BLYMYER
ENGINEERS, INC.
1829 Clement Avenue
Alameda, California 94501-1396
(510) 521-3773 FAX: (510) 865-2594

LETTER OF TRANSMITTAL

DATE August 25, 1998	BEI Job No. 98078
ATTENTION: Mr. Russell Vincent	
SUBJECT: 1370 Ocean Avenue	
Emeryville, California	

Russell Vincent Construction

855 Keeler Avenue

Berkeley, CA 94708

We are sending you
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3	8/24/98		Final report; *ASTM RBCA Health Risk Assessment*

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COPY TO: File
Ms. Susan Hugo, ACHCSA
Ms. Madhulla Logan, ACHCSA

SIGNED: Mark Detterman

\\md\98078.rvc\transrvc.02

If enclosures are not as noted, kindly notify Blymyer Engineers, Inc. at once.

BLYMYER
ENGINEERS, INC.

August 24, 1998
BEI Job No. 98078

Mr. Russell Vincent
Russell Vincent Construction
855 Keeler Avenue
Berkeley, CA 94708

Subject: **ASTM RBCA Health Risk Assessment**
1370 Ocean Avenue
Emeryville, California

Dear Mr. Vincent:

Blymyer Engineers, Inc. is pleased to present this health risk assessment (HRA) evaluating the potential of soil and groundwater contamination to adversely impact the health of future onsite residential or construction workers (Figure 1). As discussed in the *Health Risk Assessment Workplan* dated August 11, 1998, Blymyer Engineers has used the model entitled *RBCA Tool Kit*, Version 1.0.1, by Groundwater Sciences, Inc. of Houston, Texas, which utilizes equations directly out of the American Society for Testing and Materials (ASTM) 1739-95 document entitled *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites*, dated November 1995. Version 1.0.1 is the most recent version of the program available and was downloaded from the Internet on May 1, 1998.

Blymyer Engineers has utilized existing data from the site in an attempt to determine the degree of health risk the residual chemical concentrations pose to future residential and utility construction workers at the site. It is the understanding of Blymyer Engineers that the existing commercial building located on the approximately eastern half of the subject site will be redeveloped into six live-work units and will be sold to future residents. The live-work units will be created through a subdivision of the existing building. No significant modification of the framework of the existing building will be undertaken. As a consequence, the risk assessment has utilized conservative residential standards during our analysis of risk that the known contaminants may pose to the future owners.

Existing soil and groundwater sample analytical results were utilized in conducting the assessment, and published, but conservative, chemical and soil parameter data were assumed where such input was required by the modeling program. Blymyer Engineers has utilized relevant, conservative data in each area of input. These areas are discussed below. It should be noted that the ASTM Worksheets have not been utilized to present relevant data in this report. The worksheets are not interconnected to the program's data input, and consequently would require reinputting of data supplied and presented in tabular form elsewhere. Where data is newly generated, or assumptions have been made, that data is presented in this report.

Blymyer Engineers principally focused the risk assessment efforts on benzene, toluene, ethylbenzene, and total xylenes (BTEX), methyl tert-butyl ether (MTBE), and volatile organic compounds (VOCs) which have been detected in either soil or groundwater beneath the subject site. Blymyer Engineers assumed risk to two potential receptors: an anticipated future residential occupant of the live-work facility in an outside and inside location and a construction worker potentially exposed to subsurface contaminants during utility modifications in the immediate vicinity of the documented contamination. Utility workers were assumed to be exposed to dermal contact with impacted soil and groundwater, inhalation of impacted soil dust and vapors, and groundwater vapors, and incidental ingestion of soil particles due to the potential to require dewatering during utility work immediately adjacent to the former underground storage tanks (UST) excavation. Incidental ingestion of groundwater was not assumed, nor modeled, as it is considered to be an unlikely occurrence.

Blymyer Engineers used a Hazard Quotient (HQ) of 1.0 for individual health risks related to non-carcinogenic chemicals, a Hazard Index (HI) of 1.0 for cumulative health risks related to non-carcinogenic chemicals, an individual health risk of 10^{-6} for individual carcinogenic chemicals, and a total health risk of 10^{-6} for carcinogenic chemicals for potential receptors. Use of 10^{-6} for cumulative health risk for carcinogenic chemicals is more conservative than recent industry trends, and previous Alameda County Health Care Services Agency (ACHCSA) requests.

1.0 Background

According to reports forwarded by International Geologic (IG), during preparations for a property transaction by the property owner, Plant Insulation Company (PIC), a suspected former fuel dispenser island was identified along the fenced western property boundary (Figure 2). On March 31, 1997, the suspected dispenser and the likely UST areas were investigated by excavation. An abandoned supply line and sections of a broken concrete slab were encountered during the explorations, but the UST appeared to have been removed prior to 1975 per communications between IG and PIC. On April 10, 1997, a hand augured bore was placed in the area of the exploration excavation to collect soil and grab groundwater samples. Upon analysis, the samples collected from the bore contained some or all of the following compounds: Total Petroleum Hydrocarbons (TPH) as gasoline, TPH as diesel, most of the BTEX compounds, total or dissolved lead, VOCs, and trace semi-volatile compounds (SVOCs). According to the documents forwarded the likely hydrocarbon released was diesel. A groundwater monitoring well was installed on October 11, 1997, approximately 9 feet from the former UST location in the assumed downgradient groundwater flow direction in an assumed "worst case" location with respect to contaminant concentrations. Groundwater flow direction is based upon data obtained from a three well monitoring network located at the immediately adjacent site to the west, the former RIX Industries site located at 6460 Hollis Street. According to reports forwarded by IG, three quarters of groundwater monitoring data have been gathered since the date of installation from the single groundwater monitoring well (MW-1) located at the site. A more complete background may be obtained from the following reports forwarded to Blymyer Engineers by IG:

- *Letter Report describing a subsurface investigation related to a suspected underground storage tank location at 1372 Ocean Avenue, Emeryville, California*, May 7, 1997, International Geologic

- *Groundwater Monitoring Well Installation Report*, December 12, 1997, International Geologic

- *Second Quarter Groundwater Monitoring Report for 1372 Ocean Avenue, Emeryville, California*, July 15, 1998, International Geologic

- *Summary Report Phase I Site Assessment*, April 29, 1998, International Geologic

- *Quarterly Groundwater Sampling Report (Rix Industries)*, May 28, 1996, Hageman-Aguiar, Inc.

- *Well Completion Report*, completed June 23, 1992, Department of Water Resources forms for wells MW-1, MW-2, MW-3 at the adjacent RIX Industries site.

On August 11, 1998, Blymyer Engineers submitted a brief risk assessment workplan entitled *Health Risk Assessment Letter Workplan*, to the ACHCSA. Due time constraints, and at the request of our client, this HRA was generated prior to ACHCSA approval of the workplan.

2.0 Site Data Summary and Data Selection Rationale

2.1 Subsurface Geology

Monitoring well MW-1 was installed to a maximum depth of approximately 16.5 feet. According to the bore log from well MW-1, the area of the investigation at the site is underlain by approximately 7.5 feet of silty clay, 3.5 feet of sandy clay to clayey sand, and 5.5 feet of silty clay to the maximum explored depth at the site. This is similar to the stratigraphy for the wells at the adjacent former RIX Industries facility, according to the Department of Water Resources (DWR) *Well Completion Reports* provided by IG for wells MW-1, MW-2, and MW-3 at that site. The only notable difference is that the granular unit at RIX Industries becomes shallower and thinner towards the west.

The near-surface vadose zone sediments appear to have been mostly damp, to moist (assumed) with depth. Sediments in the vadose zone are typically silty clays. The ASTM modeling program default thicknesses for the vadose zone and the capillary fringe (5 cm) were modified to reflect more realistic values for the soils encountered at the site. The capillary thickness was derived from Table 2.4 in *Groundwater Hydrology*, second edition, 1980, by David Keith Todd. A thinner capillary zone produces a more conservative result; consequently, the capillary thickness selected (110 cm) is more appropriate of a silt although the actual soils were considerably more clayey (finer), and would be represented better with a capillary thickness of 200 cm.

Groundwater is confined. Groundwater was originally encountered at approximately 7.5 feet below grade surface (bgs) during well installation in October 1997, and shortly rose to approximately 4 feet bgs. It has varied between 3.12 to 4.38 feet bgs in well MW-1 since that time. For the purposes of modeling it was assumed that groundwater was at 7.5 feet bgs.

2.2 Analytical Data Review

To generate the health risk assessment, all soil and groundwater analytical data generated at the site were utilized. To provide a sufficient number of samples to generate the best available conservative statistical evaluation of the site, it was assumed that detectable concentrations of an analyte were present in all samples which produced nondetectable results, at 95% of the detection limit. Thus it was assumed that in soil sample S-7-SB1, 4.7 parts per billion (ppb) of vinyl chloride were detected when the detection limit was 5 ppb. Because these potentially theoretical, high concentrations would skew the results significantly, the 95% upper confidence level (UCL) was used in the risk calculations rather than maximum concentrations. This remains, however, more conservative than use of the calculated contaminant concentration mean, as generally requested by the ACHCSA (Appendix A).

Data for all soil and groundwater analytical results are enclosed in Appendix A. This is a compilation of all site-specific data generated and forwarded by IG and contains all relevant laboratory analytical data used for the input of the chemicals of concern (COC).

3.0 ASTM Risk Assessment

The *RBCA Tool Kit* consists of a series of screens that facilitate the input of site-related data. These are discussed in some detail below.

3.1 Site Location and Site Specific Target Level Choice

Site location, name, and other relevant cultural data is input in Screen 1. In Screen 2 Site Specific Target Levels (SSTLs), or health-based remedial goals, are chosen from three options; *Site-Specific Screening Levels, Individual Constituent SSTLs*, and *Cumulative/Individual Constituent SSTLs*. For this HRA, Blymyer Engineers chose the most in-depth option in the program, *Cumulative/Individual Constituent SSTLs*.

3.2 Exposure Pathway Input

Exposure Pathway Data are input in Screens 3.1 and 3.2. As proposed in the referenced HRA workplan, Blymyer Engineers explicitly excluded a groundwater ingestion pathway, due to previous discussions with the ACHCSA concerning the nonpotability of near surface groundwater in Emeryville and along the bay fringe.

Onsite commercial ingestion and dermal contact to surface soil was considered a completed pathway for the purpose of modeling risk to a construction worker excavating soil in the vicinity of the release. Because there are no detectable concentrations of the COC in the surface soils (defined as the upper meter bgs [3.28 feet] by the program) it was assumed that the available COC data from subsurface soils were also encountered in the surface soil at equal concentrations. In this scenario the program was run with 100% of the subsurface soil contaminant impact in the surface soil and 100% in the subsurface soil (ie, a total of 200% of actual contaminant concentration from the subsurface soil).

