Appendix C
Vapor Migration Model Results

SUMMARY OF VAPOR MIGRATION RESULTS - COMMERCIAL/LIGHT INDUSTRIAL SCENARIO
BRC Former C-6 Facility, Los Angeles, California

Groundwater

CAS No.	Chemical	Maximum Concentration in Groundwater (ug/L)	Cancer Risk	Hazard Index
75-15-0	Carbon disulfide	2	No Slope Factor	0.00000028
71-55-6	Chloroform	2	4.8E-11	0.000000082
75-34-3	1,1-Dichloroethane (1,1-DCA)	18	1.5E-10	0.00000051
75-34-3	1,1-Dichloroethylene (1,1-DCE)	2,000	2.9E-06	0.0023
156-59-2	cis-1,2-Dichloroethylene (cis 1,2-DCE)	9	No Slope Factor	0.0000027
156-60-5	trans-1,2-dichloroethene	15	No Slope Factor	0.0000048
108-88-3	Toluene	9	No Slope Factor	0.00000058
79-00-5	1,1,2-Trichloroethane	1.3	1.8E-11	0.00000022
79-01-6	Trichloroethlyene (TCE)	1,100	3.1E-08	0.000050
75-69-4	Trichlorofluoromethane	0.52	No Slope Factor	0.00000021
95-63-6	1,2,4 - Trimethylbenzene	0.21	No Slope Factor	0.00000050
108-67-8	1,3,5-Trimethylbenzene	0.51	No Slope Factor	0.0000017
	Total		2.9E-06	0.0024

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Carbon disulfide

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	7.60E+04	mg/mole
Vapor pressure	VP	=	4.72E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	2.00E+00	ug/l
Henry's Law Constant	H	=	1.20E+00	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**2.40E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	1.20E+00	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	4.60E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**1.84E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 2.40E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	1.00E-01	cm2/sec
Effective diffusion coefficient	**D_e**	=	**8.03E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**3.50E-04**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**1.73E-06**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**1.73E-06**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**2.01E-08**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**5.64E-08**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	5.64E-08	mg/kg-day
Reference dose	RfD	=	2.00E-01	mg/kg-day
Hazard Index	**HI**	=	**2.82E-07**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	2.01E-08	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Chloroform

