704 707 B File: 541.460.000n C.H.



## THE MEMPHIS DEPOT **TENNESSEE**

## **ADMINISTRATIVE RECORD COVER SHEET**

AR File Number <u>104</u>

Part II of II

Disposal Area - Onsite - N Plume, Indoor Air - Hypothetical Future Residential Adult Scenario - Inhalation Dunn Field, Defense Distribution Depot Memphis, Tennessee

			•	Ö	Carcinogenic		No	Noncarcinogenic	흔
Units	Chemical	WOE	EPC	SFi	IGO	ELCR	RfDi	ī	፰
ng/m3	ug/m3 1,1,2,2-TETRACHLOROETHANE	ပ	4.28E-05	2 03E-01	7.63E-09	1.55E-09		1.17E-08	
ng/m3	1,1,2-TRICHLOROETHANE	ပ	1.19E-04	5.60E-02	2.12E-08	1.19E-09		3.26E-08	
ng/m3	1,1-DICHLOROETHENE	ပ	4.20E-03	1.75E-01	7.48E-07	1.31E-07		1.15E-06	
ng/m3	1,2-DICHLOROETHANE	<b>B</b> 2	1.56E-04	9 10E-02	2 78E-08	2.53E-09	1.40E-03	4.27E-08	3,05E-05
ng/m3	BROMODICHLOROMETHANE	82	1 23E-04		2.19E-08			3.37E-08	
ng/m3	CARBON TETRACHLORIDE	<b>B</b> 2	4.19E-03	5.25E-02	7.47E-07	3.92E-08		1.15E-06	
ug/m3	CHLOROFORM	<b>B</b> 2	6.03E-04	8 05E-02	1.07E-07	8 64E-09	0.00E+00	1.65E-07	
ug/m3	cis-1,2-DICHLOROETHYLENE	۵	5.50E-04		9 79E-08		1.00E-02	1.51E-07	1.51E-05
ng/m3	METHYLENE CHLORIDE	<b>B</b> 2	3.67E-04	1.65E-03	6 54E-08	1.08E-10	8.57E-01	1.01E-07	1.17E-07
ug/m3	<b>TETRACHLOROETHYLENE(PCF</b>	C-B2	2.21E-03	2 00E-03	3.93E-07	7.87E-10	1.71E-01	6 05E-07	3.54E-06
ug/m3	trans-1,2-DICHLOROETHENE		1.27E-03		2.26E-07	-	2.00E-02	3.48E-07	1.74E-05
ug/m3	ug/m3 TRICHLOROETHYLENE (TCE)	B2	1.38E-03	6.00E-03	2.46E-07	1.47E-09		3 78E-07	ĺ

0.0001

Tota! HI:

Total ELCR: 1.86E-07

Disposal Area (Potable Use) (N Plume) - Hypothetical Future Residential Adult Scenario

Dunn Field, Defense		

Ingestic	nn.	Carcinogenic	<u>Noncarcinogenic</u>
-	or non-carcinogenic compounds	Age-specific intake (for carcinogei	nio gampai indo anti il
CDI =			nic compounds only):
CDI -	<u>C<sub>ow</sub> * IR * EF * ED</u> BW * AT	$CDI_{adj} = \underline{C_{ga} * EF * CF * IR_{adj}}$	
^ -		AT	
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR ≈	Ingestion Rate (L/day)	N/A	2 a
IR <sub>adi</sub> =	Age-adjusted Ingestion Rate (L-year/kg-day		N/A
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
BW =	Body Weight (kg)	70 a	70 a
	Augraging Time (days)	25552 +	40000 -
AT = Dermal.		25550 a	10950 a
<b>Dermal.</b> Intake fo	r non-carcinogenic compounds.	Age-specific intake (for carcinoger  CDI <sub>adj</sub> = <u>C<sub>ow</sub> *SA<sub>ad</sub> * PC * ET * EF * (</u> AT	nic compounds only).
Dermal. Intake fo CDI =	r non-carcinogenic compounds.  C <sub>ow</sub> *SA * PC * ET * EF * ED * CF	Age-specific intake (for carcinoger CDI <sub>adj</sub> = <u>C<sub>ow</sub>*SA<sub>adj</sub>*PC * ET * EF * (</u>	nic compounds only).
Dermal. Intake fo CDI = C <sub>gw</sub> = SA =	r non-carcinogenic compounds.  C <sub>ow</sub> *SA * PC * ET * EF * ED * CF  BW * AT	Age-specific intake (for carcinoger CDI <sub>adj</sub> = <u>C<sub>ow</sub> *SA<sub>adj</sub> * PC * ET * EF * (</u> AT	nic compounds only). CF
Dermal. Intake fo CDI = C <sub>gw</sub> = SA =	r non-carcinogenic compounds.  Cow *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)	Age-specific intake (for carcinoger CDI <sub>adj</sub> = <u>C<sub>ow</sub>*SA<sub>ad;</sub>*PC*ET*EF*(</u> AT EPC	nic compounds only). CF EPC
Dermal. Intake fo CDI = C <sub>gw</sub> ≈	r non-carcinogenic compounds.  Cow *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)  Surface Area (cm²)	Age-specific intake (for carcinoger CDI <sub>adj</sub> = <u>C<sub>ow</sub>*SA<sub>adj</sub>*PC*ET*EF*(</u> AT EPC N/A	nic compounds only). C <u>F</u> EPC 20000 b,
Dermal. Intake fo CDI =  Cgw = SA = SA <sub>adj</sub> = PC =	r non-carcinogenic compounds.  C <sub>pw</sub> *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)  Surface Area (cm²)  Age-adjusted Surface Area (cm²-yr/kg)	Age-specific intake (for carcinoger  CDI <sub>adj</sub> = C <sub>cow</sub> *SA <sub>adj</sub> *PC * ET * EF * 6  AT  EPC  N/A  9480 b,c	nic compounds only). CF EPC 20000 b, N/A
Dermal. Intake fo CDI = C <sub>gw</sub> ≈ SA = SA <sub>adj</sub> = PC = ET =	r non-carcinogenic compounds.  Cow *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)  Surface Area (cm²)  Age-adjusted Surface Area (cm²-yr/kg)  Dermal Permeability Constant (cm/hr)  Exposure Time (hr/day)  Exposure Frequency (day/year)	Age-specific intake (for carcinoger  CDI <sub>adj</sub> = C <sub>cox</sub> *SA <sub>adj</sub> *PC*ET*EF*(  AT  EPC  N/A  9480 b,c  (Chemical Specific) d	nic compounds only). CF EPC 20000 b, N/A (Chemical Specific) d
Dermal. Intake fo CDI =  C <sub>gw</sub> = SA = SA <sub>adj</sub> = PC = ET = EF =	r non-carcinogenic compounds.  Cow *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)  Surface Area (cm²)  Age-adjusted Surface Area (cm²-yr/kg)  Dermal Permeability Constant (cm/hr)  Exposure Time (hr/day)	Age-specific intake (for carcinoger  CDI <sub>adj</sub> = C <sub>cow</sub> *SA <sub>ad,</sub> *PC*ET*EF*(  AT  EPC  N/A  9480 b,c  (Chemical Specific) d  0 007 b,e	EPC 20000 b, N/A (Chemical Specific) d 0.007 b,
Dermal. intake fo CDI =  C <sub>gw</sub> = SA = SA <sub>adj</sub> = PC = ET = EF = ED =	r non-carcinogenic compounds.  Cow *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)  Surface Area (cm²)  Age-adjusted Surface Area (cm²-yr/kg)  Dermal Permeability Constant (cm/hr)  Exposure Time (hr/day)  Exposure Frequency (day/year)	Age-specific intake (for carcinoger  CDI <sub>adj</sub> = C <sub>cow</sub> *SA <sub>ad,</sub> * PC * ET * EF * (  AT  EPC  N/A  9480 b,c  (Chemical Specific) d  0 007 b,e  350 a	EPC 20000 b, N/A (Chemical Specific) d 0.007 b, 350 a
Dermal. Intake fo CDI = C <sub>gw</sub> = SA = SA <sub>adj</sub> =	r non-carcinogenic compounds.  Cow *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)  Surface Area (cm²)  Age-adjusted Surface Area (cm²-yr/kg)  Dermal Permeability Constant (cm/hr)  Exposure Time (hr/day)  Exposure Frequency (day/year)  Exposure Duration (year)	Age-specific intake (for carcinoger CDI <sub>adj</sub> = C <sub>cow</sub> *SA <sub>adj</sub> *PC*ET*EF*(  AT  EPC  N/A  9480 b,c  (Chemical Specific) d  0 007 b,e  350 a  30 a	EPC 20000 b, N/A (Chemical Specific) d 0.007 b, 350 a 30 a

### Inhalation:

CDI = Ingestion CDI from above f

#### References:

a = U.S. EPA, Human Health Evaluation Manual, Supplemental Guidance. "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Age-adjusted ingestion rate for adults, adjusted for body weight and time for carcinogenic exposure

$$IRadj = IRc \times EDc + IRa \times (EDa - EDc) = 1 \times 6 + 2 \times (30-6)$$
 $BWc BWa 15 + 2 \times (30-6)$ 

## 1.09 (L-year)/(kg-day)

b = USEPA Exposure Factors Handbook, August 1997

c = Total Body Surface Area represents whole body (average of male & female adults).

f = Age-adjusted surface area for adults, adjusted for body weight and time for carcinogenic exposure

SAadj = 
$$\frac{\text{SAc} \times \text{ED}_{\text{i}}}{\text{BW}_{\text{c}}}$$
 +  $\frac{\text{SAa} \times (\text{EDa} - \text{EDc}}{\text{BW}_{\text{a}}}$  =  $\frac{6557 \times 6}{15}$  +  $\frac{20000 \times (30-6)}{70}$ 

9480 (cm<sup>2</sup>-year)/(kg)

d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value; all values adapted from EPA, Dermal Exposure Assessment: Principles and Applications, January 1992.

