

ENVIRONMENTAL
PROTECTION
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**ADDENDUM TO TIER 2
RISK ASSESSMENT**

PROJECT SITE:

**MOTOR PARTNERS SITE
1234 40TH AVE., OAKLAND, CA
StID #3682**

PREPARED FOR:

Mr. Bill Owens
2221 Olympic Blvd.
Walnut Creek, CA 94595
510-935-3840

SUBMITTED TO:

Mr. Barney Chan
Environmental Health
Alameda County
1131 Harbor Bay Pkwy
Alameda, CA 94502-6577

PREPARED BY:

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PROJECT NO. 1004.95

January 28, 2000

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1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

This addendum to the Tier 2 Risk Assessment has been completed in response to a letter from Alameda County (see copy in Appendix A). The Tier 2 study was conducted to determine potential future health risks of contaminants in groundwater and soils at the Motor Partners site, 1234 40th Avenue, Oakland, California.

The analysis was conducted to determine the risk of residual chemicals at the site especially down gradient of the former underground storage tank area. A Risk Based Corrective Action (RBCA) approach in accordance with the American Society for Testing and Materials (ASTM) Standard Guidance for Risk-Based Corrective Action Applied at Petroleum Release Sites (E 1739-95) has been used to evaluate the potential risk. The RBCA Toolkit for Chemical Releases (Version 1.2) supplied by Groundwater Services, Inc. (GSI) has been used in this evaluation.

2.0 INPUT DATA FOR ADDENDUM TO TIER 2 RISK ANALYSIS

The methods for this risk analysis follow the guidelines presented in the ASTM document, ASTM E-1739, "Standard Guide for Risk-Based Corrective Action (RBCA) Applied at Petroleum Release Sites." The RBCA process includes EPA risk assessment practices in addition to site investigation activities to determine cost-effective methods for protection of environmental health and resources. For this study, the RBCA Toolkit for Chemical Releases Version 1.2 (Groundwater Services, Inc.) computer model was used in the risk evaluation.

2.1 Input Data for Addendum

This addendum addresses specific requests of Mr. Barney Chan, Alameda County in his letter dated Jan. 3, 2000 (copy included in Appendix A). The following items were requested:

- Provide a description of the groundwater sampling procedure.
- Complete assessment using average groundwater results from past four quarterly monitoring events for MW-1 and MW-5.
- Complete assessment using average soil sample results from MW-1, MW-5, B-5, and B-6. Also provide soil SSTL values.
- Assessment should not consider groundwater ingestion pathway.
- The assessment should use the California slope factor of 0.1 for benzene.
- The results of the December 1999 quarterly monitoring event should be incorporated in the risk assessment.
- Report should provide an input parameter summary table with default and site specific parameters.

2.2 Sampling Procedure

Three of the five monitoring wells at the Motor Partners site are being treated using oxygen release compound (ORC). Filter socks with ORC have been placed in monitoring wells MW-1, MW-3, and MW-5 to enhance natural attenuation at the site.

Before purging and sampling the wells, the ORC filter socks were removed and stored in a 5 gallon bucket. Each of the five wells were purged by withdrawing a minimum of three casing volumes from the well using a diaphragm pump. Purging continued until the turbidity was less than 100 NTU and the temperature, conductivity, and pH were relatively stable. The turbidity, temperature, electric conductivity, dissolved oxygen and ORP levels were recorded for each well sample.

Groundwater samples were collected using a disposable teflon bailer and placed into 40-ml VOA's, 500 ml plastic containers, and a one-liter amber bottle. The samples were labeled and stored on ice until delivered under a chain of custody to a state certified laboratory. Samples from all five wells were analyzed for total petroleum hydrocarbons as diesel (TPH-D), using EPA

methods modified 8015; as gasoline (TPH-G) using EPA methods 8015/5030; benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA methods 8020; and methyl t-butyl ether (MTBE) using EPA method 8020. After sampling, the ORC filter socks were returned to wells MW-1, MW-3, and MW-5.

2.3 Groundwater Concentrations Used in Addendum to Risk Assessment

Groundwater hydrocarbon concentrations used in this Tier 2 Risk Assessment were average values from monitoring wells, MW-1 and MW-5. Data included results from the past four quarterly monitoring events (including the 4th Quarter, 1999). These values are summarized in Table 1.

2.4 Soil Concentrations Used in Addendum to Risk Assessment

The soil hydrocarbon concentrations used in this Tier 2 Risk Assessment were average values from soil samples collected at monitoring well MW-5 and borings B-5 and B-6. The values are summarized in Table 1.

2.5 Exposure Assessment

2.5.1 Exposure Pathways

The potential exposure pathways for the Motor Partners site include; inhalation of volatile substances and direct contact with contaminated soil (entry through the skin). Groundwater ingestion is not considered a complete pathway for the site and was not considered in this analysis.

Contamination is localized in a small area at the site. It appears that soil lithology has prevented significant movement of contaminants so there should be no offsite exposure pathways. In addition, the only known potential for onsite exposure would be in the case of excavation activities. Present site activities should pose no hazard since contamination is confined to a small subsurface area.

2.5.2 Exposure Frequency and Duration

The exposure period was assumed to be a 70-year lifetime. Other parameters for frequency and duration are presented in Appendix B. The California oral and dermal slope factors of 0.1 for benzene were used in this assessment. An input parameter summary table with default and site specific parameters has been included in Appendix B.

3.0 ADDENDUM TO TIER 2 RISK ANALYSIS RESULTS

Output data sheets from the RBCA Toolkit for Chemical Releases analysis are presented in Appendix B. The following discussion summarizes the results.

3.1 Risk Characterization

The potential health risks to humans exposed to the chemical constituents of concern (COC) are quantified by calculating the average daily intake rates and the toxicological effects for both carcinogenic and noncarcinogenic risks. The toxicological data for each COC is classified as carcinogen (Class A, B, or C), systemic toxicant, or both.

3.1.1 Carcinogenic Risks

The carcinogenic risks are estimated using the following equation that considers chronic exposure to a carcinogen.

$$R = CDI \times SF$$

where, R is the excess lifetime cancer risk, CDI is the chronic daily intake of the carcinogen, and SF is the slope factor for the COC. An excess lifetime cancer risk of 1×10^{-6} indicates an individual has a one in one million chance of developing cancer as a result of exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

The Baseline Risk Summary Table in Appendix B presents the estimated cancer risks for the Motor Partners site. The carcinogenic risk estimate for the critical exposure pathway was 4.4×10^{-6} . This number is less than the target carcinogenic risk of 1.0×10^{-5} .

3.1.2 Hazard Index

The hazard index (HI) is calculated by summing the individual hazard quotients (HQ) for all contaminants within a medium. Both the HI and HQ are used to describe the noncarcinogenic effect of a contaminant. The HQ is calculated using the following equation that describes exposure to a systemic toxicant.

$$HQ = I/RfD$$

where, HQ is hazard quotient, I is the average daily chemical intake for the toxicant, and RfD is the reference dose. The hazard index (HI) is estimated by adding the HQ's. For only one compound, the HQ is equal to the HI. If the HI value is greater than 1.0, exposure could result in adverse health effects. The Baseline Risk Summary Table in Appendix B summarizes the estimated HQ's and HI's for the chemicals of concern at Motor Partners. The estimated HQ is 8.0×10^{-2} , and the HI is 8.1×10^{-2} . Each of these values is less than the target index of 1.0.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

The results of this Addendum to the Tier 2 risk assessment suggest that hydrocarbon contamination at the Motor Partners site does not provide a significant risk to human health and the environment. This assessment is based on the following observations and findings:

- 1) Overall levels of hydrocarbon contamination are decreasing at the site.
- 2) The carcinogenic risk estimate for the critical exposure pathway was 4.4×10^{-6} . This number is less than the target carcinogenic risk of 1.0×10^{-5} .
- 3) The estimated Hazard Quotient is 8.0×10^{-2} , and the Hazard Index is 8.1×10^{-2} . Each of these values is less than the target index of 1.0.

4.2 Recommendations

The results of this risk assessment suggest that hydrocarbon contamination at the Motor Partners site does not provide a significant risk to human health and the environment. The site should be considered a low risk groundwater site. It is recommended that the site be considered for closure.

5.0 REFERENCES

- CEC, 1994a. Work Plan for Remediation, 1234 40th Avenue, Oakland, CA. Prepared by Certified Environmental Consulting, Inc., March 15, 1994.
- CEC, 1994b. Amendments to Work Plan for Remediation, 1234 40th Avenue, Oakland, CA. Prepared by Certified Environmental Consulting, Inc., April 6, 1994.
- CEC, 1994c. Report of Phase I Site Investigation, 1234 40th Avenue, Oakland, CA. Prepared by Certified Environmental Consulting, Inc., September 21, 1994.
- Growth, 1995a. Work Plan for Phase II Site Characterization of Groundwater, 1234 40th Avenue, Oakland, CA. Prepared by Growth Environmental Services, Inc., February 15, 1995.
- Growth, 1995b. Site Investigation Report, 1234 40th Avenue, Oakland, CA. Prepared by Growth Environmental Services, Inc., 1995.
- VISTA, 1995. Site Assessment Plus Report, 1234 40th Avenue, Oakland, CA. Prepared by VISTA Information Services, November 20, 1995.
- RES, 1995a. Report of Quarterly Sampling, 1234 40th Avenue, Oakland, CA. Prepared by Rogers Environmental Services, December 8, 1995.
- RES, 1995b. Revised Work Plan for Phase II Investigation, 1234 40th Avenue, Oakland, CA. Prepared by Rogers Environmental Services, December 19, 1995.
- RES, 1996a. Report of Monitoring Well Installation and Quarterly Sampling, 1234 40th Avenue, Oakland, CA. Prepared by Rogers Environmental Services, February 27, 1996.
- RES, 1996b. Report of Quarterly Monitoring at 1234 40th Avenue, Oakland, CA. Prepared by Rogers Environmental Services, May 28, 1996.
- RES, 1996c. Aquifer Pump Test Report, 1234 40th Avenue, Oakland, CA. Prepared by Rogers Environmental Services, June 1996.
- RES, 1996d. Report of Quarterly Monitoring at 1234 40th Avenue, Oakland, CA. Prepared by Rogers Environmental Services, August 29, 1996.
- RES, 1996e. Quarterly Monitoring Report, 1234 40th Avenue, Oakland, CA. Prepared by Rogers Environmental Services, December 3, 1996.
- RES, 1996f. Report of Soil Vapor Extraction Pilot Test Completed at 1234 40th Avenue, Oakland, CA. Prepared by Rogers Environmental Services, December 16, 1996.