Multiple air exposure pathways were evaluated as a part of the modeling effort. Assumed onsite residential receptors were evaluated for *Outdoor Air Exposure Pathways* including *Volatiles and Particulates from Surface Soils*, as described above, *Volatiles and Particulates from Subsurface Soils to Ambient Air*, and *Volatiles from Groundwater to Ambient Air. Indoor Air Exposure Pathways* were modeled for an assumed onsite residential receptor, including *Volatiles From Groundwater to Enclosed Space* with the available data. *Volatiles From Subsurface Soil to Enclosed Space* was not modeled as all known subsurface volatiles in soil are west of the building at the site and would be expected to escape into outdoor air. Because modeling for residential exposure to outdoor or indoor air is inherently more conservative than commercial or construction exposure, this modeling program does not calculate these exposures if there is an onsite residential exposure scenario. The default parameters for a commercial building were replaced with actual parameter values. All site-specific calculations are detailed in Appendix B. A printout of input data is included in Appendix C. Items in bold print on the printout sheet (*Output Table 1*) are site-specific modifications.

3.3 Exposure Factors

Screen 4.1 allows the input of typical human health *Exposure Factors* such as the averaging time for carcinogens and noncarcinogens, body weight, exposure durations, exposure frequency, dermal exposure frequency, skin surface area (assuming 70 year life span; skin surface of an infant, child, and adult). With the exception of an age adjustment to the skin surface area (more conservative), all data parameters on this screen conformed to ASTM default (conservative) parameters in this project. A printout of these data is included in Appendix C. Items in bold print on the printout sheet (*Output Table 1*) are site-specific modifications.

Screen 4.2 allows further input of *Exposure Factors* such as the ingestion rate of water, ingestion rate of soil, age adjustment of these two items, inhalation rate indoors and outdoors, and soil-to-skin adherence factor. All data parameters on this screen conformed to ASTM default (conservative) parameters in this project.

3.4 Target Risk Values

Screen 5 allows the input of *Target Risk Values* for individual and cumulative risk goals. As proposed in the workplan, this project used risk values of 1.00E-6 for individual carcinogens and a modified (more conservative) risk value of 1.00E-6 for cumulative chemical risk goals for carcinogens. For noncarcinogens the target HQ goal for individual chemical risk and the target Hazard Index goal for cumulative chemical risk goals were both 1.0. This screen also allows the further specification of Permissible Exposure Limits/Threshold Limit Values (PEL/TLV) commercial/industrial exposure limits for air, and Maximum Contaminant Level (MCL) exposure limits for groundwater ingestion. These were not utilized, as the goal of this project is to determine individual and total health risk to site and construction workers based on specified target health risk limits (i.e., 1.00E-6), rather than chemical exposure thresholds (i.e., PEL/TLV). Appendix C contains a printout of the *Target Risk Values* on the site-specific *Output Table 1* used for this project.

3.5 Chemicals of Concern

Screen 6 allows input of the site-specific COC, and screens 6.1 and 6.2 allow input of new COC relevant to the site. The *RBCA Tool Kit* program contains a 90-chemical database from which to draw; however, the parameters used for benzene were modified to fit the parameters recognized by the California Environmental Protection Agency. This specifically included the cancer potency factor (slope factor) of 0.1 kg-day/mg, in comparison to the Federal EPA slope factor of 0.029 kg-day/mg. Additionally 1,1-Dichloroethene chemical data was input into the chemical database for this modeling effort. Copies of the data output files for all chemicals are included as Appendix D.

3.6 Representative COC Concentrations

Screen 7 allows input of *Representative COC Concentrations in Source Media.* As discussed previously, all soil and groundwater analytical data generated at the site were utilized. To generate conservative modeling parameters, it was assumed that detectable concentrations of an analyte were present in all samples which produced nondetectable laboratory results, at 95% of the detection limit. Copies of the data output files for the results of these calculations are included in Appendix A.

3.7 Site-Specific Parameters

Screen 8.1 allows *Site-Specific Soil Parameters* to be input. These parameters include vadose zone thickness, capillary zone thickness, depth to groundwater, and a number of other parameters. Screen 8.2 allows *Site-Specific Groundwater Parameters* to be input, and screen 8.3 allows *Site-Specific Air Parameters* to be input. Screen 8.4 allows *Site-Specific Building Parameters* to be input. These are the screens wherein the specific modifications to the default values discussed in Sections 2.1, 2.2, and 3.2 were input. If site-specific parameters were not available, the *RBCA Tool-Kit* default parameters were used. A printout of the parameters used in this project is included in Appendix C. All site-specific inputs appear in bold on Output Table I.

4.0 Modeling Results; Baseline Risk Levels and Media Cleanup Goals

Based on these input data *Baseline Risk Levels* and *Media Cleanup Goals* were generated by the program. Appendix E contains a *Baseline Risk Summary Table* and individual pathway *Exposure Concentration and Intake Calculation* tables for air, soil, and groundwater for the scenarios modeled. In all cases the model indicates that there is not a baseline risk for any environmental media, or for any residential or construction receptor, for either carcinogens or noncarcinogens onsite, and consequently in the vicinity, with the (conservative) assumptions used in this program. Please note that the groundwater ingestion pathway is not complete as the use of groundwater as drinking water has been excluded as discussed above. On *Worksheet 8.3* included in Appendix E, NC stands for "No Concentration" entered. As a consequence of these results, there are additionally no onsite or offsite SSTL values (or media-specific goals) for surface, subsurface or groundwater pathways other than existing chemical concentrations (Appendix F), which have been exceeded for individual COC, or for cumulative risk effects (Appendix G).

5.0 Recommendations

- Based on the results of this modeling program for the site, and our understanding of the site as based upon the forwarded documents, Blymyer Engineers recommends a risk-based site closure for the property located at 1372 Ocean Avenue in Emeryville. Contaminant concentrations present at the site do not appear to represent a health risk for the anticipated uses or activities at the site.

- Blymyer Engineers recommends that a copy of this report be forwarded in a timely manner to:

  Alameda County Health Care Services Agency
  Environmental Health Department
  Environmental Protection Division
  1131 Harbor Bay Parkway, #250
  Alameda, CA 94502
  Attn: Ms. Susan Hugo
  Attn: Ms. Madhulla Logan

6.0 Limitations

Services performed by Blymyer Engineers, Inc. have been provided in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. The scope of work for the project was conducted within the limitations prescribed by our client. This report is not meant to represent a legal opinion. No other warranty, expressed or implied, is made. This report was prepared for the sole use of our client. Third-party liability cannot be accepted by Blymyer Engineers, Inc.

Please call Mark Detterman at (510) 521-3773 with any questions or comments regarding this project.

Sincerely,

Blymyer Engineers, Inc.

By: _____
Mark E. Detterman, C.E.G. 1788
Senior Geologist

REGISTERED GEOLOGIST
MARK E. DETTERMAN
No. 1788
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

And: _____
Michael S. Lewis
Vice President, Technical Services

Enclosures:

Figure 1: Site Location Map
Figure 2: Site Plan

Appendix A: *Representative COC Concentration In Source Media*, Output Files
Appendix B: Building Parameter Modification Calculations
Appendix C: Site-Specific Parameters *Output Table 1*
Appendix D: *RBCA Chemical Database* Output Files
Appendix E: *Baseline Risk Summary Table*, *Exposure Concentration and Intake Calculation* Tables, and *Tier 2 Pathway Risk Calculation* Tables
Appendix F: SSTL Values for Surface, Subsurface, and Groundwater Pathways
Appendix G: Cumulative Risk Worksheets for Onsite Receptors

UNITED STATES GEOLOGICAL SURVEY 7.5' QUAD. "OAKLAND WEST, CA", ED. 1959, PHOTOREVISED 1980.

BLYMYER ENGINEERS, INC.

BEI JOB NO. 98078

DATE 8-25-98

0 1000 2000

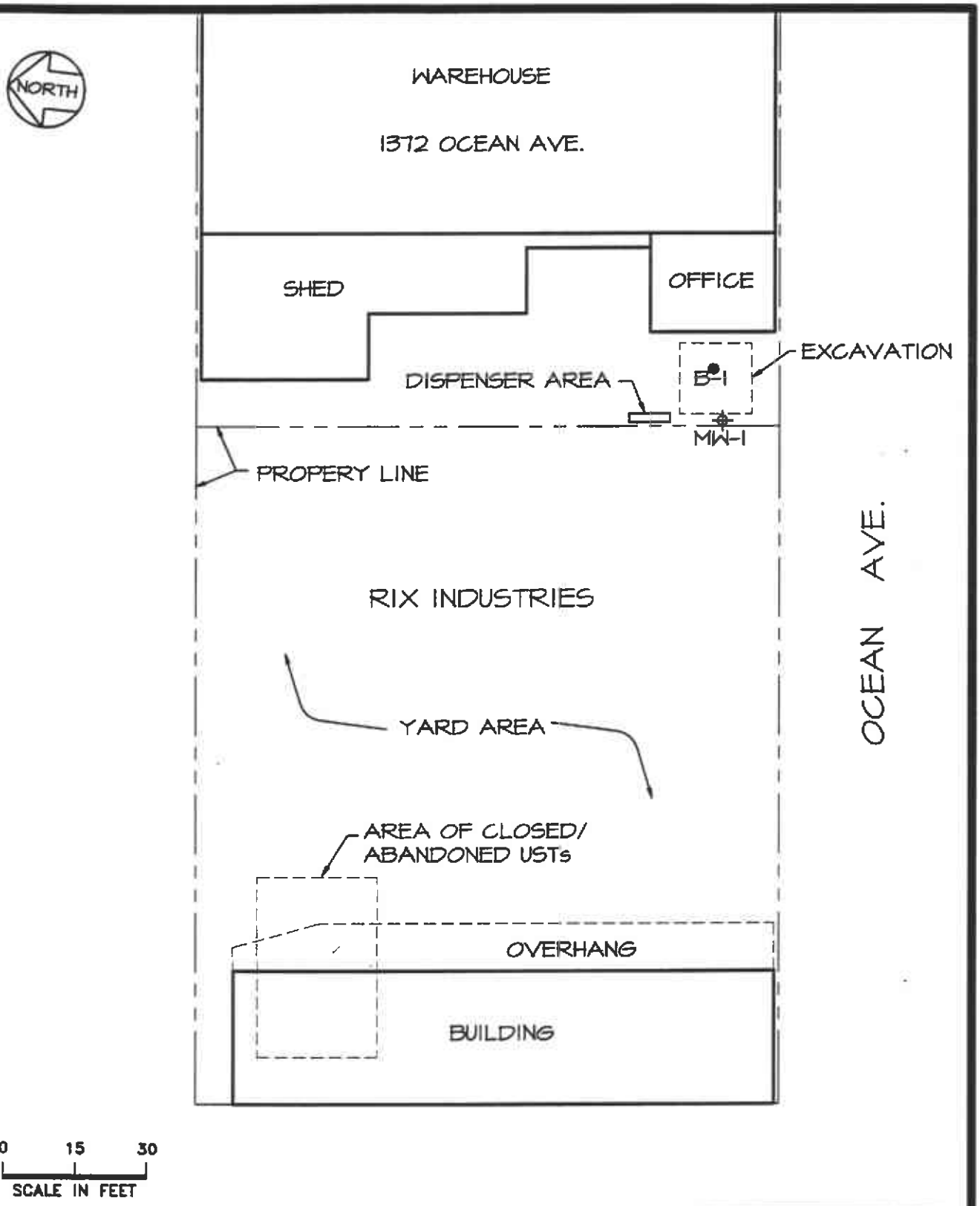
SCALE IN FEET

N

SITE LOCATION MAP

RUSSELL VINCENT CONSTRUCTION
1372 OCEAN AVE.
EMERYVILLE, CA

FIGURE 1



BLYMYER ENGINEERS, INC.