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event.

f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Disposal Area (Potable Use) (N Plume) - Hypothetical Future Residential Adult Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

	1							Ingestion	STION	Derma	ma m	Inhalation*
Chemical	S N	SFo	SFd	SFI	EPC	ABSgi	PC	ᅙ	ELCR	G	ELCR	ELCR
ALUMINUM					1 30E+01	1 00E-01	1 60E-04	1.93E-01		1 89E-06		
ARSENIC	∢	1 50E+00	50E+00 3.66E+00	1 51E+01	3.00E-03	4 10E-01	1 60E-04	4 46E-05	7E-05	4.36E-10	2E-09	
BARIUM	٥				1 00E-01	7 00E-02	1 60E-04	1 49E-03		1 45E-08		
BERYLLIUM	<u>6</u>			8 40E+00	7	1 00E-02	1 60E-04	1 04E-05		1.02E-10		
CADMIUM	<u>8</u>			6 30E+00		1.00E-02	1.00E-03	2.97E-05		1 82F-09		
CHROMIUM, TOTAL	Ą O			4.20E+01		5 00E-03	1,00E-03	2.97E-04		1 82F-08		
COBALT					2.00E-02	8 00E-01	4 00F-04	2 97F-04		7 27E-09		
COPPER	۵				2 00E-02	3 00E-01	1 60F-04	2 97F-04		2 91 11-00		
LEAD	<b>B</b> 2					1 50E-01	4 00E-06	1 49E-04				
MANGANESE	۵				2 00E+00	4 00E-02	1 60E-04	2 97E-02				
MERCURY	۵				1 00E-04	1,00E-04	1 00E-03	1 49E-06		9 09F-11		
NICKEL	۵				1 00E-02	2 70E-01	1 00E-04	1 49E-04		9 09E-10		
SILICON					1.50E+01	2.00E-01	1 60E-04	2 23E-01		2 18E-06		
VANADIUM					4 00E-02	1,00E-02	1 60E-04	5 95E-04		5 82E-09		
DIELDRIN	82	1 60E+01	3 20E+01	1,61E+01	6 00E-05	5 00E-01	1 60E-02	8 92E-07	1E-05	8 73E-10	3E-08	
HEPTACHLOR EPOXIDE B2 9	<b>B</b> 2	9 10E+00	1 26E+01	9 10E+00	1 00E-05	7.20E-01	1 10E-02	1 49E-07	1E-06	1 00E-10	1E-09	
2-TETRACHLOROETHANE	Ç	2 00E-01		2 03E-01		7 00E-01		181E-04	4E-05	9 97E-08	3E-08	4E-05
RICHLOROETHANE	ပ	5.70E-02		5 60E-02		8 10E-01		5.32E-05	3E-06	2 73E-08	2F-09	30.08
CHLOROETHENE	ပ	6 00E-01	00E-01	175E-01		1 00E+00		2.93E-04	2E-04	2 86E-07	2E-07	5E-05
CHLOROFIHANE	82	9 10E-02		9 10E-02		1.00E+00		5 68E-05	5E-06	184E-08	2E-09	5E-06
ODICHLOROMETHANE	83	6.20E-02	6 33E-02		3 74E-03	9 80E-01		5 57E-05	3E-06	1 97E-08	16-09	) ) !
ON TETRACHLORIDE	<b>B</b> 2	1 30E-01	2 00E-01	5 25E-02	3 14E-03	6.50E-01		4 67E-05	6E-06	6 28E-08	1E-08	2E-06
ROFORM	<b>B</b> 2	6.10E-03	3 05E-02	8 05E-02	6 36E-03	2.00E-01		9.45E-05	6E-07	5 14E-08	2F-09	AF-06
2-DICHLOROETHYLENE	Δ,				6.17E-03	1.00E+00		9 18E-05	;	5 61E-08	}	3
TYLENE CHLORIDE	82	7 50E-03	7.89E-03	1.65E-03	9.84E-03	9 50E-01		1 46E-04	1E-06	4 03E-08	3E-10	2F-07
ACHLOROETHYLENE(PCE)	C-B2	5.20E-02		2 00E-03	2.94E-02	1.00E+00		4 37E-04	2E-05	1.28E-06	7E-08	9E-07
rans-1,z-DICHLOROE I HENE				1	1 07E-02	1.00E+00		1.59E-04		9 73E-08		; 
RICHLORUE (HYLENE (ICE)	2	1.10E-02	7 33E-02	6 00E-03	8.28E-02	1.50E-01	1.60E-02	1 23E-03	1E-05	1 20E-06	9E-08	7E-06
OTAL KISK							:		4E-04		4F-07	1E-04

WOE = Weight of Evidence, CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, ELCR = Excess Lifetime Cancer Exposure, \* = inhalation intake (CD

Disposal Area (Potable Use) (N Plume) - Hypothetical Future Residential Adult Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

;									Ingestion	tion	Der	Dermal	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	RfDi	EPC	ABSgi	<u>ဂ</u>	<u>5</u>	ā	<u>0</u>	오	오
MG/L	ALUMINUM		1 00E+00	1,00E-01		1.30E+01	1 00E-01	1.60E-04	3 56E-01	0 36	3 99E-06	3 99E-05	
MG/L	ARSENIC	∢	3.00E-04	1,23E-04		3.00E-03	4 10E-01	1 60E-04	8 22E-05	0 27		7 48E-06	
MG/L	BARIUM	Ω	7.00E-02	4 90E-03	1 43E-04	1 00E-01	7 00E-02	1 60E-04	2.74E-03	0 039	3 07€-08	6 26F-06	
MG/L	BERYLLIUM	<u>8</u>	2.00E-03	2 00E-05	5 70E-06	7 00E-04	1.00E-02	1 60E-04	1 92E-05	9600 0	2 15E-10	1 07E-05	
MG/L	CADMIUM	<u>8</u>	5 00E-04	5.00E-06		2 00E-03	1 00E-02	1,00E-03	5 48E-05	0 11	3 84E-09	7 67E-04	
MG/L	CHROMIUM, TOTAL	A-D	3 00E-03		2 86E-05	2 00E-02	5 00E-03	1.00E-03	5 48E-04	0 18	3 84E-08	0.0026	
MG/L	COBALT		6 00E-02	4		2.00E-02	8 00E-01	4 00E-04	5 48E-04	0 0091	1.53E-08	3 20E-07	
MG/L	COPPER	۵	3 70E-02	1.11E-02		2.00E-02	3 00E-01	1 60E-04	5 48E-04	0 015	6 14E-09	5 53E-07	
MG/L	LEAD	82				1 00E-02	1 50E-01	4 00E-06	2		7 70E-11	1	
MG/L	MANGANESE	۵	1 40E-01	5 60E-03	1 43E-05	2,00E+00	4 00E-02	1.60E-04	S	0 39	6 14E-07	1 10E-04	
MG/L	MERCURY	Δ			8 57E-05	1.00E-04	1 00E-04	1.00E-03	2 74E-06		1.92E-10	!	
MG/L	NOKEL	۵	2 00E-02	5.40E-03		1 00E-02	2 70E-01	1.00E-04	2 74E-04	0 014	1.92E-09	3 55E-07	
MG/L	SILICON					1 50E+01	2.00E-01	1.60E-04	4 11E-01		4 60E-06		
MG/L	VANADIUM		7 00E-03	7 00E-05		4 00E-02	1 00E-02	1.60E-04	1 10E-03	0 16	1.23E-08	1.75E-04	
MG/L	DIELDRIN	B2	5.00E-05	2.50E-05		6 00E-05	5.00E-01	1 60E-02	1.64E-06	0 033	1.84E-09	7 36E-05	
MG/L	HEPTACHLOR EPOXIDE	B2	1 30E-05	9 36E-06		1 00E-05	7.20E-01	1 10E-02	2 74E-07	0.021	2.11E-10	2 25E-05	
MG/L	1,1,2,2-TETRACHLOROETHANE	ပ	6.00E-02	4 20E-02		1 22E-02	7.00E-01	9 00E-03	3 34E-04	0.0056	2 10E-07	5 01E-06	
MG/L	1,1,2-TRICHLOROETHANE	ပ	4 00E-03	ന		3.58E-03	8 10E-01	8 40E-03	9 80E-05	0 025	5 76E-08	1 78E-05	
MG/L	1,1-DICHLOROETHENE	ပ	9 00E-03	9 00 <b>E</b> -03		1 97E-02	1 00E+00	1 60E-02	5 39E-04	0.060	6 04E-07	6 71E-05	
MG/L	1,2-DICHLOROETHANE	B2	3 00E-02	3 00E-02	1 40E-03	3.82E-03	1 00E+00	5 30E-03	1 05E-04	0 0035	3 89E-08	1 30E-06	0 075
MG/L	BROMODICHLOROMETHANE	82	2.00E-02	1,96E-02		3.74E-03	9 80E-01	5 80E-03	1 03E-04	0 0051	4 16E-08	2 12E-06	
MG/L	CARBON TETRACHLORIDE	B2	7.00E-04	4 55E-04		3 14E-03	6 50E-01	2 20E-02	8 61E-05	0 12	1 33E-07	2 91E-04	
MG/L	CHLOROFORM	85	1 00E-02	2 00E-03		6 36E-03	2 00E-01	8 90E-03	1 74E-04	0.017	1 09E-07	5 43E-05	
MG/L	cis-1,2-DICHLOROETHYLENE	۵	1.00E-02	_	1 00E-02	6 17E-03	1 00E+00	1 00E-02	1.69E-04	0 017	1.18E-07	1 18E-05	0 017
MG/L	METHYLENE CHLORIDE	<b>B</b> 5	6 00E-02	۷,	8 57E-01	9 84E-03	9 50E-01	4.50E-03	2 70E-04	0 0045	8.49E-08	1 49E-06	3 15E-04
MG/L	TETRACHLOROETHYLENE(PCE)	C-B2	1 00E-02	_	1 71E-01	2 94E-02	1 00E+00	4.80E-02	8 05E-04	0 080	2.70E-06	2 70E-04	0.0047
MG/L	trans-1,2-DICHLOROETHENE		2 00E-02	2 00E-02	2 00E-02	1 07E-02	1.00E+00	1 00E-02	2 93E-04	0 015	2 05E-07	1 03E-05	0 015
MG/L	TRICHLOROETHYLENE (TCE)	B2	6 00E-03	9 00E-04		8 28E-02	1 50E-01	1 60E-02	2,27E-03	0 38	2 54E-06	0 0028	
	Hazard Index									2.3		0.0073	0.11
i de la		1		( ) ( )				:	<u> </u>	Total Hazard Index	= xepul p	2.5	:

Total Hazard Index = 2.5
WOE = Weight of Evidence, CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index, \* = inhalation intake (CDI) = ir

## Disposal Area - Onsite - N Plume, Indoor Air - Hypothetical Future Residential Child Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

#### Inhalation

Intake for noncarcinogenic compounds

CDI=	Cair * IR *EF * ED * CF
	RW * AT

		Carcinogenic	Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	· NA	EPC	. р
IR =	Inhalation Rate (m³/day)	NA	15	а
EF =	Exposure Frequency (days/year)	NA	350	а
ED =	Exposure Duration (years)	NA	6	а
CF =	Conversion Factor (mg/ug)	NA	1 00E-03	
BW =	Body Weight (kg)	NA	15	а
AT =	Averaging Time (days)	NA	2190	а

## Sources:

a = U S. EPA, Human Health Evaluation Manual, Supplemental Guidance. "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings. Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

Disposal Area - Onsite - N Plume, Indoor Air - Hypothetical Future Residential Child Scenario - Inhalation Dunn Field, Defense Distribution Depot Memphis, Tennessee

			•	J	Carcinogenic	<u>.0</u>	Non	Noncarcinogenic	٦̈٢
Units	Chemical	WOE	EPC	SFi	CDI	ELCR	RfDi	<u>1</u> 3	도
ug/m3	1,1,2,2-TETRACHLOROETHANE	၁	4.28E-05	;	1	1		4.1E-08	
ng/m3	1,1,2-TRICHLOROETHANE	O	1.19E-04	ı	ı	1		1.1E-07	
ng/m3	1,1-DICHLOROETHENE	ပ	4.20E-03	ı	!	ì		4 0E-06	
ug/m3	1,2-DICHLOROETHANE	<b>B</b> 2	1.56E-04	;	ŀ	1	1.40E-03	1.5E-07	1.07E-04
ng/m3	BROMODICHLOROMETHANE	<b>B</b> 2	1.23E-04	ł	t	1		1.2E-07	
ng/m3	CARBON TETRACHLORIDE	B2	4.19E-03	;	i	1		4.0E-06	
ug/m3	CHLOROFORM	<b>B</b> 2	6.03E-04	1	i	;	0.00E+00	5.8E-07	
ug/m3	cis-1,2-DICHLOROETHYLENE	۵	5 50E-04	:	1	ı	1.00E-02	5.3E-07	5 27E-05
ng/m3	METHYLENE CHLORIDE	<b>B</b> 2	3 67E-04	1	ł	1	8 57E-01	3 5E-07	4.11E-07
ng/m3	<b>TETRACHLOROETHYLENE(PCE</b>	C-B2	2.21E-03	1	:	ı	1.71E-01	2 1E-06	1.24E-05
ng/m3	trans-1,2-DICHLOROETHENE		1 27E-03	;	i	ŀ	2.00E-02	1.2E-06	6.09E-05
ng/m3	ug/m3 TRICHLOROETHYLENE (TCE)	B2	1.38E-03	1	1			1.3E-06	

0.0002

Total HI:

ł

Total ELCR:

Disposal Area (Potable Use) (N Plume) - Hypothetical Future Residential Child Scenario

Dunn Field, Defense Distribution Depot Memphis, Tennessee

		Carcinogenic	Noncarcinogenic
Ingestio	n·		-tottogette
Intake fo	r non-carcinogenic and carcinogenic compounds.		
CDI =	Cow * IR * EF * ED		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	 1 a	1 a
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a
	r non-carcinogenic and carcinogenic compounds		
CDI =	Cgw *SA * PC * ET * EF * ED * CF		
	BW * AT		
C <sup>am</sup> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	6557 b, c	6557 b. c
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0 007 b.e	0 007 b.e
EF ≃	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
CF =	Conversion Factor (L/cm <sup>3</sup> )	1 00E-03	1 00E-03
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a

### Inhalation:

CDI = Ingestion CDI from above f

## References:

- a = U S. EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors"

  OSWER Directive 9285 6-03, March 25, 1991
- b = US EPA Exposure Factors Handbook, August 1997
  - Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998
- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old))
- d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment: Principles and Applications, January 1992
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event.
- f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Disposal Area (Potable Use) (N Plume) - Future Residential Child Carcinogenic Scenarlo (OptionaL) Dunn Field, Defense Distribution Depot Memphis, Tennessee

									sebul	ngestion	Derma	mal	Inhalation*
Units	Chemical	WOE	<b>NOE SF</b> o	SFd	SFI	EPC	ABSgl	ပ္	CD	ELCR	3	ELCR	ELCR
MG/L	ALUMINUM					1 30E+01	1.00E-01	1 60E-04 7.12E-02	7.12E-02		5 23E-07		
MG/L	ARSENIC	∢	1.50E+00	1.50E+00 3 66E+00 1.51E+01	1.51E+01	3 00E-03	4 10E-01	1.60E-04	1 64E-05	2E-05	1 21E-10	4F-10	2F-04
MG/L	BARIUM	۵				1 00E-01	7 00E-02	1 60E-04	5 48E-04		4.02E-09	? <u>J</u>	5
MG/L	BERYLLIUM	9			8,40E+00	7 00E-04		1.60E-04	3 84E-06		2 82E-11		3F-05
MG/L	CADMIUM	19			6 30E+00	2 00E-03	1.00E-02	1.00E-03	1.10E-05		5 03E-10		7E-05
MG/L	CHROMIUM, TOTAL	A-D			4 20E+01	2.00E-02 t	5 00E-03	1.00E-03	1 10E-04		5.03E-09		56-03
MG/L	COBALT					2 00E-02	8.00E-01	4 00E-04	1.10E-04		2 01E-09		
MG/L	COPPER	٥				2 00E-02	3.00E-01	1 60E-04	1.10E-04		8 05E-10		
	Total Risk									1E-04		1E-07	5E-03
										ို	Fotal Risk =	5E-03	

Disposal Area (Potable Use) (N Plume) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

