

# RBCA TIER 1/TIER 2 EVALUATION

# Output Table 1

Site Name: Good Chevrolet Job Identification:  
 Site Location: 1630 Park Street, Alameda, CA Date Completed: 12/10/98  
 Completed By: Cathrene Glick

Software: GSI RBCA Spreadsheet  
 Version: v 1.0

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

### DEFAULT PARAMETERS

Exposure Parameter	Definition (Units)	Residential			Commercial/Industrial	
		Adult	(1-6yrs)	(1-16 yrs)	Chronic	Constrctn
ATc	Averaging time for carcinogens (yr)	70				
ATn	Averaging time for non-carcinogens (yr)	30			25	1
BW	Body Weight (kg)				70	
ED	Exposure Duration (yr)				25	1
EF	Exposure Frequency (days/yr)				250	180 <i>150</i>
EF.Derm	Exposure Frequency for dermal ex				250	
IRgw	Ingestion Rate of Water (l/day)				1	
IRs	Ingestion Rate of Soil (mg/day)				50	100 <i>50</i>
IRadj	Adjusted soil ing. rate (mg/yr/kg-d)				9.4E+01	
IRa.in	Inhalation rate indoor (m <sup>3</sup> /day)				20	
IRa.out	Inhalation rate outdoor (m <sup>3</sup> /day)				20	10 <i>20</i>
SA	Skin surface area (dermal) (cm <sup>2</sup> )				5.8E+03	5.8E+03
SAadj	Adjusted dermal area (cm <sup>2</sup> -yr/kg)				1.7E+03	
M	Soil to Skin adherence factor					
AAFs	Age adjustment on soil ingestion				<u>TRUE</u>	
AAFd	Age adjustment on skin surface area				<u>TRUE</u>	
tox	Use EPA tox data for air (or PEL based)					
gwMCL?	Use MCL as exposure limit in groundwater?	FALSE				

*RISK  
1x10<sup>-5</sup>*

Surface Parameters	Definition (Units)	Residential			Commercial/Industrial	
		Chronic	Construction	Construction	Chronic	Construction
t	Exposure duration (yr)	30				
A	Contaminated soil area (cm <sup>2</sup> )	<u>6.5E+06</u>			25	<u>9.3E+05</u>
W	Length of affected soil parallel to wind (cm)	<u>2.4E+03</u>	1500			<u>1.5E+03</u>
W.gw	Length of affected soil parallel to groundwater (cm)	<u>3.0E+03</u>				
Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02	322			
delta	Air mixing zone height (cm)	2.0E+02				
Lss	Definition of surficial soils (cm)	<u>9.1E+01</u>				
Pe	Particulate areal emission rate (g/cm <sup>2</sup> /s)	2.2E-10				<i>2.139E-11</i>

Groundwater Parameters	Definition (Units)	Value
delta.gw	Groundwater mixing zone depth (cm)	<u>2.6E+02</u>
I	Groundwater infiltration rate (cm/yr)	<u>1.5E+01</u>
Ugw	Groundwater Darcy velocity (cm/yr)	<u>1.5E+03</u>
Ugw.tr	Groundwater Transport 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)	
BC	Biodegradation Capacity (mg/L)	
Is BIO?	Is Bioattenuation Considered	TRUE
phi.eff	Effective Porosity in Water-Bearing Unit	3.8E-01
foc.sat	Fraction organic carbon in water-bearing unit	1.0E-03

Soil Parameters	Definition (Units)	Value
hc	Capillary zone thickness (cm)	<u>4.6E+00</u>
hv	Vadose zone thickness (cm)	<u>2.4E+02</u>
rho	Soil density (g/cm <sup>3</sup> )	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)	<u>2.4E+02</u>
Ls	Depth to top of affected soil (cm)	<u>9.1E+01</u>
Lsubs	Thickness of affected subsurface soils (cm)	<u>3.7E+02</u>
pH	Soil/groundwater pH	6.5
phi.w	Volumetric water content	0.342
phi.a	Volumetric air content	0.038