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.20E+05	mg/mole
Vapor pressure	VP	=	2.59E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	2.00E+00	ug/l
Henry's Law Constant	H	=	1.50E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**3.00E-01**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	1.50E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	5.30E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**2.12E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 3.00E-01 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	1.00E-01	cm2/sec
Effective diffusion coefficient	**D_e**	=	**8.03E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**4.38E-05**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**2.16E-07**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=	0.00E+00	m
Wind speed	u	=	0.00E+00	m/hr
Height of building openings (or height of breathing zone)	h	=	0.00E+00	m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**2.16E-07**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**2.51E-09**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**7.05E-09**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	7.05E-09	mg/kg-day
Reference dose	RfD	=	8.60E-02	mg/kg-day
Hazard Index	**HI**	=	**8.19E-08**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	2.51E-09	mg/kg-day
Slope factor (potency)	SF	=	1.90E-02	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**4.77E-11**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,1 - Dichloroethane (1,1-DCA)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.90E+04	mg/mole
Vapor pressure	VP	=	3.08E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	1.80E+01	ug/l
Henry's Law Constant	H	=	2.30E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**4.14E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	2.30E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	5.30E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**2.12E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 4.14E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.40E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**5.94E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**4.47E-04**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	C_i	=	**2.21E-06**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	C_o	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	C_t	=	**2.21E-06**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	IT_c	=	**2.57E-08**	**mg/kg-day**
Chemical Intake (non-carc. risk)	IT_{nc}	=	**7.20E-08**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	IT_{nc}	=	7.20E-08	mg/kg-day
Reference dose	RfD	=	1.40E-01	mg/kg-day
Hazard Index	**HI**	=	**5.14E-07**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	2.57E-08	mg/kg-day
Slope factor (potency)	SF	=	5.70E-03	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**1.46E-10**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,1-Dichloroethylene (1,1-DCE)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.70E+04	mg/mole
Vapor pressure	VP	=	7.78E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	2.00E+03	ug/l
Henry's Law Constant	H	=	1.10E+00	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**2.20E+03**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	1.10E+00	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	6.50E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**2.60E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 2.20E+03 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	9.00E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**7.22E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**2.89E-01**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**1.43E-03**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**1.43E-03**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.66E-05**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**4.65E-05**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	4.65E-05	mg/kg-day
Reference dose	RfD	=	2.00E-02	mg/kg-day
Hazard Index	**HI**	=	**2.33E-03**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.66E-05	mg/kg-day
Slope factor (potency)	SF	=	1.75E-01	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**2.90E-06**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: cis-1,2-Dichloroethylene (cis 1,2-DCE)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.70E+04	mg/mole
Vapor pressure	VP	=	2.40E-04	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	**=**	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	9.00E+00	ug/l
Henry's Law Constant	H	=	1.70E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	**=**	**1.53E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	1.70E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	3.60E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**1.44E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	**=**	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	**=**		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.53E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.40E-02	cm2/sec
Effective diffusion coefficient	**D_e**	**=**	**5.94E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	**=**	**1.65E-04**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**8.15E-07**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**8.15E-07**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**9.48E-09**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**2.66E-08**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	IT_{nc}	=	2.66E-08	mg/kg-day
Reference dose	RfD	=	1.00E-02	mg/kg-day
Hazard Index	**HI**	=	**2.66E-06**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	9.48E-09	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: trans-1,2-Dichloroethylene (trans-1,2-DCE)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.70E+04	mg/mole
Vapor pressure	VP	=	7.61E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	1.50E+01	ug/l
Henry's Law Constant	H	=	3.80E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**5.70E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	3.80E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	3.80E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**1.52E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 5.70E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.10E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**5.70E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**5.90E-04**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**2.91E-06**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**2.91E-06**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**3.39E-08**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**9.51E-08**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	9.51E-08	mg/kg-day
Reference dose	RfD	=	2.00E-02	mg/kg-day
Hazard Index	**HI**	=	**4.75E-06**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	3.39E-08	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Toluene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.20E+04	mg/mole
Vapor pressure	VP	=	3.74E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	**=**	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	9.00E+00	ug/l
Henry's Law Constant	H	=	2.70E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	**=**	**2.43E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	2.70E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	1.40E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**5.60E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	**=**	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	**=**		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 2.43E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	8.70E-02	cm2/sec
Effective diffusion coefficient	**D_e**	**=**	**6.98E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	**=**	**3.08E-04**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**1.52E-06**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**1.52E-06**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.77E-08**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**4.97E-08**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	4.97E-08	mg/kg-day
Reference dose	RfD	=	8.57E-02	mg/kg-day
Hazard Index	**HI**	=	**5.79E-07**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.77E-08	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,1,2 - TCA

