking Water Advisory Council
Water Infrastructure Security
Drinking Water For Kids!

Consumer Factsheet on: 1,1,1-TRICHLOROETHANE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is 1,1,1-TCA and how is it used?

1,1,1-Trichloroethane (1,1,1-TCA) is an organic liquid with a chloroform-like odor. It is largely used as a solvent removing grease from machined metal products, in textile processing and dyeing and in aerosols.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Chloroethene
Methylchloroform
Aerothene TT
Algylen
Alpha-T
Chlorten
Gemalgene
Genklene
Dowclene
Solvent 111
Trichloran
Inhibisol

Why is 1,1,1-TCA being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for 1,1,1-TCA has been set at 0.2 parts per million (ppm) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 0.2 ppm because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found 1,1,1-TCA to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: damage to the liver, nervous system and circulatory system.

Long-term: 1,1,1-TCA has the potential to cause the following effects from a lifetime exposure at levels above the MCL: liver, nervous system and circulatory system damage.

How much 1,1,1-TCA is produced and released to the environment?

Demand for 1,1,1-trichloroethane was 705 million lbs. in 1989. 1,1,1-TCA is likely to enter the environment by evaporation or in wastewater from its production or use in metal cleaning. It can also enter the environment in leachates and volatile emissions from landfills.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, releases to water and land totalled over 1 million lbs. These releases were primarily from metal fabrication industries. The largest releases occurred in California and Georgia. The largest direct releases to water occurred in Utah and Indiana.

What happens to 1,1,1-TCA when it is released to the environment?

1,1,1-TCA will evaporate rapidly from water and soil. It does not bind to soils nor is it broken down by microbial action, so it may leach to ground water. It has little tendency to accumulate in aquatic life.

How will 1,1,1-TCA be Detected in and Removed from My Drinking Water?

The regulation for 1,1,1-TCA became effective in 1989. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if 1,1,1-TCA is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of 1,1,1-TCA so that it is consistently below that level. The following treatment methods have been approved by EPA for removing 1,1,1-TCA: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if 1,1,1-TCA is in my drinking water?

If the levels of 1,1,1-TCA exceed the MCL, 0.2 ppm, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: 0.2 ppm

Mcl: 0.2 ppm

1,1,1-TCA Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS (in pounds)	**222,403**	**812,873**
Top Six States*		
CA	0	109,070
GA	0	73,258
AR	0	67,000
IN	15,000	46,096
VA	0	51,822
UT	40,000	0

Major Industries		
Gray iron foundries	1,084	76,158
Aircraft	546	73,258
Manufacturing industries	1,018	72,572
Wood furniture	0	53,038
Fabricated structural metal	0	51,425
Plating, polishing	6,152	41,647
Turbines, generators	40,317	966

* State totals only include facilities with releases greater than 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800)

426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

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Consumer Factsheet on: 1,1-DICHLOROETHYLENE

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This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is 1,1-DCE and how is it used?

1,1-Dichloroethylene (1,1-DCE) is an organic liquid with a mild, sweet, chloroform-like odor. Virtually all of it is used in making adhesives, synthetic fibers, refrigerants, food packaging and coating resins such as the saran types.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

1,1-DCE
1,1-Dichloroethene
Asym-dichloro-ethylene
Vinylidene chloride

Why is 1,1-DCE being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for 1,1-DCE has been set at 7 parts per billion (ppb) because EPA

believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 7 ppb because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found 1,1-DCE to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: liver damage.

Long-term: 1,1-DCE has the potential to cause the following effects from a lifetime exposure at levels above the MCL: liver and kidney damage, as well as toxicity to the developing fetus; cancer.

How much 1,1-DCE is produced and released to the environment?

An estimated 90,700 tons/yr of 1,1-DCE were produced in the USA during the early 1980s. It may be released by evaporation or in wastewater during its production and use in the manufacture of plastic wrap, adhesives, and synthetic fiber. It may also form in groundwater that has been contaminated by similar solvents.

From 1987 to 1993, according to the Toxics Release Inventory, releases to water and land totalled over 11,500 lbs. These releases were primarily from facilities which make plastics materials/resins. The largest releases occurred in Kentucky.

What happens to 1,1-DCE when it is released to the environment?

Releases to water will primarily be lost to the atmosphere through evaporation. 1,1-DCE will evaporate from soil and will leach into the groundwater where its fate is unknown, but degradation is expected to be slow. Its tendency to accumulate in aquatic life is unknown but expected to be minor.

How will 1,1-DCE be Detected in and Removed from My Drinking Water?

The regulation for 1,1-DCE became effective in 1989. Between 1993 and 1995, EPA

required your water supplier to collect water samples every 3 months for one year and analyze them to find out if 1,1-DCE is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of 1,1-DCE so that it is consistently below that level. The following treatment methods have been approved by EPA for removing 1,1-DCE: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if 1,1-DCE is in my drinking water?

If the levels of 1,1-DCE exceed the MCL, 7 ppb, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: 7 ppb

Mcl: 7 ppb

1,1-DCE Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS (in pounds)		**10,101**	**1,488**
Top States			
KY	2,880	286	
TX	2,061	150	
LA	2,079	3	
Major Industries			
Plastics materials, resins		3,942	1,299
Alkalies, chlorine		4,173	154

Learn more about your drinking water!

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Your local water supplier can give you a list of the chemicals they test for in your

water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

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Last updated on Tuesday, November 28th, 2006
URL: http://www.epa.gov/safewater/contaminants/dw_contamfs/11-dichl.html

OPPT Chemical Fact Sheet EPA 749-F-94-022

CHEMICALS IN THE ENVIRONMENT: 1,2,4-TRIMETHYLBENZENE (CAS NO. 95-63-6)

prepared by
OFFICE OF POLLUTION PREVENTION AND TOXICS
U.S. ENVIRONMENTAL PROTECTION AGENCY
August 1994

Chemicals can be released to the environment as a result of their manufacture, processing, and use. EPA has developed information summaries on selected chemicals to describe how you might be exposed to these chemicals, how exposure to them might affect you and the environment, what happens to them in the environment, who regulates them, and whom to contact for additional information. EPA is committed to reducing environmental releases of chemicals through source reduction and other practices that reduce creation of pollutants.

WHAT IS 1,2,4-TRIMETHYLBENZENE, HOW IS IT USED, AND HOW MIGHT I BE EXPOSED?

1,2,4-Trimethylbenzene (also called TMB or pseudocumene) is a colorless, flammable liquid. It occurs naturally in coal tar and petroleum crude oil. It is a major component (typically 40%) of a petroleum refinery distillation fraction known as the C9 aromatic fraction (or simply the C9 fraction). Oil refineries produce large amounts (an estimated 80 billion pounds) of the C9 fraction each year. Most of the C9 fraction is not isolated. Refineries pump this "unrecovered" C9 fraction to some other location where it is usually added directly to gasoline. Refineries isolate less than one-half percent of the C9 fraction. Companies add this "recovered" C9 fraction to protective surface coatings and cleaners.

Oil refineries generally do not isolate 1,2,4-trimethylbenzene from crude oil or from the C9 fraction. Currently only one refinery in the United States "recovers" TMB. The Environmental Protection Agency estimates that the amount of "recovered" 1,2,4-trimethylbenzene is in excess of 10 million pounds per year. US demand for this isolated 1,2,4-trimethylbenzene is likely to remain stable. The largest users of isolated 1,2,4-trimethylbenzene are chemical companies that make trimellitic anhydride. Companies also use it to make dyes and drugs.

Exposure to 1,2,4 trimethylbenzene can occur in the workplace or in the environment following releases to air, water, land, or groundwater. Exposure can also occur when people use gasoline or certain paints and cleaners. 1,2,4-Trimethylbenzene enters the body when breathed in with contaminated air or when consumed with contaminated food or water. It can also be absorbed through skin contact. It may remain in the body, stored in fat, before its removal in expired air or in urine.

WHAT HAPPENS TO 1,2,4-TRIMETHYLBENZENE IN THE ENVIRONMENT?

1,2,4-Trimethylbenzene evaporates when exposed to air. It dissolves only slightly when mixed with water. Most direct releases of 1,2,4-trimethylbenzene to the environment are to air. It also evaporates from water
and soil exposed to air. Once in air, it breaks down to other chemicals. Microorganisms that live in water and in soil can also break down TMB. Because it is a liquid that does not bind well to soil, 1,2,4-trimethylbenzene that makes its way into the ground can move through the ground and enter groundwater. Plants and animals living in environments contaminated with TMB can store small amounts of the chemical.

HOW DOES 1,2,4-TRIMETHYLBENZENE AFFECT HUMAN HEALTH AND THE ENVIRONMENT?

Effects of 1,2,4-trimethylbenzene on human health and the environment depend on how much TMB is present and the length and frequency of exposure.
Effects also depend on the health of a person or the condition of the environment when exposure occurs.

Breathing large amounts of 1,2,4-trimethylbenzene for short periods of time adversely affects the human nervous system. Effects range from headaches to fatigue and drowsiness. TMB vapor irritates the nose and the throat. Prolonged contact with liquid TMB irritates the skin. These effects are not likely to occur at levels of 1,2,4-trimethylbenzene that are normally found in the environment.

Human health effects associated with breathing or otherwise consuming smaller amounts of 1,2,4-trimethylbenzene are not known. The petroleum industry has conducted several studies on the C9 fraction in response to an
EPA request for testing. These studies show that repeat exposure to this mixture of chemicals in air adversely affects the reproductive system and the developing fetus of animals. EPA believes that adverse effects associated with exposure to the C9 fraction are similar to those expected to occur as a result of exposure to individual chemicals, like 1,2,4-tri-

methylbenzene, that make up this mixture.

1,2,4-Trimethylbenzene by itself is not likely to cause environmental harm at levels normally found in the environment. TMB can contribute to the formation of photochemical smog when it reacts with other volatile organic carbon substance in air.

WHAT EPA PROGRAM OFFICES REGULATE 1,2,4-TRIMETHYLBENZENE, AND UNDER WHAT LAWS IS IT REGULATED?

EPA OFFICE	LAW	PHONE NUMBER
Pollution Prevention & Toxics	Toxic Substances Control Act	(202) 554-1404
	Emergency Planning and Community Right-to-Know Act (EPCRA) Regulations (Sec. 313)	(800) 424-9346
	Toxics Release Inventory data	(202) 260-1531
Air	Clean Air Act	(919) 541-0888
Solid Waste & Emergency Response	EPCRA (Sec. 311/312)	(800) 424-9346

A technical support document can be requested from the TSCA Assistance Information Service, (202) 554-1404.

WHAT OTHER FEDERAL AGENCIES OR GROUPS CAN I CONTACT FOR INFORMATION ON 1,2,4-TRIMETHYLBENZENE?

AGENCY/GROUP	PHONE NUMBER
Consumer Product Safety Commission	(301) 504-0994
National Institute for Occupational Safety and Health (NIOSH)	(800) 356-4674
Occupational Safety and Health Administration (Check your local phone book under U.S. Department of Labor)	

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Consumer Factsheet on: 1,2-DICHLOROETHANE

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This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is 1,2-DCA and how is it used?

1,2-Dichloroethane (1,2-DCA) is a colorless, oily, organic liquid with a sweet, chloroform-like odor. The greatest use of 1,2-dichloroethane is in making chemicals involved in plastics, rubber and synthetic textile fibers. Other uses include: as a solvent for resins and fats, photography, photocopying, cosmetics, drugs; and as a fumigant for grains and orchards.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

1,2-Ethylene dichloride
Glycol dichloride
Freon 150
Borer sol
Brocide
Destruxol borer-sol
Dichlor-mulsion
Dutch oil
Granosan

Why is 1,2-DCA being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for 1,2-dichloroethane has been set at zero because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 5 parts per billion (ppb) because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found 1,2-dichloroethane to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: central nervous system disorders, and adverse lung, kidney, liver circulatory and gastrointestinal effects.