REFERENCES (CONTINUED)

RES, 1997a. Report of Quarterly Monitoring at 1234 40th Avenue, Oakland, CA. Prepared by Rogers Environmental Services, March 7, 1997.

RES, 1997b. Report of Quarterly Monitoring at 1234 40th Avenue, Oakland, CA. Prepared by Rogers Environmental Services, June 4, 1997.

RES, 1997c. Tier 1 Risk Assessment completed for Motor Partners, 1234 40th Avenue, Oakland, California. August 13, 1997.

Aquatic & Environmental Applications, 1997a. Work Plan for Additional Site Investigation Activities at Motor Partners, 1234 40th Ave., Oakland, California. September 13, 1997.

Aquatic & Environmental Applications, 1997b. Report of Quarterly Monitoring at 1234 40th Avenue, Oakland, CA. September 12, 1997.

Aquatic & Environmental Applications, 1997c. Report of Quarterly Monitoring at 1234 40th Avenue, Oakland, CA. December 16, 1997.

Aquatic & Environmental Applications, 1998a. Work Plan Addendum for Additional Site Investigation, Motor Partners, 1234 40th Ave., Oakland, California. January 26, 1998.

Aquatic & Environmental Applications, 1998b. Enhancing On-site Bioremediation at Motor Partners, 1234 40th Ave., Oakland, CA. February 16, 1998.

Aquatic & Environmental Applications, 1998c. Well Installation and Quarterly Monitoring Report Motor Partners, 1234 40th Ave., Oakland, CA. March 31, 1998.

Aquatic & Environmental Applications, 1998d. Report of Quarterly Monitoring at 1234 40th Avenue, Oakland, CA. July 10, 1998.

Aquatic & Environmental Applications, 1998e. Report of Quarterly Monitoring at 1234 40th Avenue, Oakland, CA. October 10, 1998.

Aquatic & Environmental Applications, 1999a. Report of Quarterly Monitoring at 1234 40th Avenue, Oakland, CA. January 4, 1999.

Aquatic & Environmental Applications, 1999b. Report of Quarterly Monitoring at 1234 40th Avenue, Oakland, CA. April 1, 1999.

Aquatic & Environmental Applications, 1999c. Report of Quarterly Monitoring at 1234 40th Avenue, Oakland, CA. July 9, 1999.

REFERENCES (CONTINUED)

Aquatic & Environmental Applications, 1999d. Report of Quarterly Monitoring at 1234 40th Avenue, Oakland, CA. October 11, 1999.

Aquatic & Environmental Applications, 1999e. Tier 2 Risk Assessment for 1234 40th Avenue, Oakland, CA. December 15, 1999.

Aquatic & Environmental Applications, 2000a. Report of Quarterly Monitoring at 1234 40th Avenue, Oakland, CA. January 12, 2000.

6.0 LIMITATIONS

This report has been prepared in accordance with generally accepted environmental, geological and engineering practices. No warranty, either expressed or implied is made as to the professional advice presented herein. The analysis, conclusions, and recommendations contained in this report are based upon site conditions as they existed at the time of the investigation and they are subject to change.

The conclusions presented in this report are professional opinions based solely upon visual observations of the site and vicinity, and interpretation of available information as described in this report. The scope of services performed in execution of this investigation may not be appropriate to satisfy the needs of other users and any use or reuse of this document or its findings, conclusions or recommendations presented herein is at the sole risk of the said user.



Gary L. Rogers, Ph.D.

7.0 FIGURES

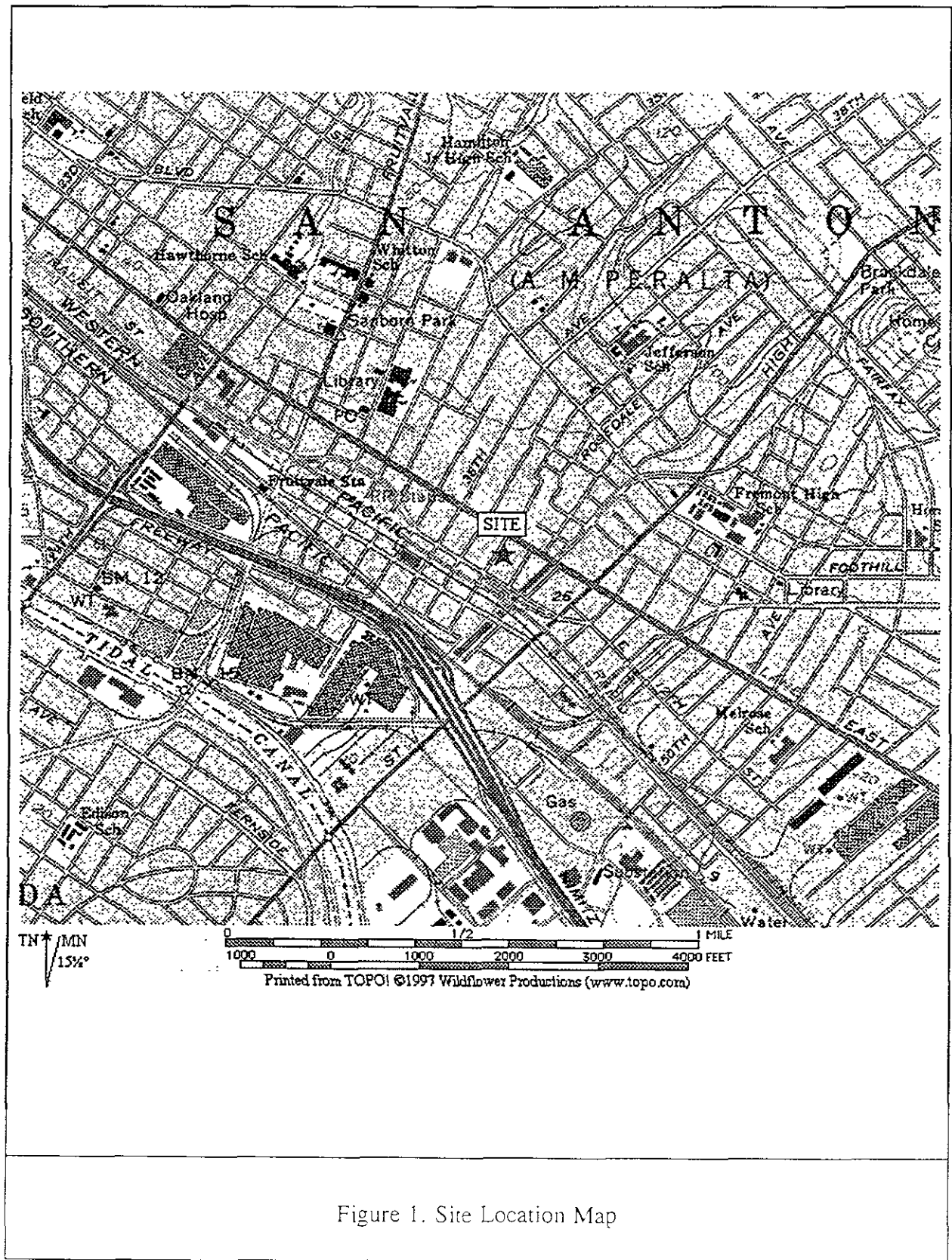
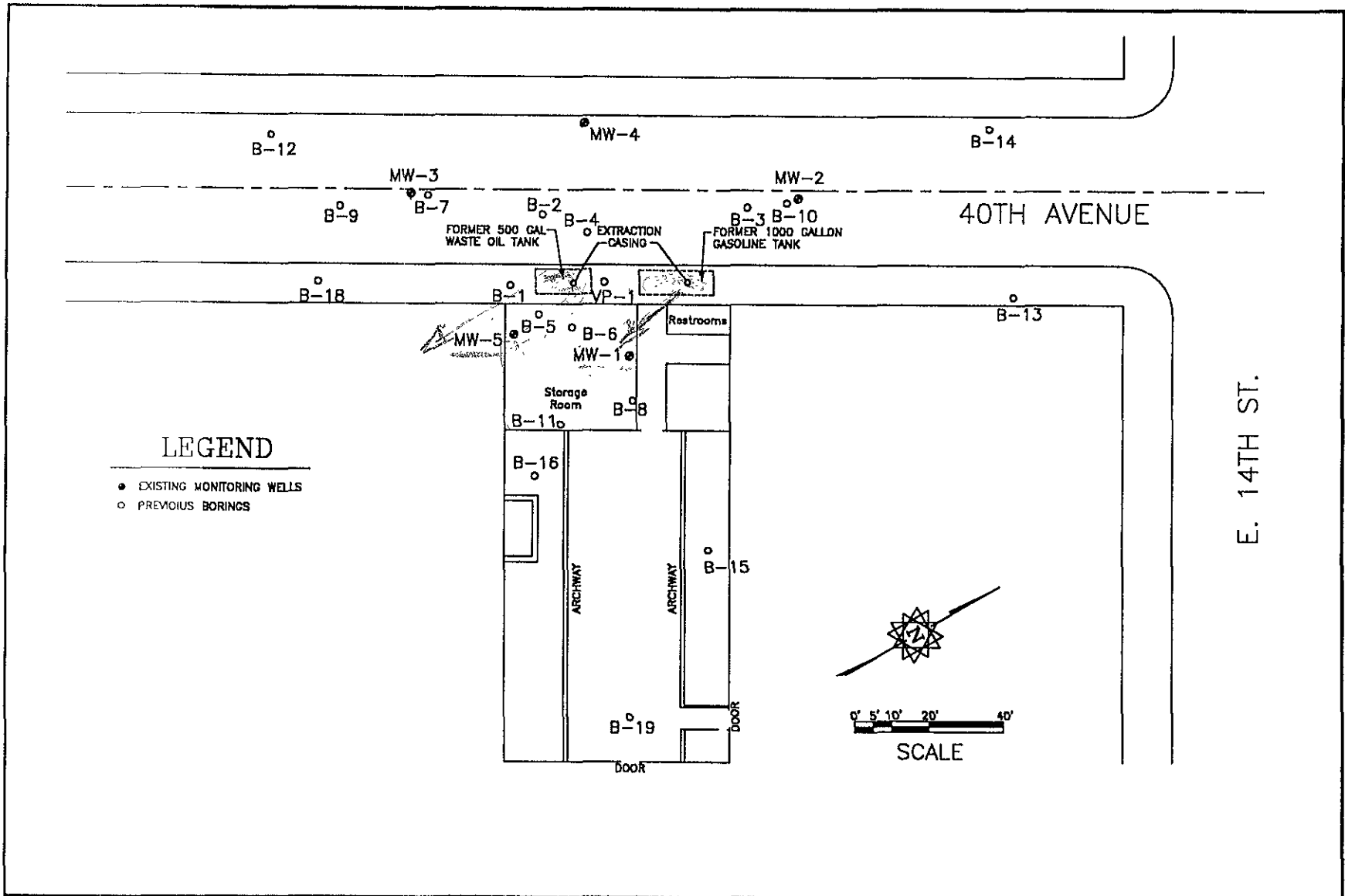