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.30E+05	mg/mole
Vapor pressure	VP	=	3.10E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	1.30E+00	ug/l
Henry's Law Constant	H	=	3.70E-02	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**4.81E-02**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	3.70E-02	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	7.50E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**3.00E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 4.81E-02 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.80E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.26E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**5.47E-06**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**2.70E-08**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**2.70E-08**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**3.14E-10**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**8.81E-10**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	8.81E-10	mg/kg-day
Reference dose	RfD	=	4.00E-03	mg/kg-day
Hazard Index	**HI**	=	**2.20E-07**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	3.14E-10	mg/kg-day
Slope factor (potency)	SF	=	5.70E-02	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**1.79E-11**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Trichloroethlyene (TCE)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.30E+05	mg/mole
Vapor pressure	VP	=	7.61E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	1.10E+03	ug/l
Henry's Law Constant	H	=	4.20E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**4.62E+02**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	4.20E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	9.40E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**3.76E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 4.62E+02 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.90E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.34E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**5.32E-02**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**2.63E-04**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**2.63E-04**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**3.06E-06**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**8.57E-06**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	8.57E-06	mg/kg-day
Reference dose	RfD	=	1.71E-01	mg/kg-day
Hazard Index	**HI**	=	**5.00E-05**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	3.06E-06	mg/kg-day
Slope factor (potency)	SF	=	1.00E-02	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**3.06E-08**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Trichlorofluoromethane (Freon 11)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.40E+05	mg/mole
Vapor pressure	VP	=	1.05E+00	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	5.20E-01	ug/l
Henry's Law Constant	H	=	4.00E+00	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**2.08E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	4.00E+00	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	1.60E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**6.40E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 2.08E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	8.70E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.98E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**2.64E-04**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**1.30E-06**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**1.30E-06**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.52E-08**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**4.25E-08**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	4.25E-08	mg/kg-day
Reference dose	RfD	=	2.00E-01	mg/kg-day
Hazard Index	**HI**	=	**2.13E-07**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.52E-08	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,2,4 - Trimethylbenzene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.20E+05	mg/mole
Vapor pressure	VP	=	2.76E-03	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	2.10E-01	ug/l
Henry's Law Constant	H	=	2.30E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**4.83E-02**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	2.30E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	3.70E+03	cm3/gm
Soil/water distribution coef.	K_d	=	**1.48E+01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 4.83E-02 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.50E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.02E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**5.28E-06**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	C_i	=	**2.61E-08**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	C_o	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	C_t	=	**2.61E-08**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	IT_c	=	**3.03E-10**	**mg/kg-day**
Chemical Intake (non-carc. risk)	IT_{nc}	=	**8.51E-10**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	IT_{nc}	=	8.51E-10	mg/kg-day
Reference dose	RfD	=	1.70E-03	mg/kg-day
Hazard Index	**HI**	=	**5.01E-07**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	3.03E-10	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,3,5 - Trimethylbenzene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.20E+05	mg/mole
Vapor pressure	VP	=	3.26E-03	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	5.10E-01	ug/l
Henry's Law Constant	H	=	3.20E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**1.63E-01**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	3.20E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	8.20E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**3.28E+00**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.63E-01 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.50E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.02E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**1.79E-05**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	C_i	=	**8.82E-08**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	C_o	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	C_t	=	**8.82E-08**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	IT_c	=	**1.02E-09**	**mg/kg-day**
Chemical Intake (non-carc. risk)	IT_{nc}	=	**2.88E-09**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	IT_{nc}	=	2.88E-09	mg/kg-day
Reference dose	RfD	=	1.70E-03	mg/kg-day
Hazard Index	**HI**	=	**1.69E-06**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.02E-09	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