Long-term: 1,2-Dichloroethane has the potential to cause the following effects from a lifetime exposure at levels above the MCL: cancer.

How much 1,2-DCA is produced and released to the environment?

Production of 1,2-dichloroethane was 18 billion lbs. in 1993. It is released in waste water, spills, and/or improper disposal primarily from its use as a cleaning solvent, in making other organics, and in pesticides.

From 1987 to 1993, according to the Toxics Release Inventory, releases to water and land totalled over 455,000 lbs. These releases were primarily from facilities which make industrial organic chemicals, alkalis and chlorine. The largest releases occurred in New Jersey and Louisiana.

What happens to 1,2-DCA when it is released to the environment?

While releases to water or soil will evaporate quickly, 1,2-dichloroethane will also leach into groundwater rapidly where it is likely to persist for a very long time. There is

little degradation by microbes. 1,2-Dichloroethane is not expected to accumulate in fish.

How will 1,2-DCA be Detected in and Removed from My Drinking Water?

The regulation for 1,2-dichloroethane became effective in 1989. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if 1,2-dichloroethane is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of 1,2-dichloroethane so that it is consistently below that level. The following treatment methods have been approved by EPA for removing 1,2-dichloroethane: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if 1,2-DCA is in my drinking water?

If the levels of 1,2-dichloroethane exceed the MCL, 5 ppb, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: zero

Mcl: 5 ppb

1,2-DCA Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS (in pounds)		**433,056**	**22,616**
Top Six States*			
NJ	192,700	231	
LA	136,508	2,292	
TX	36,459	7,028	
MO	6,786	8,730	
NY	11,330	0	
KY	10,309	0	

Major Industries

Industrial organics	211,146	363
Alkalies, chlorine	120,283	3,254
Cyclic crudes, intermed.	32,945	119
Agricultural chemicals	11,918	8,980
Industrial gases	15,497	0
Plastics materials, resins	6,908	6,895
Photographic equip.	11,566	0
Other Chemicals	8,179	0
Pharmaceuticals	7,525	521
Petroleum refining	1,730	1,479

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

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Consumer Factsheet on: ORTHO-DICHLOROBENZENE (o-DCB)

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This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is o-DCB and how is it used?

Ortho-dichlorobenzene, (o-DCB) is a colorless organic liquid with a pleasant, aromatic odor. The greatest use of o-dichlorobenzene is as a chemical intermediate for making agricultural chemicals, primarily herbicides. Other present and past uses include: solvent for waxes, gums, resins, wood preservatives, paints; insecticide for termites and borers; in making dyes; as a coolant, deodorizer, degreaser.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

ortho-Dichlorobenzol
Dilantin
Dowtherm E
Chloroben
Dilatin DB

Why is o-DCB being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and

exposure, are called Maximum Contaminant Level Goals.

The MCLG for o-DCB has been set at 0.6 parts per million (ppm) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 0.6 ppm because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: o-DCB is not known to cause any health problems when people are exposed to it at levels above the MCL for relatively short periods of time.

Long-term: o-DCB has the potential to cause the following effects from a lifetime exposure at levels above the MCL: damage to the nervous system, liver, kidneys and blood cells.

How much o-DCB is produced and released to the environment?

Production of o-DCB was estimated at 43 million lbs. in 1991. Its use in manufacturing and solvents may be significant sources of discharges into water. Dichlorobenzenes also enter water systems from the use of o-DCB as a deodorant in industrial wastewater treatment. Chemical waste dump leachates and industrial wastewater are the major source of pollution of dichlorobenzenes to Lake Ontario.

From 1987 to 1993, according to the Toxic Release Inventory, o-DCB releases to land and water totalled 248 million lbs., mostly to land. These releases were primarily form organic chemical manufacturing industries. The largest releases occurred in New Jersey.

What happens to o-DCB when it is released to the environment?

If released to soil, o-DCB can bind to soil particles. However, its detection in groundwater indicates that leaching can occur. It will evaporate from soil or surface water and will be broken down by microbes. o-DCB is likely to accumulate in fish and other aquatic life.

How will o-DCB be Detected in and Removed from My Drinking Water?

The regulation for o-DCB became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if o-DCB is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of o-DCB so that it is consistently below that level. The following treatment methods have been approved by EPA for removing o-DCB: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if o-DCB is in my drinking water?

If the levels of o-DCB exceed the MCL, 0.6 ppm, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: 0.6 ppm

Mcl: 0.6 ppm

o-DCB Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS (in pounds)		**75,967**	**171,663**
Top Five States *			
NJ	19,602	165,661	
WV	39,653	0	
OR	7,260	0	
SC	1,502	4,628	
TX	1,418	1,000	
Major Industries			
Industrial Organics		15,416	98,092
Cyclic crudes, dyes		7,639	67,418

Alkalis, chlorine	38,029	0
Paper mills	7,260	0
Gum, wood chems.	250	4,378

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

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New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **TRIMETHYL BENZENE (mixed isomers)**

CAS Number: 25551-13-7
DOT Number: UN 2325

RTK Substance number: 1929
Date: January 1997 Revision: May 2003

HAZARD SUMMARY

* **Trimethyl Benzene** can affect you when breathed in.
* Contact can irritate the skin and eyes.
* Exposure can cause you to feel dizzy, lightheaded, and to pass out.
* Repeated exposure can cause headaches, and cause you to feel nervous, tense, tired and sleepy.
* **Trimethyl Benzene** may cause changes in the blood cells and affect the blood's clotting ability.
* **Trimethyl Benzene** can irritate the lungs. Repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.
* *CONSULT THE NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES HAZARDOUS SUBSTANCE FACT SHEET ON PSEUDOCUMENE.*

IDENTIFICATION

Trimethyl Benzene is a colorless liquid with a distinct odor. It is used in making dyes, pharmaceuticals and antioxidants, and as a solvent.

REASON FOR CITATION

* **Trimethyl Benzene** is on the Hazardous Substance List because it is cited by ACGIH, DOT, NIOSH, DEP and NFPA.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.
* **ODOR THRESHOLD = 2.4 ppm**.
* The range of accepted odor threshold values is quite broad. Caution should be used in relying on odor alone as a warning of potentially hazardous exposures.

WORKPLACE EXPOSURE LIMITS

NIOSH: The recommended airborne exposure limit is **25 ppm** averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is **25 ppm** averaged over an 8-hour workshift.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to **Trimethyl Benzene** and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Trimethyl Benzene** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Trimethyl Benzene**:

* Contact can irritate the skin and eyes.
* Exposure can cause you to feel dizzy, lightheaded, and to pass out.
* Repeated exposure can cause headaches, and cause you to feel nervous, tense, tired and sleepy.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Trimethyl Benzene** and can last for months or years:

Cancer Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Trimethyl Benzene** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Trimethyl Benzene** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

* **Trimethyl Benzene** may cause changes in the blood cells and affect the blood's clotting ability.
* **Trimethyl Benzene** can irritate the lungs. Repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.

MEDICAL

Medical Testing

If symptoms develop or overexposure is suspected, the following are recommended:

* Lung function tests.
* Complete blood count and platelet count.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures

* Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

* Where possible, automatically pump liquid **Trimethyl Benzene** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Trimethyl Benzene** should change into clean clothing promptly.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with **Trimethyl Benzene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Trimethyl Benzene**, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where **Trimethyl Benzene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, applying cosmetics, smoking, or using the toilet.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **Trimethyl Benzene**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

* Wear indirect-vent, impact and splash resistant goggles when working with liquids.
* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* Where the potential exists for exposure over **25 ppm**, use a NIOSH approved full facepiece respirator with an organic vapor cartridge. Increased protection is obtained from full facepiece powered-air purifying respirators.
* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Trimethyl Benzene**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
* Where the potential for high exposure exists, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

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Drinking Water For Kids!

Consumer Factsheet on: BENZENE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Benzene and how is it used?

Benzene is a clear, colorless aromatic liquid. It is highly flammable. The greatest use of benzene is as a building block for making plastics, rubber, resins and synthetic fabrics like nylon and polyester. Other uses include: as a solvent in printing, paints, dry cleaning, etc.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Benzol 90
Pyrobenzol
Polystream
Coal naphtha
Phene

Why is Benzene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for benzene has been set at zero because EPA believes this level of

protection would not cause any of the health effects described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 5 parts per billion (ppb) because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All community water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found benzene to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: temporary nervous system disorders, immune system depression, anemia.

Long-term: Benzene has the potential to cause the following effects from a lifetime exposure at levels above the MCL: chromosome aberrations, cancer.

How much Benzene is produced and released to the environment?

Production of benzene has increased: from about 9.9 billion lbs. in 1984 to over 12 billion lbs. in 1993.

Benzene is released to air primarily from fumes and exhaust connected with its use in gasoline. Other sources are fumes from its production and use in manufacturing other chemicals. In addition, there are discharges into water from industrial effluents and losses during spills.

From 1987 to 1992, according to the Toxics Release Inventory, releases of benzene to water and land totalled over 2 million lbs. These releases were primarily from petroleum refining industries, with the greatest releases occurring in Texas.

What happens to Benzene when it is released to the environment?

If benzene is released to soil, it will either evaporate very quickly or leach to groundwater. It can be broken down by some soil microbes. It may also be degraded in some ground waters. If benzene is released to surface water, most of it should evaporate within a few hours. Though it does not degrade by reacting with water, it may be degraded by microbes. It is not likely to accumulate in aquatic organisms.

How will Benzene be Detected in and Removed from My Drinking Water?

The regulation for benzene became effective in 1989. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if benzene is present above 0.5 ppb. If it is present above this level, the system must continue to monitor the benzene levels.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of benzene so that it is consistently below that level. The following treatment methods have been approved by EPA for removing benzene: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if Benzene is in my drinking water?

If the levels of benzene exceed the MCL, 5 ppb, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: zero

Mcl: 5 ppb

Benzene Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTAL	**564,546**	**1,539,385**
Top Six States*		
TX	1,436	1,135,994
AL	199,642	0
LA	137,599	4,347
CO	0	40,793
NM	0	38,199
IL	3	34,110
Major Industries*		
Petroleum refining	32,411	1,049,800
Primary Metal Ind.	133,339	18,078

Industrial chemicals	73,000	250,103
Alkalies, chlorine	122,240	0

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

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Last updated on Tuesday, November 28th, 2006
URL: http://www.epa.gov/safewater/contaminants/dw_contamfs/benzene.html

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **DIISOPROPYL ETHER**

CAS Number: 108-20-3
DOT Number: UN 1159

RTK Substance number: 0730
Date: September 1995 Revision: July 2001

HAZARD SUMMARY

* **Diisopropyl Ether** can affect you when breathed in.
* Contact can irritate the skin and eyes.
* Breathing **Diisopropyl Ether** can irritate the nose and throat.
* Breathing **Diisopropyl Ether** can cause headache, drowsiness, dizziness, nausea and confusion. Higher exposure can cause loss of consciousness and even death.
* Prolonged or repeated skin contact may cause drying and cracking of the exposed areas.
* **Diisopropyl Ether** is a FLAMMABLE LIQUID and a FIRE HAZARD.

IDENTIFICATION

Diisopropyl Ether is a colorless liquid with a sharp, sweet, *Ether*-like odor. It is used as a solvent.

REASON FOR CITATION

* **Diisopropyl Ether** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH and NFPA.
* This chemical is on the Special Health Hazard Substance List because it is **FLAMMABLE**.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

* **ODOR THRESHOLD = 0.017 ppm**.
* The range of accepted odor threshold values is quite broad. Caution should be used in relying on odor alone as a warning of potentially hazardous exposures.

WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is **500 ppm** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is **500 ppm** averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is **250 ppm** averaged over an 8-hour workshift and **310 ppm** as a STEL (short term exposure limit).