Figure 1. Site Location Map

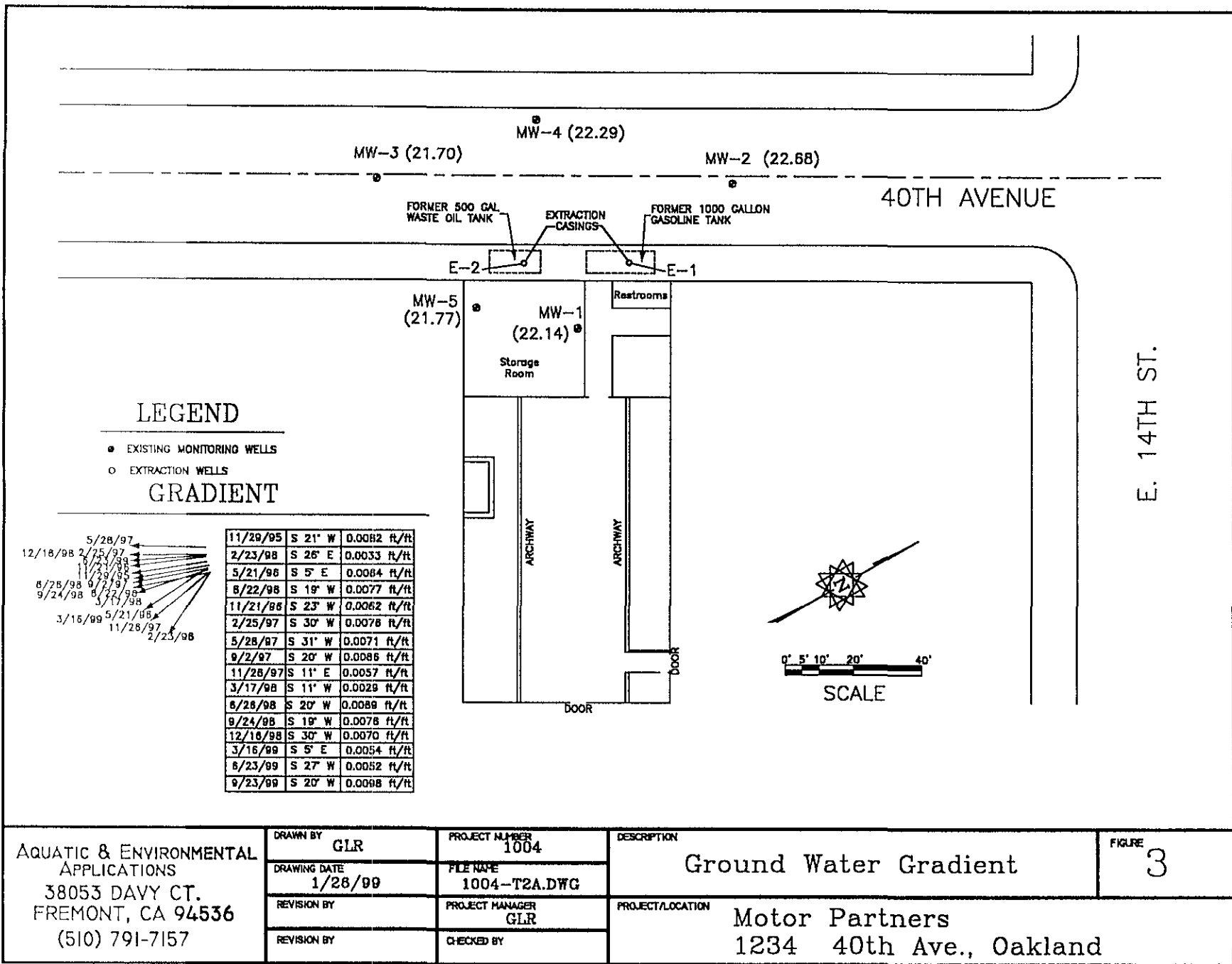


AQUATIC & ENVIRONMENTAL APPLICATIONS 38053 DAVY CT. FREMONT, CA 94536 (510) 791-7157	DRAWN BY GLR	PROJECT NUMBER 1004	DESCRIPTION Site Layout	FIGURE 2
	DRAWING DATE 1/28/99	FILE NAME 1004-T2A.DWG		
	REVISION BY	PROJECT MANAGER GLR	PROJECT LOCATION Motor Partners 1234 40th Ave., Oakland	
	REVISION BY	CHECKED BY		

Motor Partners, 1234 40th Ave., Oakland, CA
 Addendum to Tier 2 Risk Assessment

13

January 28, 2000
 File: 1004-T2A.RPT



AQUATIC & ENVIRONMENTAL APPLICATIONS 38053 DAVY CT. FREMONT, CA 94536 (510) 791-7157	DRAWN BY GLR	PROJECT NUMBER 1004	DESCRIPTION Ground Water Gradient	FIGURE 3	
	DRAWING DATE 1/28/99	FILE NAME 1004-T2A.DWG			
	REVISION BY	PROJECT MANAGER GLR	PROJECT/LOCATION Motor Partners 1234 40th Ave., Oakland		
	REVISION BY	CHECKED BY			

8.0 TABLES

Table 1. Summary of Soil and Groundwater Sampling Results for
Addendum Tier 2 Risk Assessment Analysis

Motor Partners Site, 1234 40th Ave., Oakland, California

Sample I.D. Number	Date Collected	TPH-D ($\mu\text{g/L}$)	TPH-G ($\mu\text{g/L}$)	MTBE ($\mu\text{g/L}$)	Benzene ($\mu\text{g/L}$)	Toluene ($\mu\text{g/L}$)	Ethyl Benzene ($\mu\text{g/L}$)	Total Xylenes ($\mu\text{g/L}$)
GROUNDWATER								
MW-1	3/16/99	270	580	0	11	1.4	8.3	11
	6/23/99	2,600	5,400	0	30	19	190	420
	9/23/99	470	1,100	0	130	4.1	74	92
	12/29/99	1,100	4,900	0	740	24	550	840
MW-5	3/16/99	0	180	0	22	0.52	0	1.9
	6/23/99	8,400	3,200	0	25	7.3	6.8	25
	9/23/99	470	490	0	16	3.3	2	4.9
	12/29/99	2,300	530	0	9	2.7	0.75	3.3
AVERAGE		1951.2	2047.5	0.0	122.9 ✓	7.8	104.0	174.8
SOIL								
Sample I.D. Number	Date Collected	TPH-D (mg/L)	TPH-G (mg/L)	MTBE (mg/L)	Benzene (mg/L) mg/kg	Toluene (mg/L)	Ethyl Benzene (mg/L)	Total Xylenes (mg/L)
B-5 @ 12'	5/17/94	2700	1100	NA	15	3.7	13	24
B-6 @ 9.5'	5/17/94	140	260	NA	0.49	0.53	3.9	13
MW-5	2/11/98	2100	0	NA	0	0	23	34
	2/11/98	1700	0	NA	1.5	0	10	18
AVERAGE		1660.0	340.0		4.2 ✓	1.1	12.5	22.2

Notes NA = Not Analyzed

9.0 APPENDICES

APPENDIX A

Letter From Alameda County

ALAMEDA COUNTY
HEALTH CARE SERVICES

AGENCY

DAVID J. KEARS, Agency Director



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

January 3, 2000
StID # 3682

Mr. Bill Owens
2221 Olympic Blvd.
Walnut Creek, CA 94595

Re: Tier 2 Risk Assessment for Motor Partners, 1234 40th Ave., Oakland CA 94601

Dear Mr. Owens:

Our office has received and reviewed the December 15, 1999 Tier 2 Risk Assessment for the above site as prepared by Mr. Gary Rogers of Aquatic & Environmental Applications. I have also spoken with Mr. Rogers regarding our offices' concerns.

Please provide the following information affecting the risk assessment so we can continue our evaluation:

- The sampling procedure for the past four sampling events should be described. Of concern is the presence of oxygen releasing socks. Groundwater samples should be purged after the removal of the socks prior to sampling.
- The groundwater concentration used for the risk assessment will be the average concentration of the past four monitoring events for wells MW1 and MW5. This value will be used to regenerate your site specific target levels (SSTL).
- The soil concentration used for the risk assessment will include all vadose soil samples from monitoring wells MW-1, MW-5 and borings B-5 and B-6. Please include a copy of the soil SSTL values. This was missing in the previous report.
- Groundwater ingestion is not considered a complete pathway at this site, therefore, it should not be evaluated.
- Please insure that the California slope factor of 0.1 for benzene is used in your assessment.
- Your addendum should also include and incorporate the results of the recent December 1999 sampling event.
- Please include the input parameter summary table indicating the default and site specific parameters used in your risk assessment.