CHEMICAL PARAMETERS

CAS No.		MW (mg/mole)		H' (dimension-less)		Da (cm^2/sec)		VP (atm)	Temp. (°C)		K_{oc} (cm^3/g)		Water Solubility (mg/L-water)		CSF (Inh) (mg/kg-day)$^{-1}$		Chronic RfD (Inh) (mg/kg-day)	
127-18-4	Tetrachloroethylene (PCE)	1.7E+05	a	7.5E-01	a	7.2E-02	a	2.4E-02	25	b	2.7E+02	a	2.0E+02	a	2.1E-02	c	1.0E-02	e
75-09-2	Methylene Chloride	8.5E+04	a	9.0E-02	a	1.0E-01	a	5.7E-01	25	b	1.0E+01	a	1.3E+04	a	3.5E-03	c	1.1E-01	e
67-66-3	Chloroform	1.2E+05	a	1.5E-01	a	1.0E-01	a	2.6E-01	25	b	5.3E+01	a	7.9E+03	a	1.9E-02	c	8.6E-02	e
95-63-6	1,2,4 - Trimethylbenzene	1.2E+05	a	2.3E-01	a	7.5E-02	a	2.8E-03	25	b	3.7E+03	a	2.6E-01	a	0.00E+00		1.70E-03	
78-93-3	Methyl Ethyl Ketone	7.2E+04	a	1.1E-03	a	9.0E-02	a	1.2E-01	25	b	4.5E+00	a	2.7E+05	a	0.00E+00		1.43E-01	
71-43-2	Benzene	7.8E+04	a	2.3E-01	a	8.8E-02	a	1.2E-01	25	b	6.2E+01	a	1.8E+03	a	1.00E-01		1.71E-02	
75-15-0	Carbon disulfide	7.6E+04	a	1.2E+00	a	1.0E-01	a	4.7E-01	25	b	4.6E+01	a	1.2E+03	a	0.00E+00		2.00E-01	
56-23-5	Carbon tetrachloride	1.5E+05	a	1.2E+00	a	7.8E-02	a	1.5E-01	25	b	1.5E+02	a	7.9E+02	a	1.50E-01		1.14E-02	
156-59-2	cis-1,2-Dichloroethylene (cis 1,2-DCE)	9.7E+04	a	1.7E-01	a	7.4E-02	a	2.4E-04	20	b	3.6E+01	a	3.5E+03	a	0.00E+00		1.00E-02	
100-41-4	Ethylbenzene	1.1E+05	a	3.2E-01	a	7.5E-02	a	1.3E-02	25	b	2.0E+02	a	1.7E+02	a	0.00E+00		5.71E-01	
98-82-8	Isopropyl-benzene (cumene, 1-methyethyl benzene)	1.2E+05	a	4.9E+01	a	7.5E-02	a	5.9E-03	25	b	2.2E+02	a	6.1E+01	a	0.00E+00		1.10E-01	
75-01-4	Vinyl chloride	6.3E+04	a	1.1E+00	a	1.1E-01	a	3.5E+00	25	b	1.9E+01	a	2.8E+03	a	2.70E-01		7.43E-03	
1330-20-7	Xylenes	1.1E+05	a	3.0E-01	a	7.0E-02	a	1.1E-02	25	b	2.0E+02	a	1.6E+02	a	0.00E+00		2.00E-01	
104-51-8	n-butylbenzene	1.3E+05	a	5.4E-01	a	7.5E-02	a	1.3E-03	23	d	2.8E+03	a	1.4E+01	a	0.00E+00		1.00E-02	
135-98-8	sec-butylbenzene	1.3E+05	a	7.7E-01	a	7.5E-02	a	1.4E-03	20	d	2.2E+03	a	1.7E+01	a	0.00E+00		1.00E-02	
103-65-1	n-propylbenzene	1.2E+05	b	5.4E-01	a	7.5E-02	a	1.3E-03	6.3	b	2.8E+03	a	1.4E+01	a	0.00E+00		1.00E-02	
108-88-3	Toluene	9.2E+04	a	2.7E-01	a	8.7E-02	a	3.7E-02	25	b	1.4E+02	a	5.3E+02	a	0.00E+00		8.57E-02	
156-60-5	trans-1,2-Dichloroethylene (trans-1,2-DCE)	9.7E+04	a	3.8E-01	a	7.1E-02	a	5.2E-01	30	b	3.8E+01	a	6.3E+03	a	0.00E+00		2.00E-02	
79-01-6	Trichloroethlyene (TCE)	1.3E+05	a	4.2E-01	a	7.9E-02	a	7.6E-02	20	b	9.4E+01	a	1.1E+03	a	1.00E-02		1.71E-01	
75-69-4	Trichlorofluoromethane (Freon 11)	1.4E+05	a	4.0E+00	a	8.7E-02	a	1.0E+00	25	b	1.6E+02	a	1.1E+03	a	0.00E+00		2.00E-01	
108-10-1	4-Methyl-2-pentanone (MIBK)	1.0E+05	a	5.7E-03	a	7.5E-02	a	2.6E-02	25	b	1.3E+02	a	1.9E+04	a	0.00E+00		2.29E-02	
108-67-8	1,3,5 - Trimethylbenzene	1.2E+05	a	3.2E-01	a	7.5E-02	a	3.3E-03	25	b	8.2E+02	a	5.0E+01	a	0.00E+00		1.70E-03	
75-34-3	1,1 - Dichloroethane (1,1-DCA)	9.9E+04	a	2.3E-01	a	7.4E-02	a	3.1E-01	25	b	5.3E+01	a	5.1E+03	a	5.70E-03		1.40E-01	
107-06-2	1,2-Dichloroethane (EDC)	9.9E+04	a	4.0E-02	a	1.0E-01	a	1.1E-01	25	b	3.8E+01	a	8.5E+03	a	7.00E-02		1.14E-01	
75-35-4	1,1-Dichloroethylene (1,1-DCE)	9.7E+04	a	1.1E+00	a	9.0E-02	a	7.8E-01	25	b	6.5E+01	a	2.3E+03	a	1.75E-01		2.00E-02	
71-55-6	1,1,1-Trichloroethane (1,1,1-TCA)	1.3E+05	a	7.1E-01	a	7.8E-02	a	1.6E-01	25	b	1.4E+02	a	1.3E+03	a	0.00E+00		2.86E-01	
79-00-5	1,1,2 - TCA	1.3E+05	a	3.7E-02	a	7.8E-02	a	3.1E-02	25	b	7.5E+01	a	4.4E+03	a	5.70E-02		4.00E-03	