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to **Diisopropyl Ether**.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Diisopropyl Ether** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Diisopropyl Ether**:

* Contact can irritate the skin and eyes.
* Breathing **Diisopropyl Ether** can irritate the nose and throat.
* Breathing **Diisopropyl Ether** can cause headache, drowsiness, dizziness, nausea, and confusion. Higher exposure can cause loss of consciousness and even death.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Diisopropyl Ether** and can last for months or years:

Cancer Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Diisopropyl Ether** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Diisopropyl Ether** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

* Prolonged or repeated skin contact may cause drying and cracking of the exposed areas.

MEDICAL

Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

* Where possible, automatically pump liquid **Diisopropyl Ether** from drums or other storage containers to process containers.
* Before entering a confined space where **Diisopropyl Ether** may be present, check to make sure that an explosive concentration does not exist.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Diisopropyl Ether** should change into clean clothing promptly.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Diisopropyl Ether**.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with **Diisopropyl Ether**, immediately wash or shower to remove the chemical.
* Do not eat, smoke, or drink where **Diisopropyl Ether** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **Diisopropyl Ether**. Wear solvent-resistant gloves and clothing. Safety equipment suppliers/ manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

* Wear indirect-vent, impact and splash resistant goggles when working with liquids.
* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.
* Contact lenses should not be worn when working with this substance.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* Where the potential exists for exposure over **250 ppm**, use a MSHA/NIOSH approved full facepiece respirator with an organic vapor cartridge. Increased protection is obtained from full facepiece powered-air purifying respirators.
* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Diisopropyl Ether**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
* Where the potential for high exposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
* Exposure to **1,400 ppm** is immediately dangerous to life and health. If the possibility of exposure above **1,400 ppm** exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

HANDLING AND STORAGE

* Prior to working with **Diisopropyl Ether** you should be trained on its proper handling and storage.
* **Diisopropyl Ether** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); and CHLOROSULFONIC ACID.
* Store in tightly closed containers in a cool, well-ventilated area away from HEAT, SPARKS or DIRECT SUNLIGHT.
* Unstable *Peroxides* may form when **Diisopropyl Ether** is in contact with the air for a long time. It may then explode by itself or when heated or subjected to shock.
* Sources of ignition, such as smoking and open flames, are prohibited where **Diisopropyl Ether** is used, handled, or stored.
* Metal containers involving the transfer of **Diisopropyl Ether** should be grounded and bonded.
* Use only non-sparking tools and equipment, especially when opening and closing containers of **Diisopropyl Ether**.
* Wherever **Diisopropyl Ether** is used, handled, manufactured, or stored, use explosion-proof electrical equipment and fittings.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

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Consumer Factsheet on: ETHYLBENZENE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Ethylbenzene and how is it used?

Ethylbenzene is a colorless organic liquid with a sweet, gasoline-like odor. The greatest use - over 99 percent - of ethylbenzene is to make styrene, another organic liquid used as a building block for many plastics. It is also used as a solvent for coatings, and in making rubber and plastic wrap.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Ethylbenzol
Phenylethane

Why is Ethylbenzene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for ethylbenzene has been set at 0.7 parts per million (ppm) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has also been set at 0.7 ppm because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found ethylbenzene to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: drowsiness, fatigue, headache and mild eye and respiratory irritation.

Long-term: Ethylbenzene has the potential to cause the following effects from a lifetime exposure at levels above the MCL: damage to the liver, kidneys, central nervous system and eyes.

How much Ethylbenzene is produced and released to the environment?

Production of ethylbenzene has increased: from 6.9 billion lbs. in 1982 to 11.8 billion lbs in 1993. It is released to the air primarily from its use in gasoline. More localized may be due to waste water and spills from its production and industrial use.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, ethylbenzene releases to water and land totalled over 761,000 lbs. These releases were primarily from petroleum refining industries. The largest releases occurred in Texas. The largest direct releases to water occurred in Virginia.

What happens to Ethylbenzene when it is released to the environment?

Ethylbenzene will evaporate rapidly from water, and will be degraded by microbes. It binds only moderately to aquatic sediment and to soils. Thus, it may leach to ground water if released to land. Ethylbenzene has little potential for accumulating in aquatic life.

How will Ethylbenzene be Detected in and Removed from My Drinking Water?

The regulation for ethylbenzene became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if ethylbenzene is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of ethylbenzene so that it is consistently below that level. The following treatment methods have been approved by EPA for removing ethylbenzene: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if Ethylbenzene is in my drinking water?

If the levels of ethylbenzene exceed the MCL, 0.7 ppm, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: 0.7 ppm

Mcl: 0.7 ppm

Ethylbenzene Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS (in pounds)		**47,293**	**714,580**
Top Ten States			
TX	9,870	480,164	
VI	1,233	72,245	
IL	31	44,789	
PR	0	23,980	
VA	17,997	1,950	
DE	3,460	13,324	
NJ	1,892	11,510	
NM	0	13,076	
WY	250	12,755	
LA	4,383	4,552	

Major Industries

Petroleum refining	55,201	718,884
Plastics, resins	12,384	9,212
Indust. Organics	10,683	9,781
Pharmaceuticals	14,090	0
Metal containers	0	11,510

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

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Last updated on Tuesday, November 28th, 2006
URL: http://www.epa.gov/safewater/contaminants/dw_contamfs/ethylben.html

Drinking Water

Note: Some terms in this document link to other EPA and non-EPA Web sites or documents on that topic. Links going to non-EPA sites are identified with an EXIT Disclaimer symbol.

- Concerns about MTBE
- Drinking Water Quality
- Occurrence of MTBE in Water
- Movement and Disposition of MTBE in the Environment
- Additional Information

Concerns about MTBE

With these air quality benefits, why is there concern with the use of MTBE?

A growing number of studies have detected MTBE in ground water throughout the country; in some instances these contaminated waters are sources of drinking water. Low levels of MTBE can make drinking water supplies undrinkable due to its offensive taste and odor.

Is MTBE harmful to humans?

The majority of the human health-related research conducted to date on MTBE has focused on effects associated with the inhalation of the chemical. When research animals inhaled high concentrations of MTBE, some developed cancers or experienced other non-cancerous health effects To date, independent expert review groups who have assessed MTBE inhalation health risks e.g., Interagency Assessment of Oxygenated Fuels) have not concluded that the use of MTBE-oxygenated gasoline poses an imminent threat to public health. However, researchers have limited data about what the health effects may be if a person swallows (ingests) MTBE. EPA's Office of Water has concluded that available data are not adequate to estimate

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potential health risks of MTBE at low exposure levels in drinking water but that the data support the conclusion that MTBE is a potential human carcinogen at high doses. Recent work by EPA and other researchers is expected to help determine more precisely the potential for health effects from MTBE in drinking water.

EPA reviewed available health effects information on MTBE in its 1997 Drinking Water Advisory guidance and decided that there was insufficient information available to allow EPA to establish quantitative estimates for health risks and as such would not set health advisory limits. The drinking water advisory document indicates that there is little likelihood that MTBE in drinking water will cause adverse health effects at concentrations between 20 and 40 ppb or below.

Drinking Water Quality

Has EPA set a drinking water health standard for MTBE?

EPA has not set a national standard for MTBE, although some states have set their own limits. EPA will issue a secondary drinking water standard, based on taste and odor, by late Fall 2000. This taste and odor standard will serve as a guideline that states may adopt. In December 1997, EPA issued a Drinking Water Advisory that states concentrations of MTBE in the range of 20 to 40 ppb of water or below will probably not cause unpleasant taste and odor for most people, recognizing that human sensitivity to taste and odor varies widely. The advisory is a guidance document that recommends keeping concentrations below that range. EPA also reviewed the available information on health effects in the 1997 advisory and stated that there is little likelihood that MTBE concentrations between 20 and 40 ppb in drinking water would cause negative health effects.

EPA is continuing to study both the potential health effects and the occurrence of MTBE, and it is on a list of contaminants (Contaminant Candidate List) for which EPA is considering setting health standards. As a means of gathering occurrence information, beginning in 2001, EPA will require all large drinking water systems and a representative sample of small systems to monitor and report the presence of MTBE (Unregulated Contaminant Monitoring Regulation).

How do I know if I have MTBE in my water?

It is possible your water would taste and/or smell like turpentine if MTBE is present at levels around or above 20-40 ppb (some people may detect it at even lower levels). Though you cannot currently purchase a home testing kit, you can determine if your water contains MTBE the following ways. If your drinking water is supplied by a public water system, you can contact the system directly and ask whether they monitor for MTBE and what levels, if any, have been detected. In 2001, most public water systems will be required to monitor for MTBE. If you have a private well, you may want to have your well water tested. Your local health department may be able to tell you if MTBE has been found in water in your area. If you want to get your water tested, call the Safe Drinking Water Hotline (800-426-4791) or go to http://www.epa.gov/safewater/faq/sco.html to get the phone number for the office in your state that certifies drinking water laboratories.

Occurrence of MTBE in Water

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How does MTBE get in drinking water sources?

There are opportunities for MTBE to leak into the environment (and potentially get in drinking water sources) wherever gasoline is stored, and there are opportunities for it to be spilled whenever fuel is transported or transferred. While federal and state programs minimize the potential for leaks and spills, no system is foolproof.

Contamination of drinking water sources can occur from leaking underground and above ground fuel storage tanks, pipelinees, refueling spills, automobile accidents damaging the fuel tank, consumer disposal of "old" gasoline", emissions from older marine engines, and to a lesser degree, storm water runoff, and precipitation mixed with MTBE in the air (EPA's Office of Ground Water and Drinking Water) or (USGS report). EXIT Disclaimer

How widespread and at what levels is MTBE contamination in water supplies?

Although there are no nation-wide data sets from which to fully characterize MTBE contamination of water, a growing number of studies to-date have detected MTBE in drinking water supplies throughout the country. Current data on MTBE levels in ground and surface waters indicate widespread and numerous detections at low levels of MTBE, with a more limited number of detections at higher levels (only about 1 percent of concentrations are more than 20 parts per billion (ppb) as discussed in the 1999 Blue Ribbon Panel Report on Oxygenates in Gasoline). Studies have shown that MTBE is detected in water roughly five times more often and at higher concentrations in areas of the country where federal RFG is sold (i.e., where there is an oxygenate mandate).

When MTBE is detected, the levels are typically below 20 ppb which is lower than EPA's Drinking Water Advisory. However, releases from petroleum storage tanks, and pipeline breaks or other point sources can cause high concentrations of MTBE in water. When such releases occur, the resulting localized concentration can be much higher than the EPA's advised taste and odor acceptable range (EPA's Office of Ground Water and Drinking Water).

What is the status of the drinking water contamination in Santa Monica, CA, the city with the first significant incidence of MTBE contamination?

In 1996, the city of Santa Monica learned that two of its drinking water wellfields, Charnock and Arcadia, were contaminated with MTBE at levels as high as 610 ppb and 86 ppb respectively. In response, the two wellfields, representing 50 percent of the city's drinking water supply were shut down and the city began purchasing replacement water. This incident was the first major water contamination which brought public attention to MTBE.

EPA's Region 9 and the Los Angeles Regional Water Quality Control Board (RWQCB) are pursuing a joint enforcement action at the Charnock wellfield in Santa Monica. Site-specific clean-up is underway. At the smaller Arcadia wellfield, the RWQCB has the lead while EPA provides technical support and field oversight of the clean-up.

Movement and Disposition of MTBE in the Environment

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National Drinking Water Advisory Council
Water Infrastructure Security
Drinking Water For Kids!

Consumer Factsheet on: TETRACHLOROETHYLENE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Tetrachloroethylene and how is it used?