BEI JOB NO.	DATE
95065	8/29/95

LEGEND
- ● BORING LOCATION
- ⌖ MONITORING WELL LOCATION
- UST UNDERGROUND STORAGE TANK

SITE PLAN
RUSSELL VINCENT CONSTRUCTION
1372 OCEAN AVE.
EMERYVILLE, CA

FIGURE 2

I:\acad\Bdwg\98078\980782 8-25-98

Appendix A

Representative COC Concentration In Source Media

Output Files

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

(Complete the following table)

CONSTITUENT	Representative COC Concentration in Groundwater		in Surface Soil		in Subsurface Soil	
	value (mg/L)	note	value (mg/kg)	note	value (mg/kg)	note
Benzene - CA	4.7E-4	UCL	7.4E-3	UCL	7.4E-3	UCL
Dichloroethene, 1,1-	2.7E-3	UCL	4.7E-3	UCL	4.7E-3	UCL
Dichloroethene, cis-1,2-	1.8E-2	UCL	4.7E-3	UCL	4.7E-3	UCL
Dichloroethene,1,2-trans-	2.7E-3	UCL	4.7E-3	UCL	4.7E-3	UCL
Ethylbenzene	4.7E-4	UCL	3.1E-1	UCL	3.1E-1	UCL
Methyl t-Butyl Ether	5.4E-2	UCL	1.4E-1	UCL	1.4E-1	UCL
Tetrachloroethene	5.6E-3	UCL	4.7E-3	UCL	4.7E-3	UCL
Toluene	4.7E-4	UCL	1.9E-1	UCL	1.9E-1	UCL
Trichloroethene	8.7E-2	UCL	4.7E-3	UCL	4.7E-3	UCL
Trichlorofluoromethane	3.7E-3	UCL	4.7E-3	UCL	4.7E-3	UCL
Vinyl chloride	2.9E-3	UCL	4.7E-3	UCL	4.7E-3	UCL
Xylene (mixed isomers)	6.5E-4	UCL	8.4E-1	UCL	8.4E-1	UCL

Site Name: Ocean Avenue

Site Location: 1372 Ocean Avenue, Emeryville, CA

Site Name: Ocean Avenue | Completed By: Mark Detterman
Site Location: 1372 Ocean Avenue, Emeryville | Date Completed: 8/21/1998 | *1 of 1*

TIER 2 GROUNDWATER CONCENTRATION DATA SUMMARY

CONSTITUENTS DETECTED		Analytical Method			Detected Concentrations		
CAS No.	Name	Typical Detection Limit (mg/L)	No. of Samples	No. of Detects	Maximum Conc. (mg/L)	Mean Conc. (mg/L)	UCL on Mean Conc. (mg/L)
71-43-2	Benzene - CA	5.0E-04	4	4	4.7E-04	4.7E-04	4.7E-04
75-35-4	Dichloroethene, 1,1-	2.0E-03	4	4	2.8E-03	1.6E-03	2.7E-03
156-59-2	Dichloroethene, cis-1,2-	2.0E-03	4	4	1.7E-02	1.4E-02	1.8E-02
156-60-5	Dichloroethene,1,2-trans-	2.0E-03	4	4	2.8E-03	2.4E-03	2.7E-03
100-41-4	Ethylbenzene	5.0E-04	4	4	4.7E-04	4.7E-04	4.7E-04
1634-04-4	Methyl t-Butyl Ether	5.0E-03	4	4	4.7E-02	2.7E-02	5.4E-02
127-18-4	Tetrachloroethene	3.0E-03	4	4	6.0E-03	3.2E-03	5.6E-03
108-88-3	Toluene	5.0E-04	4	4	4.7E-04	4.7E-04	4.7E-04
79-01-6	Trichloroethene	2.0E-03	4	4	8.2E-02	6.0E-02	8.7E-02
75-69-4	Trichlorofluoromethane	2.0E-03	4	4	3.8E-03	2.7E-03	3.7E-03
75-01-4	Vinyl chloride	5.0E-04	4	4	3.0E-03	2.0E-03	2.9E-03
1330-20-7	Xylene (mixed isomers)	5.0E-04	4	4	6.9E-04	5.3E-04	6.5E-04

SCREEN 7.1 GROUNDWATER CONCENTRATION CALCULATOR

Choose UCL Percentile

95%

Analytical Data (Up to 50 Data Points)

	1	2	3	4	5	6	7	8	9	10	11
Calculated Distribution of Data	Default Detection Limit (mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Well Name		W-B1	MW-1	MW-1	MW-1							
Date Sampled		4/10/97	10/19/97	3/6/98	6/21/98							
Normal	0.0005	0.00047	0.00047	0.00047	0.00047							
Normal	0.002	0.00123	0.00057	0.0028	0.0019							
Normal	0.002	0.0094	0.012	0.015	0.017							
Normal	0.002	0.0024	0.0022	0.0028	0.0021							
Normal	0.0005	0.00047	0.00047	0.00047	0.00047							
Normal	0.005	0.0085	0.047	0.047	0.0071							
Normal	0.003	0.00123	0.005	0.0028	0.0028							
Normal	0.0005	0.00047	0.00047	0.00047	0.00047							
Normal	0.002	0.04	0.041	0.082	0.078							
Normal	0.002	0.0027	0.0025	0.0038	0.0019							
Normal	0.0005	0.0015	0.0011	0.003	0.0022							
Normal	0.0005	0.00069	0.00047	0.00047	0.00047							

Site Name: Ocean Avenue | Completed By: Mark Detterman
Site Location: 1372 Ocean Avenue, Emeryville, C | Date Completed: 8/21/1998 | 1 of 1

TIER 2 SUBSURFACE SOIL CONCENTRATION DATA SUMMARY

CONSTITUENTS DETECTED		Analytical Method			Detected Concentrations		
CAS No.	Name	Typical Detection Limit (mg/kg)	No. of Samples	No. of Detects	Maximum Conc. (mg/kg)	Mean Conc. (mg/kg)	UCL on Mean Conc. (mg/kg)
71-43-2	Benzene - CA	5.0E-03	5	5	9.0E-03	5.6E-03	7.4E-03
75-35-4	Dichloroethene, 1,1-	5.0E-03	2	2	4.7E-03	4.7E-03	4.7E-03
156-59-2	Dichloroethene, cis-1,2-	5.0E-03	2	2	4.7E-03	4.7E-03	4.7E-03
156-60-5	Dichloroethene,1,2-trans-	5.0E-03	2	2	4.7E-03	4.7E-03	4.7E-03
100-41-4	Ethylbenzene	5.0E-03	5	5	5.2E-01	2.9E-02	3.1E-01
1634-04-4	Methyl t-Butyl Ether		5	5	1.9E-01	7.6E-02	1.4E-01
127-18-4	Tetrachloroethene	5.0E-03	2	2	4.7E-03	4.7E-03	4.7E-03
108-88-3	Toluene	5.0E-03	5	5	3.5E-01	2.4E-02	1.9E-01
79-01-6	Trichloroethene	5.0E-03	2	2	4.7E-03	4.7E-03	4.7E-03
75-69-4	Trichlorofluoromethane	5.0E-03	2	2	4.7E-03	4.7E-03	4.7E-03
75-01-4	Vinyl chloride	5.0E-03	2	2	4.7E-03	4.7E-03	4.7E-03
1330-20-7	Xylene (mixed isomers)	5.0E-03	5	5	1.4E+00	4.4E-02	8.4E-01

SCREEN 7.3
SUBSURFACE SOILS
CONCENTRATION
CALCULATOR

UCL Percentile
95%

Analytical Data (Up to 50 Data Points)

	1	2	3	4	5	6	7	8	9	10	11
Calculated Distribution of Data	Default Detection Limit (mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Sample Name		S-5.5-B1	S-2-D1	S-5.5-SB1	S-7-SB1	S-11.5-SB1						
Date Sampled		4/10/97	4/10/97	10/10/97	10/10/97	10/10/97						
Normal	0.005	0.009	0.0047	0.0047	0.0047	0.0047						
Normal	0.005	0.0047			0.0047							
Normal	0.005	0.0047			0.0047							
Normal	0.005	0.0047			0.0047							
Lognormal	0.005	0.38	0.0047	0.52	0.0047	0.0047						
Normal	0	0.19	0.047	0.047	0.047	0.047						
Normal	0.005	0.0047			0.0047							
Lognormal	0.005	0.2	0.0047	0.35	0.0047	0.0047						
Normal	0.005	0.0047			0.0047							
Normal	0.005	0.0047			0.0047							
Normal	0.005	0.0047			0.0047							
Lognormal	0.005	1.2	0.0047	1.4	0.0047	0.0047						

RBCA SITE ASSESSMENT | Input Screen 9.4

GROUNDWATER DAF VALUES

(Enter DAF values in the grey area of the following table)

CONSTITUENT	Dilution Attenuation Factor (DAF) in Groundwater	
	Residential Receptor	Comm./Ind. Receptor
Benzene - CA	1.0E+0	1.0E+0
Dichloroethene, 1,1-	1.0E+0	1.0E+0
Dichloroethene, cis-1,2-	1.0E+0	1.0E+0
Dichloroethene,1,2-trans-	1.0E+0	1.0E+0
Ethylbenzene	1.0E+0	1.0E+0
Methyl t-Butyl Ether	1.0E+0	1.0E+0
Tetrachloroethene	1.0E+0	1.0E+0
Toluene	1.0E+0	1.0E+0
Trichloroethene	1.0E+0	1.0E+0
Trichlorofluoromethane	1.0E+0	1.0E+0
Vinyl chloride	1.0E+0	1.0E+0
Xylene (mixed isomers)	1.0E+0	1.0E+0

Site Name: Ocean Avenue
Site Location: 1372 Ocean Avenue, Emeryville, CA

Completed By: Mark Detterman
Date Completed: 8/21/1998

RBCA SITE ASSESSMENT	Input Screen 9.1

CONSTITUENT HALF-LIFE VALUES

(Complete the following table)

CONSTITUENT	Half-Life of Constituent (day)
Benzene - CA	
Dichloroethene, 1,1-	
Dichloroethene, cis-1,2-	
Dichloroethene,1,2-trans-	
Ethylbenzene	228
Methyl t-Butyl Ether	
Tetrachloroethene	
Toluene	28
Trichloroethene	
Trichlorofluoromethane	
Vinyl chloride	
Xylene (mixed isomers)	360

Site Name: Ocean Avenue Completed By: Mark Detterman

Site Location: 1372 Ocean Avenue, Emeryv Date Completed: 8/21/1998

RBCA SITE ASSESSMENT

EXPOSURE LIMITS IN GROUNDWATER AND AIR

CONSTITUENT	Exposure Limits Applied to Receptors	
	Groundwater (MCL) (mg/L)	Air (Comm. only) (PEL/TLV) (mg/m^3)
Benzene - CA		
Dichloroethene, 1,1-		
Dichloroethene, cis-1,2-		
Dichloroethene,1,2-trans-		
Ethylbenzene		
Methyl t-Butyl Ether		
Tetrachloroethene		
Toluene		
Trichloroethene		
Trichlorofluoromethane		
Vinyl chloride		
Xylene (mixed isomers)		