:									Ingestion	tion	Q	Dermal	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	Ŗ.	EPC	ABSgi	ည	G	ឮ	<u>5</u>	멸	g
NG/L	ALUMINUM		1 00E+00	1 00E-01		1 30E+01	1 00E-01	1 60E-04	8 31E-01	0 83	6 10E-06	6 10E-05	
MG/L	ARSENIC	∢	3 00E-04	1 23E-04		3 00E-03	4 10E-01	1 60E-04	1 92E-04	0 64	1 41E-09	1 15E-05	
MG/L	BARIUM	۵	7 00E-02	4.90E-03	1 43E-04	1 00E-01	7 00E-02	1 60E-04	6 39E-03	0 091	4 69E-08	9.58F-06	
MG/L	BERYLLIUM	8	2 00E-03	2 00E-05	5 70E-06	7 00E-04	1 00E-02	1.60E-04	4 47E-05	0 022	3 29E-10	1 64E-05	
MG/L	CADMIUM	<del>1</del>	5 00E-04	S 00E-06		2 00E-03	1 00E-02	1 00E-03	1 28E-04	0.26	5.87F-09	0.0012	
MG/L	CHROMIUM, TOTAL	Α̈́D	3 00E-03	1 50E-05	2.86E-05	2 00E-02	5 00E-03	1 00E-03	1.28E-03	0.43	5 87E-08	0.00	
MG/L	COBALT		6 00E-02	4 80E-02		2 00E-02	8 00E-01	4 00E-04	1 28E-03	0.02	2.35E-08	4 R9F-07	
MG/L	COPPER	۵	3 70E-02	1 11E-02		2 00E-02	3 00E-01	1 60E-04	1 28E-03	0.035	9 39F-09	8 46F-07	
MG/L	LEAD	B2				1 00E-02	1 50E-01	4 00E-06	6 42F-04	) )	1 18E-10	5	
MG/L	MANGANESE	۵	1 40E-01	5 60E-03	1 43E-05	2 00E+00	4 00E-02	1 60E-04	1 28E-01	0.91	9 39F-07	1 68F-04	
MG/L	MERCURY	۵			8 57E-05	1 00E-04	1 00E-04	1 00E-03	6 39E-06			1	
MG/L	NICKEL	۵	2 00E-02	5 40E-03		1 00E-02	2 70E-01	1 00E-04	6 39E-04	0 032	2 93E-09	5 43E-07	
MG/L	SILICON					1 50E+01	2 00E-01	1 60E-04	9 59E-01		7.04F-06	:	
MG/L	VANADIUM		7 00E-03	7.00E-05		4 00E-02	1 00E-02	1 60E-04	2 56E-03	0 37	1 88E-08	2 68E-04	
MG/L	DIELDRIN	82	5 00E-05	2 50E-05		6 00E-05	5 00E-01	1 60E-02	3 84E-06	0 077	2.82E-09	1 13E-04	
MG/L	HEPTACHLOR EPOXIDE	<b>B</b> 2	1 30E-05	9 36E-06		1 00E-05	7 20E-01	1 10E-02	6.39E-07	0.049	3 23F-10	3.45E-05	
MG/L	1,1,2,2-TETRACHLOROETHANE	ပ	6 00E-02	4 20E-02		1 22E-02	7 00E-01	9 00E-03	7 79E-04	0 0 13	3 22E-07	7 66E-06	
MG/L	1,1,2-TRICHLOROETHANE	Ç	4 00E-03	3 24E-03		3 58E-03	8 10E-01	8 40E-03	2 29E-04	0 057	8 82E-08	2.72E-05	
WG/	1,1-DICHLOROETHENE	ပ	9 00E-03	9 00E-03		1 97E-02	1.00E+00	1 60E-02	1 26E-03	0.14	9 24E-07	1 03E-04	
MG/L	1,2-DICHLOROETHANE	82	3 00E-02	3 00E-02	1 40E-03	3 82E-03	1 00E+00	5 30E-03	2 44E-04	0 0081	5 94E-08	1.98E-06	0.17
MG/L	BROMODICHLOROMETHANE	82	2 00E-02	1 96E-02		3 74E-03	9 80E-01	5 80E-03	2 39E-04	0 012	6 37E-08	3,25E-06	:
MG/L	CARBON TETRACHLORIDE	82	7 00E-04	4 55E-04		3 14E-03	6 50E-01	2 20E-02	2 01E-04	0 29	2.03E-07	4 46E-04	
MG/L	CHLOROFORM	82	1 00E-02	2 00E-03		6.36E-03	2 00E-01	8 90E-03	4 06E-04	0 041	1 66E-07	8.30E-05	
MG/L	cis-1,2-DICHLOROETHYLENE	۵		1 00E-02	1 00E-02	6 17E-03	1 00E+00	1 00E-02	3 95E-04	0.039	181E-07	181E-05	0 039
MG/L	METHYLENE CHLORIDE	<b>B</b> 2	6 00E-02	5 70E-02	8 57E-01	9 84E-03	9 50E-01	4 50E-03	6 29E-04	0.010	1 30E-07	2 28E-06	7 34F-04
MG/L	Ğ Ü	C-82	1 00E-02	1 00E-02	1 71E-01	2 94E-02	1 00E+00	4 80E-02	1.88E-03	0.19	4 14E-06	4 14E-04	0.011
MG/L	trans-1,2-DICHLOROETHENE		2 00E-02	2 00E-02	2 00E-02	1 07E-02	1 00E+00	1.00E-02	6 85E-04	0 034	3 14E-07	157E-05	0.034
MG/L	TRICHLOROETHYLENE (TCE)	82	6 00E-03	9 00E-04		8 28E-02	1 50E-01	1 60E-02	5 29E-03	0.88	3 89E-06	0 0043	
	Hazard Index									5.5		0.011	0.3

F.5 0.011 0.3

Total Hazard Index = 6

WOE = Weight of Evidence, CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index, \* = inhalation intake (CDI) = ir

## Disposal Area - Onsite - NW Plume, Indoor Air - Hypothetical Future Industrial Worker Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic and carcinogenic compounds:

CDI=	C <sub>sir</sub> * IR *EF * ED * CF
	BW * AT

		Carcinogenic		Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	EPC	_ b	EPC	-ь
IR =	Inhalation Rate (m³/day)	20	a,c	20	a,c
EF =	Exposure Frequency (days/year)	250	а	250	а
ED =	Exposure Duration (years)	<b>2</b> 5	a	25	а
CF =	Conversion Factor (mg/ug)	1.00E-03		1.00E-03	
BW =	Body Weight (kg)	70	а	70	а
AT =	Averaging Time (days)	25550	а	25550	а

### Sources:

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

c = Based on an eight hour workday

Disposal Area - Onsite - NW Plume, Indoor Air - Hypothetical Future Industrial Worker Scenario - Inhalation Dunn Field, Defense Distribution Depot Memphis, Tennessee

				ပီ	Carcinogenic		Non	Noncarcinogenic	nic
Units	Chemical	WOE	EPC	SFi	īgo	ELCR	RfDi	<u>5</u>	₹
ng/m3	1,1,2,2-TETRACHLOROETHANE	ပ	3.9E-05	2.0E-01	2.7E-09	5 5E-10		7.6E-09	
ng/m3	1,1,2-TRICHLOROETHANE	ပ	1.1E-04	5.6E-02	7 8E-09	4.4E-10		2.2E-08	
ng/m3	1,1-DICHLOROETHENE	ပ	4.0E-03	1.8E-01	2.8E-07	4.9E-08		7 8E-07	
ng/m3	1,2-DICHLOROETHANE	B2	1.5E-04	9.1E-02	1.0E-08	9.3E-10	1.4E-03	2.9E-08	2.04E-05
ng/m3	1,2-DICHLOROPROPANE	B2	3 6E-04		2 5E-08		1.1E-03	7.0E-08	6 14E-05
ug/m3	BENZENE	∢	7.7E-04	2.7E-02	5.4E-08	1.5E-09	1 7E-03	1 5E-07	8,90E-05
ng/m3	CARBON TETRACHLORIDE	B2	4.0E-03	5 3E-02	2.8E-07	1.5E-08		7.9E-07	
ug/m3	CHLOROFORM	B2	5 7E-04	8.1E-02	4.0E-08	3.2E-09	0000	1.1E-07	
ng/m3	cis-1,2-DICHLOROETHYLENE	۵	5.3E-04		3 7E-08		1.0E-02	1.0E-07	1 03E-05
ng/m3	TETRACHLOROETHYLENE(PCE	C-B2	2.1E-03	2.0E-03	1.5E-07	3.0E-10	1.7E-01	4.2E-07	2.44E-06
ng/m3	trans-1,2-DICHLOROETHENE		1.2E-03		8.6E-08		2.0E-02	2.4E-07	1.20E-05
ug/m3	TRICHLOROETHYLENE (TCE)	B2	1.3E-03	6.0E-03	9.2E-08	5.5E-10		2.6E-07	
ug/m3	ug/m3 VINYL CHLORIDE	۷	4 9E-03	1.5E-02	3.4E-07	5.2E-09	1.1E-01	9.5E-07	8.64E-06

Total ELCR: 7.7E-08 Total HI:

0.0002

## Disposal Area (Potable Use) (NW Plume) - Hypothetical Future Industrial Worker Scenario

Dunn Field, Defense Distribution Depot Memphis, Tennessee

		Carcinogenic	Noncarcinogenic
Ingestion	1:		
Intake for	non-carcinogenic and carcinogenic compounds:		
CD! =	C * IR * EF * ED		
	BW * AT		
C <sub>IIw</sub> =	Concentration in groundwater (mg/L)	EPC	EPÇ
IR =	Ingestion Rate (L/day)	1 a	1 a
EF =	Exposure Frequency (day/year)	250 a	250 a
ED =	Exposure Duration (year)	25 a	25 a
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	9125 a
Dermal: Intake for CDI =	non-carcinogenic and carcinogenic compounds:  Cpw *SA * PC * ET * EF * ED * CF  BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm <sup>2</sup> )	2679 b,c	2679 b,c
PC =	Dermat Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0.007 b,e	0 007 b,e
EF =	Exposure Frequency (day/year)	250 a	250 a
ED =	Exposure Duration (year)	25 a	25 a
CF =	Conversion Factor (L/cm <sup>3</sup> )	1.00E-03	1.00E-03
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	9125 a

#### Inhalation:

CDI = Ingestion CDI from above 9

### References:

- a = U S. EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991.
- b = Default factors adapted from EPA Exposure Factors Handbook, August 1997.
- c = Surface area represents 1/2 head, 1/2 arms, and the hands of an adult worker
- d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment: Principles and Applications, January 1992
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0.007 day per event
- g = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Disposal Area (Potable Use) (NW Plume) - Hypothetical Future Industrial Worker Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

듸	CR ELCR		2E-10													60-			-09 5 1E-06						-10 6.8E-06		-09 1.3E-07		-07 3 8E-05	
Dermal	ELCR	1/2	•		2	9	. 6		2	2	82	2	=	70	9	11 2 0E-09			8 1.0E-09								8 3.0E-09		_	
	CDI	1 36E-0	က	-	7 34E-12	1 31E-10	1.31E-09	5 24E-10	2 10E-10	2.63E-12	2.10E-08	6 55E-12	6 55E-11	1 57E-07	4 19E-10		• -		1.44E-08	•	• •	•				6 27E-0	5.74E-0	1 54E-08	1 92E-06	
Ingestion	FLCK		1 6E-05													3.4E-06	3 2E-07	1 6E-03	5.2E-06	4.6E-05	7.0E-06	6 6E-06	4 2E-06	1 OE-05	5 1E-07		3 3E-06		7.1E-05	
lnge (	S	4 54E-02	1 05E-05	3 49E-04	2 45E-06	6 99E-06	6 99E-05	6 99E-05	6 99E-05	3 51E-05	6 99E-03	3.49E-07	3.49E-05	5.24E-02	1,40E-04	2 10E-07	3.49E-08	7.79E-03	9.15E-05	7.64E-05	7 68E-05	9.71E-05	7 65E-05	7 73E-05	8 44E-05	3 34E-04	637E-05	8 24E-05	6.41E-03	
2	7	1 60E-04	1 60E-04	1 60E-04	1.60E-04	1,00E-03	1.00E-03	4 00E-04	1 60E-04	4 00E-06	1.60E-04	1.00E-03	1.00E-04	1 60E-04	1 60E-04	1.60E-02								2.20E-02	3 90E-03	1.00E-02	4.80E-02	1 00E-02	1.60E-02	
100	Abagi	1 00E-01	4 10E-01	7 00E-02	1 00E-02	1,00E-02	5 00E-03	8 00E-01	3 00E-01	1.50E-01	4 00E-02	1 00E-04	2 70E-01	2 00E-01	1 00E-02	5.00E-01										1.00E+00	1.00E+00	1.00E+00	1.50E-01	
u u	ב ב	1 30E+01	3 00E-03	1 00E-01	7 00E-04	2 00E-03	2 00E-02	2 00E-02	2 00E-02	1.00E-02	2 00E+00	1 00E-04	1.00E-02	1 50E+01	4.00E-02	6 00E-05	1 00E-05	2.23E+00	2.62E-02	2.19E-02 '	2.20E-02	2 78E-02	2 19E-02	2 21E-02 (	2.42E-02	9 56E-02 (	1.82E-02 1	2.36E-02 1	83E+00	
ij			1.51E+01		8 40E+00	6.30E+00					•••			•	•		9.10E+00				9 10E-02 ;		2 70E-02				2 00E-03		6 00E-03	
700	מבה		50E+00 3 66E+00 1.51E+01														1 26E+01				9 10E-02						5 20E-02		7.33E-02	
ů.			1 50E+00														9 10E+00										5.20E-02		1.10E-02	
MOR			∢	۵	<u>8</u>	<u>Б</u>	٩- ٩-		۵	<b>B</b> 2	۵	۵	۵			<b>B</b> 2											C-B2		27.	
Chemical		ALCMINON	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CHROMIUM, TOTAL	COBALT	COPPER	LEAD	MANGANESE	MERCURY	NICKEL	SILICON	VANADIUM	DIELDRIN	HEPTACHLOR EPOXIDE	1,1,2,2-TETRACHLOROETHANE	1,1,2-TRICHLOROETHANE	1,1-DICHLOROETHENE	1,2-DICHLOROETHANE	1,2-DICHLOROPROPANE	BENZENE CADONITETO CIII OCIOR	CARBON IFI KACHLOKIUL	CHLOROFORM	CIS-1, Z-DICHLOROE I HYLENE	Ğ.	rans-1,2-DICHLOROETHENE	MICHICACON DELINATERNE (LCE)	
Units	Š	7/5/K	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	WG/C	J.	MG/L	٦ 2 2 3	٦ ا	٦ و و	7 2 2 3 3 3	∑.	J.S.	אַ פֿלַ בּ	אַ פֿלי	٦ 2 2		

Disposal Area (Potable Use) (NW Plume) - Hypothetical Future Industrial Worker Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

									Ingestion	tion	Õ	Dermal	Inhatation*
Units	Chemical	WOE	RfDo	RfDd	RfDi	EPC	ABSgi	ပ	g	옆	G	Ŧ	全
MG/L	ALUMINUM		1 00E+00	1 00E-01		1 30E+01	1 00E-01	1 60E-04	1 27E-01	0 13	3 82E-07	3 82E-06	
MG/L	ARSENIC	∢	3 00E-04	123E-04		3 00E-03	4 10E-01	1 60E-04	2 94E-05	0 098	8.81E-11	7 16E-07	
MG/L	BARIUM	۵	7 00E-02	4 90E-03	1 43E-04	1.00E-01	7 00E-02	1 60E-04	9.78E-04	0.014	2.94E-09	5 99E-07	
MG/L	BERYLLIUM	<u>6</u>	2 00E-03	2 00E-05	5 70E-06	7 00E-04	1 00E-02	1 60E-04	6.85E-06	0 0034	2 06E-11	1 03E-06	
MG/L	CADMIUM	8	5.00E-04	5 00E-06		2 00E-03	1 00E-02	1.00E-03	1 96E-05	0 039	3 67E-10	7 34E-05	
MG/L	CHROMIUM, TOTAL	A-D	3 00E-03	1 50E-05	2 86E-05	2 00E-02	5 00E-03	1.00E-03	1 96E-04	0 065	3 67E-09	2 45E-04	
MG/L	COBALT		6 00E-02	4 80E-02		2 00E-02	8 00E-01	4 00E-04	1 96E-04	0.0033	1 47E-09	3 06E-08	
MG/L	COPPER	۵	3 70E-02	1 11E-02		2 00E-02	3 00E-01	1 60E-04	1 96E-04	0 0053	5.87E-10	5 29E-08	
MG/L	LEAD	<b>B</b> 2				1.00E-02	1 50E-01	4 00E-06	9 82E-05		7 37E-12		
MG/L	MANGANESE	۵	1 40E-01	5 60E-03	1 43E-05	2.00E+00	4 00E-02	1.60E-04	1 96E-02	0.14	5 87E-08	1 05E-05	
MG/L	MERCURY	۵			8 57E-05	1.00E-04	1.00E-04	1 00E-03	9 78E-07		1 83E-11	1	
MG/L	NICKEL	۵	2 00E-02	5 40E-03		1 00E-02	2 70E-01	1 00E-04	9 78E-05	0 0049	1,83E-10	3.40€-08	
MG/L	SILICON					1 50E+01	2 00E-01	1 60E-04	1 47E-01		4 40E-07		
MG/L	VANADIUM		7 00E-03	7,00E-05		4 00E-02	1 00E-02	1 60E-04	3 91E-04	0 056	1 17E-09	1 68E-05	
MG/L	DIELDRIN	83	5 00E-05	2 50E-05		6 00E-05	5 00E-01	1 60E-02	587E-07	0 012	1 76E-10	7 05E-06	
MG/L	HEPTACHLOR EPOXIDE	<b>B</b> 2	1,30E-05	9 36E-06		1.00E-05	7 20E-01	1 10E-02	9 78E-08	0 0075	2.02E-11	2 16E-06	
MG/L	1,1,2,2-TETRACHLOROETHANE	O	6 00E-02	4.20E-02		2 23E+00	7 00E-01	9 00E-03	2 18E-02	0 36	3 68E-06	8 76E-05	
MG/L	1,1,2-TRICHLOROETHANE	ပ	4 00E-03	3 24E-03		2 62E-02	8 10E-01	8 40E-03	2 56E-04	0 064	4 04E-08	1 25E-05	
MG/L	1,1-DICHLOROETHENE	O	9 00E-03	9 00E-03		2 19E-02	1 00至+00	1 60E-02	2 14E-04	0 024	6 42E-08	7 14E-06	
MG/L	1,2-DICHLOROETHANE	<b>B</b> 2	3 00E-02	3 00E-02	1 40E-03	2 20E-02	1,00E+00	5 30E-03	2 15E-04	0 0072	2 14E-08	7 12E-07	0 15
MG/L	1,2-DICHLOROPROPANE	B2			1 14E-03	2 78E-02	7 40E-01	1.00E-02	2 72E-04		5.10E-08		0 24
MG/L	BENZENE	∢	3,00E-03	2 91E-03	1.70E-03	2 19E-02	9 70E-01	2 10E-02	2 14E-04	0 071	8 44E-08	2 90E-05	0 13
MG/L	CARBON TETRACHLORIDE	<b>B</b> 2	7.00E-04	4.55E-04		2.21E-02	6 50E-01	2 20E-02	2 16E-04	031	8 93E-08	1 96E-04	
MG/L	CHLOROFORM	82	1 00E-02	2 00E-03		2.42E-02	2 00E-01	8 90E-03	2 36E-04	0 024	3 94E-08	1 97E-05	
MG/L			1 00E-02	1.00E-02	1 00E-02	9.56E-02	1 00E+00	1 00E-02	9 36E-04	0.094	175E-07	1.75E-05	0.094
MG/L	Ñ	C-82	1 00E-02	1 00E-02	171E-01	1.82E-02	1.00E+00	4.80E-02	1 78E-04	0 018	1 61E-07	1 61E-05	0 0010
MG/L	trans-1,2-DICHLOROETHENE		2.00E-02	2.00E-02	2 00E-02	2.36E-02	1 00E+00	1,00E-02	231E-04	0.012	4.33E-08	2.16E-06	0 012
Jo No.	TRICHLOROETHYLENE (TCE)	85	6 00E-03	9 00E-04		183E+00	1 50E-01	1 60E-02	1 80E-02	30	5 39E-06	09000	
MG/L	VINYL CHLORIDE	⋖	3 00E-03	3 00E-03	1 10E-01	2 23E-02	1 00E+00	7 30E-03	2.19E-04	0 073	2 99E-08	9 97E-06	0 0020
	Hazard Index									4.6		0.0067	0.63