Tetrachloroethylene (PCE) is a colorless organic liquid with a mild, chloroform-like odor. Its greatest use is in the textile industry, and as a component of aerosol dry-cleaning products.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Ethylene tetrachloride
Perchloroethylene
PCE
Ankilostin
Didakene
Fedal-un
Nema
Perclene
Persec
Tetlen
Tetracap
Tetraleno
Tetropil

Antisal 1
Dow-per
Perawin
Perchlor
Percosolv
Perk
Perklone
Tetraguer
Tetralex
Tetravec

Why is Tetrachloroethylene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for PCE has been set at zero because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 5 parts per billion (ppb) because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver and may have an increased risk of getting cancer.

How much Tetrachloroethylene is produced and released to the environment?

Production of tetrachloroethylene was 405 million lbs in 1986. Major releases of tetrachloroethylene to air and water are from dry cleaning and industrial metal cleaning or finishing. Water pollution can occur from tetrachloroethylene leaching from vinyl liners in some types of pipelines used for water distribution, and during chlorination water treatment.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, tetrachloroethylene releases to land and water totalled over 1 million lbs. These releases were primarily from alkali and chlorine industries which use it to make other chemicals. The largest releases occurred in Louisiana and South Carolina.

What happens to Tetrachloroethylene when it is released to the environment?

PCE released to soil will readily evaporate or may leach slowly to the groundwater. Its break down by soil microbes is slow. PCE released to water will primarily evaporate and has little potential for accumulating in aquatic life.

How will Tetrachloroethylene be Detected in and Removed from My Drinking Water?

The regulation for tetrachloroethylene became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if PCE is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant until the system has taken immediate steps to remediate the problem or the State has determined that the contaminant will remain reliably and consistently below the MCL.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of PCE so that it is consistently below that level. The following treatment methods have been approved by EPA for removing PCE: Granular activated carbon in combination with Packed Tower Aeration.

How will I know if Tetrachloroethylene is in my drinking water?

If the levels of PCE exceed the MCL, 5 ppb, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: zero

Mcl: 5 ppb

Tetrachloroethylene Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS (in pounds)		**297,602**	**750,104**
Top Ten States*			
LA	23,639	610,518	

SC	104,728	0
NH	62,150	0
NC	42,192	13,102
IL	0	40,500
TX	36,144	720
OH	0	32,170
IN	1,300	27,000
CO	0	11,000
IA	5,112	0

Major Industries*

Alkalis, chlorine	63,472	611,242
Leather tanning,finishing	62,150	0
Cotton fabric finishing	51,577	0
Misc textile finishing	48,082	2,000
Knit outwear mills	45,808	0
Misc. apparel, access.	0	40,500
Transportation Equip.	3,750	27,000
Ammunition	0	20,575
Misc Chem. preparations	0	11,102
Petroleum refining	0	11,000
Ordnance, accessories	0	10,100

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to

support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

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Last updated on Tuesday, November 28th, 2006
URL: http://www.epa.gov/safewater/contaminants/dw_contamfs/tetrachl.html

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **CYMENES**

CAS Number: 25155-15-1
DOT Number: UN 2046

RTK Substance number: 0591
Date: August 2003

HAZARD SUMMARY

* **Cymenes** can affect you when breathed in.
* Contact can irritate the skin and eyes. Repeated or prolonged contact can cause skin redness and dryness.
* **Cymenes** can cause headache, nausea and vomiting.

IDENTIFICATION

Cymenes are clear, colorless liquids. They are used as thinners for lacquers and varnishes, as solvents and metal polishes.

REASON FOR CITATION

* **Cymenes** are on the Hazardous Substance List because they are cited by DOT and NFPA.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **Cymenes**. This does not mean that these substances are not harmful. Safe work practices should always be followed.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to **Cymenes** and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Cymenes** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Cymenes**:

* Contact can irritate the skin and eyes. Repeated or prolonged contact can cause skin redness and dryness.
* **Cymenes** can cause headache, nausea and vomiting.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Cymenes** and can last for months or years:

Cancer Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Cymenes** have not been tested for their ability to cause cancer in animals.

Reproductive Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Cymenes** have not been tested for their ability to affect reproduction.

Other Long-Term Effects

* **Cymenes** have not been tested for other chronic (long-term) health effects.

MEDICAL

Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

* Where possible, automatically pump liquid **Cymenes** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Cymenes** should change into clean clothing promptly.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Cymenes**.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with **Cymenes**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Cymenes**, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where **Cymenes** are handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, applying cosmetics, smoking, or using the toilet.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **Cymenes**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

* Wear indirect-vent, impact and splash resistant goggles when working with liquids.
* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* Where the potential for overexposure exists, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

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Water Infrastructure Security
Drinking Water For Kids!

Consumer Factsheet on: STYRENE

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As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Styrene and how is it used?

Styrene is an oily organic liquid with an aromatic, almost floral odor. Initially, styrene was used primarily in the synthetic rubber industry, but it is currently used as a building block for polymers in making plastics, resins, coatings, and paints.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Vinyl benzene
Phenethylene
Cinnamene
Diarex HF 77
Styrolene
Styrol
Styropol

Why is Styrene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for styrene has been set at 0.1 parts per million (ppm) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 0.1 ppm because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found styrene to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: nervous system effects such as depression, loss of concentration, weakness, fatigue and nausea.

Long-term: Styrene has the potential to cause the following effects from a lifetime exposure at levels above the MCL: liver and nerve tissue damage; cancer.

How much Styrene is produced and released to the environment?

Production of styrene was 10.7 billion lbs in 1993. It is released into the environment by emissions and effluents from its production and its use in polymer manufacture. Consumers may be exposed to styrene through contact with resin products used in fiberglass boat construction and repair, and in auto body fillers. Styrene may also leach from polystyrene containers used for food products.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, styrene releases to land and water totalled over 2 million lbs. These releases were primarily from adhesives and sealants industries. The largest releases occurred in Texas. The largest direct releases to water occurred in Louisiana.

What happens to Styrene when it is released to the environment?

Styrene released to water rapidly evaporates and is degraded by microbes. It does not bind well to soils and may leach to groundwater, but its rapid break down minimizes this process. It does not tend to accumulate in aquatic life.

How will Styrene be Detected in and Removed from My Drinking Water?

The regulation for styrene became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if styrene is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of styrene so that it is consistently below that level. The following treatment methods have been approved by EPA for removing styrene: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if Styrene is in my drinking water?

If the levels of styrene exceed the MCL, 0.1 ppm, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: 0.1 ppm

Mcl: 0.1 ppm

Styrene Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS (in pounds)	**275,888**	**1,796,451**
Top Ten States*		
TX	160,411	572,294
WV	1,600	555,360
IN	0	124,794
WI	0	102,973
OH	0	90,358
GA	0	79,000
LA	53,430	0
FL	0	38,800
NY	32	33,192

KY	0	18,000	
Major Industries*			
Adhesives, sealants		0	537,360
Concrete products		0	398,424
Synthetic rubber		152,215	149,147
Misc. plastic products		515	201,713
Plastics and resins		25,133	71,363
Boatbuilding, repair		220	83,256
Car parts, access.		0	79,250
Misc. Indust. organics		34,275	43,290
Travel trailers, campers		0	45,129
Custom plastic resins		720	44,320

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

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Consumer Factsheet on: TRICHLOROETHYLENE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Trichloroethylene and how is it used?

Trichloroethylene is a colorless or blue organic liquid with a chloroform-like odor. The greatest use of trichloroethylene is to remove grease from fabricated metal parts and some textiles.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

1,1,2-Trichloroethylene
Acetylene trichloroethylene
Algylen
Anameth
Benzinol
Chlorilen
CirCosolv
Germalgene
Lethurin
Perm-a-chlor
Petzinol
Philex
TRI-Plus M

Vitran

Why is Trichloroethylene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for trichloroethylene has been set at zero because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 5 parts per billion (ppb) because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.

How much Trichloroethylene is produced and released to the environment?

Production of trichloroethylene has increased from just over 260,000 lbs. in 1981 to 320 million lbs. in 1991. Major environmental releases of trichloroethylene are due to air emissions from metal degreasing plants. Wastewater from metal finishing, paint and ink formulation, electrical/electronic components, and rubber processing industries also may contain trichloroethylene.

From 1987 to 1993, according to the Toxics Release Inventory, trichloroethylene releases to water and land totalled over 291,000 lbs. These releases were primarily from steel pipe and tube manufacturing industries. The largest releases occurred in Pennsylvania and Illinois. The largest direct releases to water occurred in West Virginia.

What happens to Trichloroethylene when it is released to the environment?

Trichloroethylene released to soil will either evaporate or leach into ground water. If released to water, it will also quickly evaporate. It has only a moderate potential to accumulate in aquatic life.

How will Trichloroethylene be Detected in and Removed from My Drinking Water?

The regulation for trichloroethylene became effective in 1989. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if TCE is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant until the system has taken immediate steps to remediate the problem or the State has determined that the contaminant will remain reliably and consistently below the MCL.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of TCE so that it is consistently below that level. The following treatment methods have been approved by EPA for removing TCE: Granular activated carbon in combination with Packed Tower Aeration.

How will I know if Trichloroethylene is in my drinking water?

If the levels of trichloroethylene exceed the MCL, 5 ppb, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: zero

Mcl: 5 ppb

Trichloroethylene Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS (in pounds)		**100,293**	**191,088**
Top Six States*			
PA	0	33,450	
IL	0	30,711	
GA	3,742	17,532	
TX	0	21,000	
MA	0	19,920	

WV	12,822	0	
Major Industries			
Steel pipe, tubes		31	39,288
Misc. Indust. Organics		27,708	0
Car parts, access.		4,405	19,920
Plating, polishing		3,342	20,100
Wool fabric mills		3,942	18,081

* State totals only include facilities with releases greater than 10,000 lbs.

Learn more about your drinking water!

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Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

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URL: http://www.epa.gov/safewater/contaminants/dw_contamfs/trichlor.html

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Consumer Factsheet on: TOLUENE

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As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Toluene and how is it used?

Toluene is an organic liquid with a sweet, benzene-like odor. The largest chemical use for toluene is to make benzene and urethane.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Methylbenzene
Methacide
Phenylmethane
Toluol
Antisal 1A

Why is Toluene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for toluene has been set at 1 parts per million (ppm) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has also been set at 1 ppm because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found toluene to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: minor nervous system disorders such as fatigue, nausea, weakness, confusion.

Long-term: Toluene has the potential to cause the following effects from a lifetime exposure at levels above the MCL: more pronounced nervous disorders such as spasms, tremors, impairment of speech, hearing, vision, memory, coordination; liver and kidney damage.

How much Toluene is produced and released to the environment?

Production of toluene was 6.4 billion lbs in 1993. It is released into the atmosphere principally from the volatilization of petroleum fuels and toluene-based solvents and thinners and from motor vehicle exhaust. It is also released in wastewaters or by spills on land during the storage, transport and disposal of fuels and oils.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, toluene releases to land and water totalled over 4 million lbs., primarily from petroleum refining industries. The largest releases occurred in Texas and California. The largest releases directly to water occurred in Connecticut and West Virginia.

What happens to Toluene when it is released to the environment?

Toluene released to soil will be lost by evaporation from near-surface soil and by leaching to the groundwater. Its breakdown by soil microbes is slow. Toluene evaporates within a few hours when released to water, and it has little tendency to accumulate in aquatic life.

How will Toluene be Detected in and Removed from My Drinking Water?

The regulation for toluene became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and

analyze them to find out if toluene is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of toluene so that it is consistently below that level. The following treatment methods have been approved by EPA for removing toluene: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if Toluene is in my drinking water?