Site Name: Ocean Avenue
Site Location: 1372 Ocean Avenue, Emeryville, CA

Completed By: Mark Detterman
Date Completed: 8/21/1998

Appendix B

Building Parameter Modification Calculations

Residential Building Volume/Area Ratio (cm):

This calculation utilizes the smallest unit of the proposed six unit redevelopment at the site, Unit 1, to obtain the lowest (most conservative) volume/area ratio possible.

$$16 \text{ ft} \times 23 \text{ ft} \times 20 \text{ ft (W x L x H)} = \frac{488 \text{ cm} \times 701 \text{ cm} \times 610 \text{ cm}}{488 \text{ cm} \times 701 \text{ cm}} = 610{:}1$$

Building Volume/Area Ratio Utilized in Modeling: 600 cm

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: Ocean Avenue | Job Identification: 98078 | Software: GSI RBCA Spreadsheet
Site Location: 1372 Ocean Avenue, Emeryville | Date Completed: 8/21/98 | Version: 1.0.1
Completed By: Mark Detterman

NOTE: values which differ from Tier 1 default values are shown in bold italics and underlined

Exposure Parameter	Definition (Units)	Residential Adult	Residential (1-6yrs)	Residential (1-16 yrs)	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
ATc	Averaging time for carcinogens (yr)	70				
ATn	Averaging time for non-carcinogens (yr)	30	6	16	25	1
BW	Body Weight (kg)	70	15	35	70	
ED	Exposure Duration (yr)	30	6	16	25	1
t	Averaging time for vapor flux (yr)	30			25	1
EF	Exposure Frequency (days/yr)	350			250	180
EF.Derm	Exposure Frequency for dermal exposure	350			250	
IRgw	Ingestion Rate of Water (L/day)	2			1	
IRs	Ingestion Rate of Soil (mg/day)	100	200		50	100
IRadj	Adjusted soil ing. rate (mg-yr/kg-d)	1.1E+02			9.4E+01	
IRa.in	Inhalation rate indoor (m^3/day)	15			20	
IRa.out	Inhalation rate outdoor (m^3/day)	20			20	10
SA	Skin surface area (dermal) (cm^2)	5.8E+03		2.0E+03	5.8E+03	5.8E+03
SAadj	Adjusted dermal area (cm^2-yr/kg)	2.1E+03			1.7E+03	
M	Soil to Skin adherence factor	1				
AAFs	Age adjustment on soil ingestion	***TRUE***			***TRUE***	
AAFd	Age adjustment on skin surface area	***TRUE***			***TRUE***	
tox	Use EPA tox data for air (or PEL based)?	TRUE				
gwMCL?	Use MCL as exposure limit in groundwater?	FALSE				

Matrix of Exposed Persons to Complete Exposure Pathways		Residential	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
Outdoor Air Pathways:				
SS.v	Volatiles and Particulates from Surface Soils	TRUE	FALSE	TRUE
S.v	Volatilization from Subsurface Soils	TRUE	FALSE	
GW.v	Volatilization from Groundwater	TRUE	FALSE	
Indoor Air Pathways:				
S.b	Vapors from Subsurface Soils	FALSE	FALSE	
GW.b	Vapors from Groundwater	TRUE	FALSE	
Soil Pathways:				
SS.d	Direct Ingestion and Dermal Contact	FALSE	TRUE	TRUE
Groundwater Pathways:				
GW.i	Groundwater Ingestion	FALSE	FALSE	
S.l	Leaching to Groundwater from all Soils	FALSE	FALSE	

Matrix of Receptor Distance and Location On- or Off-Site		Residential Distance	Residential On-Site	Commercial/Industrial Distance	Commercial/Industrial On-Site
GW	Groundwater receptor (cm)		FALSE		FALSE
S	Inhalation receptor (cm)		TRUE		FALSE

Matrix of Target Risks		Individual	Cumulative
TRab	Target Risk (class A&B carcinogens)	1.0E-06	***1.0E-06***
TRc	Target Risk (class C carcinogens)	1.0E-05	
THQ	Target Hazard Quotient	1.0E+00	1.0E+00
Opt	Calculation Option (1, 2, or 3)	3	
Tier	RBCA Tier	2	

Surface Parameters	Definition (Units)	Residential	Constrctn
A	Contaminated soil area (cm^2)	***7.0E+04***	***2.8E+04***
W	Length of affect. soil parallel to wind (cm)	***4.6E+02***	***9.1E+01***
W.gw	Length of affect. soil parallel to groundwater (cm)	***4.6E+02***	
Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02	
delta	Air mixing zone height (cm)	2.0E+02	
Lss	Thickness of affected surface soils (cm)	***7.6E+01***	
Pe	Particulate areal emission rate (g/cm^2/s)	6.9E-14	

Groundwater	Definition (Units)	Value
delta.gw	Groundwater mixing zone depth (cm)	2.0E+02
I	Groundwater infiltration rate (cm/yr)	3.0E+01
Ugw	Groundwater Darcy velocity (cm/yr)	2.5E+03
Ugw.tr	Groundwater seepage velocity (cm/yr)	6.6E+03
Ks	Saturated hydraulic conductivity(cm/s)	
grad	Groundwater gradient (cm/cm)	
Sw	Width of groundwater source zone (cm)	
Sd	Depth of groundwater source zone (cm)	
phi.eff	Effective porosity in water-bearing unit	3.8E-01
foc.sat	Fraction organic carbon in water-bearing unit	1.0E-03
BIO?	Is bioattenuation considered?	FALSE
BC	Biodegradation Capacity (mg/L)	

Soil	Definition (Units)	Value		
hc	Capillary zone thickness (cm)	***1.1E+02***		
hv	Vadose zone thickness (cm)	***1.2E+02***		
rho	Soil density (g/cm^3)	1.7		
foc	Fraction of organic carbon in vadose zone	0.01		
phi	Soil porosity in vadose zone	0.38		
Lgw	Depth to groundwater (cm)	***2.3E+02***		
Ls	Depth to top of affected subsurface soil (cm)	***1.1E+02***		
Lsubs	Thickness of affected subsurface soils (cm)	***7.6E+01***		
pH	Soil/groundwater pH	***7.5***		
		capillary	vadose	foundation
phi.w	Volumetric water content	0.342	0.12	0.12
phi.a	Volumetric air content	0.038	0.26	0.26

Building	Definition (Units)	Residential	Commercial
Lb	Building volume/area ratio (cm)	***6.0E+02***	***6.0E+02***
ER	Building air exchange rate (s^-1)	1.4E-04	2.3E-04
Lcrk	Foundation crack thickness (cm)	***2.5E+00***	
eta	Foundation crack fraction	0.01	

Transport Parameters	Definition (Units)	Residential	Commercial
Groundwater			
ax	Longitudinal dispersivity (cm)		
ay	Transverse dispersivity (cm)		
az	Vertical dispersivity (cm)		
Vapor			
dcy	Transverse dispersion coefficient (cm)		
dcz	Vertical dispersion coefficient (cm)		

RBCA CHEMICAL DATABASE

Physical Property Data

CAS Number	Constituent	type	Molecular Weight (g/mole) MW	ref	Diffusion Coefficients in air (cm2/s) Dair	ref	in water (cm2/s) Dwat	ref	log (Koc) or log(Kd) (@ 20 - 25 C) log(l/kg)	ref	Henry's Law Constant (@ 20 - 25 C) (atm-m3) mol	(unitless)	ref	Vapor Pressure (@ 20 - 25 C) (mm Hg)	ref	Solubility (@ 20 - 25 C) (mg/L)	ref	acid pKa	base pKb	ref
71-43-2	Benzene - CA	O	78.1		9.30E-02		1.10E-05		1.58		5.29E-03	2.20E-01		9.52E+01		1.75E+03				
75-35-4	Dichloroethene, 1,1-	O	96.94		9.40E-02		9.50E-06		1.81		5.29E-02	2.20E+00		5.00E+02		4.00E+02				
156-59-2	Dichloroethene, cis-1,2-	C	96.936	4	7.36E-02	4	1.13E-05	4	1.38	8	3.19E-02	1.33E+00	4	2.00E+02	5	8.00E+02	5			
156-60-5	Dichloroethene,1,2-trans-	C	96.936	4	7.07E-02	4	1.19E-05	4	1.46	4	5.32E-03	2.21E-01	4	3.31E+02	4	6.00E+02	5			
100-41-4	Ethylbenzene	A	106.2	5	7.60E-02	A	8.50E-06	A	1.98	A	7.69E-03	3.20E-01	A	1.00E+01	4	1.52E+02	5			
1634-04-4	Methyl t-Butyl Ether	O	88.146	5	7.92E-02	6	9.41E-05	7	1.08	A	5.77E-04	2.40E-02		2.49E+02		4.80E+04	A			
127-18-4	Tetrachloroethene	C	165.83	4	7.20E-02	4	8.20E-06	4	2.42	29	2.90E-02	1.21E+00	4	1.90E+01	4	1.43E+02	4			
108-88-3	Toluene	A	92.4	5	8.50E-02	A	9.40E-06	A	2.13	A	6.25E-03	2.60E-01	A	3.00E+01	4	5.15E+02	29			
79-01-6	Trichloroethene	C	131.4	23	8.18E-02	6	1.05E-04	7	1.26	11	1.00E-02	4.17E-01	10	5.80E+01	23	1.00E+03	23			
75-69-4	Trichlorofluoromethane	C	137.4	4	8.70E-02	4	9.70E-06	4	2.49	4	5.83E-02	2.42E+00	4	7.96E+02	4	2.47E+03	4			
75-01-4	Vinyl chloride	C	62.5	4	1.06E-01	4	1.23E-05	4	0.06	4	8.60E-02	3.58E+00	4	2.66E+03	4	2.54E+03	4			
1330-20-7	Xylene (mixed isomers)	A	106.2	5	7.20E-02	A	8.50E-06	A	2.38	A	6.97E-03	2.90E-01	A	7.00E+00	4	1.98E+02	5			

Site Name: Ocean Avenue Site Location: 1372 Ocean Avenue, Emei Completed By: Mark Detterman Date Completed: 8/21/1998

Software version: 1.0.1

CAS Number	Constituent	Reference Dose (mg/kg/day) Oral RfD_oral	ref	Inhalation RfD_inhal	ref	Slope Factors 1/(mg/kg/day) Oral SF_oral	ref	Inhalation SF_inhal	ref	EPA Weight of Evidence	Is Constituent Carcinogenic ?
71-43-2	Benzene - CA			1.70E-03		1.00E-01		1.00E-01		A	TRUE
75-35-4	Dichloroethene, 1,1-	9.00E-03		9.00E-03		6.00E-02		1.80E-01			TRUE
156-59-2	Dichloroethene, cis-1,2-	1.00E-02	R	-		-		-		D	FALSE
156-60-5	Dichloroethene,1,2-trans-	2.00E-02	R	-		-		-			FALSE
100-41-4	Ethylbenzene	1.00E-01	A	2.86E-01	A	-		-		D	FALSE
1634-04-4	Methyl t-Butyl Ether	5.00E-03	R	8.57E-01	R	-		-			FALSE
127-18-4	Tetrachloroethene	1.00E-02	R	-		5.20E-02	R	2.03E-03	R	C-B2	TRUE
108-88-3	Toluene	2.00E-01	A,R	1.14E-01	A,R	-		-		D	FALSE
79-01-6	Trichloroethene	6.00E-03	R	-		1.10E-02	R	6.00E-03	R		TRUE
75-69-4	Trichlorofluoromethane	3.00E-01	R	2.00E-01	R	-		-			FALSE
75-01-4	Vinyl chloride	-		-		1.90E+00	R	3.00E-01	R	A	TRUE
1330-20-7	Xylene (mixed isomers)	2.00E+00	A,R	2.00E+00	A	-		-		D	FALSE