4.6 0.0067 0.63
Total Hazard Index = 0.0067 0.63
WOE = Weight of Evidence; CDI = Chronic Daily Intake; EPC = Exposure Point Concentration, HQ = Hazard Quotient; HI = Hazard Index; \* = Inhalation Intake (CDI) = Ing

# Disposal Area - Onsite - NW Plume, Indoor Air - Hypothetical Future Residential Adult Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

## Inhalation

Intake for noncarcinogenic compounds

Intake for carcinogenic compounds:

CDI=	Cair * IR *EF * ED * CF	<u>C<sub>air</sub> *</u>	IR <sub>adi.</sub>	<u>*EF * * CF</u>	
	BW * AT		A	T	
		Carcinogenic		Noncarcinogenic	
C <sub>alr</sub> =	Estimated Indoor Air Concentration (ug/m³)	EPC	ь	EPC	- b
IR =	Inhalation Rate (m³/day)	NA		20	а
IRadj =	Adjusted Inhalation Rate (m³-yr)/(kg-day)	13	a,c	NA	
EF =	Exposure Frequency (days/year)	350	a	350	а
ED =	Exposure Duration (years)	NA	а	30	a
CF =	Conversion Factor (mg/ug)	1.00E-03		1 00E-03	
BW =	Body Weight (kg)	NA	а	70	а
AT =	. Averaging Time (days)	25550	а	10950	а

## Sources:

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991.

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings. Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response c = Age adjusted

Disposal Area - Onsite - NW Plume, Indoor Air - Hypothetical Future Residential Adult Scenario - Inhalation Dunn Field, Defense Distribution Depot Memphis, Tennessee

				ပ	Carcinogenic		Non	Noncarcinogenic	nic
Units	Chemical	WOE	EPC	SFi	П	ELCR	RfDi	<u>G</u> S	Ŧ
ng/m3	ug/m3 1,1,2,2-TETRACHLOROETHANE	ပ	3.91E-05	2.03E-01	6.96E-09	1.41E-09		1.07E-08	
ug/m3	1,1,2-TRICHLOROETHANE	ပ	1.12E-04	5 60E-02	1 99E-08	1.12E-09		3.06E-08	
ng/m3	1,1-DICHLOROETHENE	ပ	4.01E-03	1.75E-01	7.14E-07	1.25E-07		1.10E-06	
ng/m3	1,2-DICHLOROETHANE	<b>B</b> 2	1.46E-04	9.10E-02	2.60E-08	2 36E-09	1.40E-03	3.99E-08	2.85E-05
ng/m3	1,2-DICHLOROPROPANE	<b>B</b> 2	3.57E-04		6.37E-08		1.14E-03	9.79E-08	8.59E-05
ng/m3	BENZENE	∢	7.73E-04	2.70E-02	1.38E-07	3.72E-09	1 70E-03	2.12E-07	1.25E-04
ng/m3	CARBON TETRACHLORIDE	B2	4.03E-03	5.25E-02	7.18E-07	3.77E-08		1.10E-06	
ng/m3	CHLOROFORM	<b>B</b> 2	5.70E-04	8.05E-02	1.01E-07	8 17E-09	0.00E+00	1 56E-07	
ng/m3	cis-1,2-DICHLOROETHYLENE	۵	5.27E-04		9 38 <b>E-</b> 08		1.00E-02	1.44E-07	1.44E-05
ng/m3	TETRACHLOROETHYLENE(PCE	C-B2	2 13E-03	2.00E-03	3.79E-07	7.59E-10	1.71E-01	5.84E-07	3.41E-06
ng/m3	trans-1,2-DICHLOROETHENE		1.22E-03		2.18E-07		2.00E-02	3.35E-07	1.68E-05
ng/m3	TRICHLOROETHYLENE (TCE)	<b>B</b> 2	1.32E-03	6.00E-03	2.36E-07	1.41E-09		3.63E-07	
ug/m3	ug/m3 VINYL CHLORIDE	4	4.86E-03	1 54E-02	8.65E-07	1 33E-08	1.10E-01	1.33E-06	1.21E-05

Total ELCR: 1.95E-07 Total HI: 0.0003

## Data

0 00016	MG/L	ALUMINUM
0 00016	MG/L	ARSENIC
0 00016	MG/L	BARIUM
0 00016	MG/L	BERYLLIUM
0 001	MG/L	CADMIUM
0 001	MG/L	CHROMIUM, TOTAL
0 0004	MG/L	COBALT
0 00016	MG/L	COPPER
0 000004	MG/L	LEAD
0 00016	MG/L	MANGANESE
0 001	MG/L	MERCURY
0 0001	MG/L	NICKEL

10950 a

## Disposal Area (Potable Use) (NW Plume) - Hypothetical Future Residential Adult Scenario

Dunn Field, Defense Distribution Depot Memphis, Tennessee

		<u>Carcinogenic</u>	<u>Noncarcinogenic</u>
Ingestic			
	or non-carcinogenic compounds	Age-specific intake (for carcinogeni-	c compounds only):
CDI =	C <sub>ow</sub> * IR * EF * ED	CDI <sub>adj</sub> = <u>C<sub>ow</sub> * EF * CF * IR<sub>adj</sub></u>	
	BW * AT	AT	
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
R=	Ingestion Rate (L/day)	N/A	2 a
R <sub>adj</sub> ≃	Age-adjusted Ingestion Rate (L-year/kg-day	) 1.1 b	N/A
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
3W =	Body Weight (kg)	70 a	70 a
<b>\T =</b>	Averaging Time (days)	25550 a	10950 a
CDI =	r non-carcinogenic compounds:  C <sub>gw</sub> *SA * PC * ET * EF * ED * CF  BW * AT	Age-specific intake (for carcinogenii CDI <sub>adj</sub> = <u>C<sub>ow</sub> *SA<sub>adj</sub> * PC * ET * EF * CI</u> AT	
) <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	
			EPC
6A =	Surface Area (cm²)	N/A	EPC 20000 b,d
	Surface Area (cm²) Age-adjusted Surface Area (cm²-yr/kg)	N/A 9480 b,c	
A <sub>adj</sub> =			20000 b,c
SA <sub>adj</sub> = SC =	Age-adjusted Surface Area (cm²-yr/kg)	9480 b,c	20000 b,c N/A
A <sub>adj</sub> = PC = T = F =	Age-adjusted Surface Area (cm²-yr/kg) Dermal Permeability Constant (cm/hr)	9480 b,c (Chemical Specific) d	20000 b,c N/A (Chemical Specific) d
SA <sub>adj</sub> = PC = ET = EF =	Age-adjusted Surface Area (cm²-yr/kg) Dermal Permeability Constant (cm/hr) Exposure Time (hr/day) Exposure Frequency (day/year) Exposure Duration (year)	9480 b,c (Chemical Specific) d 0 007 b,e	20000 b,c N/A (Chemical Specific) d 0 007 b,e
SA = SA <sub>adj</sub> = PC = ET = EF = ED = CF =	Age-adjusted Surface Area (cm²-yr/kg) Dermal Permeability Constant (cm/hr) Exposure Time (hr/day) Exposure Frequency (day/year)	9480 b,c (Chemical Specific) d 0 007 b,e 350 a	20000 b,c N/A (Chemical Specific) d 0 007 b,e 350 a

25550 a

## Inhalation:

AT =

CDI = Ingestion CDI from above f

Averaging Time (days)

## References:

a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance. "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991.

b = Age-adjusted ingestion rate for adults, adjusted for body weight and time for carcinogenic exposure.