If the levels of toluene exceed the MCL, 1 ppm, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: 1 ppm

Mcl: 1 ppm

Toluene Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS* (in pounds)		**732,310**	**3,672,041**
Top Ten States*			
TX	16,285	969,210	
CA	0	930,000	
CT	316,068	0	
OK	0	287,000	
VA	27,500	216,000	
VI	2,970	191,504	
IL	56	180,824	
MI	0	129,226	
WV	117,523	1,377	
SC	6,000	89,578	

Major Industries*		
Petroleum refining	227,196	2,580,941
Medicinals, botanicals	301,585	1,108
Petroleum/coal prods.	38,856	287,000
Misc Ind. Chemicals	179,576	107,159
Gaskets, sealing devices	4,002	216,000
Wood office furniture	0	129,226
Plastics, resins	57,661	39,139
Wood home furniture	30,000	65,444
Paints, allied products	5,927	88,024

* Water/Land totals only include facilities with releases greater than 10,000 lbs.

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Consumer Factsheet on: VINYL CHLORIDE

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As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Vinyl Chloride and how is it used?

Vinyl chloride is a colorless organic gas with a sweet odor. It is used in the manufacture of numerous products in building and construction, automotive industry, electrical wire insulation and cables, piping, industrial and household equipment, medical supplies, and is depended upon heavily by the rubber, paper, and glass industries.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Chlorethene
Chlorethylene
Monochloroethene
Monovinyl chloride (MVC)
Trovidur

Why is Vinyl Chloride being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for vinyl chloride has been set at zero because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 2 parts per billion (ppb) because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found vinyl chloride to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: damage to the nervous system.

Long-term: Vinyl chloride has the potential to cause the following effects from a lifetime exposure at levels above the MCL: damage to the liver and nervous system; cancer.

How much Vinyl Chloride is produced and released to the environment?

Production of vinyl chloride in 1993 was nearly 14 billion lbs. Its major release to the environment will be as emissions and wastewater at polyvinyl chloride (PVC) plastics production and manufacturing facilities. Small quantities of vinyl chloride can be released to food since it is used to make many food wrappings and containers.

From 1987 to 1993, according to EPA's Toxic Release Inventory, vinyl chloride releases to water and land totalled over 38,000 lbs. These releases were primarily from plastics materials and resins industries. The largest releases occurred in Louisiana and Delaware.

What happens to Vinyl Chloride when it is released to the environment?

Vinyl chloride released to soil will either quickly evaporate, be broken down by microbes or may leach to the groundwater. It also rapidly evaporates from water, but does not degrade there. It will not accumulate in aquatic life.

How will Vinyl Chloride be Detected in and Removed from My Drinking Water?

The regulation for vinyl chloride became effective in 1989. Between 1993 and 1995,

EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if vinyl chloride is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of vinyl chloride so that it is consistently below that level. The following treatment methods have been approved by EPA for removing vinyl chloride: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if Vinyl Chloride is in my drinking water?

If the levels of vinyl chloride exceed the MCL, 2 ppb, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: zero

Mcl: 2 ppb

Vinyl Chloride Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS (in pounds)		**21,693**	**17,038**
Top Five States			
LA	12,600	0	
DE	86	8,829	
OH	3,360	0	
PA	0	3,290	
SC	0	3,100	
Major Industries			
Plastics, resins	19,489		13,375

Learn more about your drinking water!

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water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

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Consumer Factsheet on: XYLENES

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As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Xylene and how is it used?

A xylene is any of a group of very similar organic compounds. They are clear liquids with a sweet odor. The greatest use of xylenes is as a solvent which is much safer than benzene. Other uses include: in gasoline as part of the BTX component (benzene-toluene-xylene); Xylene mixtures are used to make phthalate plasticizers, polyester fiber, film and fabricated items.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Dimethyl benzene
Xylol
Methyltoluene
Violet 3

Why is Xylene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for xylenes has been set at 10 parts per million (ppm) because EPA

believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 10 ppm because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found xylenes to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: disturbances of cognitive abilities, balance, and coordination.

Long-term: Xylenes has the potential to cause the following effects from a lifetime exposure at levels above the MCL: damage to the central nervous system, liver and kidneys.

How much Xylene is produced and released to the environment?

Production of xylenes was 6.84 billion lbs. in 1993. Major environmental releases of xylenes are due to evaporation from the refining and use of petroleum products. It may also be released by leaks or spills during the transport and storage of gasoline and other fuels. Xylenes are a natural products of many plants, and are a component of petroleum and coal tar.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, xylene releases to land and water totalled nearly 4.8 billion lbs. These releases were primarily from petroleum refining industries. The largest releases occurred in Texas. The largest direct releases to water occurred in New Jersey and Georgia.

What happens to Xylene when it is released to the environment?

Most of the xylenes are released into the atmosphere where they are quickly degraded by sunlight. When released to soil or water, xylenes will quickly evaporate. They may leach into ground water and persist there for several years. There is little potential for accumulation in aquatic life.

How will Xylene be Detected in and Removed from My Drinking Water?

The regulation for xylenes became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if xylenes is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of xylenes so that it is consistently below that level. The following treatment methods have been approved by EPA for removing xylenes: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if Xylene is in my drinking water?

If the levels of xylenes exceed the MCL, 10 ppm, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: 10 ppm

Mcl: 10 ppm

Xylene Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS (in pounds)		**875,943**	**3,897,738**
Top Ten States*			
TX	30,853	2,099,734	
NJ	294,437	280,759	
IL	36	206,990	
IN	0	145,079	
AL	34,361	59,022	
CA	0	91,500	
MI	0	86,774	
GA	68,310	15,000	
VA	50,100	33,000	

WA	27,860	52,360	
Major Industries*			
Petroleum refining		131,817	2,678,958
Metal barrels, drums		5	289,542
Textile finishing, misc.		278,454	0
Misc. Industrial chems.		95,706	69,696
Extruded Aluminum prod.		1,265	138,798
Furniture, fixtures		0	91,500
Cotton fabric finishing		68,310	15,000
Wood office furniture		0	67,677
Pharmaceuticals		52,285	3,100
Paper mills		52,480	2,122

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

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Technical Factsheet on: 1,2-DICHLOROETHYLENE

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As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:

National Primary Drinking Water Regulations

Drinking Water Standards

MCLG: cis-0.07; trans-0.1 mg/L
MCL: cis-0.07; trans-0.1 mg/L
HAL(child)- 1 day: cis-4; trans-20
: Longer-term: cis-3; trans-2

Health Effects Summary

Acute: EPA has found cis- and trans- 1,2-dichloroethylene to potentially cause central nervous system depression from short-term exposures at levels above the MCL.

Short-term exposures in drinking water which are considered "safe" for a 10-kg (22 lb.) child consuming 1 liter of water per day: for the cis form- a one-day exposure of 4 mg/L or upto a 7-year exposure to 3 mg/L. For the trans isomer: a one-day exposure of 20 mg/L or upto a 7-year exposure to 2 mg/L.

Chronic: Both cis- and trans-1,2-DCE have the potential to cause liver, circulatory and nervous system damage from long-term exposure at levels above the MCL. The trans isomer is approximately twice as potent as the cis- isomer in its ability to depress the central nervous system.

Cancer: There is inadequate evidence to state whether or not either cis- or trans-1,2-DCE have the potential to cause liver cancer from a lifetime exposure in drinking water.

Usage Patterns

Both the cis and trans forms - usually as a mixture - are used as a solvent for waxes, resins, and acetylcellulose; in the extraction of rubber; as a refrigerant; in the manufacture of pharmaceuticals and artificial pearls and in the extraction of oils and fats from fish and meat; as a chemical intermediate for making chlorinated compounds.

No data were available on recent production levels in the United States.

Release Patterns

Releases to the environment are expected to be limited to manufacturing plants in the Gulf Region of the United States. Since cis-and trans-1,2-DCE are not listed chemicals in the Toxics Release Inventory, data on releases during manufacture and handling are not available.

Trans-1,2-dichloroethylene may be released to the environment in air emissions and wastewater during its production and use as a solvent and extractant, in organic synthesis,

and in the manufacture of perfumes, lacquers, and thermoplastics.

An assessment of the sources of trans-1,2-dichloroethylene is complicated by the fact that it is a priority pollutant while the cis isomer is not and the standard EPA methods of analysis do not allow the isomers to differentiated. This has resulted in monitoring reports erroneously listing the trans isomer when the cis isomer is present. The Michigan Department of Health has the capability of distinguishing these isomers and claims that it frequently finds the cis isomer and, if concentrations are high, they occasionally find traces of the trans isomer.

Environmental Fate

Both the cis- and trans-1,2-dichloroethylenes may be released to the environment in air emissions and wastewater during its production and use. Under anaerobic conditions that may exist in landfills, aquifers, or sediment one is likely to find 1,2-dichloroethylenes that are formed as breakdown products from the reductive dehalogenation of common industrial solvents trichloroethylene, tetrachloroethylene, and 1,1,2,2-tetrachloroethane.

The cis-1,2-dichloroethylene is apparently the more common isomer found although it is mistakenly reported as the trans isomer. The trans-isomer, being a priority pollutant, is more commonly analyzed for and the analytical procedures generally used do not distinguish between isomers.

If 1,2-dichloroethylenes are released on soil, it should evaporate and leach into the groundwater where very slow biodegradation should occur. If released into water, 1,2-dichloroethylenes will be lost mainly through volatilization.

In the atmosphere, 1,2-dichloroethylenes will be lost by reaction with photochemically produced hydroxyl radicals and scavenged by rain. Because it is relatively long-lived in the atmosphere, considerable dispersal from source areas should occur.

Biodegradation, adsorption to sediment, and bioconcentration in aquatic organisms should not be significant.

Chemical/Physical Properties

CAS Number: cis- 156-59-2 trans- 156-60-5

Color/ Form/Odor: Colorless, odorless liquid

M.P.: cis- -80 C; trans- -50 C

B.P.: cis- 60.3 C; trans- 48 C

Vapor Pressure: cis- 273 mm Hg at 30 C; trans- 395 mm Hg at 30 C

Octanol/Water Partition (Kow): Log Kow = cis- 1.86; trans- 2.06

Density/Spec. Grav.: cis- 1.26 at 20 C trans- 1.28 at 20 C

Solubility: Soluble in water, cis- 3.5 g/L of water, trans- 6.3 g/L of water at 25 C

Soil sorption coefficient: Kocs of cis and trans isomers are estimated at 36 to 49; high to very high mobility in soil

Odor/Taste Thresholds: N/A

Henry's Law Coefficient: cis- 0.00337 atm-cu m/mole; trans- 0.00672 atm-cu m/mole

Bioconcentration Factor: BCFs of cis and trans isomers are estimated at 15 to 22; not expected to bioconcentrate in aquatic organisms.

Trade Names/Synonyms: Both isomers- 1,2-DCE, Acetylene dichloride; cis- Z-1,2-

dichloroethene; trans- E-1,2-dichloroethene, sym-dichloroethylene

Other Regulatory Information

Monitoring:

-- For Ground/Surface Water Sources:

Initial Frequency- 4 quarterly samples every 3 years

Repeat Frequency- Annually after 1 year of no detection

-- Triggers - Return to Initial Freq. if detect at > 0.0005 mg/L

Analysis

Reference Source	Method Numbers
EPA 600/4-88-039	502.2; 524.2

Treatment/Best Available Technologies: Granular Activated Charcoal and Packed Tower Aeration

For Additional Information

EPA can provide further regulatory or other general information:
EPA Safe Drinking Water Hotline - 800/426-4791

Other sources of toxicological and environmental fate data include:
Toxic Substance Control Act Information Line - 202/554-1404
Toxics Release Inventory, National Library of Medicine - 301/496-6531
Agency for Toxic Substances and Disease Registry - 404/639-6000

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URL: http://www.epa.gov/safewater/dwh/t-voc/12-dich2.html

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **BUTYL BENZENE**

CAS Number: 104-51-8
DOT Number: UN 2709

RTK Substance number: 0282
Date: October 2002

HAZARD SUMMARY

* **Butyl Benzene** can affect you when breathed in.
* Contact can irritate the skin and eyes.