References:

a EPA Region 9, Preliminary Remediation Goals (PRGs), 2000.
b U.S. National Library of Medicine Hazardous Substance Data Bank (HSDB), http://www.nlm.nih.gov/pubs/factsheets/hsdbfs.html
c Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA), Toxicity Criteria Database and December 2000 California Cancer Potency Values, http://www.oehha.ca.gov/risk/chemicalDB/index.asp
d Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf
e Cal-EPA, Air Resources Board (ARB), Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values, October 10, 2000, http://www.arb.ca.gov/ab2588/riskassess.htm

Toxicity Value reference priority:
1. Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA), Toxicity Criteria Database and December 2000 California Cancer Potency Values, http://www.oehha.ca.gov/risk/chemicalDB/index.asp
2. Cal-EPA, Air Resources Board (ARB), Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values, October 10, 2000, http://www.arb.ca.gov/ab2588/riskassess.htm
3. EPA Region 9, Preliminary Remediation Goals (PRGs), 2000.

BOE-C6-0128965

SUMMARY OF VAPOR MIGRATION RESULTS - COMMERCIAL/LIGHT INDUSTRIAL SCENARIO
BRC Former C-6 Facility, Los Angeles, California

Groundwater

CAS No.	Chemical	Estimated Concentration in Groundwater (ug/L)	Cancer Risk	Hazard Index
75-34-3	1,1-Dichloroethane (1,1-DCA)	13	1.1E-10	0.00000037
107-06-2	1,2-Dichloroethane (1,2-DCA)	2.3	5.4E-11	0.000000019
75-34-3	1,1-Dichloroethylene (1,1-DCE)	120	1.7E-07	0.00014
156-59-2	cis-1,2-Dichloroethylene (cis 1,2-DCE)	10	No Slope Factor	0.0000030
127-18-4	Tetrachloroethene (PCE)	25	2.4E-09	0.000032
71-55-6	1,1,1-Trichloroethane	2.2	No Slope Factor	0.00000010
79-00-5	1,1,2-Trichloroethane	4.3	5.9E-11	0.00000073
79-01-6	Trichloroethlyene (TCE)	60	1.7E-09	0.0000027
	Total		1.8E-07	0.00018

BOE-C6-0128966

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,1 - Dichloroethane (1,1-DCA)