Site Name: Ocean Avenue Site Location: 1372 Ocean Avenue, En Completed By: Mark Detterman Date Completed: 8/21/1998

Software version: 1.0.1

RBCA CHEMICAL DATABASE

Miscellaneous Chemical Data

CAS Number	Constituent	Maximum Contaminant Level MCL (mg/L)	reference	Permissible Exposure Limit PEL/TLV (mg/m3)	ref	Relative Absorption Factors Oral	Dermal	Detection Limits Groundwater (mg/L)	ref	Soil (mg/kg)	ref	Half Life (First-Order Decay) (days) Saturated	Unsaturated	ref
71-43-2	Benzene - CA	1.00E-03		3.20E+00		1	0.1	0.0005		0.005				
75-35-4	Dichloroethene, 1,1-	6.00E-03		0.00E+00		1	0.1	0.0005		0.005				
156-59-2	Dichloroethene, cis-1,2-	7.00E-02	56 FR 3526 (30 Jan 91)			1	0.5	0.001	C	0.005	S			
156-60-5	Dichloroethene,1,2-trans-	1.00E-01	56 FR 3526 (30 Jan 91)			1	0.5	0.001	C	0.005	S			
100-41-4	Ethylbenzene	7.00E-01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	1	0.5	0.002	C	0.005	S	228	228	H
1634-04-4	Methyl t-Butyl Ether			1.44E+02	ACGIH	1	0.5					360	180	H
127-18-4	Tetrachloroethene	5.00E-03	56 FR 3526 (30 Jan 91)	1.70E+02	ACGIH	1	0.5	0.0005	C			720	720	H
108-88-3	Toluene	1.00E+00	56 FR 3526 (30 Jan 91)	1.47E+02	ACGIH	1	0.5	0.002	C	0.005	S	28	28	H
79-01-6	Trichloroethene	5.00E-03	52 FR 25690 (08 Jul 87)	2.69E+02	ACGIH	1	0.5	0.001	C	0.005	S	1653	1653	H
75-69-4	Trichlorofluoromethane			5.60E+03	OSHA	1	0.5	0.005	C			720	720	H
75-01-4	Vinyl chloride	2.00E-03	52 FR 25690 (08 Jul 87)	1.30E+01	ACGIH	1	0.5	0.002	C	0.01	S	2875	2875	H
1330-20-7	Xylene (mixed isomers)	1.00E+01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	1	0.5	0.005	C	0.005	S	360	360	H

Site Name: Ocean Avenue Site Location: 1372 Ocean Avenue, Emeryville, CA Completed By: Mark Detterman Date Completed: 8/21/1998

Software version: 1.0.1

Appendix E

Baseline Risk Summary Table,

Exposure Concentration and Intake Calculation Tables

and

Tier 2 Pathway Risk Calculation Tables

RBCA SITE ASSESSMENT | **Tier 2 Worksheet 8.3**

Site Name: Ocean Avenue
Site Location: 1372 Ocean Avenue, Emeryville, CA
Completed By: Mark Detterman
Date Completed: 8/21/1998

TIER 2 BASELINE RISK SUMMARY TABLE

	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
EXPOSURE PATHWAY	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
OUTDOOR AIR EXPOSURE PATHWAYS										
Complete:	9.5E-10	1.0E-6	1.8E-9	1.0E-6	☐	3.3E-6	1.0E+0	6.6E-6	1.0E+0	☐
INDOOR AIR EXPOSURE PATHWAYS										
Complete:	4.3E-7	1.0E-6	6.8E-7	1.0E-6	☐	1.9E-4	1.0E+0	2.5E-4	1.0E+0	☐
SOIL EXPOSURE PATHWAYS										
Complete:	8.1E-8	1.0E-6	8.6E-8	1.0E-6	☐	7.0E-4	1.0E+0	8.6E-4	1.0E+0	☐
GROUNDWATER EXPOSURE PATHWAYS										
Complete:	NC	1.0E-6	NC	1.0E-6	■	NC	1.0E+0	NC	1.0E+0	■
CRITICAL EXPOSURE PATHWAY (Select Maximum Values From Complete Pathways)										
	4.3E-7	1.0E-6	6.8E-7	1.0E-6	☐	7.0E-4	1.0E+0	8.6E-4	1.0E+0	☐

Site Name: Ocean Avenue | Site Location: 1372 Ocean Avenue, Emeryville, CA | Completed By: Mark Detterman | Date Completed: 8/21/1998 | 1 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS: VAPOR AND DUST INHALATION

Exposure Concentration

Constituents of Concern	1) Source Medium: Surface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg) Receptor: On-Site Residential		3) Exposure Medium: Outdoor Air: POE Conc. (mg/m^3) (1) / (2): On-Site Residential		4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (m^3/kg-day): On-Site Residential		5) Average Daily Intake Rate: (mg/kg-day) (3) X (4): On-Site Residential	
Benzene - CA	7.4E-3	7.2E+5		1.0E-8		1.2E-1		1.2E-9	
Dichloroethene, 1,1-	4.7E-3	7.2E+5		6.5E-9		1.2E-1		7.7E-10	
Dichloroethene, cis-1,2-	4.7E-3	7.2E+5		6.5E-9		2.7E-1		1.8E-9	
Dichloroethene,1,2-trans-	4.7E-3	7.2E+5		6.5E-9		2.7E-1		1.8E-9	
Ethylbenzene	3.1E-1	7.2E+5		4.4E-7		2.7E-1		1.2E-7	
Methyl t-Butyl Ether	1.4E-1	7.2E+5		1.9E-7		2.7E-1		5.2E-8	
Tetrachloroethene	4.7E-3	7.2E+5		6.5E-9		1.2E-1		7.7E-10	
Toluene	1.9E-1	7.2E+5		2.7E-7		2.7E-1		7.4E-8	
Trichloroethene	4.7E-3	7.2E+5		6.5E-9		1.2E-1		7.7E-10	
Trichlorofluoromethane	4.7E-3	7.2E+5		6.5E-9		2.7E-1		1.8E-9	
Vinyl chloride	4.7E-3	7.2E+5		6.5E-9		1.2E-1		7.7E-10	
Xylene (mixed isomers)	8.4E-1	7.2E+5		1.2E-6		2.7E-1		3.2E-7	

NOTE: ABS = Dermal absorption factor (dim); AF = Adherance factor (mg/cm^2); AT = Averaging time (days); BW = Body weight (kg); CF = Units conversion factor; ED = Exposure duration (yrs); EF = Exposure frequency (days/yr); ET = Exposure time (hrs/day); IR = Inhalation rate (m^3/day); POE = Point of exposure; SA = Skin exposure area (cm^2/day)

Site Name: Ocean Avenue | Site Location: 1372 Ocean Avenue, Emeryville, CA | Completed By: Mark Detterman | Date Completed: 8/21/1998 | 2 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

SUBSURFACE SOILS: VAPOR INHALATION

Exposure Concentration

Constituents of Concern	1) Source Medium: Subsurface Soil Conc (mg/kg)	2) NAF Value (m^3/kg) Receptor: On-Site Residential		3) Exposure Medium: Outdoor Air. POE Conc. (mg/m^3) (1) / (2) On-Site Residential		4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (m^3/kg-day) On-Site Residential		5) Average Daily Intake Rate: (mg/kg-day) (3) X (4) On-Site Residential	
Benzene - CA	7.4E-3	7.2E+5		1.0E-8		1.2E-1		1.2E-9	
Dichloroethene, 1,1-	4.7E-3	7.2E+5		6.5E-9		1.2E-1		7.7E-10	
Dichloroethene, cis-1,2-	4.7E-3	7.2E+5		6.5E-9		2.7E-1		1.8E-9	
Dichloroethene,1,2-trans-	4.7E-3	7.2E+5		6.5E-9		2.7E-1		1.8E-9	
Ethylbenzene	3.1E-1	7.2E+5		4.4E-7		2.7E-1		1.2E-7	
Methyl t-Butyl Ether	1.4E-1	7.2E+5		1.9E-7		2.7E-1		5.2E-8	
Tetrachloroethene	4.7E-3	7.2E+5		6.5E-9		1.2E-1		7.7E-10	
Toluene	1.9E-1	7.2E+5		2.7E-7		2.7E-1		7.4E-8	
Trichloroethene	4.7E-3	7.2E+5		6.5E-9		1.2E-1		7.7E-10	
Trichlorofluoromethane	4.7E-3	7.2E+5		6.5E-9		2.7E-1		1.8E-9	
Vinyl chloride	4.7E-3	7.2E+5		6.5E-9		1.2E-1		7.7E-10	
Xylene (mixed isomers)	8.4E-1	7.2E+5		1.2E-6		2.7E-1		3.2E-7	

NOTE:
ABS = Dermal absorption factor (dim)
AF = Adherance factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequency (days/yr)
ET = Exposure time (hrs/day)
IR = Inhalation rate (m^3/day)
POE = Point of exposure
SA = Skin exposue area (cm^2/day)

Site Name: Ocean Avenue | Site Location: 1372 Ocean Avenue, Emeryville | Completed By: Mark Detterman | Date Completed: 8/21/1998 | 3 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER: VAPOR INHALATION

Constituents of Concern	Exposure Concentration: 1) Source Medium — Groundwater Conc. (mg/L)	2) NAF Value (m^3/L) Receptor — On-Site Residential		3) Exposure Medium — Outdoor Air: POE Conc. (mg/m^3) (1) / (2) — On-Site Residential		4) Exposure Multiplier (IRxEFxED)/(BWxAT) (m^3/kg-day) — On-Site Residential		5) Average Daily Intake Rate (mg/kg-day) (3) X (4) — On-Site Residential		TOTAL PATHWAY INTAKE (mg/kg-day) (Sum intake values from surface, subsurface & groundwater routes.) — On-Site Residential	
Benzene - CA	4.7E-4	2.3E+6		2.1E-10		1.2E-1		2.4E-11		2.4E-9	
Dichloroethene, 1,1-	2.7E-3	3.8E+5		7.2E-9		1.2E-1		8.5E-10		2.4E-9	
Dichloroethene, cis-1,2-	1.8E-2	7.3E+5		2.4E-8		2.7E-1		6.6E-9		1.0E-8	
Dichloroethene,1,2-trans-	2.7E-3	2.5E+6		1.1E-9		2.7E-1		3.0E-10		3.9E-9	
Ethylbenzene	4.7E-4	2.3E+6		2.1E-10		2.7E-1		5.7E-11		2.4E-7	
Methyl t-Butyl Ether	5.4E-2	6.6E+5		8.2E-8		2.7E-1		2.2E-8		1.3E-7	
Tetrachloroethene	5.6E-3	8.5E+5		6.6E-9		1.2E-1		7.7E-10		2.3E-9	
Toluene	4.7E-4	2.3E+6		2.0E-10		2.7E-1		5.6E-11		1.5E-7	
Trichloroethene	8.7E-2	4.4E+5		2.0E-7		1.2E-1		2.3E-8		2.5E-8	
Trichlorofluoromethane	3.7E-3	3.7E+5		9.8E-9		2.7E-1		2.7E-9		6.3E-9	
Vinyl chloride	2.9E-3	2.1E+5		1.4E-8		1.2E-1		1.6E-9		3.2E-9	
Xylene (mixed isomers)	6.5E-4	2.5E+6		2.6E-10		2.7E-1		7.2E-11		6.4E-7	