You may contact me at (510) 567-6765 if you have any questions.

Sincerely,

Barney M Chan
Hazardous Materials Specialist

C B Chan, files

Mr G Rogers, Aquatic & Environmental Applications, 38053 Davy Ct, Fremont, CA 94536

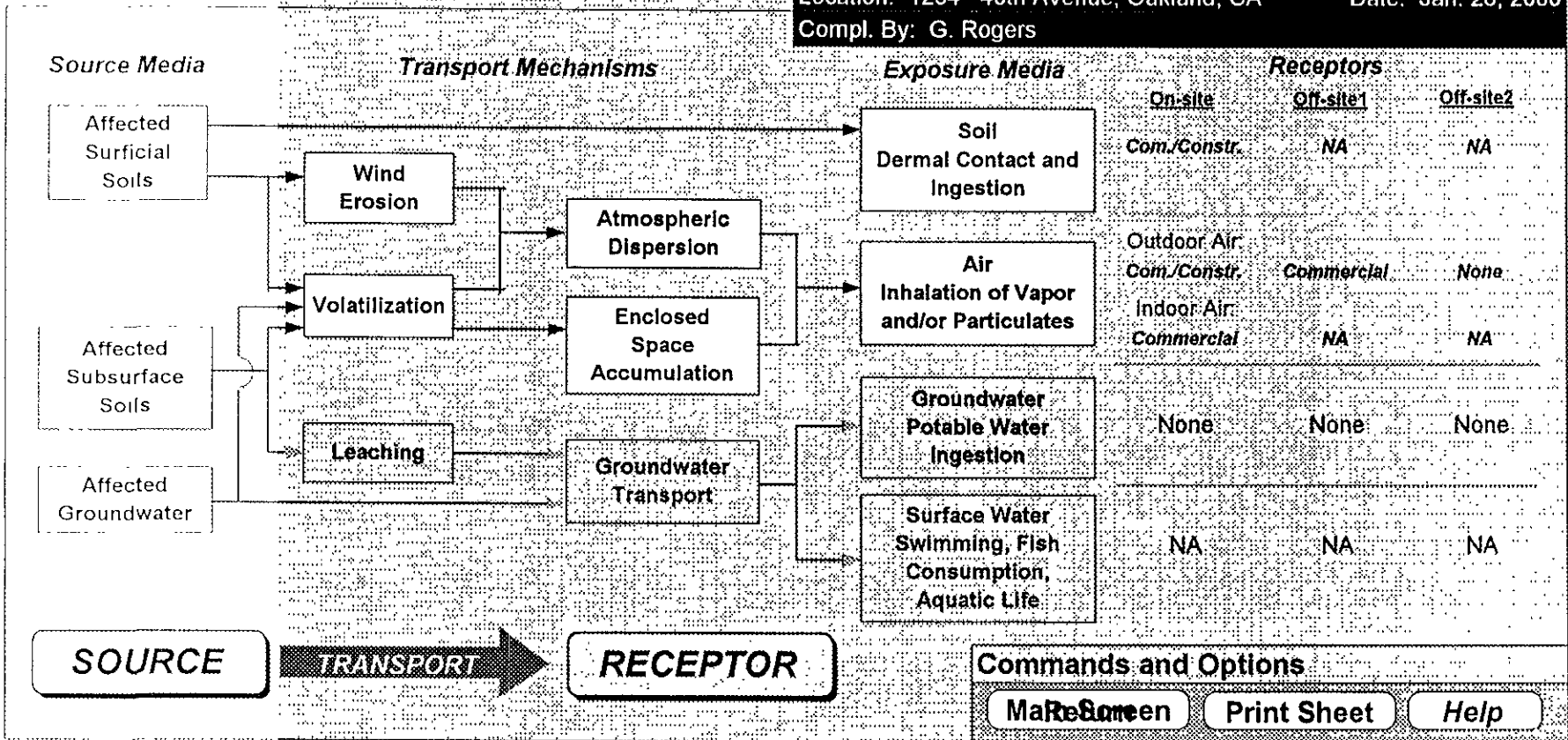
T2RBCA1234 40th

APPENDIX B

Tier 2 Results

Exposure Pathway Flowchart

Site Name: Motor Partners
 Location: 1234 40th Avenue, Oakland, CA
 Compl. By: G. Rogers
 Job ID: 1004
 Date: Jan. 28, 2000



RBCA SITE ASSESSMENT

Input Parameter Summary

Site Name: Motor Partners
 Site Location: 1234 40th Avenue Oakland, CA

Completed By: G. Rogers
 Date Completed: Jan 28, 2000

Job ID: 1004

1 OF 1

Exposure Parameters	Residential		Commercial/Industrial	
	Adult (1-18yrs)	(1-18yrs)	Chronic	Construc.
AT _c	70			
AT _n	30		25	1
BW	70	15	70	
ED	30	6	25	1
t	30		25	1
EF	350		250	180
FF _D	350		250	
IR _w	2		1	
IR _s	100	200	50	100
SA	5800		5800	5800
M	1			
ET _{swim}	3			
EV _{swim}	12	12		
IR _{swim}	0.05	0.5		
SA _{swim}	23000		8100	
IR _{fish}	0.025			
F _{fish}	1			

Surface Parameters	General	Construction	Units
	A	4.0E+3	
W	4.0E+1	1.5E+2	(ft)
W _{gw}	NA		(ft)
U _{air}	6.4E+5		(ft/d)
δ _{air}	6.6E+0		(ft)
P _a	6.9E-14		(g/cm ² /s)
L ₁₁	NA		(ft)

Surface Soil Column Parameters	Value	Units	
h _{cap}	9.5E-1	(ft)	
h _v	7.0E+0	(ft)	
ρ _s	1.7E+0	(g/cm ³)	
f _{oc}	1.0E-2	(-)	
θ _t	3.6E-1	(-)	
K _{vs}	6.6E-3	(cm/d)	
k _v	1.1E-16	(ft ²)	
L _{gw}	8.0E+0	(ft)	
L ₁	9.0E+0	(ft)	
L _{base}	1.2E+1	(ft)	
L _{soil}	3.0E+0	(ft)	
pH	6.8E+0	(-)	
	capillary	vadose	foundation
θ _v	0.35	0.34	0.12
θ _a	0.01	0.02	0.28

Complete Exposure Pathways and Receptors	On-site	Off-site 1	Off-site 2
Groundwater			
Groundwater Ingestion	None	None	None
Soil leaching to Groundwater Ingestion	None	None	None
Applicable Surface Water Exposure Routes:			
Swimming			NA
Fish Consumption			NA
Aquatic Life Protection			NA
Soil			
Direct Ingestion and Dermal Contact	Com / Constr.		
Outdoor Air			
Particulates from Surface Soils	Com / Constr.	Commercial	None
Volatilization from Soils	Com / Constr.	Commercial	None
Volatilization from Groundwater	Commercial	Commercial	None
Indoor Air			
Volatilization from Subsurface Soils	Commercial	NA	NA
Volatilization from Groundwater	Commercial	NA	NA

Building Parameters	Residential	Commercial	Units
V _b	NA	9.84E+0	(ft)
A _b	NA	7.53E+2	(cm ²)
X _{crk}	NA	1.12E+2	(ft)
ER	NA	1.99E+1	(1/d)
L _{crk}	NA	4.92E-1	(ft)
Z _{crk}	NA	4.92E-1	(ft)
η	NA	1.00E-2	(-)
dP	NA	0.00E+0	(g/cm ² *2)
C ₁	NA	0.00E+0	(ft ³ /d)

Receptor Distance from Source Media	On-site	Off-site 1	Off-site 2	Units
Groundwater receptor	NA	NA	NA	(ft)
Soil leaching to groundwater receptor	NA	NA	NA	(ft)
Outdoor air inhalation receptor	0	150	NA	(ft)

Groundwater Parameters	Value	Units
δ _{gw}	NA	(ft)
i	NA	(cm/yr)
U _{gw}	NA	(cm/d)
V _{gw}	NA	(cm/d)
K _s	NA	(cm/d)
i	NA	(-)
S _w	NA	(ft)
S _g	NA	(ft)
θ _{eff}	NA	(-)
f _{oc, gw}	NA	(-)
pH _{gw}	NA	(-)
	Biodegradation considered?	NA

Target Health Risk Values	Individual	Cumulative
TR ₁₀₀	1.0E-5	1.0E-5
TR ₁	1.0E-6	
THQ	1.0E+0	1.0E+0

Transport Parameters	Off-site 1	Off-site 2	Off-site 1	Off-site 2	Units
Lateral Groundwater Transport		Groundwater Ingestion		Soil Leaching to GW	
α _x	NA	NA	NA	NA	(ft)
α _y	NA	NA	NA	NA	(ft)
α _z	NA	NA	NA	NA	(ft)
Lateral Outdoor Air Transport		Soil to Outdoor Air Inhal.		GW to Outdoor Air Inhal.	
σ _y	1.6E+1	NA	1.6E+1	NA	(ft)
σ _z	1.1E+1	NA	1.1E+1	NA	(ft)
ADF	1.2E+0	NA	2.9E+0	NA	(-)

Modeling Options	
RBCA tier	Tier 2
Outdoor air volatilization model	Surface model only
Indoor air volatilization model	Johnson & Ettinger model
Soil leaching model	NA
Use soil attenuation model (SAM) for leachate?	NA
Air diffusion factor	3-D Gaussian dispersion
Groundwater dilution-attenuation factor	NA

Surface Water Parameters	Off-site 2	Units
Q _{sw}	NA	(ft ³ /d)
W _{sw}	NA	(ft)
δ _{sw}	NA	(ft)
DF _{sw}	NA	(-)