Variable Descriptions				Units
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.90E+04	mg/mole
Vapor pressure	VP	=	3.08E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	1.30E+01	ug/l
Henry's Law Constant	H	=	2.30E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**2.99E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	2.30E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	5.30E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**2.12E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 2.99E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.40E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**5.94E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**3.23E-04**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**1.59E-06**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**1.59E-06**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.85E-08**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**5.20E-08**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	5.20E-08	mg/kg-day
Reference dose	RfD	=	1.40E-01	mg/kg-day
Hazard Index	**HI**	=	**3.71E-07**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.85E-08	mg/kg-day
Slope factor (potency)	SF	=	5.70E-03	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**1.06E-10**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,2-Dichloroethane (EDC)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.90E+04	mg/mole
Vapor pressure	VP	=	1.14E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	2.30E+00	ug/l
Henry's Law Constant	H	=	4.00E-02	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**9.20E-02**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	4.00E-02	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	3.80E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**1.52E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 9.20E-02 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	1.00E-01	cm2/sec
Effective diffusion coefficient	**D_e**	=	**8.03E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**1.34E-05**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	C_i	=	**6.63E-08**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	C_o	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	C_t	=	**6.63E-08**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	IT_c	=	**7.70E-10**	**mg/kg-day**
Chemical Intake (non-carc. risk)	IT_{nc}	=	**2.16E-09**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	IT_{nc}	=	2.16E-09	mg/kg-day
Reference dose	RfD	=	1.14E-01	mg/kg-day
Hazard Index	**HI**	=	**1.89E-08**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	7.70E-10	mg/kg-day
Slope factor (potency)	SF	=	7.00E-02	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**5.39E-11**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,1-Dichloroethylene (1,1-DCE)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.70E+04	mg/mole
Vapor pressure	VP	=	7.78E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	1.20E+02	ug/l
Henry's Law Constant	H	=	1.10E+00	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**1.32E+02**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	1.10E+00	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	6.50E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**2.60E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.32E+02 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	9.00E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**7.22E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**1.73E-02**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**8.56E-05**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**8.56E-05**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**9.95E-07**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**2.79E-06**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	2.79E-06	mg/kg-day
Reference dose	RfD	=	2.00E-02	mg/kg-day
Hazard Index	**HI**	=	**1.40E-04**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	9.95E-07	mg/kg-day
Slope factor (potency)	SF	=	1.75E-01	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**1.74E-07**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: cis-1,2-Dichloroethylene (cis 1,2-DCE)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.70E+04	mg/mole
Vapor pressure	VP	=	2.40E-04	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	**=**	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	1.00E+01	ug/l
Henry's Law Constant	H	=	1.70E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	**=**	**1.70E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	1.70E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	3.60E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**1.44E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	**=**	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	**=**		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.70E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.40E-02	cm2/sec
Effective diffusion coefficient	**D_e**	**=**	**5.94E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	**=**	**1.83E-04**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	C_i	=	**9.06E-07**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	C_o	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	C_t	=	**9.06E-07**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	IT_c	=	**1.05E-08**	**mg/kg-day**
Chemical Intake (non-carc. risk)	IT_{nc}	=	**2.96E-08**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	IT_{nc}	=	2.96E-08	mg/kg-day
Reference dose	RfD	=	1.00E-02	mg/kg-day
Hazard Index	**HI**	=	**2.96E-06**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.05E-08	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Tetrachloroethylene (PCE)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.70E+05	mg/mole
Vapor pressure	VP	=	2.43E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	2.50E+01	ug/l
Henry's Law Constant	H	=	7.50E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**1.88E+01**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	7.50E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	2.70E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**1.08E+00**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.88E+01 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.20E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**5.78E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**1.97E-03**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	C_i	=	**9.72E-06**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	C_o	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	C_t	=	**9.72E-06**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	IT_c	=	**1.13E-07**	**mg/kg-day**
Chemical Intake (non-carc. risk)	IT_{nc}	=	**3.17E-07**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	IT_{nc}	=	3.17E-07	mg/kg-day
Reference dose	RfD	=	1.00E-02	mg/kg-day
Hazard Index	**HI**	=	**3.17E-05**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.13E-07	mg/kg-day
Slope factor (potency)	SF	=	2.10E-02	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**2.37E-09**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,1,1-Trichloroethane (1,1,1-TCA)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.30E+05	mg/mole
Vapor pressure	VP	=	1.63E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	2.20E+00	ug/l
Henry's Law Constant	H	=	7.10E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**1.56E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	7.10E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	1.40E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**5.60E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.56E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.80E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.26E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**1.78E-04**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**8.78E-07**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**8.78E-07**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.02E-08**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**2.86E-08**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	2.86E-08	mg/kg-day
Reference dose	RfD	=	2.86E-01	mg/kg-day
Hazard Index	**HI**	=	**1.00E-07**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.02E-08	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,1,2 - TCA

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.30E+05	mg/mole
Vapor pressure	VP	=	3.10E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	4.30E+00	ug/l
Henry's Law Constant	H	=	3.70E-02	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**1.59E-01**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	3.70E-02	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	7.50E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**3.00E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.59E-01 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.80E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.26E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**1.81E-05**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	C_i	=	**8.94E-08**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	C_o	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	C_t	=	**8.94E-08**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	IT_c	=	**1.04E-09**	**mg/kg-day**
Chemical Intake (non-carc. risk)	IT_{nc}	=	**2.92E-09**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	IT_{nc}	=	2.92E-09	mg/kg-day
Reference dose	RfD	=	4.00E-03	mg/kg-day
Hazard Index	**HI**	=	**7.29E-07**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.04E-09	mg/kg-day
Slope factor (potency)	SF	=	5.70E-02	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**5.92E-11**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Trichloroethlyene (TCE)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.30E+05	mg/mole
Vapor pressure	VP	=	7.61E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	6.00E+01	ug/l
Henry's Law Constant	H	=	4.20E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**2.52E+01**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	4.20E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	9.40E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**3.76E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 2.52E+01 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.90E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.34E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**2.90E-03**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	C_i	=	**1.43E-05**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	C_o	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	C_t	=	**1.43E-05**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	IT_c	=	**1.67E-07**	**mg/kg-day**
Chemical Intake (non-carc. risk)	IT_{nc}	=	**4.68E-07**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	IT_{nc}	=	4.68E-07	mg/kg-day
Reference dose	RfD	=	1.71E-01	mg/kg-day
Hazard Index	**HI**	=	**2.73E-06**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.67E-07	mg/kg-day
Slope factor (potency)	SF	=	1.00E-02	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**1.67E-09**	