NOTE: ABS = Dermal absorption factor (dim); AF = Adherance factor (mg/cm^2); AT = Averaging time (days); BW = Body weight (kg); CF = Units conversion factor; ED = Exposure duration (yrs); EF = Exposure frequencey (days/yr); ET = Exposure time (hrs/day); IR = Inhalation rate (m^3/day); POE = Point of exposure; SA = Skin exposure area (cm^2/day)

Site Name: Ocean Avenue | Site Location: 1372 Ocean Avenue, Emeryville, CA | Completed By: Mark Detterman | Date Completed: 8/21/1998 | 1 OF 4

TIER 2 PATHWAY RISK CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAYS ARE ACTIVE)

Constituents of Concern	(1) EPA Carcinogenic Classification	CARCINOGENIC RISK (2) Total Carcinogenic Intake Rate (mg/kg/day) On-Site Residential		(3) Inhalation Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3) On-Site Residential		TOXIC EFFECTS (5) Total Toxicant Intake Rate (mg/kg/day) On-Site Residential		(6) Inhalation Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6) On-Site Residential	
Benzene - CA	A	2.4E-9		1.0E-1	2.4E-10		5.7E-9		1.7E-3	3.3E-6	
Dichloroethene, 1,1-		2.4E-9		1.8E-1	4.3E-10		5.6E-9		9.0E-3	6.2E-7	
Dichloroethene, cis-1,2-	D										
Dichloroethene,1,2-trans-											
Ethylbenzene	D						2.4E-7		2.9E-1	8.3E-7	
Methyl t-Butyl Ether							1.3E-7		8.6E-1	1.5E-7	
Tetrachloroethene	C-B2	2.3E-9		2.0E-3	4.7E-12						
Toluene	D						1.5E-7		1.1E-1	1.3E-6	
Trichloroethene		2.5E-8		6.0E-3	1.5E-10						
Trichlorofluoromethane							6.3E-9		2.0E-1	3.1E-8	
Vinyl chloride	A	3.2E-9		3.0E-1	9.5E-10						
Xylene (mixed isomers)	D						6.4E-7		2.0E+0	3.2E-7	

Total Pathway Carcinogenic Risk = 1.8E-9 | 0.0E+0

Total Pathway Hazard Index = 6.6E-6 | 0.0E+0

Site Name: Ocean Avenue | Site Location: 1372 Ocean Avenue, Emeryville, CA | Completed By: Mark Detterman | Date Completed: 8/21/1998 | 4 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

SUBSURFACE SOILS:
VAPOR INTRUSION TO BUILDINGS

Constituents of Concern	Exposure Concentration 1) Source Medium: Subsurface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg) Receptor		3) Exposure Medium: Indoor Air: POE Conc. (mg/m^3) (1) / (2)		4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (m^3/kg-day)		5) Average Daily Intake Rate: (mg/kg-day) (3) X (4)	
Benzene - CA	7.4E-3								
Dichloroethene, 1,1-	4.7E-3								
Dichloroethene, cis-1,2-	4.7E-3								
Dichloroethene,1,2-trans-	4.7E-3								
Ethylbenzene	3.1E-1								
Methyl t-Butyl Ether	1.4E-1								
Tetrachloroethene	4.7E-3								
Toluene	1.9E-1								
Trichloroethene	4.7E-3								
Trichlorofluoromethane	4.7E-3								
Vinyl chloride	4.7E-3								
Xylene (mixed isomers)	8.4E-1								

NOTE: ABS = Dermal absorption factor (dim); AF = Adherance factor (mg/cm^2); AT = Averaging time (days); BW = Body weight (kg); CF = Units conversion factor; ED = Exposure duration (yrs); EF = Exposure frequency (days/yr); ET = Exposure time (hrs/day); IR = Inhalation rate (m^3/day); POE = Point of exposure; SA = Skin exposure area (cm^2/day)

Site Name: Ocean Avenue | Site Location: 1372 Ocean Avenue, Emeryville | Completed By: Mark Detterman | Date Completed: 8/21/1998 | 5 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER:
VAPOR INTRUSION TO BUILDINGS

Constituents of Concern	Exposure Concentration: 1) Source Medium — Groundwater Conc. (mg/L)	2) NAF Value (m^3/L) Receptor — On-Site Residential		3) Exposure Medium — Indoor Air: POE Conc. (mg/m^3) (1) / (2) — On-Site Residential		4) Exposure Multiplier (IRxEFxED)/(BWxAT) (m^3/kg-day) — On-Site Residential		5) Average Daily Intake Rate (mg/kg-day) (3) X (4) — On-Site Residential		TOTAL PATHWAY INTAKE (mg/kg-day) (Sum intake values from subsurface & groundwater routes.) — On-Site Residential	
Benzene - CA	4.7E-4	2.0E+3		2.4E-7		8.8E-2		2.1E-8		2.1E-8	
Dichloroethene, 1,1-	2.7E-3	3.3E+2		8.4E-6		8.8E-2		7.4E-7		7.4E-7	
Dichloroethene, cis-1,2-	1.8E-2	6.3E+2		2.8E-5		2.1E-1		5.8E-6		5.8E-6	
Dichloroethene,1,2-trans-	2.7E-3	2.2E+3		1.3E-6		2.1E-1		2.6E-7		2.6E-7	
Ethylbenzene	4.7E-4	1.9E+3		2.4E-7		2.1E-1		5.0E-8		5.0E-8	
Methyl t-Butyl Ether	5.4E-2	7.1E+2		7.6E-5		2.1E-1		1.6E-5		1.6E-5	
Tetrachloroethene	5.6E-3	7.3E+2		7.7E-6		8.8E-2		6.7E-7		6.7E-7	
Toluene	4.7E-4	2.0E+3		2.4E-7		2.1E-1		4.8E-8		4.8E-8	
Trichloroethene	8.7E-2	3.9E+2		2.3E-4		8.8E-2		2.0E-5		2.0E-5	
Trichlorofluoromethane	3.7E-3	3.2E+2		1.1E-5		2.1E-1		2.4E-6		2.4E-6	
Vinyl chloride	2.9E-3	1.8E+2		1.6E-5		8.8E-2		1.4E-6		1.4E-6	
Xylene (mixed isomers)	6.5E-4	2.1E+3		3.1E-7		2.1E-1		6.3E-8		6.3E-8	

NOTE:
ABS = Dermal absorption factor (dim)
AF = Adherance factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Inhalation rate (m^3/day)
POE = Point of exposure
SA = Skin exposure area (cm^2/day)

Site Name: Ocean Avenue | Site Location: 1372 Ocean Avenue, Emeryville, CA | Completed By: Mark Detterman | Date Completed: 8/21/1998 | 2 OF 4

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ● (CHECKED IF PATHWAYS ARE ACTIVE)

Constituents of Concern	(1) EPA Carcinogenic Classification	CARCINOGENIC RISK: (2) Total Carcinogenic Intake Rate (mg/kg/day) On-Site Residential		(3) Inhalation Slope Factor (mg/kg-day)^-1	CARCINOGENIC RISK: (4) Individual COC Risk (2) x (3) On-Site Residential		TOXIC EFFECTS: (5) Total Toxicant Intake Rate (mg/kg/day) On-Site Residential		TOXIC EFFECTS: (6) Inhalation Reference Dose (mg/kg-day)	TOXIC EFFECTS: (7) Individual COC Hazard Quotient (5) / (6) On-Site Residential	
Benzene - CA	A	2.1E-8		1.0E-1	2.1E-9		4.9E-8		1.7E-3	2.9E-5	
Dichloroethene, 1,1-		7.4E-7		1.8E-1	1.3E-7		1.7E-6		9.0E-3	1.9E-4	
Dichloroethene, cis-1,2-	D										
Dichloroethene,1,2-trans-											
Ethylbenzene	D						5.0E-8		2.9E-1	1.7E-7	
Methyl t-Butyl Ether							1.6E-5		8.6E-1	1.8E-5	
Tetrachloroethene	C-B2	6.7E-7		2.0E-3	1.4E-9						
Toluene	D						4.8E-8		1.1E-1	4.2E-7	
Trichloroethene		2.0E-5		6.0E-3	1.2E-7						
Trichlorofluoromethane							2.4E-6		2.0E-1	1.2E-5	
Vinyl chloride	A	1.4E-6		3.0E-1	4.3E-7						
Xylene (mixed isomers)	D						6.3E-8		2.0E+0	3.1E-8	

Total Pathway Carcinogenic Risk = **6.8E-7** **0.0E+0**

Total Pathway Hazard Index = **2.5E-4** **0.0E+0**

Site Name: Ocean Avenue Site Location: 1372 Ocean Avenue, Emeryville, CA Completed By: Mark Detterr Date Completed: 8/21/1998

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

SOIL EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS OR SEDIMENTS: **Exposure Concentration**

DERMAL CONTACT

Constituents of Concern	1) Source Medium: Surface Soil Conc. (mg/kg)	2) Exposure Multiplier (SAxAFxABSxCFxEFxED)/(BWxAT) (kg/kg-day): On-Site Residential	2) Exposure Multiplier: On-Site Commercial	3) Average Daily Intake Rate (mg/kg-day) (1) x (2): On-Site Residential	3) Average Daily Intake Rate: On-Site Commercial
Benzene - CA	7.4E-3		1.6E-6		1.2E-8
Dichloroethene, 1,1-	4.7E-3		1.6E-6		7.7E-9
Dichloroethene, cis-1,2-	4.7E-3		2.3E-5		1.1E-7
Dichloroethene,1,2-trans-	4.7E-3		2.3E-5		1.1E-7
Ethylbenzene	3.1E-1		2.3E-5		7.2E-6
Methyl t-Butyl Ether	1.4E-1		2.3E-5		3.1E-6
Tetrachloroethene	4.7E-3		8.2E-6		3.8E-8
Toluene	1.9E-1		2.3E-5		4.5E-6
Trichloroethene	4.7E-3		8.2E-6		3.8E-8
Trichlorofluoromethane	4.7E-3		2.3E-5		1.1E-7
Vinyl chloride	4.7E-3		8.2E-6		3.8E-8
Xylene (mixed isomers)	8.4E-1		2.3E-5		1.9E-5

NOTE: ABS = Dermal absorption factor (dim); AF = Adherance factor (mg/cm^2); AT = Averaging time (days); BW = Body weight (kg); CF = Units conversion factor; ED = Exposure duration (yrs); EF = Exposure frequencey (days/yr); ET = Exposure time (hrs/day); IR = Intake rate (mg/day); POE = Point of exposure; SA = Skin exposure area (cm^2/day)

Site Name: Ocean Avenue | Site Location: 1372 Ocean Avenue, Emeryvill | Completed By: Mark Detterman | Date Completed: 8/21/1998 | 7 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