IDENTIFICATION

Butyl Benzene is a colorless liquid. It is used to make other chemicals and insecticides.

REASON FOR CITATION

* **Butyl Benzene** is on the Hazardous Substance List because it is cited by DOT and NFPA.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **Butyl Benzene**. This does not mean that this substance is not harmful. Safe work practices should always be followed.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to **Butyl Benzene**.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Butyl Benzene** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Butyl Benzene**:

* Contact can irritate the skin and eyes.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Butyl Benzene** and can last for months or years:

Cancer Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Butyl Benzene** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Butyl Benzene** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

* No chronic (long-term) health effects are known at this time.

MEDICAL

Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

* Where possible, automatically pump liquid **Butyl Benzene** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Butyl Benzene** should change into clean clothing promptly.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Butyl Benzene**.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with **Butyl Benzene**, immediately wash or shower to remove the chemical.
* Do not eat, smoke, or drink where **Butyl Benzene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **Butyl Benzene**. Wear protective gloves and clothing. Safety equipment suppliers/ manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

* Wear indirect-vent, impact and splash resistant goggles when working with liquids.
* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* Where the potential for overexposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?

A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?

A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?

A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?

A: Conditions which increase risk of exposure include physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?

A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 984-7407 (fax)

Web address: http://www.state.nj.us/health/eoh/odisweb/

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEL is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

>>>>>>>>>>>>>>>>>> EMERGENCY INFORMATION <<<<<<<<<<<<<<<<<<

Common Name: **BUTYL BENZENE**
DOT Number: **UN 2709**
NAERG Code: **128**
CAS Number: **104-51-8**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	-	2
REACTIVITY	-	0
COMBUSTIBLE POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* **Butyl Benzene** is a COMBUSTIBLE LIQUID.
* Use dry chemical, CO_2, water spray, alcohol or polymer foam extinguishers.
* POISONOUS GASES ARE PRODUCED IN FIRE.
* CONTAINERS MAY EXPLODE IN FIRE.
* Use water spray to keep fire-exposed containers cool.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If **Butyl Benzene** is spilled or leaked, take the following steps:

* Evacuate persons not wearing protective equipment from area of spill or leak until clean-up is complete.
* Remove all ignition sources.
* Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.
* Ventilate and wash area after clean-up is complete.
* It may be necessary to contain and dispose of **Butyl Benzene** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
* If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: 1-877-WARN-DEP

HANDLING AND STORAGE

* Prior to working with **Butyl Benzene** you should be trained on its proper handling and storage.
* **Butyl Benzene** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE).
* Store in tightly closed containers in a cool, well-ventilated area.
* Sources of ignition, such as smoking and open flames, are prohibited where **Butyl Benzene** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

FIRST AID

For POISON INFORMATION call 1-800-222-1222

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact

* Remove contaminated clothing. Wash contaminated skin with soap and water.

Breathing

* Remove the person from exposure.

PHYSICAL DATA

Vapor Pressure: 1.03 mm Hg at 73°F (23°C)
Flash Point: 139°F (59°C)
Water Solubility: Insoluble

OTHER COMMONLY USED NAMES

Chemical Name:
Benzene, Butyl-
Other Names:
1-Phenylbutane

Not intended to be copied and sold for commercial purposes.

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Right to Know Program
PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **NAPHTHALENE**

CAS Number: 91-20-3
DOT Number: UN 1334 (Crude or Refined)
UN 2304 (Molten)

RTK Substance number: 1322
Date: March 1998 Revision: October 2004

HAZARD SUMMARY

* **Naphthalene** can affect you when breathed in and by passing through your skin.
* **Naphthalene** should be handled as a CARCINOGEN–WITH EXTREME CAUTION.
* Exposure to **Naphthalene** can irritate the skin, eyes, nose and throat.
* Very high levels can cause headache, fatigue, confusion, nausea and vomiting.
* Repeated exposure can cause clouding of the eye lens (cataract), which may damage vision.
* **Naphthalene** may cause a skin allergy. If allergy develops, very low future exposures can cause itching and a skin rash.
* **Naphthalene** may damage the kidneys and liver.
* **Naphthalene** may damage the red blood cells causing anemia (low blood count).

IDENTIFICATION

Naphthalene is a white crystalline flake or solid, which is shipped as a molten (melted) solid with a strong odor like mothballs. It is used in making dyes, explosives, plastics, and lubricants, and as a moth repellant.

REASON FOR CITATION

* **Naphthalene** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, DEP, IARC, IRIS, NFPA and EPA.
* This chemical is on the Special Health Hazard Substance List because it is a **CARCINOGEN**.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.
* **ODOR THRESHOLD = 0.038 ppm.**
* The range of accepted odor threshold values is quite broad. Caution should be used in relying on odor alone as a warning of potentially hazardous exposures.

WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is **10 ppm** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is **10 ppm** averaged over a 10-hour workshift and **15 ppm**, not to be exceeded during any 15 minute work period.

ACGIH: The recommended airborne exposure limit is **10 ppm** averaged over an 8-hour workshift and **15 ppm** as a STEL (short term exposure limit).

* **Naphthalene** may be a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
* It should be recognized that **Naphthalene** can be absorbed through your skin, thereby increasing your exposure.

WAYS OF REDUCING EXPOSURE

* Enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to **Naphthalene** and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Naphthalene** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Naphthalene**:

* Exposure to **Naphthalene** can irritate the skin, eyes, nose and throat.
* Very high levels can cause headache, fatigue, confusion, nausea and vomiting.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Naphthalene** and can last for months or years:

Cancer Hazard

* **Naphthalene** may be a CARCINOGEN in humans since it has been shown to cause nasal and lung cancer in animals.
* Many scientists believe there is no safe level of exposure to a carcinogen.

Reproductive Hazard

* There is limited evidence that **Naphthalene** may damage the developing fetus.

Other Long-Term Effects

* Repeated exposure can cause clouding of the eye lens (cataract), which may damage vision.
* **Naphthalene** may cause a skin allergy. If allergy develops, very low future exposures can cause itching and a skin rash.
* **Naphthalene** may damage the kidneys and liver.
* **Naphthalene** may damage the red blood cells causing anemia (low blood count).

MEDICAL

Medical Testing

For those with frequent or potentially high exposure (half the TLV or greater, or significant skin contact), the following are recommended before beginning work and at regular times after that:

* Exam of the eyes and vision.

If symptoms develop or overexposure is suspected, the following are recommended:

* Liver and kidney function tests.
* Complete blood count.
* Evaluation by a qualified allergist, including careful exposure history and special testing, may help diagnose skin allergy.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures

* Because more than light alcohol consumption can cause liver damage, drinking alcohol can increase the liver damage caused by **Naphthalene**.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

* Where possible, automatically transfer solid or molten **Naphthalene** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Naphthalene** should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Naphthalene**.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with **Naphthalene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Naphthalene**, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where **Naphthalene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.

* For solid **Naphthalene** use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **Naphthalene**. Wear protective gloves and clothing. Safety equipment suppliers/ manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

* Wear impact resistant eye protection with side shields or goggles.
* Wear non-vented, impact resistant goggles when working with fumes, gases, or vapors.
* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* Where the potential exists for exposure over **10 ppm**, use a MSHA/NIOSH approved full facepiece respirator with an organic vapor cartridge and particulate prefilters. Increased protection is obtained from full facepiece powered-air purifying respirators.
* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Naphthalene**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
* Where the potential exists for exposure over **100 ppm**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mo de.
* Exposure to **250 ppm** is immediately dangerous to life and health. If the possibility of exposure above **250 ppm** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

HANDLING AND STORAGE

* Prior to working with **Naphthalene** you should be trained on its proper handling and storage.
* The reaction between WATER and *molten* **Naphthalene** may be violent.
* **Naphthalene** must be stored to avoid contact with DINITROGEN PENTOXIDE; CHROMIC ANHYDRIDE; OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); and MIXTURES OF ALUMINUM CHLORIDE and BENZOYL CHLORIDE since violent reactions occur.
* **Naphthalene** is not compatible with STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE) and STRONG MINERAL ACIDS.
* Store in tightly closed containers in a cool, well-ventilated area away from MOISTURE.
* Sources of ignition, such as smoking and open flames, are prohibited where **Naphthalene** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?

A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?

A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?

A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?

A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?

A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

Q: Don't all chemicals cause cancer?

A: No. Most chemicals tested by scientists are not cancer-causing.

Q: Should I be concerned if a chemical causes cancer in animals?

A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.

Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?

A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.

Q: Can men as well as women be affected by chemicals that cause reproductive system damage?

A: Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.

Q: Who is at the greatest risk from reproductive hazards?

A: Pregnant women are at greatest risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 984-7407 (fax)

Web address: http://www.state.nj.us/health/eoh/odisweb/

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

CFR is the Code of Federal Regulations, which consists of the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

IRIS is the Integrated Risk Information System database of the federal EPA.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEL is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

>>>>>>>>>>>>>>>>>> EMERGENCY INFORMATION <<<<<<<<<<<<<<<<<<

Common Name: **NAPHTHALENE**
DOT Number: **UN 1334 (Crude or Refined)**
UN 2304 (Molten)
NAERG Code: **133**
CAS Number: **91-20-3**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	-	2
REACTIVITY	-	0
CARCINOGEN COMBUSTIBLE POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* **Naphthalene** is a COMBUSTIBLE SOLID.
* Use dry chemical, CO_2, water spray, or a foaming agent.
* Use caution when using water spray or foam directly on *molten* **Naphthalene** as extensive foaming may occur.
* POISONOUS GASES ARE PRODUCED IN FIRE.
* CONTAINERS MAY EXPLODE IN FIRE.
* Use water spray to keep fire-exposed containers cool.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If **Naphthalene** is spilled, take the following steps:

* Evacuate persons not wearing protective equipment from area of spill until clean-up is complete.
* Remove all ignition sources.
* Collect solid or *molten* material in the most convenient and safe manner and deposit in sealed containers.
* Ventilate and wash area after clean-up is complete.
* It may be necessary to contain and dispose of **Naphthalene** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
* If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: 1-877-WARN-DEP

HANDLING AND STORAGE (See page 3)

FIRST AID

For POISON INFORMATION call 1-800-222-1222

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact

* Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Breathing

* Remove the person from exposure.
* Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Vapor Pressure: 0.08 mm Hg at 68°F (20°C)
Flash Point: 174°F (79°C)
Water Solubility: Very slightly soluble

OTHER COMMONLY USED NAMES

Chemical Name:
Naphthalene
Other Names:
Mothballs; Moth Flakes; Camphor Tar

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NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Right to Know Program
PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **PROPYL BENZENE**

CAS Number: 103-65-1
DOT Number: UN 2364

RTK Substance number: 1607
Date: September 2001

HAZARD SUMMARY

* **Propyl Benzene** can affect you when breathed in and may be absorbed through the skin.
* Contact can irritate the skin and eyes.
* Breathing **Propyl Benzene** can irritate the nose and throat.
* High exposure can cause headache, nausea, vomiting, dizziness, drowsiness and fainting.
* **Propyl Benzene** is a FLAMMABLE LIQUID and a FIRE HAZARD.

IDENTIFICATION

Propyl Benzene is a colorless liquid. It is used in textile dyeing and printing, as a solvent for *Cellulose Acetate*, and in the production of *Methyl Styrene*.

REASON FOR CITATION

* **Propyl Benzene** is on the Hazardous Substance List because it is cited by DOT and NFPA.
* This chemical is on the Special Health Hazard Substance List because it is **FLAMMABLE**
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **Propyl Benzene**. This does not mean that this substance is not harmful. Safe work practices should always be followed.