CHEMICAL PARAMETERS

CAS No.		MW (mg/mole)		H' (dimension-less)		Da (cm^2/sec)		VP (atm)	Temp. (°C)		K_{oc} (cm^3/g)		Water Solubility (mg/L-water)		CSF (inh) (mg/kg-day)$^{-1}$		Chronic RfD (inh) (mg/kg-day)	
127-18-4	Tetrachloroethylene (PCE)	1.7E+05	a	7.5E-01	a	7.2E-02	a	2.4E-02	25	b	2.7E+02	a	2.0E+02	a	2.1E-02	c	1.0E-02	e
75-09-2	Methylene Chloride	8.5E+04	a	9.0E-02	a	1.0E-01	a	5.7E-01	25	b	1.0E+01	a	1.3E+04	a	3.5E-03	c	1.1E-01	e
67-66-3	Chloroform	1.2E+05	a	1.5E-01	a	1.0E-01	a	2.6E-01	25	b	5.3E+01	a	7.9E+03	a	1.9E-02	c	8.6E-02	e
95-63-6	1,2,4 - Trimethylbenzene	1.2E+05	a	2.3E-01	a	7.5E-02	a	2.8E-03	25	b	3.7E+03	a	2.6E-01	a	0.00E+00		1.70E-03	
78-93-3	Methyl Ethyl Ketone	7.2E+04	a	1.1E-03	a	9.0E-02	a	1.2E-01	25	b	4.5E+00	a	2.7E+05	a	0.00E+00		1.43E-01	
71-43-2	Benzene	7.8E+04	a	2.3E-01	a	8.8E-02	a	1.2E-01	25	b	6.2E+01	a	1.8E+03	a	1.00E-01		1.71E-02	
75-15-0	Carbon disulfide	7.6E+04	a	1.2E+00	a	1.0E-01	a	4.7E-01	25	b	4.6E+01	a	1.2E+03	a	0.00E+00		2.00E-01	
56-23-5	Carbon tetrachloride	1.5E+05	a	1.2E+00	a	7.8E-02	a	1.5E-01	25	b	1.5E+02	a	7.9E+02	a	1.50E-01		1.14E-02	
156-59-2	cis-1,2-Dichloroethylene (cis 1,2-DCE)	9.7E+04	a	1.7E-01	a	7.4E-02	a	2.4E-04	20	b	3.6E+01	a	3.5E+03	a	0.00E+00		1.00E-02	
100-41-4	Ethylbenzene	1.1E+05	a	3.2E-01	a	7.5E-02	a	1.3E-02	25	b	2.0E+02	a	1.7E+02	a	0.00E+00		5.71E-01	
98-82-8	Isopropyl-benzene (cumene, 1-methyethyl benzene)	1.2E+05	a	4.9E+01	a	7.5E-02	a	5.9E-03	25	b	2.2E+02	a	6.1E+01	a	0.00E+00		1.10E-01	
75-01-4	Vinyl chloride	6.3E+04	a	1.1E+00	a	1.1E-01	a	3.5E+00	25	b	1.9E+01	a	2.8E+03	a	2.70E-01		7.43E-03	
1330-20-7	Xylenes	1.1E+05	a	3.0E-01	a	7.0E-02	a	1.1E-02	25	b	2.0E+02	a	1.6E+02	a	0.00E+00		2.00E-01	
104-51-8	n-butylbenzene	1.3E+05	a	5.4E-01	a	7.5E-02	a	1.3E-03	23	d	2.8E+03	a	1.4E+01	a	0.00E+00		1.00E-02	
135-98-8	sec-butylbenzene	1.3E+05	a	7.7E-01	a	7.5E-02	a	1.4E-03	20	d	2.2E+03	a	1.7E+01	a	0.00E+00		1.00E-02	
103-65-1	n-propylbenzene	1.2E+05	b	5.4E-01	a	7.5E-02	a	1.3E-03	6.3	b	2.8E+03	a	1.4E+01	a	0.00E+00		1.00E-02	
108-88-3	Toluene	9.2E+04	a	2.7E-01	a	8.7E-02	a	3.7E-02	25	b	1.4E+02	a	5.3E+02	a	0.00E+00		8.57E-02	
156-60-5	trans-1,2-Dichloroethylene (trans-1,2-DCE)	9.7E+04	a	3.8E-01	a	7.1E-02	a	5.2E-01	30	b	3.8E+01	a	6.3E+03	a	0.00E+00		2.00E-02	