Building Parameters	Definition (Units)	Residential	Commercial
Lb	Building volume/area ratio (cm)	2.0E+02	3.0E+02
ER	Building air exchange rate (s <sup>-1</sup> )	1.4E-04	2.3E-04
Lcrk	Foundation crack thickness (cm)	1.5E+01	
eta	Foundation crack fraction	0.01	

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

Matrix of Exposed Persons to Complete Exposure Pathways	Residential		Commercial/Industrial	
	Chronic	Constrctn	Chronic	Constrctn
<b>Groundwater Pathways:</b>				
GW.i	Groundwater Ingestion	TRUE	TRUE	
GW.v	Volatilization to Outdoor Air	FALSE	TRUE	
GW.b	Vapor Intrusion to Buildings	FALSE	TRUE	
<b>Soil Pathways</b>				
S.v	Volatiles from Subsurface Soils	TRUE	TRUE	
SS.v	Volatiles and Particulate Inhalation	TRUE	TRUE	TRUE
SS.d	Direct Ingestion and Dermal Contact	FALSE	TRUE	TRUE
S.I	Leaching to Groundwater from all Soils	TRUE	TRUE	
S.b	Intrusion to Buildings - Subsurface Soils	FALSE	TRUE	

Matrix of Receptor Distance and Location on- or off-site	Residential		Commercial/Industrial	
	Distance	On-Site	Distance	On-Site
GW	Groundwater receptor (cm)	4.6E+04	FALSE	TRUE
S	Inhalation receptor (cm)	4.6E+04	FALSE	TRUE

Matrix of Target Risks	Individual		Cumulative	
	Distance	On-Site	Distance	On-Site
TRab	Target Risk (class A&B carcinogens)	<u>1.0E-05</u>	<u>1.0E-05</u>	
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		

*Red = Oakland Tier 2 default for Merritt Sands*

RBCA CHEMICAL DATABASE

Miscellaneous Chemical Data

CAS Number	Constituent	Maximum Contaminant Level		Permissible Exposure Limit PEL/TLV (mg/m3)	ref	Relative Absorption Factors		Detection Limits				Half Life (First-Order Decay) (days)		ref
		MCL (mg/L)	reference			Oral	Dermal	Groundwater (mg/L)	ref	Soil (mg/kg)	re	Saturated	Unsaturated	
71-43-2	Benzene	5.00E-03	52 FR 25690	3.20E+00	OSHA	1	0.5	0.002	C	0.005	S	720	720	H
100-41-4	Ethylbenzene	7.00E-01	6 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	360	H
108-88-3	Toluene	1.00E+00	6 FR 3526 (30 Jan 91)	1.47E+02	ACGIH	1	0.5	0.002	C	0.005	S	28	28	H
1330-20-7	Xylene (mixed isomers)	1.00E+01	6 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	1	0.5	0.005	C	0.005	S	360	360	H

Site Name: Good Chevrol Site Location: 1630 Park Street, Alameda, CA

Completed By: Cathrene Glick Date Completed: 12/10/1998

Software version: v 1.0

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## 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	4.5E+0		7.1E-2		8.6E+0	
Ethylbenzene	5.7E-1		2.6E-2		5.1E+1	
Methyl t-Butyl Ether	2.0E-2		1.0E-2		3.1E+0	
Toluene	4.5E-1		5.2E-2		9.0E+1	
Xylene (mixed isomers)	1.0E+0		7.4E-2		2.3E+2	

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**CONSTITUENT MOLE FRACTIONS**

(Complete the following table)

CONSTITUENT	Mole Fraction of Constituent in Source Material
Benzene	
Ethylbenzene	
Methyl t-Butyl Ether	
Toluene	
Xylene (mixed isomers)	

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**CONSTITUENT HALF-LIFE VALUES**

(Complete the following table)

CONSTITUENT	Half-Life of Constituent (day)
Benzene	720
Ethylbenzene	228
Methyl t-Butyl Ether	360
Toluene	28
Xylene (mixed isomers)	360