NOTE: NA = Not applicable

RBCA Tool Kit for Chemical Releases, Version 1.2

RBCA SITE ASSESSMENT

Site Name: Motor Partners

Completed By: G. Rogers

Site Location: 1234 40th Avenue, Oakland, CA Date Completed: Jan. 28, 2000

1 of 1

TIER 2 SOIL CONCENTRATION DATA SUMMARY

CONSTITUENTS DETECTED		Analytical Method			Detected Concentrations		
		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)
1634-04-4	Methyl t-Butyl ether	#N/A	4	4	1.0E-99	1.0E-99	1.0E-99
1330-20-7	Xylene (mixed isomers)	5.0E-03	4	4	3.4E+01	2.2E+01	3.3E+01
108-88-3	Toluene	5.0E-03	4	4	3.7E+00	1.1E+00	3.2E+00
100-41-4	Ethylbenzene	5.0E-03	4	4	2.3E+01	1.2E+01	2.2E+01
71-43-2	Benzene*	5.0E-03	4	4	1.5E+01	4.2E+00	1.3E+01

* = Chemical with user-specified data

W/air

RBCA Tool Kit for Chemical Releases, Version 1.2

RBCA SITE ASSESSMENT

Site Name: Motor Partners

Completed By: G. Rogers

Site Location: 1234 40th Avenue, Oakland, CA Date Completed: Jan. 28, 2000

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)
1634-04-4	Methyl t-Butyl ether	#N/A	8	8	1.0E-99	1.0E-99	1.0E-99
1330-20-7	Xylene (mixed isomers)	5.0E-03	8	8	8.4E-01	1.7E-01	3.8E-01
108-88-3	Toluene	2.0E-03	8	8	2.4E-02	7.8E-03	1.4E-02
100-41-4	Ethylbenzene	2.0E-03	8	8	5.5E-01	1.0E-01	2.3E-01
71-43-2	Benzene*	2.0E-03	8	8	7.4E-01	1.2E-01	2.9E-01

* = Chemical with user-specified data

RBCA SITE ASSESSMENT

User-Specified COC Data

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

CONSTITUENT	Representative COC Concentration			
	Groundwater		Soils (9 - 12 ft)	
	value (mg/L)	note	value (mg/kg)	note
Methyl t-Butyl ether	1.0E-99		1.0E-99	
Xylene (mixed isomers)	1.7E-1		2.2E+1	
Toluene	7.8E-3		1.1E+0	
Ethylbenzene	1.0E-1		1.2E+1	
Benzene*	1.2E-1		4.2E+0	

* = Chemical with user-specified data

Site Name: Motor Partners

Date Completed: Jan. 28, 2000

Site Location: 1234 40th Avenue, Oakland, CA

Job ID: 1004

Completed By: G. Rogers

RBCA SITE ASSESSMENT	Baseline Risk Summary-All Pathways
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Site Name Motor Partners

Completed By: G. Rogers

Site Location 1234 40th Avenue, Oakland, CA

Date Completed: Jan. 28, 2000

TIER 2 BASELINE RISK SUMMARY TABLE										
EXPOSURE PATHWAY	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
OUTDOOR AIR EXPOSURE PATHWAYS										
Complete:	5.4E-8	1.0E-5	5.4E-8	1.0E-5	<input type="checkbox"/>	1.6E-2	1.0E+0	1.6E-2	1.0E+0	<input type="checkbox"/>
INDOOR AIR EXPOSURE PATHWAYS										
Complete:	1.4E-6	1.0E-5	1.4E-6	1.0E-5	<input type="checkbox"/>	8.0E-2	1.0E+0	8.1E-2	1.0E+0	<input type="checkbox"/>
SOIL EXPOSURE PATHWAYS										
Complete:	4.4E-6	1.0E-5	4.4E-6	1.0E-5	<input type="checkbox"/>	4.1E-2	1.0E+0	4.5E-2	1.0E+0	<input type="checkbox"/>
GROUNDWATER EXPOSURE PATHWAYS										
Complete:	NA	NA	NA	NA	<input type="checkbox"/>	NA	NA	NA	NA	<input type="checkbox"/>
SURFACE WATER EXPOSURE PATHWAYS										
Complete:	NA	NA	NA	NA	<input type="checkbox"/>	NA	NA	NA	NA	<input type="checkbox"/>
CRITICAL EXPOSURE PATHWAY (Maximum Values From Complete Pathways)										
	4.4E-6	1.0E-5	4.4E-6	1.0E-5	<input type="checkbox"/>	8.0E-2	1.0E+0	8.1E-2	1.0E+0	<input type="checkbox"/>
	<i>Soil</i>		<i>Soil</i>			<i>Indoor Air</i>		<i>Indoor Air</i>		

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS (CHECKED IF PATHWAYS ARE ACTIVE)

CARCINOGENIC RISK

Constituents of Concern	(1) EPA Carcinogenic Classification	(2) Total Carcinogenic Exposure (mg/m ³)				(3) Inhalation Unit Risk Factor (µg/m ³) ⁻¹	(4) Individual COC Risk (2) x (3) x 1000				
		On-site (0 ft)		Off-site 1 (150 ft)	Off-site 2 (0 ft)		On-site (0 ft)		Off-site 1 (150 ft)	Off-site 2 (0 ft)	
		Commercial	Construction Worker	Commercial	None		Commercial	Construction Worker	Commercial	None	
Methyl t-Butyl ether	-										
Xylene (mixed isomers)	D										
Toluene	D										
Ethylbenzene	D										
Benzene*	A	6.5E-6	1.4E-6	5.5E-6		8.3E-6	5.4E-8	1.1E-8	4.6E-8		

Total Pathway Carcinogenic Risk = **5.4E-8** **1.1E-8** **4.6E-8**

Site Name Motor Partners
 Site Location 1234 40th Avenue, Oakland, CA

Completed By: G. Rogers
 Date Completed: Jan. 28, 2000

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RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS (CHECKED IF PATHWAYS ARE ACTIVE)

TOXIC EFFECTS

Constituents of Concern	(5) Total Toxicant Exposure (mg/m ³)				(6) Inhalation Reference Conc. (mg/m ³)	(7) Individual COC Hazard Quotient (5) / (6)			
	On-site (0 ft)		Off-site 1 (150 ft)	Off-site 2 (0 ft)		On-site (0 ft)		Off-site 1 (150 ft)	Off-site 2 (0 ft)
	Commercial	Construction Worker	Commercial	None		Commercial	Construction Worker	Commercial	None
Methyl t-Butyl ether	1.1E-104	1.0E-103	8.3E-105		3.0E+0	3.6E-105	3.4E-104	2.8E-105	
Xylene (mixed isomers)	4.9E-5	2.6E-4	4.2E-5		7.0E+0	7.0E-6	3.7E-5	6.0E-6	
Toluene	3.2E-6	1.7E-5	2.7E-6		4.0E-1	7.9E-6	4.2E-5	6.8E-6	
Ethylbenzene	2.2E-5	1.2E-4	1.9E-5		1.0E+0	2.2E-5	1.2E-4	1.9E-5	
Benzene*	1.8E-5	9.6E-5	1.5E-5		6.0E-3	3.0E-3	1.6E-2	2.6E-3	

Total Pathway Hazard Index = **3.1E-3** **1.6E-2** **2.6E-3**

Site Name Motor Partners
 Site Location 1234 40th Avenue, Oakland, CA

Completed By: G. Rogers
 Date Completed: Jan. 28, 2000

Job ID: 1004

RBCA SITE ASSESSMENT

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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 Exposure (mg/m ³) Commercial	(3) Inhalation Unit Risk Factor (µg/m ³) ⁻¹	(4) Individual COC Risk (2) x (3) x 1000 Commercial
Methyl t-Butyl ether	-			
Xylene (mixed isomers)	D			
Toluene	D			
Ethylbenzene	D			
Benzene*	A	1.7E-4	8.3E-6	1.4E-6

Total Pathway Carcinogenic Risk = 1.4E-6

Site Name: Motor Partners
 Site Location: 1234 40th Avenue, Oakland, CA
 Completed By: G. Rogers

Date Completed: Jan. 28, 2000
 Job ID: 1004

RBCA SITE ASSESSMENT

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TIER 2 PATHWAY RISK CALCULATION

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

TOXIC EFFECTS

Constituents of Concern	(5) Total Toxicant Exposure (mg/m ³)	(6) Inhalation Reference Concentration (mg/m ³)	(7) Individual COC Hazard Quotient (5)/(6)
	Commercial		Commercial
Methyl t-Butyl ether	1.7E-102	3.0E+0	5.8E-103
Xylene (mixed isomers)	6.8E-4	7.0E+0	9.7E-5
Toluene	5.9E-5	4.0E-1	1.5E-4
Ethylbenzene	2.5E-4	1.0E+0	2.5E-4
Benzene*	4.8E-4	6.0E-3	8.0E-2

Total Pathway Hazard Index = 8.1E-2

Site Name: Motor Partners
 Site Location: 1234 40th Avenue, Oakland, CA
 Completed By: G. Rogers

Date Completed: Jan. 28, 2000
 Job ID: 1004

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

SOIL EXPOSURE PATHWAY (CHECKED IF PATHWAY IS ACTIVE)

CARCINOGENIC RISK

Constituents of Concern	(1) EPA Carcinogenic Classification	(2) Total Carcinogenic Intake Rate (mg/kg/day)				(3) Slope Factor (mg/kg/day) ⁻¹		(4) Individual COC Risk	
		(a) via Ingestion	(b) via Dermal Contact	(c) via Ingestion	(d) via Dermal Contact	(a) Oral	(b) Dermal	(2a)x(3a) + (2b)x(3b)	(2c)x(3a) + (2d)x(3b)
		Commercial		Construction Worker				Commercial	Construction Worker
Methyl t-Butyl ether	-								
Xylene (mixed isomers)	D								
Toluene	D								
Ethylbenzene	D								
Benzene*	A	7.4E-7	4.3E-5	4.3E-8	1.2E-6	1.0E-1	1.0E-1	4.4E-6	1.3E-7

* No dermal slope factor available—oral slope factor used

Total Pathway Carcinogenic Risk = 4.4E-6 1.3E-7

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 Site Location: 1234 40th Avenue, Oakland, CA
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RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