79-01-6	Trichloroethlyene (TCE)	1.3E+05	a	4.2E-01	a	7.9E-02	a	7.6E-02	20	b	9.4E+01	a	1.1E+03	a	1.00E-02		1.71E-01	
75-69-4	Trichlorofluoromethane (Freon 11)	1.4E+05	a	4.0E+00	a	8.7E-02	a	1.0E+00	25	b	1.6E+02	a	1.1E+03	a	0.00E+00		2.00E-01	
108-10-1	4-Methyl-2-pentanone (MIBK)	1.0E+05	a	5.7E-03	a	7.5E-02	a	2.6E-02	25	b	1.3E+02	a	1.9E+04	a	0.00E+00		2.29E-02	
108-67-8	1,3,5 - Trimethylbenzene	1.2E+05	a	3.2E-01	a	7.5E-02	a	3.3E-03	25	b	8.2E+02	a	5.0E+01	a	0.00E+00		1.70E-03	
75-34-3	1,1 - Dichloroethane (1,1-DCA)	9.9E+04	a	2.3E-01	a	7.4E-02	a	3.1E-01	25	b	5.3E+01	a	5.1E+03	a	5.70E-03		1.40E-01	
107-06-2	1,2-Dichloroethane (EDC)	9.9E+04	a	4.0E-02	a	1.0E-01	a	1.1E-01	25	b	3.8E+01	a	8.5E+03	a	7.00E-02		1.14E-01	
75-35-4	1,1-Dichloroethylene (1,1-DCE)	9.7E+04	a	1.1E+00	a	9.0E-02	a	7.8E-01	25	b	6.5E+01	a	2.3E+03	a	1.75E-01		2.00E-02	
71-55-6	1,1,1-Trichloroethane (1,1,1-TCA)	1.3E+05	a	7.1E-01	a	7.8E-02	a	1.6E-01	25	b	1.4E+02	a	1.3E+03	a	0.00E+00		2.86E-01	
79-00-5	1,1,2 - TCA	1.3E+05	a	3.7E-02	a	7.8E-02	a	3.1E-02	25	b	7.5E+01	a	4.4E+03	a	5.70E-02		4.00E-03	

References:

a EPA Region 9, Preliminary Remediation Goals (PRGs), 2000.
b U.S. National Library of Medicine Hazardous Substance Data Bank (HSDB), http://www.nlm.nih.gov/pubs/factsheets/hsdbfs.html
c Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA), Toxicity Criteria Database and December 2000 California Cancer Potency Values, http://www.oehha.ca.gov/risk/chemicalDB/index.asp
d Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf
e Cal-EPA, Air Resources Board (ARB), Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values, October 10, 2000, http://www.arb.ca.gov/ab2588/riskassess.htm

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1. Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA), Toxicity Criteria Database and December 2000 California Cancer Potency Values, http://www.oehha.ca.gov/risk/chemicalDB/index.asp
2. Cal-EPA, Air Resources Board (ARB), Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values, October 10, 2000, http://www.arb.ca.gov/ab2588/riskassess.htm
3. EPA Region 9, Preliminary Remediation Goals (PRGs), 2000.

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