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**GROUNDWATER DAF VALUES**

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

Dilution Attenuation Factor  
(DAF) in Groundwater

CONSTITUENT	Residential	Comm./Ind.
	Receptor	Receptor
Benzene	1.0E+0	1.0E+0
Ethylbenzene	1.0E+0	1.0E+0
Methyl t-Butyl Ether	1.0E+0	1.0E+0
Toluene	1.0E+0	1.0E+0
Xylene (mixed isomers)	1.0E+0	1.0E+0

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**EXPOSURE LIMITS IN GROUNDWATER AND AIR**

CONSTITUENT	Exposure Limits Applied to Receptors	
	Groundwater (MCL) (mg/L)	Air (Comm. only) (PEL/TLV) (mg/m <sup>3</sup> )
Benzene		
Ethylbenzene		
Methyl t-Butyl Ether		
Toluene		
Xylene (mixed isomers)		

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**RBCA SITE ASSESSMENT**

Tier 2 Worksheet 9.1

Site Name: Good Chevrolet

Completed By: Cathrene Glick

Site Location: 1630 Park Street, Alameda, CA

Date Completed: 12/10/1998

1 OF 1

**SURFACE SOIL SSTL VALUES  
( < 3 FT BGS)**

Target Risk (Class A & B) 1.0E-5  
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 (mg/kg)	Soil Leaching to Groundwater			Ingestion, Inhalation and Dermal Contact		Construction Worker	Applicable SSTL (mg/kg)	SSTL Exceeded ? "■" If yes	Required CRF Only if "yes" left
			X	Residential: 1500 feet	Commercial: (on-site)	Regulatory(MCL): (on-site)	X	Residential: 1500 feet			
71-43-2	Benzene	7.1E-2	1.4E-1	4.5E-1	NA	3.3E+2	3.5E+1	7.3E+2	1.4E-1	<input type="checkbox"/>	<1
100-41-4	Ethylbenzene	2.6E-2	3.7E+1	1.0E+2	NA	>Res	>Res	>Res	3.7E+1	<input type="checkbox"/>	<1
1634-04-4	Methyl t-Butyl Ether	1.0E-2	3.4E-1	9.4E-1	NA	>Res	2.0E+2	2.4E+2	3.4E-1	<input type="checkbox"/>	<1
108-88-3	Toluene	5.2E-2	1.0E+2	2.8E+2	NA	>Res	>Res	>Res	1.0E+2	<input type="checkbox"/>	<1
1330-20-7	Xylene (mixed isomers)	7.4E-2	>Res	>Res	NA	>Res	>Res	>Res	>Res	<input type="checkbox"/>	<1



**RBCA SITE ASSESSMENT**

Tier 2 Worksheet 9.2

Site Name: Good Chevrolet

Completed By: Cathrene Glick

Site Location: 1630 Park Street, Alameda, CA

Date Completed: 12/10/1998

1 OF 1

Calculation Option: 3

**SUBSURFACE SOIL SSTL VALUES  
(> 3 FT BGS)**

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

MCL exposure limit?

Target Risk (Class C) 1.0E-5

PEL exposure limit?

Target Hazard Quotient 1.0E+0

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

CONSTITUENTS OF CONCERN		Representative Concentration (mg/kg)	Soil Leaching to Groundwater			Soil Volatilization to Indoor Air		Soil Volatilization to Outdoor Air		Applicable SSTL (mg/kg)	SSTL Exceeded ? *■* If yes	Required CRF Only if "yes" left
			X	Residential: 1500 feet	Commercial: (on-site)	Regulatory(MCL): (on-site)	X	Residential: (on-site)	Commercial: (on-site)			
71-43-2	Benzene	8.6E+0	1.4E-1	4.5E-1	NA	NA	4.3E-1	8.2E+1	1.2E+2	1.4E-1	■	6.3E+01
100-41-4	Ethylbenzene	5.1E+1	3.7E+1	1.0E+2	NA	NA	1.3E+2	>Res	>Res	3.7E+1	■	1.0E+00
1634-04-4	Methyl t-Butyl Ether	3.1E+0	3.4E-1	9.4E-1	NA	NA	6.3E+2	>Res	>Res	3.4E-1	■	9.0E+00
108-88-3	Toluene	9.0E+1	1.0E+2	2.8E+2	NA	NA	5.4E+1	>Res	>Res	5.4E+1	■	2.0E+00
1330-20-7	Xylene (mixed isomers)	2.3E+2	>Res	>Res	NA	NA	>Res	>Res	>Res	>Res	<input type="checkbox"/>	<1