SOIL EXPOSURE PATHWAY (CHECKED IF PATHWAY IS ACTIVE)

TOXIC EFFECTS

Constituents of Concern	(5) Total Toxicant Intake Rate (mg/kg/day)				(6) Oral Reference Dose (mg/kg-day)		(7) Individual COC Hazard Quotient	
	(a) via Ingestion	(b) via Dermal Contact	(c) via Ingestion	(d) via Dermal Contact	(a) Oral	(b) Dermal	(5a)/(6a) + (5b)/(6b)	(5c)/(6a) + (5d)/(6b)
	Commercial		Construction Worker				Commercial	Construction Worker
Methyl t-Butyl ether	4.9E-106	2.8E-104	7.0E-106	2.0E-104	1.0E-2	8.0E-3	3.6E-102	2.6E-102
Xylene (mixed isomers)	1.1E-5	6.3E-4	1.6E-5	4.5E-4	2.0E+0	1.8E+0	3.5E-4	2.5E-4
Toluene	5.2E-7	3.0E-5	7.5E-7	2.2E-5	2.0E-1	1.6E-1	1.9E-4	1.4E-4
Ethylbenzene	6.1E-6	3.5E-4	8.8E-6	2.5E-4	1.0E-1	9.7E-2	3.7E-3	2.7E-3
Benzene*	2.1E-6	1.2E-4	3.0E-6	8.7E-5	3.0E-3	3.0E-3*	4.1E-2	3.0E-2

* No dermal reference dose available—oral reference dose used.

Total Pathway Hazard Index = 4.5E-2 3.3E-2

Site Name Motor Partners
 Site Location 1234 40th Avenue, Oakland, CA
 Completed By G Rogers

Date Completed: Jan. 28, 2000
 Job ID: 1004

RBCA SITE ASSESSMENT

Site Name Motor Partners

Site Location: 1234 40th Avenue, Oakla Completed By: G. Rogers

Date Completed: Jan. 28, 2000

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TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

SOIL EXPOSURE PATHWAY (CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS OR SEDIMENTS:

ON-SITE INGESTION AND
DERMAL CONTACT

Constituents of Concern	1) Source/Exposure Medium	2) Exposure Multiplier (IR+SAxMxRAF)xEFxED/(BWxAT) (kg/kg/day)		3) Average Daily Intake Rate (mg/kg/day) (1) x (2)	
	Surface Soil Conc. (mg/kg)	Commercial	Construction Worker	Commercial	Construction Worker
Methyl t-Butyl ether	1.0E-99	2.9E-5	2.1E-5	2.9E-104	2.1E-104
Xylene (mixed isomers)	2.2E+1	2.9E-5	2.1E-5	6.4E-4	4.7E-4
Toluene	1.1E+0	2.9E-5	2.1E-5	3.1E-5	2.2E-5
Ethylbenzene	1.2E+1	2.9E-5	2.1E-5	3.6E-4	2.6E-4
Benzene*	4.2E+0	1.0E-5	3.0E-7	4.4E-5	1.3E-6

NOTE RAF = Relative absorption factor (-) AT = Averaging time (days) ED = Exposure duration (yrs) IR = Soil ingestion rate (mg/day)
M = Adherence factor (mg/cm²) BW = Body weight (kg) EF = Exposure frequency (days/yr) SA = Skin exposure area (cm²/day)

Site Name Motor Partners

Site Location 1234 40th Avenue, Oakland, CA

Completed By G Rogers

Date Completed: Jan. 28, 2000

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RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS (CHECKED IF PATHWAY IS ACTIVE)

SOILS (9 - 12 ft) VAPOR

INTRUSION INTO ON-SITE BUILDINGS

Constituents of Concern	1) Source Medium	2) NAF Value (m ³ /kg) Receptor	3) Exposure Medium Indoor Air: POE Conc. (mg/m ³) (1)/(2)	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)	5) Average Inhalation Exposure Concentration (mg/m ³) (3) X (4)
	Soil Conc. (mg/kg)	Commercial	Commercial	Commercial	Commercial
Methyl t-Butyl ether	1.0E-99	5.3E+2	1.9E-102	6.8E-1	1.3E-102
Xylene (mixed isomers)	2.2E+1	2.3E+4	9.7E-4	6.8E-1	6.6E-4
Toluene	1.1E+0	1.2E+4	8.5E-5	6.8E-1	5.8E-5
Ethylbenzene	1.2E+1	3.5E+4	3.5E-4	6.8E-1	2.4E-4
Benzene*	4.2E+0	6.2E+3	6.8E-4	2.4E-1	1.7E-4

* = Chemical with user-specified data

NOTE AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name Motor Partners

Site Location 1234 40th Avenue, Oakland, CA

Completed By G Rogers

Date Completed: Jan. 28, 2000

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RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

(CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER VAPOR INTRUSION
INTO ON SITE BUILDINGS

Exposure Concentration

Constituents of Concern	1) Source Medium	2) NAF Value (m ³ L) Receptor	3) Exposure Medium Indoor Air. POE Conc (mg/m ³) (1)/(2)	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)	5) Average Inhalation Exposure Concentration (mg/m ³) (3) X (4)
	Groundwater Conc. (mg/L)	Commercial	Commercial	Commercial	Commercial
Methyl t-Butyl ether	1.0E-99	1.5E+3	6.5E-103	6.8E-1	4.5E-103
Xylene (mixed isomers)	1.7E-1	7.9E+3	2.2E-5	6.8E-1	1.5E-5
Toluene	7.8E-3	7.2E+3	1.1E-6	6.8E-1	7.4E-7
Ethylbenzene	1.0E-1	8.3E+3	1.3E-5	6.8E-1	8.6E-6
Benzene*	1.2E-1	7.0E+3	1.7E-5	2.4E-1	4.3E-6

NOTE AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Motor Partners
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Completed By: G Rogers

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RBCA SITE ASSESSMENT

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TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

TOTAL PATHWAY EXPOSURE (mg/m³)

(Sum average exposure concentrations from soil and groundwater routes.)

Constituents of Concern	Commercial
Methyl t-Butyl ether	1.7E-102
Xylene (mixed isomers)	6.8E-4
Toluene	5.9E-5
Ethylbenzene	2.5E-4
Benzene*	1.7E-4

Site Name: Motor Partners Date Completed: Jan. 28, 2000
 Site Location: 1234 40th Avenue, Oakland, CA Job ID: 1004
 Completed By: G. Rogers

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS (CHECKED IF PATHWAY IS ACTIVE)

SOILS (9 - 12 ft)

VAPOR AND DUST INHALATION

Constituents of Concern	1) Source Medium	2) NAF Value (m ³ /kg) Receptor				3) Exposure Medium Outdoor Air. POE Conc (mg/m ³) (1) / (2)			
	Soil Conc. (mg/kg)	On-site (0 ft)		Off-site 1 (150 ft)	Off-site 2 (0 ft)	On-site (0 ft)		Off-site 1 (150 ft)	Off-site 2 (0 ft)
		Commercial	Construction Worker	Commercial	None	Commercial	Construction Worker	Commercial	None
Methyl t-Butyl ether	1.0E-99	7.5E+4	4.8E+3	8.8E+4		1.3E-104	2.1E-103	1.1E-104	
Xylene (mixed isomers)	2.2E+1	3.1E+5	4.2E+4	3.6E+5		7.2E-5	5.3E-4	6.1E-5	
Toluene	1.1E+0	2.3E+5	3.1E+4	2.7E+5		4.6E-6	3.4E-5	4.0E-6	
Ethylbenzene	1.2E+1	3.8E+5	5.2E+4	4.5E+5		3.3E-5	2.4E-4	2.8E-5	
Benzene*	4.2E+0	1.6E+5	2.2E+4	1.9E+5		2.6E-5	1.9E-4	2.3E-5	

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name Motor Partners

Site Location 1234 40th Avenue, Oakland, CA

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RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS

SOILS (9 - 12 ft)

VAPOR AND DUST INHALATION (cont'd)

Constituents of Concern	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)				5) Average Inhalation Exposure Concentration (mg/m ³) (3) X (4)			
	On-site (0 ft)		Off-site 1 (150 ft)	Off-site 2 (0 ft)	On-site (0 ft)		Off-site 1 (150 ft)	Off-site 2 (0 ft)
	Commercial	Construction Worker	Commercial	None	Commercial	Construction Worker	Commercial	None
Methyl t-Butyl ether	6.8E-1	4.9E-1	6.8E-1		9.1E-105	1.0E-103	7.8E-105	
Xylene (mixed isomers)	6.8E-1	4.9E-1	6.8E-1		4.9E-5	2.6E-4	4.2E-5	
Toluene	6.8E-1	4.9E-1	6.8E-1		3.2E-6	1.7E-5	2.7E-6	
Ethylbenzene	6.8E-1	4.9E-1	6.8E-1		2.2E-5	1.2E-4	1.9E-5	
Benzene*	2.4E-1	7.0E-3	2.4E-1		6.5E-6	1.4E-6	5.5E-6	

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr)

Site Name Motor Partners

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RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS (CHECKED IF PATHWAY IS ACTIVE)

SUBSURFACE SOILS (9 - 12 ft):
VAPOR INHALATION

Constituents of Concern	1) Source Medium	2) NAF Value (m ³ /kg) Receptor			3) Exposure Medium Outdoor Air POE Conc. (mg/m ³) (1) / (2)		
	Soil Conc. (mg/kg)	On-site (0 ft)	Off-site 1 (150 ft)	Off-site 2 (0 ft)	On-site (0 ft)	Off-site 1 (150 ft)	Off-site 2 (0 ft)
		Commercial	Commercial	None	Commercial	Commercial	None
Methyl t-Butyl ether	1.0E-99						
Xylene (mixed isomers)	2.2E+1						
Toluene	1.1E+0						
Ethylbenzene	1.2E+1						
Benzene*	4.2E+0						

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name Motor Partners
Site Location 1234 40th Avenue, Oakland, CA
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TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS:

SUBSURFACE SOILS (9 - 12 ft):
 VAPOR INHALATION (cont'd)