1.09 (L-year)/(kg-day) b = USEPA Exposure Factors Handbook, August 1997

c = Total Body Surface Area represents whole body (average of male & female adults).

f = Age-adjusted surface area for adults, adjusted for body weight and time for carcinogenic exposure

$$SAadj = \frac{SAc \times ED_{i}}{BWc} + \frac{SAa \times (EDa - EDc)}{BWa} = \frac{6557 \times 6}{15} + \frac{20000 \times (30-6)}{70}$$

9480 (cm2-year)/(kg)

d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment. Principles and Applications, January 1992

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event.

f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS. Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Disposal Area (Potable Use) (NW Plume) - Hypothetical Future Residential Adult Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

	Chemical	WOE	SFo	SFd	S	EPC	ABSai	Č	Ingestion	stion FI CP		Dermal El Ce	Inhalation*
N.		1	ı			1 30E+01	1 00E-01	1.60E-04	1.93E-01	1 2	1 89F-06	1	LLCA
O	∢		1.50E+00	1.50E+00 3.66E+00 1	151E+01	3 00E-03	4 10E-01	-	4 46E-05	7E-05	4 36E-10	2E-09	
	Ω					1 00E-01	7.00E-02	τ-	1.49E-03		1 45E-08		
BERYLLIUM B1	<u>8</u>				8 40E+00	7 00E-04	1.00E-02	•	1 04E-05		1 02E-10		
	<u>6</u>				6,30E+00	2 00E-03	1 00E-02	~	2 97E-05		1 82E-09		
UM, TOTAL	Ą-D				4 20E+01	2 00E-02	5 00E-03	<del>-</del>	2 97E-04		1.82E-08		
						2 00E-02	8 00E-01	4	2 97E-04		7 27E-09		
COPPER	۵					2 00E-02	3 00E-01	•	2 97E-04		2.91E-09		
	<b>B</b> 2					1 00E-02	1 50E-01	4	1 49E-04		3 65E-11		
SE	۵					2.00E+00	4 00E-02	_	2 97E-02		2.91E-07		
RY	۵					1 00E-04	1.00E-04	•	1.49E-06		9 09E-11		
	۵					1 00E-02	2 70E-01	-	1.49E-04		9 09E-10		
SILICON						1 50E+01	2 00E-01	<b>–</b>	2.23E-01		2 18E-06		
5						4.00E-02	1 00E-02	_	5 95E-04				
<b>B</b> 2		•	1 60E+01		161E+01	6 00E-05	5 00E-01	<u>.</u>	8.92E-07	1E-05	8 73E-10	3E-08	
82		c	10E+00		9.10E+00	1.00E-05	7 20E-01	1 10E-02	1 49E-07	1E-06	1.00E-10	1F-09	
HANE C		(A)	00E-01	2.86E-01	2.03E-01	2.23E+00	7.00E-01	9 00E-03	3 31E-02	7E-03	1 82E-05	5E-06	7E-03
٦ کا		4,,	20E-02		5 60E-02	2 62E-02	8 10E-01	8 40E-03	3 90E-04	2E-05	2.00E-07	1F-08	2E-05
ט נינו					1.75E-01	2.19E-02	1.00E+00	1 60E-02	3 25E-04	2E-04	3 18E-07	2E-07	6E-05
82			9 10E-02		9.10E-02	2.20E-02	1 00E+00	5 30E-03	3 27E-04	3E-05	1 06E-07	1F-08	3E-05
			6 80E-02	9 19E-02	1	2 78E-02	7.40E-01	1.00E-02	4.13E-04	9 9	2 53E-07	2E-08	
	₹ 6		3 30E-02	20-1796	Z /UE-UZ	Z 19E-0Z	9 70E-01	2 10E-02	3 26E-04	2E-05	4.18E-07	2E-08	9E-06
CARBON LELRACHLORIDE BZ	200		1.30E-01	2.00E-01	5 25E-02	2 21E-02	6 50E-01	2 20E-02	3 29E-04	4E-05	4 42E-07	9E-08	2E-05
	200		6.10E-U3	3 05E-02	8 05E-02	2.42E-02	2 00E-01	8 90E-03	3.59E-04	2E-06	1.95E-07	6E-09	3E-05
•	2		1	1	1	9 56E-02	1 00E+00	1 00E-02	1 42E-03		8 69E-07		! 
TELIKACHI OKOELHYLENE(PCE) C-82 trans-1 2-DICHI OBOETHENE			5.20E-02	5 20E-02	2.00E-03	1.82E-02	1 00E+00	4 80E-02	2 71E-04	1E-05	7 96E-07	4E-08	5E-07
u (i	ć		400	100		2 30E-UZ	1 00E+00	1.00E-02	3 51E-04		2 14E-07		
	ή.		1 10E-02	7 33E-02	6 00E-03	1 83E+00	1 50E-01	1 60E-02	2 73E-02	3E-04	2 67E-05	2E-06	2E-04
VINTL CHLURIDE A	∢	- 1	/.ZUE-U1	/ 20E-01	154E-02	2.23E-02	1 00E+00		3 32E-04	2E-04	1.48E-07	1E-07	5E-06
I OLGI MISH										8E-03		8E-06	7E-03
										۲	1 7 7 1 1 1 1	5	

WOE ≈ Weight of Evidence, CDI ≈ Chronic Daily Intake, EPC = Exposure Point Concentration, ELCR = Excess Lifetime Cancer Exposure; \* = inhalation intake (CD

Disposal Area (Potable Use) (NW Plume) - Hypothetical Future Residential Adult Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