* It should be recognized that **Propyl Benzene** may be absorbed through your skin, thereby increasing your exposure.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to **Propyl Benzene** and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Propyl Benzene** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Propyl Benzene**:

* Contact can irritate the skin and eyes.
* Breathing **Propyl Benzene** can irritate the nose and throat.
* High exposure can cause headache, nausea, vomiting, dizziness, drowsiness and fainting.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Propyl Benzene** and can last for months or years:

Cancer Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Propyl Benzene** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Propyl Benzene** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

* **Propyl Benzene** has not been tested for other chronic (long-term) health effects.

MEDICAL

Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

* Where possible, automatically pump liquid **Propyl Benzene** from drums or other storage containers to process containers.
* Before entering a confined space where **Propyl Benzene** may be present, check to make sure that an explosive concentration does not exist.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Propyl Benzene** should change into clean clothing promptly.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Propyl Benzene**.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with **Propyl Benzene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Propyl Benzene**, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where **Propyl Benzene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, applying cosmetics, smoking, or using the toilet.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **Propyl Benzene**. Wear solvent-resistant gloves and clothing. Safety equipment suppliers/ manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

* Wear indirect-vent, impact and splash resistant goggles when working with liquids.
* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* Where the potential for overexposure exists, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

HANDLING AND STORAGE

* Prior to working with **Propyl Benzene** you should be trained on its proper handling and storage.
* **Propyl Benzene** is not compatible with NITRIC ACID and OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE).
* Store in tightly closed containers in a cool, well-ventilated area away from HEAT and FLAME.
* Sources of ignition, such as smoking and open flames, are prohibited where **Propyl Benzene** is used, handled, or stored.
* Metal containers involving the transfer of **Propyl Benzene** should be grounded and bonded.
* Use only non-sparking tools and equipment, especially when opening and closing containers of **Propyl Benzene**.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?

A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?

A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?

A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?

A: Conditions which increase risk of exposure include physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?

A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 984-7407 (fax)

Web address: http://www.state.nj.us/health/eoh/odisweb/

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEL is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

>>>>>>>>>>>>>>>>>> EMERGENCY INFORMATION <<<<<<<<<<<<<<<<<<

Common Name: **PROPYL BENZENE**
DOT Number: **UN 2364**
NAERG Code: **127**
CAS Number: **103-65-1**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	-	3
REACTIVITY	-	0
FLAMMABLE POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* **Propyl Benzene** is a FLAMMABLE LIQUID.
* Use dry chemical, CO_2, water spray, alcohol or polymer foam extinguishers.
* POISONOUS GASES ARE PRODUCED IN FIRE.
* CONTAINERS MAY EXPLODE IN FIRE.
* Use water spray to keep fire-exposed containers cool.
* Vapors may travel to a source of ignition and flash back.
* Vapor is heavier than air and may travel a distance to cause a fire or explosion far from the source.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If **Propyl Benzene** is spilled or leaked, take the following steps:

* Evacuate persons not wearing protective equipment from area of spill or leak until clean-up is complete.
* Remove all ignition sources.
* Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.
* Ventilate and wash area after clean-up is complete.
* Keep **Propyl Benzene** out of a confined space, such as a sewer, because of the possibility of an explosion, unless the sewer is designed to prevent the build-up of explosive concentrations.
* It may be necessary to contain and dispose of **Propyl Benzene** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
* If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: 1-877-WARN-DEP

HANDLING AND STORAGE (See page 3)

FIRST AID

For POISON INFORMATION call 1-800-222-1222

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact

* Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Breathing

* Remove the person from exposure.
* Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Vapor Pressure: 2 mm Hg at 68°F (20°C)
Flash Point: 86°F (30°C)
Water Solubility: Insoluble

OTHER COMMONLY USED NAMES

Chemical Name:
Benzene, Propyl-
Other Names:
n-Propyl Benzene; Isocumene; 1-Phenylpropane

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NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Right to Know Program
PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

Appendix E

MUNICIPAL SETTING DESIGNATION APPLICATION
8200 SOUTHWEST FREEWAY
HOUSTON, TEXAS

PROPERTIES OF CHEMICALS of CONCERN IN DESIGNATED GROUNDWATER

The following chemicals of concern (COCs) have been detected in the Designated Groundwater at the Site. COCs in bold have been identified at concentrations above the applicable residential ingestion PCL. The other VOCs were identified at concentrations below the applicable ingestion PCL:

- **Benzene**
- **1,2-DCA**
- **1,1-DCE**
- **Cis-1,2-DCE**
- **Ethylbenzene**
- **MTBE**
- **PCE**
- **Toluene**
- **VC**
- N-butylbenzene
- Sec-butylbenzene
- 1,1-DCA
- Di-isopropyl ether
- 1,2-Dichlorobenzene
- Isopropylbenzene
- 1,4-Isopropyltoluene
- Naphthalene
- N-Propylbenzene
- Styrene
- 1,1,1-Trichloroethane
- Trichloroethylene
- 1,2,4-TMB
- 1,2,3-TMB
- 1,3,5-TMB
- Xylenes

Soil and groundwater analytical data tables are presented in **Table 1 and Table 2, respectively** (presented in **Appendix F**). The analytical data tables present the concentrations of each COC in soil and groundwater in comparison to their respective ingestion and non-ingestion PCLs.

Figure 7 (previously presented in **Appendix B**) depicts the horizontal extent of the groundwater ingestion PCLE zone for benzene, 1,2-DCA, 1,1-DCE, cis-1,2-DCE, ethylbenzene, MTBE, PCE, toluene, and VC. No other COCs were detected at concentrations above the Tier 1 Residential PCLs. The groundwater bearing zone for which this MSD applies is located at a maximum estimated depth of approximately 50 feet bgs. Groundwater was first encountered beneath the Designated Property in the shallow water-bearing zone at depths of approximately 14.35 to 16.60 feet bgs.

COC concentrations are limited to an area of groundwater impact approximately 14.35 feet bgs to an estimated 50 feet bgs where an aquitard is encountered that significantly reduces the potential for the migration of COCs. COC are contained on-Site and levels above detection encompass an area of less than approximately 0.5 acres.

Appendix E

Groundwater ingestion and non-ingestion PCL data for benzene, 1,2-DCA, 1,1-DCE, cis-1,2-DCE, ethylbenzene, MTBE, PCE, toluene, and VC are found in **Appendix F**. n-Butylbenzene was identified in the plume at a maximum concentration of 0.0586 mg/L, which does not exceed the ingestion PCL of 0.98 mg/L. Sec-Butylbenzene was identified in the plume at a maximum concentration of 0.0039 mg/L, which does not exceed the ingestion PCL of 0.98 mg/L. 1,1-Dichloroethane was identified in the plume at a maximum concentration of 0.401 mg/L, which does not exceed the ingestion PCL of 4.9 mg/L. Chlorobenzene was identified in the plume at a maximum concentration of 0.0040 mg/L, which does not exceed the ingestion PCL of 0.1 mg/L. 1,2-Dichlorobenzne was identified in the plume at a maximum concentration of 0.0055, which does not exceed the ingestion PCL of 0.6 mg/L. Di-isopropyl ether was identified in the plume at a maximum concentration of 0.012 mg/L, which does not exceed the ingestion PCL of 2.4 mg/L. Isopropylbenzene was identified in the plume at a maximum concentration of 0.0399 mg/L, which does not exceed the ingestion PCL of 2.4 mg/L. 1,4-Isopropyltoluene was identified in the plume at a maximum concentration of 0.0024 mg/L, which does not exceed the ingestion PCL of 2.4 mg/L. Naphthalene was identified in the plume at a maximum concentration of 0.37 mg/L, which does not exceed the ingestion PCL of 0.49 mg/L. N-Propylbenzene was identified in the plume at a maximum concentration of 0.0876 mg/L, which does not exceed the ingestion PCL of 0.98 mg/L. Styrene was identified in the plume at a maximum concentration of 0.025 mg/L, which does not exceed the ingestion PCL of 0.1 mg/L. 1,1,1-Trichlorethane was identified in the plume at a maximum concentration of 0.0259 mg/L, which does not exceed the ingestion PCL of 0.2 mg/L. Trichloroethylene was identified in the plume at a maximum concentration of 0.0040 mg/L, which does not exceed the ingestion PCL of 0.005 mg/L. 1,2,4 – Trimethylbenzene was identified in the plume at a maximum concentration of 0.712 mg/L, which does not exceed the ingestion PCL of 1.2 mg/L. 1,2,3-Trimethylbenzene was identified in the plume at a maximum concentration of 0.020 mg/L, which does not exceed the ingestion PCL of 1.2 mg/L. 1,3,5- Trimethylbenzene was identified in the plume at a maximum concentration of 0.17 mg/L, which does not exceed the ingestion PCL of 1.2 mg/L. Xylenes were identified in the plume at a maximum concentration of 5.08 mg/L, which does not exceed the ingestion PCL of 10 mg/L. The total estimated surface area of affected groundwater with COC detections for the COCs listed above is less than 0.5 acres on the Designated Property. No reported concentrations of these COCs exceed the ingestion or the non-ingestion PCLs.

The chemical properties of the COCs listed above in this section are provided in the chemical abstract and fact sheet located in **Appendix D**. In general, all of the COCs are VOCs and are somewhat soluble in water to many parts per million. The chlorinated VOCs are denser than water and will tend to sink in groundwater if present above the solubility limit. Gasoline and other aromatic VOCs are lighter than water and will tend to float in groundwater if present above the solubility limit. Based on concentrations reported in the groundwater, there is no indication that a dense or light NAPL is present at the Designated Property.

Appendix F

MUNICIPAL SETTING DESIGNATION APPLICATION
8200 SOUTHWEST FREEWAY
HOUSTON, TEXAS

COC TABLES

The attached soil analytical data table, **Table 1**, contains the concentrations of each COC detected in soil and the respective critical PCLs both with and without an MSD. All VOCs were included in the laboratory analysis; however, only those COCs with detections above the laboratory sample quantitation limit (SQL) were listed.

Soil boring SB-02 and SB-03 were collected October 2007 by SSCi. Analytical results identified concentrations of arsenic, benzene, 1,1-DCE, ethylbenzene, 1,2,4-Trimethylbenzene, PCE, and toluene above the soil ingestion PCLs (refer to **BOLD** data in **Table 1** for incidents of exceedance). Fourteen other COCs listed in **Table 1** were detected in soil borings at the Site; however, the concentrations of these COCs were below their respective ingestion residential PCL.

The attached groundwater analytical data table, **Table 2**, contains the concentrations of each COC in groundwater and their respective critical PCLs both with and without an MSD. All VOCs were included in the laboratory analysis; however, only those COCs with detections above the SQL were listed.

Groundwater collected from temporary monitoring wells SB-02 and SB-03 (collected in October 2007) and monitoring well MW-04 (collected in June 2008) identified concentrations of benzene, 1,2-DCA, 1,1-DCE, MTBE, PCE, and VC, above the groundwater ingestion PCLs. Groundwater collected from temporary monitoring wells SB-02 and SB-03 also identified cis,1,2-DCE, ethylbenzene, and toluene at concentrations above their respective groundwater ingestion PCLs (refer to **BOLD** data in **Table 2** for incidents of exceedance). No DNAPL has been detected in any wells. Seventeen other COCs listed in **Table 2** were detected in groundwater collected at the Site; however, the concentrations are below their respective ingestion residential PCL.

No concentrations of COCs were detected in soil or groundwater samples at levels above the non-ingestion PCLs.