SOIL EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE):

SURFACE SOILS OR SEDIMENTS:

INGESTION

Constituents of Concern	Exposure Concentration: 1) Source Medium — Surface Soil Conc. (mg/kg)	2) Exposure Multiplier (IRxCFxEFxED)/(BWxAT) (kg/kg-day) — On-Site Residential	2) Exposure Multiplier — On-Site Commercial	3) Average Daily Intake Rate (mg/kg-day) (1) x (2) — On-Site Residential	3) Average Daily Intake Rate — On-Site Commercial	TOTAL PATHWAY INTAKE (mg/kg-day) (Sum intake values from dermal & ingestion routes.) — On-Site Residential	TOTAL PATHWAY INTAKE — On-Site Commercial
Benzene - CA	7.4E-3		9.2E-7		6.8E-9		1.9E-8
Dichloroethene, 1,1-	4.7E-3		9.2E-7		4.3E-9		1.2E-8
Dichloroethene, cis-1,2-	4.7E-3		2.6E-6		1.2E-8		1.2E-7
Dichloroethene,1,2-trans-	4.7E-3		2.6E-6		1.2E-8		1.2E-7
Ethylbenzene	3.1E-1		2.6E-6		8.0E-7		8.0E-6
Methyl t-Butyl Ether	1.4E-1		2.6E-6		3.5E-7		3.5E-6
Tetrachloroethene	4.7E-3		9.2E-7		4.3E-9		4.3E-8
Toluene	1.9E-1		2.6E-6		5.0E-7		5.0E-6
Trichloroethene	4.7E-3		9.2E-7		4.3E-9		4.3E-8
Trichlorofluoromethane	4.7E-3		2.6E-6		1.2E-8		1.2E-7
Vinyl chloride	4.7E-3		9.2E-7		4.3E-9		4.3E-8
Xylene (mixed isomers)	8.4E-1		2.6E-6		2.1E-6		2.1E-5

NOTE:
ABS = Dermal absorption factor (dim)
AF = Adherance factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Intake rate (mg/day)
POE = Point of exposure
SA = Skin exposure area (cm^2/day)

Site Name: Ocean Avenue | Site Location: 1372 Ocean Avenue, Emeryville, CA | Completed By: Mark Detterman | Date Completed: 8/21/1998 | 3 OF 4

TIER 2 PATHWAY RISK CALCULATION

SOIL EXPOSURE PATHWAYS ● (CHECKED IF PATHWAYS ARE ACTIVE)

		CARCINOGENIC RISK					TOXIC EFFECTS				
	(1) EPA Carcinogenic Classification	(2) Total Carcinogenic Intake Rate (mg/kg/day) On-Site Residential	(2) Total Carcinogenic Intake Rate (mg/kg/day) On-Site Commercial	(3) Oral Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3) On-Site Residential	(4) Individual COC Risk (2) x (3) On-Site Commercial	(5) Total Toxicant Intake Rate (mg/kg/day) On-Site Residential	(5) Total Toxicant Intake Rate (mg/kg/day) On-Site Commercial	(6) Oral Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6) On-Site Residential	(7) Individual COC Hazard Quotient (5) / (6) On-Site Commercial
Constituents of Concern											
Benzene - CA	A		1.9E-8	1.0E-1		1.9E-9					
Dichloroethene, 1,1-			1.2E-8	6.0E-2		7.2E-10		3.4E-8	9.0E-3		3.7E-6
Dichloroethene, cis-1,2-	D							1.2E-7	1.0E-2		1.2E-5
Dichloroethene,1,2-trans-								1.2E-7	2.0E-2		6.0E-6
Ethylbenzene	D							8.0E-6	1.0E-1		8.0E-5
Methyl t-Butyl Ether								3.5E-6	5.0E-3		7.0E-4
Tetrachloroethene	C-B2		4.3E-8	5.2E-2		2.2E-9		1.2E-7	1.0E-2		1.2E-5
Toluene	D							5.0E-6	2.0E-1		2.5E-5
Trichloroethene			4.3E-8	1.1E-2		4.7E-10		1.2E-7	6.0E-3		2.0E-5
Trichlorofluoromethane								1.2E-7	3.0E-1		4.0E-7
Vinyl chloride	A		4.3E-8	1.9E+0		8.1E-8					
Xylene (mixed isomers)	D							2.1E-5	2.0E+0		1.1E-5
Total Pathway Carcinogenic Risk =					**0.0E+0**	**8.6E-8**	***Total Pathway Hazard Index =***			**0.0E+0**	**8.6E-4**

Site Name: Ocean Avenue Site Location: 1372 Ocean Avenue, Emeryville, CA Completed By: Mark Detterman Date Completed: 8/21/1998

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

SOIL: LEACHING TO GROUNDWATER/ GROUNDWATER INGESTION

Constituents of Concern	Exposure Concentration 1) Source Medium: Soil Concentration (mg/kg)	2) NAF Value (L/kg) Receptor		3) Exposure Medium: Groundwater: POE Conc. (mg/L) (1)/(2)		4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (L/kg-day)		5) Average Daily Intake Rate: (mg/kg-day) (3) x (4)	
Benzene - CA	7.4E-3								
Dichloroethene, 1,1-	4.7E-3								
Dichloroethene, cis-1,2-	4.7E-3								
Dichloroethene,1,2-trans-	4.7E-3								
Ethylbenzene	3.1E-1								
Methyl t-Butyl Ether	1.4E-1								
Tetrachloroethene	4.7E-3								
Toluene	1.9E-1								
Trichloroethene	4.7E-3								
Trichlorofluoromethane	4.7E-3								
Vinyl chloride	4.7E-3								
Xylene (mixed isomers)	8.4E-1								

NOTE: ABS = Dermal absorption factor (dim); AF = Adherance factor (mg/cm^2); AT = Averaging time (days); BW = Body Weight (kg); CF = Units conversion factor; ED = Exposure duration (yrs); EF = Exposure frequencey (days/yr); ET = Exposure time (hrs/day); IR = Intake rate (L/day); POE = Point of exposure; SA = Skin exposure area (cm^2/day)

Site Name: Ocean Avenue | Site Location: 1372 Ocean Avenue, Emeryville, CA | Completed By: Mark Detterman | Date Completed: 8/21/1998 | 9 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER: INGESTION

Constituents of Concern	Exposure Concentration: 1) Source Medium — Groundwater Conc. (mg/L)	2) NAF Value (dim) — Receptor		3) Exposure Medium — Groundwater: POE Conc. (mg/L) (1)/(2)		4) Exposure Multiplier — (IRxEFxED)/(BWxAT) (L/kg-day)		5) Average Daily Intake Rate — (mg/kg-day) (3) x (4)		MAX. PATHWAY INTAKE (mg/kg-day) *(Maximum intake of active pathways soil leaching & groundwater routes.)*	
Benzene - CA	4.7E-4										
Dichloroethene, 1,1-	2.7E-3										
Dichloroethene, cis-1,2-	1.8E-2										
Dichloroethene,1,2-trans-	2.7E-3										
Ethylbenzene	4.7E-4										
Methyl t-Butyl Ether	5.4E-2										
Tetrachloroethene	5.6E-3										
Toluene	4.7E-4										
Trichloroethene	8.7E-2										
Trichlorofluoromethane	3.7E-3										
Vinyl chloride	2.9E-3										
Xylene (mixed isomers)	6.5E-4										

NOTE:
ABS = Dermal absorption factor (dim)
AF = Adherance factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Intake rate (L/day)
POE = Point of exposure
SA = Skin exposure area (cm^2/day)

Site Name: Ocean Avenue | Site Location: 1372 Ocean Avenue, Emeryville, CA | Completed By: Mark Detterman | Date Completed: 8/21/1998 | 4 OF 4

TIER 2 PATHWAY RISK CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAYS ARE ACTIVE)

Constituents of Concern	(1) EPA Carcinogenic Classification	CARCINOGENIC RISK (2) Total Carcinogenic Intake Rate (mg/kg/day)		(3) Oral Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3)		TOXIC EFFECTS (5) Total Toxicant Intake Rate (mg/kg/day)		(6) Oral Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6)	
Benzene - CA	A			1.0E-1							
Dichloroethene, 1,1-				6.0E-2					9.0E-3		
Dichloroethene, cis-1,2-	D								1.0E-2		
Dichloroethene,1,2-trans-									2.0E-2		
Ethylbenzene	D								1.0E-1		
Methyl t-Butyl Ether									5.0E-3		
Tetrachloroethene	C-B2			5.2E-2					1.0E-2		
Toluene	D								2.0E-1		
Trichloroethene				1.1E-2					6.0E-3		
Trichlorofluoromethane									3.0E-1		
Vinyl chloride	A			1.9E+0							
Xylene (mixed isomers)	D								2.0E+0		
Total Pathway Carcinogenic Risk =					0.0E+0	0.0E+0	*Total Pathway Hazard Index =*			0.0E+0	0.0E+0

Appendix F

SSTL Values for Surface, Subsurface, and Groundwater Pathways

RBCA SITE ASSESSMENT

Tier 2 Worksheet 9.1

Site Name: Ocean Avenue
Site Location: 1372 Ocean Avenue, Emeryville, CA

Completed By: Mark Detterman
Date Completed: 8/21/1998

SURFACE SOIL SSTL VALUES (< 2.5 FT BGS)

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 3

SSTL Results For Complete Exposure Pathways ("x" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration		Soil Leaching to Groundwater			X	Ingestion, Inhalation and Dermal Contact		X	Construction Worker	Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)		Residential: (on-site)	Commercial: (on-site)			Commercial: (on-site)	(mg/kg)	"■" If yes	Only if "yes" left
71-43-2	Benzene - CA	7.4E-3	NA	NA	NA		6.1E+1	3.9E+0			1.3E+2	3.9E+0	☐	<1
75-35-4	Dichloroethene, 1,1-	4.7E-3	NA	NA	NA		3.4E+1	6.5E+0			1.8E+2	6.5E+0	☐	<1
156-59-2	Dichloroethene, cis-1,2-	4.7E-3	NA	NA	NA		>Res	>Res			>Res	>Res	☐	<1
156-60-5	Dichloroethene,1,2-trans-	4.7E-3	NA	NA	NA		>Res	>Res			>Res	>Res	☐	<1
100-41-4	Ethylbenzene	3.1E-1	NA	NA	NA		>Res	>Res			>Res	>Res	☐	<1
1634-04-4	Methyl t-Butyl Ether	1.4E-1	NA	NA	NA		>Res	2.0E+2			2.4E+2	2.0E+2	☐	<1
127-18-4	Tetrachloroethene	4.7E-3	NA	NA	NA		>Res	2.1E+0			6.4E+1	2.1E+0	☐	<1
108-88-3	Toluene	1.9E-1	NA	NA	NA		>Res	>Res			>Res	>Res	☐	<1
79-01-6	Trichloroethene	4.7E-3	NA	NA	NA		>Res	1.0E+1			3.0E+2	1.0E+1	☐	<1
75-69-4	Trichlorofluoromethane	4.7E-3	NA	NA	NA		>Res	>Res			>Res	>Res	☐	<1
75-01-4	Vinyl chloride	4.7E-3	NA	NA	NA		2.0E+1	5.8E-2			1.7E+0	5.8E-2	☐	<1
1330-20-7	Xylene (mixed isomers)	8.4E-1	NA	NA	NA		>Res	>Res			>Res	>Res	☐	<1