Constituents of Concern	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m ³) (3) X (4)		
	On-site (0 ft)	Off-site 1 (150 ft)	Off-site 2 (0 ft)	On-site (0 ft)	Off-site 1 (150 ft)	Off-site 2 (0 ft)
	Commercial	Commercial	None	Commercial	Commercial	None
Methyl t-Butyl ether						
Xylene (mixed isomers)						
Toluene						
Ethylbenzene						
Benzene*						

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr)

Site Name Motor Partners

Site Location 1234 40th Avenue, Oakland, CA

Completed By: G. Rogers

Date Completed: Jan. 28, 2000

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RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER VAPOR
INHALATION

Exposure Concentration

Constituents of Concern	1) Source Medium Groundwater Conc. (mg/L)	2) NAF Value (m ³ /L) Receptor			3) Exposure Medium Outdoor Air: POE Conc (mg/m ³) (1) / (2)		
		On-site (0 ft) Commercial	Off-site 1 (150 ft) Commercial	Off-site 2 (0 ft) None	On-site (0 ft) Commercial	Off-site 1 (150 ft) Commercial	Off-site 2 (0 ft) None
		Methyl t-Butyl ether	1.0E-99	4.4E+5	1.3E+6		2.2E-105
Xylene (mixed isomers)	1.7E-1	4.2E+6	1.2E+7		4.2E-8	1.4E-8	
Toluene	7.8E-3	3.8E+6	1.1E+7		2.0E-9	7.0E-10	
Ethylbenzene	1.0E-1	4.4E+6	1.3E+7		2.4E-8	8.1E-9	
Benzene*	1.2E-1	3.7E+6	1.1E+7		3.3E-8	1.1E-8	

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name Motor Partners

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RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS

GROUNDWATER: VAPOR

INHALATION (cont'd)

Constituents of Concern	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m ³) (3) X (4)		
	On-site (0 ft)	Off-site 1 (150 ft)	Off-site 2 (0 ft)	On-site (0 ft)	Off-site 1 (150 ft)	Off-site 2 (0 ft)
	Commercial	Commercial	None	Commercial	Commercial	None
Methyl t-Butyl ether	6.8E-1	6.8E-1		1.5E-105	5.3E-106	
Xylene (mixed isomers)	6.8E-1	6.8E-1		2.9E-8	9.7E-9	
Toluene	6.8E-1	6.8E-1		1.4E-9	4.8E-10	
Ethylbenzene	6.8E-1	6.8E-1		1.6E-8	5.5E-9	
Benzene*	2.4E-1	2.4E-1		8.1E-9	2.8E-9	

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr)

Site Name Motor Partners

Site Location 1234 40th Avenue, Oakland, CA

Completed By G. Rogers

Date Completed: Jan. 28, 2000

Job ID: 1004

RBCA SITE ASSESSMENT

7 OF 7

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS

TOTAL PATHWAY EXPOSURE (mg/m³)
*(Sum average exposure concentrations
 from soil and groundwater routes.)*

Constituents of Concern	On-site (0 ft)		Off-site 1 (150 ft)	Off-site 2 (0 ft)
	Commercial	Construction Worker	Commercial	None
Methyl t-Butyl ether	1.1E-104	1.0E-103	8.3E-105	
Xylene (mixed isomers)	4.9E-5	2.6E-4	4.2E-5	
Toluene	3.2E-6	1.7E-5	2.7E-6	
Ethylbenzene	2.2E-5	1.2E-4	1.9E-5	
Benzene*	6.5E-6	1.4E-6	5.5E-6	

Site Name: Motor Partners

Site Location: 1234 40th Avenue, Oakland, CA

Completed By: G. Rogers

Date Completed: Jan. 28, 2000

Job ID: 1004

RBCA SITE ASSESSMENT	Cumulative Risk Worksheet
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Site Name Motor Partners

Completed By: G. Rogers

Job ID: 1004

Site Location 1234 40th Avenue, Oakland, CA

Date Completed: Jan. 28, 2000

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CUMULATIVE RISK WORKSHEET

CONSTITUENTS OF CONCERN		Representative Concentration		Proposed CRF		Resultant Target Concentration	
CAS No.	Name	Soil (mg/kg)	Groundwater (mg/L)	Soil	GW	Soil (mg/kg)	Groundwater (mg/L)
1634-04-4	Methyl t-Butyl ether	1.0E-99	1.0E-99			1.0E-99	1.0E-99
1330-20-7	Xylene (mixed isomers)	2.2E+1	1.7E-1			2.2E+1	1.7E-1
108-88-3	Toluene	1.1E+0	7.8E-3			1.1E+0	7.8E-3
100-41-4	Ethylbenzene	1.2E+1	1.0E-1			1.2E+1	1.0E-1
71-43-2	Benzene*	4.2E+0	1.2E-1			4.2E+0	1.2E-1

Cumulative Values:

RBCA SITE ASSESSMENT	Cumulative Risk Worksheet
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Site Name: Motor Partners	Site Name: Motor Partners	Completed By: G. Rogers	Job ID: 1004
Site Location: 1234 40th Avenue, Oakland, CA	Site Location: 1234 40th Avenue, Oakland, CA	Date Completed: Jan. 28, 2000	2 OF 3

CUMULATIVE RISK WORKSHEET	Cumulative Target Risk: 1.0E-5 Target Hazard Index: 1.0E+0																																								
ON-SITE RECEPTORS																																									
CONSTITUENTS OF CONCERN	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">Outdoor Air Exposure:</th> <th colspan="2">Indoor Air Exposure:</th> <th colspan="2">Soil Exposure:</th> <th colspan="2">Groundwater Exposure:</th> </tr> <tr> <th colspan="2">Commercial</th> <th colspan="2">Commercial</th> <th colspan="2">Commercial</th> <th colspan="2">None</th> </tr> <tr> <td>Target Risk</td> <td>Target HQ</td> <td>Target Risk</td> <td>Target HQ</td> <td>Target Risk</td> <td>Target HQ</td> <td>Target Risk</td> <td>Target HQ</td> </tr> <tr> <td>1.0E-5 / 1.0E-5</td> <td>1.0E+0</td> <td>1.0E-5 / 1.0E-5</td> <td>1.0E+0</td> <td>1.0E-5 / 1.0E-5</td> <td>1.0E+0</td> <td>1.0E-5 / 1.0E-5</td> <td>1.0E+0</td> </tr> <tr> <td>Carcinogenic Risk</td> <td>Hazard Quotient</td> <td>Carcinogenic Risk</td> <td>Hazard Quotient</td> <td>Carcinogenic Risk</td> <td>Hazard Quotient</td> <td>Carcinogenic Risk</td> <td>Hazard Quotient</td> </tr> </table>	Outdoor Air Exposure:		Indoor Air Exposure:		Soil Exposure:		Groundwater Exposure:		Commercial		Commercial		Commercial		None		Target Risk	Target HQ	Target Risk	Target HQ	Target Risk	Target HQ	Target Risk	Target HQ	1.0E-5 / 1.0E-5	1.0E+0	1.0E-5 / 1.0E-5	1.0E+0	1.0E-5 / 1.0E-5	1.0E+0	1.0E-5 / 1.0E-5	1.0E+0	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
	Outdoor Air Exposure:		Indoor Air Exposure:		Soil Exposure:		Groundwater Exposure:																																		
Commercial		Commercial		Commercial		None																																			
Target Risk	Target HQ	Target Risk	Target HQ	Target Risk	Target HQ	Target Risk	Target HQ																																		
1.0E-5 / 1.0E-5	1.0E+0	1.0E-5 / 1.0E-5	1.0E+0	1.0E-5 / 1.0E-5	1.0E+0	1.0E-5 / 1.0E-5	1.0E+0																																		
Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient																																		
Cumulative Values:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>5.4E-8</td> <td>3.1E-3</td> <td>1.4E-6</td> <td>8.1E-2</td> <td>4.4E-6</td> <td>4.5E-2</td> <td>0.0E+0</td> <td>0.0E+0</td> </tr> </table>	5.4E-8	3.1E-3	1.4E-6	8.1E-2	4.4E-6	4.5E-2	0.0E+0	0.0E+0																																
5.4E-8	3.1E-3	1.4E-6	8.1E-2	4.4E-6	4.5E-2	0.0E+0	0.0E+0																																		

■ indicates risk level exceeding target risk

RBCA SITE ASSESSMENT Cumulative Risk Worksheet

Site Name: Motor Partners Site Name: Motor Partners Completed By: G. Rogers Job ID: 1004
 Site Location: 1234 40th Avenue, Oakland, CA Site Location: 1234 40th Avenue, Oakland, CA Date Completed: Jan. 28, 2000 3 OF 3

CUMULATIVE RISK WORKSHEET Cumulative Target Risk: 1.0E-5 Target Hazard Index: 1.0E+0

OFF-SITE RECEPTORS

CONSTITUENTS OF CONCERN		Outdoor Air Exposure:				Groundwater Exposure:			
		Commercial (150 ft)		None		None		None	
		Target Risk: 1.0E-5 / 1.0E-5	Target HQ 1.0E+0	Target Risk 1.0E-5 / 1.0E-5	Target HQ 1.0E+0	Target Risk: 1.0E-5 / 1.0E-5	Target HQ 1.0E+0	Target Risk: 1.0E-5 / 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
1634-04-4	Methyl t-Butyl ether		2.8E-105						
1330-20-7	Xylene (mixed isomers)		6.0E-6						
108-88-3	Toluene		6.8E-6						
100-41-4	Ethylbenzene		1.9E-5						
71-43-2	Benzene*	4.6E-8	2.6E-3						
Cumulative Values:		4.6E-8	2.6E-3	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0

* indicates risk level exceeding target risk

RBCA SITE ASSESSMENT

Site Name: Motor Partners
 Site Location: 1234 40th Avenue, Oakland, CA

Completed By: G. Rogers
 Date Completed: Jan 28, 2000

Job ID: 1004

SOIL (9 - 12 ft) SSTL VALUES

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

Groundwater DAF Option: Domenico - No Decay
 (One-directional vertical dispersion)