TABLE 1
SOIL ANALYTICAL DATA SUMMARY

8200 Southwest Freeway LLC
Houston, Texas

ANALYSIS	**Critical PCL without MSD** [5]	**Critical PCL with an MSD** [6]	MW-1 [1] (4-4.5')	MW-2 [1] (4-4.5')	MW-3 [1] (4-4.5')	MW-4 [1] (4-4.5')	SB-01[2] (12'-16')	SB-02[2] (15'-18')	SB-03[2] (21'-25')	SB-04[2] (0-4')
Date			3-Jun-08	3-Jun-08	3-Jun-08	3-Jun-08	31-Oct-07	31-Oct-07	31-Oct-07	31-Oct-07
VOCs[3]										
Acetone	**43**	**9,800**	0.31	<0.12	<0.12	<0.12	1.0	<0.45	<0.42	0.13
Benzene	**0.026**	**66**	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	**0.935**	**1.29**	<0.0015
n-Butyl-Benzene	**120**	**1,900**	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	5.88	1.77	<0.0012
sec-Butyl-benzene	**85**	**2,100**	<0.001	<0.001	<0.001	<0.001	<0.0013	1.49	0.535	<0.0012
Carbon Disulfide	**14**	**4,600**	-	-	-	-	<0.0015	<0.079	<0.075	0.002
1,1-Dichloroethylene	**0.05**	**2,300**	<0.0037	<0.0037	<0.0037	<0.0037	<0.0015	**0.131J**	<0.074	<0.014
Ethylbenzene	**7.6**	**5,300**	<0.0011	<0.0011	<0.0011	<0.0011	0.0053J	**21.0**	**8.01**	<0.0054
2-Hexanone	**3.9**	**110**	-	-	-	-	<0.0081	<0.43	<0.4	0.451
Isopropyl-benzene	**350**	**4,300**	<0.001	<0.001	<0.001	<0.001	<0.0014	2.46	0.944	<0.0013
Naphthalene	**31.0**	**220**	<0.012	<0.012	<0.012	<0.012	<0.0015	14.0	3.42	<0.0013
n-Propylbenzene	**45**	**2,200**	<0.001	<0.001	<0.001	0.0024J	<0.0013	11.6	3.34	<0.0012
1,1,1-Trichloroethane	**1.6**	**52,000**	<0.0026	<0.0026	<0.0026	<0.0026	<0.0014	0.13	<0.071	<0.0013
1,2,4-Trimethylbenzene	**49**	**150**	<0.00085	<0.00085	<0.00085	<0.00085	<0.0013	**68.6**	20.4	<0.0012
1,3,5-Trimethylbenzene	**53**	**110**	<0.0011	<0.0011	<0.0011	<0.0011	<0.0013	15.8	5.64	<0.0012
Tetrachloroethylene	**0.05**	**98**	<0.0012	<0.0012	<0.0012	<0.0012	<0.0016	**0.798**	**<0.078**	<0.0014
Toluene	**8.2**	**6,000**	<0.012	<0.012	<0.012	<0.012	0.0035J	**30.5**	2.56	0.0037J
Xylene	**120**	**1,400**	<0.0023	<0.0023	<0.0023	0.0066J	0.0252	88.8	29	<0.0041
RCRA Metals[4]										
Arsenic	**5.9**	**24**	-	-	-	-	4.5	**7.8**	0.818	3.2
Barium	**440**	**8,000**	-	-	-	-	327	53	45.6	158
Chromium	**2400**	**30,000**	-	-	-	-	25.4	10.2	9.3	15.9
Lead	**15**	**500**	-	-	-	-	11	12.8	5.9	10.7
Mercury	**0.04**	**3.6**	-	-	-	-	0.0035	<0.00038	0.00037	0.0064

[1]Soil samples were collected by W&M Environmental Group, Inc, and analyzed at Environmental Science Corporation (Lebanon, Tennessee)
[2]Soil samples collected by Separation Systems Consulting, Inc. (SSCI) on October 31, 2007 and analyzed by Accutest, Inc. (Houston, Texas)
[3]Volatile Organic Compounds (VOCs), Environmental Protection Agency (EPA) EPA Method 8260.
[4]Resource Conservation and Recovery Act (RCRA) Metals, EPA Method 6010B
[5]Critical PCL without an MSD is the Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Tier 1 Residential 0.5-Acre Source Area $^{GW}Soil_{ING}$ PCL (Ingestion PCL).
[6]Critical PCL with an MSD is the TCEQ TRRP Tier 1 Residential 0.5-Acre Source Area $^{Total}Soil_{Comb}$ PCL (Non-Ingestion PCL).
Bold values indicate concentrations exceeding the Critical PCL Without an MSD.
No concentrations exceed PCL with an MSD.
All VOCs and TPH were analyzed, only the chemicals of concern listed were detected above the laboratory sample quantitation limit (SQL).
All values are mg/kg.

TABLE 2
GROUNDWATER ANALYTICAL DATA SUMMARY

8200 Southwest Freeway LLC
Houston, Texas

	Critical PCL without MSD [4]	Critical PCL with an MSD [5]	MW-1 [1]		MW-2 [1]		MW-3 [1]		MW-4 [1]		Duplicate MW-4 [1]		MW-5 [1]		SB-02[2]	SB-03[2]
VOCs[3]			6/3/2008	10/22/2008	6/3/2008	10/22/2008	6/3/2008	10/22/2008	6/3/2008	10/22/2008	6/3/2008	10/22/2008	8/11/2008	10/22/2008	10/31/2007	10/31/2007
Benzene	**0.005**	**180**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.099**	**0.370**	**0.091**	**0.350**	<0.001	<0.001	**0.236**	**12.8**
n-Butylbenzene	**0.98**	**3,600**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0037	0.0012	0.0038	0.0014	<0.001	<0.001	0.0051J	0.0586
Sec-Butylbenzene	**0.98**	**3,900**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0024	0.0019	0.0025	0.0020	<0.001	<0.001	0.0039J	<0.0050
1,1-Dichloroethane	**4.9**	**7,200**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.014	0.017	0.013	0.018	<0.001	<0.001	0.401	0.057
Chlorobenzene	**0.1**	**1,200**	<0.0026	<0.0026	<0.0026	<0.0026	<0.0026	<0.0026	<0.0026	<0.0026	<0.0026	<0.0026	<0.0026	<0.0026	0.0040J	<0.0054
1,2-Dichloroethane	**0.005**	**33**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.0067**	<0.001	**0.0068**	<0.001	<0.001	**0.032**	**0.57**
1,1-Dichloethylene	**0.007**	**1,700**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.094**	**0.170**	**0.096**	**0.180**	<0.001	<0.001	**0.032**	**0.262**
cis-1,2-DCE	**0.07**	**16,000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0025	0.0150	0.0026	0.0150	<0.001	<0.001	0.0061J	**0.11**
1,2-Dichlorobenzene	**0.60**	**1,200**	<0.00029	<0.00029	<0.00029	<0.00029	<0.00029	<0.00029	<0.00029	<0.00029	<0.00029	<0.00029	<0.00029	<0.00029	0.0055J	<0.0050
Di-isopropyl ether	**2.4**	**11,000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.011	0.012	0.010	0.012	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	**0.7**	**16,000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.064	0.089	0.066	0.084	<0.001	0.0084J	0.589	**1.44**
Isopropylbenzene	**2.4**	**4,400**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0093	0.0081	0.0096	0.0078	<0.001	<0.001	0.0296	0.0399
1,4- isopropyltoluene	**2.4**	**4,600**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00093J	0.0020	0.0024	0.0021	<0.001	<0.001	<0.0029	<0.0058
Methyl tert-butyl ether	**0.24**	**4,000**	0.00042J	0.026	0.0077	0.013	0.00069J	0.0045	0.120	**0.270**	0.120	**0.290**	<0.001	<0.001	-	-
Naphthalene	**0.49**	**320**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.018	0.017	0.018	0.016	<0.005	<0.005	0.153	0.37
n-Propylbenzene	**0.98**	**6,000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.015	0.011	0.016	0.011	<0.001	<0.001	0.0706	0.0876
Styrene	**0.1**	**32,000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0034	0.0058	0.0035	0.0055	<0.001	<0.001	0.025	<0.0050
Tetrachloroethylene	**0.005**	**330**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0048	<0.001	**0.0052**	<0.001	0.00080	<0.001	**0.0082J**	**0.0196J**
Toluene	**1.0**	**78,000**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.100	0.075	0.098	0.075	<0.005	<0.005	0.484	**17.6**
1,1,1-Trichlorethane	**0.2**	**40,000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0017	0.0039	0.0015	0.0039	<0.001	<0.001	<0.0019	0.0259
Trichloroethylene	**0.005**	**160**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0019	<0.001	0.0019	<0.001	<0.001	<0.001	0.0040J	<0.0063
1,2,4- Trimethylbenzene	**1.2**	**190**	<0.001	0.004J	<0.001	0.0042	<0.001	0.0033	0.066	0.056	0.065	0.053	<0.001	0.0034	0.179	0.712
1,2,3- Trimethylbenzene	**1.2**	**190**	<0.001	<0.001	<0.001	0.00076J	<0.001	<0.001	0.020	0.015	0.020	0.014	<0.001	0.007J	-	-
1,3,5- Trimethylbenzene	**1.2**	**130**	<0.001	<0.001	<0.001	0.0011	<0.001	0.00083J	0.020	0.018	0.020	0.017	<0.001	0.00089J	0.046	0.17
Vinyl Chloride	**0.002**	**3.6**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.012**	**0.015**	**0.012**	**0.015**	<0.001	<0.001	**0.543**	**0.199**
Xylenes*	**10**	**1,700**	<0.003	<0.003	<0.003	0.0011	<0.003	0.001J	0.140	0.082	0.140	0.076	<0.003	0.0017J	0.543	5.08

[1]Groundwater samples were collected by W&M Environmental Group, Inc. and analyzed by Environmental Science Corporation (Lebanon, Tennessee).

[2]Groundwater samples collected by Separation Systems Consulting, Inc. (SSCI) on October 31, 2007 and analyzed by Accutest, Inc. (Houston, Texas).

[3]Volatile Organic Compounds (VOCs), Environmental Protection Agency (EPA) EPA Method 8260.

[4]Critical PCL without an MSD is the Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Tier 1 Residential 0.5-Acre Source Area $^{GW}GW_{ING}$ PCL (Ingestion PCL).

[5]Critical PCL with an MSD is the TCEQ TRRP Tier 1 Residential $^{Air}GW_{Inh-V}$ PCL (Non-Ingestion PCL).

Bold values indicate concentrations exceeding the Critical PCL without an MSD.

No concentrations exceed PCL with an MSD

All VOCs and TPH and PAHs on the highest TPH sample were analyzed, only the chemicals of concern listed were detected above the laboratory sample quantitation limit (SQL).

All Values are mg/L.

Appendix G

MUNICIPAL SETTING DESIGNATION APPLICATION
8200 SOUTHWEST FREEWAY
HOUSTON, TEXAS

STATEMENT REGARDING PLUME STABILITY

Based upon the investigations completed to date, the contaminant plume is stable. This statement is based upon the fact that the USTs were permanently filled and abandoned in-place in 1994. The age of the plume, the source mass, natural attenuation, and the low concentrations at the source all limit the migration of the contaminant plume. Since the source of impact is a decade old, natural degradation is underway and will continue to mitigate the impact. The source mass was small to begin with (only the small amount of residual left as the tanks were filled with sand-slurry and closed) and some soil residue. So without a large source mass, breakdown has exceeded expansion. The USTs were closed in accordance with the State of Texas regulations.

Groundwater sampling data indicates that the contaminant plume is centered on the northern corner of the Designated Property. The contaminant plume is fully delineated and contained on the Designated Property. Vertical contaminant migration is limited due to the extreme stratification in the area of southwest Houston. Many layers of clay are encountered in the geologic profile between the shallow groundwater and usable public supply groundwater units. The sand units that are encountered are small lens units at the Designated Property underlain by a series of clay aquitards.

Concentrations of the specified contaminants have not exceeded TRRP Tier 1 Residential Assessment Level <u>with an MSD</u> in any of the monitoring wells located on the Designated Property.