>Res indicates risk-based target concentration greater than constituent residual saturation value

Software: GSI RBCA Spreadsheet
Version: 1.0.1

Serial: G-301-WWX-744

RBCA SITE ASSESSMENT | **Tier 2 Worksheet 9.2**

Site Name: Ocean Avenue
Site Location: 1372 Ocean Avenue, Emeryville, CA

Completed By: Mark Detterman
Date Completed: 8/21/1998

SUBSURFACE SOIL SSTL VALUES (> 2.5 FT BGS)

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 3

SSTL Results For Complete Exposure Pathways ("x" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration		Soil Leaching to Groundwater				Soil Volatilization to Indoor Air		X Soil Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential: (on-site)	Commercial: (on-site)	(mg/kg)	"■" If yes	Only if "yes" left
71-43-2	Benzene - CA	7.4E-3	NA	NA	NA	NA	NA	6.1E+1	NA	6.1E+1	☐	<1
75-35-4	Dichloroethene, 1,1-	4.7E-3	NA	NA	NA	NA	NA	3.4E+1	NA	3.4E+1	☐	<1
156-59-2	Dichloroethene, cis-1,2-	4.7E-3	NA	NA	NA	NA	NA	NA	NA	>Res	☐	<1
156-60-5	Dichloroethene,1,2-trans-	4.7E-3	NA	NA	NA	NA	NA	NA	NA	>Res	☐	<1
100-41-4	Ethylbenzene	3.1E-1	NA	NA	NA	NA	NA	>Res	NA	>Res	☐	<1
1634-04-4	Methyl t-Butyl Ether	1.4E-1	NA	NA	NA	NA	NA	>Res	NA	>Res	☐	<1
127-18-4	Tetrachloroethene	4.7E-3	NA	NA	NA	NA	NA	>Res	NA	>Res	☐	<1
108-88-3	Toluene	1.9E-1	NA	NA	NA	NA	NA	>Res	NA	>Res	☐	<1
79-01-6	Trichloroethene	4.7E-3	NA	NA	NA	NA	NA	>Res	NA	>Res	☐	<1
75-69-4	Trichlorofluoromethane	4.7E-3	NA	NA	NA	NA	NA	>Res	NA	>Res	☐	<1
75-01-4	Vinyl chloride	4.7E-3	NA	NA	NA	NA	NA	2.0E+1	NA	2.0E+1	☐	<1
1330-20-7	Xylene (mixed isomers)	8.4E-1	NA	NA	NA	NA	NA	>Res	NA	>Res	☐	<1

>Res indicates risk-based target concentration greater than constituent residual saturation value

Software: GSI RBCA Spreadsheet Serial: G-301-WWX-744
Version: 1.0.1

Site Name: Ocean Avenue
Site Location: 1372 Ocean Avenue, Emeryville, CA
Completed By: Mark Detterman
Date Completed: 8/21/1998

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 3

SSTL Results For Complete Exposure Pathways ("x" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration		Groundwater Ingestion			X Groundwater Volatilization to Indoor Air		X Groundwater Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential (on-site)	Commercial: (on-site)	(mg/L	"■" If yes	Only if "yes" left
71-43-2	Benzene - CA	4.7E-4	NA	NA	NA	2.2E-1	NA	1.9E+2	NA	2.2E-1	☐	<1
75-35-4	Dichloroethene, 1,1-	2.7E-3	NA	NA	NA	2.1E-2	NA	1.8E+1	NA	2.1E-2	☐	<1
156-59-2	Dichloroethene, cis-1,2-	1.8E-2	NA	NA	NA	NA	NA	NA	NA	>Sol	☐	<1
156-60-5	Dichloroethene,1,2-trans-	2.7E-3	NA	NA	NA	NA	NA	NA	NA	>Sol	☐	<1
100-41-4	Ethylbenzene	4.7E-4	NA	NA	NA	>Sol	NA	>Sol	NA	>Sol	☐	<1
1634-04-4	Methyl t-Butyl Ether	5.4E-2	NA	NA	NA	3.0E+3	NA	>Sol	NA	3.0E+3	☐	<1
127-18-4	Tetrachloroethene	5.6E-3	NA	NA	NA	4.1E+0	NA	>Sol	NA	4.1E+0	☐	<1
108-88-3	Toluene	4.7E-4	NA	NA	NA	>Sol	NA	>Sol	NA	>Sol	☐	<1
79-01-6	Trichloroethene	8.7E-2	NA	NA	NA	7.3E-1	NA	6.3E+2	NA	7.3E-1	☐	<1
75-69-4	Trichlorofluoromethane	3.7E-3	NA	NA	NA	3.1E+2	NA	>Sol	NA	3.1E+2	☐	<1
75-01-4	Vinyl chloride	2.9E-3	NA	NA	NA	6.9E-3	NA	6.0E+0	NA	6.9E-3	☐	<1
1330-20-7	Xylene (mixed isomers)	6.5E-4	NA	NA	NA	>Sol	NA	>Sol	NA	>Sol	☐	<1

>Sol indicates risk-based target concentration greater than constituent solubility

Appendix G

Cumulative Risk Worksheets for Onsite Receptors

Site Name: Ocean Avenue
Site Location: 1372 Ocean Avenue, Emeryville, CA
Completed By: Mark Detterman
Date Completed: 8/21/1998

CUMULATIVE RISK WORKSHEET

CONSTITUENTS OF CONCERN		Representative Concentration			Proposed CRF			Resultant Target Concentration		
CAS No.	Name	Surface Soil (mg/kg)	Subsurface Soil	Groundwater (mg/L)	Surface Soil	Subsurface Soil	GW	Surface Soil (mg/kg)	Subsurface Soil (mg/kg)	Groundwater (mg/L)
71-43-2	Benzene - CA	7.4E-3	7.4E-3	4.7E-4				7.4E-3	7.4E-3	4.7E-4
75-35-4	Dichloroethene, 1,1-	4.7E-3	4.7E-3	2.7E-3				4.7E-3	4.7E-3	2.7E-3
156-59-2	Dichloroethene, cis-1,2-	4.7E-3	4.7E-3	1.8E-2				4.7E-3	4.7E-3	1.8E-2
156-60-5	Dichloroethene,1,2-trans-	4.7E-3	4.7E-3	2.7E-3				4.7E-3	4.7E-3	2.7E-3
100-41-4	Ethylbenzene	3.1E-1	3.1E-1	4.7E-4				3.1E-1	3.1E-1	4.7E-4
1634-04-4	Methyl t-Butyl Ether	1.4E-1	1.4E-1	5.4E-2				1.4E-1	1.4E-1	5.4E-2
127-18-4	Tetrachloroethene	4.7E-3	4.7E-3	5.6E-3				4.7E-3	4.7E-3	5.6E-3
108-88-3	Toluene	1.9E-1	1.9E-1	4.7E-4				1.9E-1	1.9E-1	4.7E-4
79-01-6	Trichloroethene	4.7E-3	4.7E-3	8.7E-2				4.7E-3	4.7E-3	8.7E-2
75-69-4	Trichlorofluoromethane	4.7E-3	4.7E-3	3.7E-3				4.7E-3	4.7E-3	3.7E-3
75-01-4	Vinyl chloride	4.7E-3	4.7E-3	2.9E-3				4.7E-3	4.7E-3	2.9E-3
1330-20-7	Xylene (mixed isomers)	8.4E-1	8.4E-1	6.5E-4				8.4E-1	8.4E-1	6.5E-4

Cumulative Values:

Cumulative Risk Goals Exceeded?

☐ Yes ■ No

Site Name: Ocean Avenue
Completed By: Mark Detterman
Site Location: 1372 Ocean Avenue, Emeryville, CA
Date Completed: 8/21/1998

CUMULATIVE RISK WORKSHEET

Cumulative Target Risk: 1.0E-6 Target Hazard Index: 1.0E+0

ON-SITE RECEPTORS

CONSTITUENTS OF CONCERN		Outdoor Air: Residential Exposure		Indoor Air: Residential Exposure		Soil: Commercial Exposure		Groundwater:	
		Target Risk: 1.0E-6 / 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-6 / 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-6 / 1.0E-5	Target HQ: 1.0E+0		
CAS No.	Name	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene - CA	2.4E-10	3.3E-6	6.4E-8	1.0E-3	1.9E-9		NA	NA
75-35-4	Dichloroethene, 1,1-	4.3E-10	6.2E-7	2.0E-7	3.1E-4	7.2E-10	3.7E-6	NA	NA
156-59-2	Dichloroethene, cis-1,2-						1.2E-5	NA	NA
156-60-5	Dichloroethene,1,2-trans-						6.0E-6	NA	NA
100-41-4	Ethylbenzene		8.3E-7		2.6E-4		8.0E-5	NA	NA
1634-04-4	Methyl t-Butyl Ether		1.5E-7		5.5E-5		7.0E-4	NA	NA
127-18-4	Tetrachloroethene	4.7E-12		2.2E-9		2.2E-9	1.2E-5	NA	NA
108-88-3	Toluene		1.3E-6		4.0E-4		2.5E-5	NA	NA
79-01-6	Trichloroethene	1.5E-10		1.2E-7		4.7E-10	2.0E-5	NA	NA
75-69-4	Trichlorofluoromethane		3.1E-8		1.7E-5		4.0E-7	NA	NA
75-01-4	Vinyl chloride	9.5E-10		5.5E-7		8.1E-8		NA	NA
1330-20-7	Xylene (mixed isomers)		3.2E-7		9.8E-5		1.1E-5	NA	NA
	Cumulative Values:	**1.8E-9**	**6.6E-6**	**9.4E-7**	**2.2E-3**	**8.6E-8**	**8.6E-4**	**0.0E+0**	**0.0E+0**

■ indicates risk level exceeding target risk

Site Name: Ocean Avenue
Site Location: 1372 Ocean Avenue, Emeryville, CA
Completed By: Mark Detterman
Date Completed: 8/21/1998

CUMULATIVE RISK WORKSHEET

Cumulative Target Risk: 1.0E-6 Target Hazard Index: 1.0E+0

OFF-SITE RECEPTORS

CONSTITUENTS OF CONCERN		Outdoor Air:		Groundwater:	
CAS No.	Name	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene - CA	NA	NA	NA	NA
75-35-4	Dichloroethene, 1,1-	NA	NA	NA	NA
156-59-2	Dichloroethene, cis-1,2-	NA	NA	NA	NA
156-60-5	Dichloroethene,1,2-trans-	NA	NA	NA	NA
100-41-4	Ethylbenzene	NA	NA	NA	NA
1634-04-4	Methyl t-Butyl Ether	NA	NA	NA	NA
127-18-4	Tetrachloroethene	NA	NA	NA	NA
108-88-3	Toluene	NA	NA	NA	NA
79-01-6	Trichloroethene	NA	NA	NA	NA
75-69-4	Trichlorofluoromethane	NA	NA	NA	NA
75-01-4	Vinyl chloride	NA	NA	NA	NA
1330-20-7	Xylene (mixed isomers)	NA	NA	NA	NA
	Cumulative Values:	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**

■ indicates risk level exceeding target risk