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

CONSTITUENTS OF CONCERN		Representative Concentration (mg/kg)	Soil Leaching to Groundwater Ingestion / Discharge to Surface Water			X	Soil Vol to Indoor Air	X	Soil Volatilization and Surface Soil Particulates to Outdoor Air			X	Surface Soil Inhalation, Ingestion, Dermal Contact		Applicable SSTL (mg/kg)	SSTL Exceeded? *M* if yes	Required CRF Only if "yes" left
			On-site (0 ft)	Off-site 1 (2500 ft)	Off-site 2 (150 ft)	On-site (0 ft)	On-site (0 ft)	Off-site 1 (150 ft)	Off-site 2 (0 ft)	On-site (0 ft)	Commercial	Construction Worker					
			None	None	None	Commercial	Commercial	Construction Worker	Commercial	None	Commercial	Construction Worker					
1634-04-4	Methyl t-Butyl ether	1.0E-99	NA	NA	NA	2.3E+3	>1.5E+4	>1.5E+4	>1.5E+4	NA	2.8E+2	3.8E+2	2.8E+2	<input type="checkbox"/>	<1		
1330-20-7	Xylene (mixed isomers)	2.2E+1	NA	NA	NA	>5.2E+2	>5.2E+2	>5.2E+2	>5.2E+2	NA	6.3E+4	7.6E+4	6.3E+4	<input type="checkbox"/>	<1		
108-88-3	Toluene	1.1E+0	NA	NA	NA	>8.0E+2	>8.0E+2	>8.0E+2	>8.0E+2	NA	5.3E+3	5.8E+3	5.3E+3	<input type="checkbox"/>	<1		
100-41-4	Ethylbenzene	1.2E+1	NA	NA	NA	>6.5E+2	>6.5E+2	>6.5E+2	>6.5E+2	NA	3.3E+3	4.4E+3	3.3E+3	<input type="checkbox"/>	<1		
71-43-2	Benzene*	4.2E+0	NA	NA	NA	3.1E+1	7.9E+2	2.6E+2	9.3E+2	NA	9.6E+0	9.2E+1	9.6E+0	<input type="checkbox"/>	<1		

* Chemical with user-specified data

M indicates risk-based target concentration greater than constituent residual saturation value. NA = Not applicable. NC = Not calculated

RBCA SITE ASSESSMENT

Site Name: Motor Partners

Completed By: G. Rogers

Job ID: 1004

Site Location: 1234 40th Avenue Oakland CA

Date Completed: Jan 28, 2000

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GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-5

Target Risk (Class C) 1.0E-5

Target Hazard Quotient 1.0E+0

Groundwater DAF Option: Domenico - No Decay
(One-directional vert. dispersion)

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

CONSTITUENTS OF CONCERN		Representative Concentration (mg/L)	Groundwater Ingestion / Discharge to Surface Water			X	GW Vol. to Indoor Air	X	Groundwater Volatilization to Outdoor Air			Applicable SSTL (mg/L)	SSTL Exceeded ?	Required CRF
			On-site (0 ft)	Off-site 1 (2500 ft)	Off-site 2 (150 ft)	On-site (0 ft)	On-site (0 ft)	Off-site 1 (150 ft)	Off-site 2 (0 ft)					
1634-04-4	Methyl t-Butyl ether	1.0E-99	None	None	None	Commercial	Commercial	Commercial	None	6.7E+3	<input type="checkbox"/>	<1		
1330-20-7	Xylene (mixed isomers)	1.7E-1	NA	NA	NA	>2.0E+2	>2.0E+2	>2.0E+2	NA	>2.0E+2	<input type="checkbox"/>	NA		
108-88-3	Toluene	7.8E-3	NA	NA	NA	>5.2E+2	>5.2E+2	>5.2E+2	NA	>5.2E+2	<input type="checkbox"/>	NA		
100-41-4	Ethylbenzene	1.0E-1	NA	NA	NA	>1.7E+2	>1.7E+2	>1.7E+2	NA	>1.7E+2	<input type="checkbox"/>	NA		
71-43-2	Benzene*	1.2E-1	NA	NA	NA	3.5E+1	>1.8E+3	>1.8E+3	NA	3.5E+1	<input type="checkbox"/>	<1		

* = Chemical with user-specified data

">" indicates risk-based target concentration greater than constituent solubility value. NA = Not applicable NC = Not calculated

CHEMICAL DATA FOR SELECTED COCS

Physical Property Data

Constituent	CAS Number	type	Molecular Weight (g/mole)		Diffusion Coefficients			log (Koc) or log(Kd) (@ 20 - 25 C)			Henry's Law Constant (@ 20 - 25 C)			Vapor Pressure (@ 20 - 25 C)		Solubility (@ 20 - 25 C)		acld pKa	basa pKb	ref	
			MW	ref	In air (cm ² /s)	ref	In water (cm ² /s)	ref	log(L/kg) partition	ref	(atm-m ³) mol	(unitless)	ref	(mm Hg)	ref	(mg/L)	ref				
Methyl t-Butyl ether	1634-04-4	O	88.146	5	7.92E-02	6	9.41E-05	7	1.08	Koc	A	5.77E-04	2.38E-02	-	2.49E+02	-	4.80E+04	A	-	-	-
Xylene (mixed isomers)	1330-20-7	A	106.2	5	7.20E-02	A	8.50E-06	A	2.38	Koc	A	7.03E-03	2.90E-01	A	7.00E+00	4	1.98E+02	5	-	-	-
Toluene	108-88-3	A	92.4	5	8.50E-02	A	9.40E-06	A	2.13	Koc	A	6.30E-03	2.60E-01	A	3.00E+01	4	5.15E+02	29	-	-	-
Et:thylbenzene	100-41-4	A	106.2	PS	7.50E-02	PS	7.80E-06	PS	2.56	Koc	PS	7.88E-03	3.25E-01	PS	1.00E+01	PS	1.69E+02	PS	-	-	-
Benzene*	71-43-2	A	78.1	PS	8.80E-02	PS	9.80E-06	PS	1.77	Koc	PS	5.55E-03	2.29E-01	PS	9.52E+01	PS	1.75E+03	PS	-	-	-

* = Chemical with user-specified data

Site Name Motor Partners

Completed By: G Rogers

Job ID: 1004

Site Location 1234 40th Avenue, Oakland, CA

Date Completed: Jan. 28, 2000

CHEMICAL DATA FOR SELECTED COCs	Toxicity Data
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Constituent	Reference Dose (mg/kg/day)				Reference Conc. (mg/m3)			Slope Factors 1/(mg/kg/day)				Unit Risk Factor 1/(µg/m3)		EPA Weight of Evidence	Is Constituent Carcinogenic ?
	Oral		Dermal		Inhalation			Oral		Dermal		Inhalation			
	RfD_oral	ref	RfD_dermal	ref	RfC_inhal	ref		SF_oral	ref	SF_dermal	ref	URF_inhal	ref		
Methyl t-Butyl ether	1.00E-02	31	8.00E-03	TX	3.00E+00	R		-	-	-	-	-	-	-	FALSE
Xylene (mixed isomers)	2.00E+00	A,R	1.84E+00	TX	7.00E+00	A		-	-	-	-	-	-	D	FALSE
Toluene	2.00E-01	A,R	1.60E-01	TX	4.00E-01	A,R		-	-	-	-	-	-	D	FALSE
Ethylbenzene	1.00E-01	PS	9.70E-02	TX	1.00E+00	PS		-	-	-	-	-	-	D	FALSE
Benzene*	3.00E-03	R	-	-	5.95E-03	R		1.00E-01	0	1.00E-01	0	8.29E-06	PS	A	TRUE

* = Chemical with user-specified

Site Name Motor Partners

Site Location 1234 40th Av

		Miscellaneous Chemical Data
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Constituent	Maximum Contaminant Level		Time-Weighted Average Workplace Criteria		Aquatic Life Prot. Criteria		Bioconcentration Factor (L-wat/kg-fish)
	MCL (mg/L)	ref	TWA (mg/m3)	ref	AQL (mg/L)	ref	
Methyl t-Butyl ether	-	-	6.00E+01	NIOSH	-	-	1
Xylene (mixed isomers)	1.00E+01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	-	-	1
Toluene	1.00E+00	56 FR 3526 (30 Jan 91)	1.47E+02	ACGIH	-	-	70
Ethylbenzene	7.00E-01	56 FR 3526 (30 Jan 91)	4.35E+02	PS	-	-	1
Benzene*	5.00E-03	52 FR 25690	3.25E+00	-	-	-	12.6

* = Chemical with user-specified

Site Name: Motor Partners

Site Location: 1234 40th Av

CHEMICAL DATA FOR SELECTED COCs	Miscellaneous Chemical Data
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Constituent	Dermal		Water Dermal Permeability Data					Detection Limits				Half Life (First-Order Decay)		
	Relative Absorp. Factor (unitless)	Dermal Permeability Coeff. (cm/hr)	Lag time for Dermal Exposure (hr)	Critical Exposure Time (hr)	Relative Contr of Derm Perm Coeff (unitless)	Water/Skin Derm Adsorp Factor (cm/event)	ref	Groundwater		Soil		Half Life (days)		
								(mg/L)	ref	(mg/kg)	ref	Saturated	Unsaturated	ref
Methyl t-Butyl ether	0.5	-	-	-	-	-	-	-	-	-	-	360	180	H
Xylene (mixed isomers)	0.5	0.08	0.39	1.4	0.16	2.9E-1	D	0.005	S	0.005	S	360	360	H
Toluene	0.5	0.045	0.32	0.77	0.054	1.6E-1	D	0.002	S	0.005	S	28	28	H
Ethylbenzene	0.5	0.074	0.39	1.3	0.14	2.7E-1	D	0.002	S	0.005	S	228	228	H
Benzene*	0.5	0.021	0.26	0.63	0.013	7.3E-2	D	0.002	S	0.005	S	720	720	H

* - Chemical with user-specified

Site Name Motor Partners

Site Location 1234 40th Av