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Software: GSI RBCA Spreadsheet  
Version: v 1.0

Serial: G-265-VHX-686

*8.6 mg/kg does not exceed Oak RBCA Tier 2 - Merritt Sands' SSTLs for benzene*

RBGA SITE ASSESSMENT

Tier 2 Worksheet 9.3

Site Name: Good Chevrolet  
 Site Location: 1630 Park Street, Alameda, CA

Completed By: Cathrene Glick  
 Date Completed: 12/10/1998

1 OF 1

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-5  
 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			Groundwater Volatilization to Indoor Air		Groundwater Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded?	Required CRF
CAS No.	Name	(mg/L)	Residential: 1500 feet	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential (on-site)	Commercial: (on-site)	(mg/L)	<input type="checkbox"/> if yes	Only if "yes" left
71-43-2	Benzene	4.5E+0	2.9E-2	9.9E-2	NA	NA	7.0E-1	NA	1.0E+2	2.9E-2	<input checked="" type="checkbox"/>	1.5E+02
100-41-4	Ethylbenzene	5.7E-1	3.7E+0	1.0E+1	NA	NA	>Sol	NA	>Sol	3.7E+0	<input type="checkbox"/>	<1
1634-04-4	Methyl t-Butyl Ether	2.0E-2	1.8E-1	5.1E-1	NA	NA	3.6E+3	NA	>Sol	1.8E-1	<input type="checkbox"/>	<1
108-88-3	Toluene	4.5E-1	7.3E+0	2.0E+1	NA	NA	8.0E+1	NA	>Sol	7.3E+0	<input type="checkbox"/>	<1
1330-20-7	Xylene (mixed isomers)	1.0E+0	7.3E+1	>Sol	NA	NA	>Sol	NA	>Sol	7.3E+1	<input type="checkbox"/>	<1

*GW is stable*

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Software: GSI RBGA Spreadsheet  
 Version: v 1.0

Serial: G-265-VHX-686

*4.5 mg/L benzene does not exceed Oak RBGA-Tier 2 - Merritt Sands for GW to indoor air (22.0 mg/L)*

Site Name: Good Chevrolet

Job Identification:

Site Location: 1630 Park Street, Alameda, Date Completed: 12/10/1998

**SUMMARY CALCULATIONS - SSTL BY CUMULATIVE RISK**

CAS No.	Constituent	Representative Concentration Groundwater (mg/L)	Representative Concentration Surface Soil (mg/kg)	Representative Concentration Subsurface Soil (mg/kg)	SSTL exceeded?			Relevant SSTL		
					Groundwater	Surface Soil	Subsurface Soil	Groundwater (mg/L)	Surface Soil (mg/kg)	Subsurface Soil (mg/kg)
71-43-2	Benzene	4.5E+0	7.1E-2	8.6E+0	■	■	■	2.9E-2	1.4E-2	7.4E-1
100-41-4	Ethylbenzene	5.7E-1	2.6E-2	5.1E+1	□	□	■	1.7E+0	7.0E-1	4.4E+0
1634-04-4	Methyl t-Butyl Ether	2.0E-2	1.0E-2	3.1E+0	□	□	■	5.9E-2	2.7E-1	2.7E-1
108-88-3	Toluene	4.5E-1	5.2E-2	9.0E+1	□	□	■	1.3E+0	1.4E+0	7.8E+0
1330-20-7	Xylene (mixed isomers)	1.0E+0	7.4E-2	2.3E+2	□	□	■	3.0E+0	2.0E+0	2.0E+1

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Cumulative Target Risk: 1.0E-5  
Target Hazard Index: 1.0E+0Software: GSI RBCA Spreadsheet  
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