Units	Chemical	NO.	RfDo	PfDd	i Cja	Jas	isaa	J	Ingestion	lon	Der	Derma	Inhalation*
MG/L	ALUMINUM		1 00E+00	1 00E-01		1 30E+01	1 00F-01	1 60F-04	3 56F-01	38.0	3 90F A	3 005 05	2
MG/L	ARSENIC	∢	3 00E-04	1 23E-04		3 00E-03	4.10E-01	1 60F-04	8 22F-05	220	9 21 110	7 48E-06	
MG/L	BARIUM	Δ		4.90E-03	1 43E-04	1 00E-01	7,00E-02	1 60E-04	2 74E-03	0 039	3 07E-08	6.26F-06	
MG/L	BERYLLIUM	8	2 00E-03	2 00E-05	5 70E-06	7 00E-04	1.00E-02	1 60E-04	1 92E-05	9600 0	2 15E-10	1 07E-05	
MG/L	CADMIUM	6	5.00E-04	5 OOE-06		2 00E-03	1 00E-02	1.00E-03	5 48E-05	0	3 84E-09	7 67E-04	
MG/L	CHROMIUM, TOTAL	ΑĐ	3 00E-03	1 50E-05	2 86E-05	2 00E-02	5 00E-03	1,00E-03	5,48E-04	0 18	3 84E-08	0 0026	
MG/L	COBALT		6 00E-02	4 80E-02		2 00E-02	8 00E-01	4 00E-04	5 48E-04	0 0091	1 53E-08	3 20E-07	
MG/L	COPPER	۵	3 70E-02	111E-02		2 00E-02	3 00E-01	1 60E-04	5 48E-04	0 015	6 14E-09	5 53E-07	
MG/L	LEAD	<b>B</b> 2				1 00E-02	1 50E-01	4 00E-06	2 75E-04				
MG/L	MANGANESE	۵	1 40E-01	5 60E-03	1.43E-05	2 00E+00	4 00E-02	1.60E-04	5 48E-02	0 39	6 14E-07	1 10E-04	
MG/L	MERCURY	۵			8 57E-05	1 00E-04	1 00E-04	1 00E-03	2 74E-06		1 92E-10		
MG/L	NICKEL	Ω	2 00E-02	5 40E-03		1 00E-02	2.70E-01	1 00E-04	2.74E-04	0 0 14	1 92E-09	3 55E-07	
MG/L	SILICON					1 50E+01	2.00E-01	1 60E-04	4 11E-01		4 60E-06		
MG/L	VANADIUM		7.00E-03	7 00E-05		4 00E-02	1,00E-02	1 60E-04	1.10E-03	0 16	1.23E-08	1 75E-04	
MG/L	DIELDRIN	82	5 00E-05	2.50E-05		6 00E-05	5 00E-01	1,60E-02	1 64E-06	0 033	1 84E-09	7 36E-05	
MG/L	HEPTACHLOR EPOXIDE	<b>B</b> 2	1 30E-05	9.36E-06		1 00E-05	7 20E-01	1 10E-02	2.74E-07	0.021	2 11E-10	2.25E-05	
MG/L	1,1,2,2-TETRACHLOROETHANE	ပ	6 00E-02	4 20E-02		2 23E+00	7 00E-01	9 00E-03	6.10E-02	10	3 85E-05	9.16E-04	
MG/L	1,1,2-TRICHLOROETHANE	ပ	4 00E-03	3 24E-03		2 62E-02	8.10E-01	8 40E-03	7 18E-04	0 18	4 22E-07	1.30E-04	
MG/L	1,1-DICHLOROETHENE	ပ	9 00E-03	9.00E-03		2 19E-02	1 00E+00	1 60E-02	5 99E-04	0.067	6 71E-07	7 46E-05	
MG/L	1,2-DICHLOROETHANE	<b>B</b> 2	3 00E-02	3.00E-02	1.40E-03	2 20E-02	1.00E+00	5 30E-03	6 02E-04	0 0 0 0 0	2.23E-07	7.44E-06	0 43
MG/L	1,2-DICHLOROPROPANE	B2			1.14E-03	2.78E-02	7 40E-01	1 00E-02	7.61E-04		5 33E-07		0.67
MG/L	BENZENE	∢	3 00E-03	2 91E-03	1.70E-03	2 19E-02	9.70E-01	2 10E-02	6 00E-04	0 20	8 82E-07	3 03E-04	0.35
MG/L	CARBON TETRACHLORIDE	82	7 00E-04	4.55E-04		2.21E-02	6 50E-01	2.20E-02	6 06E-04	0.87	9 33E-07	0 0021	
MG/L	CHLOROFORM	<b>B</b> 2	1 00E-02	2.00E-03		2 42E-02	2 00E-01	8 90E-03	6 62E-04	990 0	4 12E-07	2.06E-04	
MG/L	cis-1,2-DICHLOROETHYLENE	۵	1.00E-02	1.00E-02	1 00E-02	9 56E-02	1 00E+00	1.00E-02	2 62E-03	0 26	1 83E-06	183E-04	0.26
MG/L	TETRACHLOROETHYLENE(PCE)	C-B2	1,00E-02	1 00E-02	171E-01	1 82E-02	1.00E+00	4 80E-02	5 00E-04	0 020	1.68E-06	1 68E-04	0 0029
MG/L	trans-1,2-DICHLOROETHENE		2 00E-02	2 00E-02	2 00E-02	2 36E-02	1.00E+00	1 00E-02	6.46E-04	0 032	4.52E-07	2 26E-05	0 032
MG/L	TRICHLOROETHYLENE (TCE)	<b>B</b> 2		9.00E-04		1 83E+00	1 50E-01	1 60E-02	5 03E-02	8 4	5,63E-05	0 063	
MG/L	VINYL CHLORIDE	4	3 00E-03	3 00E-03	1 10E-01	2.23E-02	1 00E+00	7,30E-03	6 12E-04	0.20	3 13E-07	1 04E-04	0 0056
	Hazard Index								į į	13	4	0.070	1.8
Notor	) - IOO	1	1	,		0		1	<u> </u>	tal Hazar	lotal Hazard Index =	13	:
8000	WOL ~ Weight of Cynderice, CO! = Chromic Daily Intake, EPC = Exposure Point Concentration; Hu = Hazard Guotient; Ht = Hazard Index,		c Dally Intak	9, FT C 11	xposure F	oint Concer	irration; HQ	= Hazard	Quotient; Hi	= Hazard	lindex, " = 1f	* = inhalation intake (CDI) ≈ ir	ke (CDI) = Ir

## Disposal Area - Onsite - NW Plume, Indoor Air - Hypothetical Future Residential Child Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds:

CDI=	Car * IR *EF * ED * CF
	BW * AT

		Carcinogenic	Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	NA NA	EPC	- ь
IR =	Inhalation Rate (m³/day)	NA	15	а
EF =	Exposure Frequency (days/year)	NA	350	a
ED =	Exposure Duration (years)	NA	6	a
CF =	Conversion Factor (mg/ug)	NA	1 00E-03	
BW =	Body Weight (kg)	NA	15	а
AT =	Averaging Time (days)	NA	2190	a

## Sources:

a = U.S. EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings. Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

Disposal Area - Onsite - NW Plume, Indoor Air - Hypothetical Future Residential Child Scenario - Inhalation Dunn Field, Defense Distribution Depot Memphis, Tennessee

				J	Carcinogenic	<u>0</u>	No.	Noncarcinogenic	nic
Units	Chemical	WOE	EPC	SFi	CDI	ELCR	RfDi	П	₹
ug/m3	1,1,2,2-TETRACHLOROETHANE	ပ	3 91E-05	;	ł	:   		3.75E-08	
ug/m3	1,1,2-TRICHLOROETHANE	O	1.12E-04	ı	t	1		1.07E-07	
ug/m3	1,1-DICHLOROETHENE	ပ	4.01E-03	:	ı	1		3.85E-06	
ng/m3	1,2-DICHLOROETHANE	B2	1.46E-04	ŀ	1	ı	1.40E-03	1.40E-07	9.99E-05
ng/m3	1,2-DICHLOROPROPANE	B2	3.57E-04	1	:	ŀ	1.14E-03	3.43E-07	3.01E-04
ng/m3	BENZENE	∢	7.73E-04	;	ì	ŀ	1.70E-03	7 42E-07	4.36E-04
ng/m3	CARBON TETRACHLORIDE	B2	4.03E-03	;	ł	1		3.87E-06	
ng/m3	CHLOROFORM	B2	5.70E-04	t	ŀ	ł	0.00E+00	5.46E-07	
ng/m3	cis-1,2-DICHLOROETHYLENE	۵	5.27E-04	ł	1	ı	1.00E-02	5.05E-07	5.05E-05
ng/m3	TETRACHLOROETHYLENE(PCE	C-82	2.13E-03	ł	ŀ	ı	1.71E-01	2.04E-06	1.19E-05
ng/m3	trans-1,2-DICHLOROETHENE		1.22E-03	:	1	;	2.00E-02	1.17E-06	5 87E-05
ng/m3	TRICHLOROETHYLENE (TCE)	<b>B</b> 2	1.32E-03	;	ı	:		1.27E-06	
ug/m3	ug/m3 VINYL CHLORIDE	A	4.86E-03		i		1.10E-01	4.66E-06	4.24E-05

Total HI: 0.0010

i

Total ELCR:

Data

0 00016 MG/L	ALUMINUM	
0 00016 MG/L	ARSENIC	
0 00016 MG/L	BARIUM	
0 00016 MG/L	BERYLLIUM	
0 001 MG/L	CADMIUM	
0 001 MG/L	CHROMIUM, TOTAL	
0 0004 MG/L	COBALT	
0 00016 MG/L	COPPER	
0 000004 MG/L	LEAD	
0 00016 MG/L	MANGANESE	
0 001 MG/L	MERCURY	
0 0001 MG/L	NICKEL	

Disposal Area (Potable Use) (NW Plume) - Hypothetical Future Residential Child Scenario

Dunn Field, Defense	Distribution De	epot Memphis	, Tennessee
---------------------	-----------------	--------------	-------------

EPC 1 a 350 a
1 a
1 a
1 a
1 a
350 a
6 a
15 a
2190 a
EPC
. c 6557 b. c
,, -
,e 0.007 b,e
350 a
6 a
1.00E-03
2190 a
,

## Inhalation:

CDI = Ingestion CDI from above f

### References:

- a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991.
- b = US EPA Exposure Factors Handbook, August 1997.
  - Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998
- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old))
- d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value; all values adapted from EPA, Dermal Exposure Assessment: Principles and Applications, January 1992
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0.007 day per event.
- f = follows EPA Region IV guidance (i e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Disposal Area (Potable Use) (NW Plume) - Future Residential Child Carcinogenic Scenario (OptionaL)

<u>Dunn Field, Defense Distribution Depot Memphis, Tennessee</u>

									Ingestion	tlon	Den	Dermal	Inhalation*
S L	Chemical	WOE	VOE SFO	SFd	SFi	EPC	ABSgi	ပ	П	ELCR	<u>1</u> 00	ELCR	ELCR
MG/L	ALUMINUM					1 30E+01	1 00E-01	1 60E-04 7 12E-02	7 12E-02		5.23E-07		
MG/L	ARSENIC	∢	1.50E+00	1,50E+00 3 66E+00 1 51E+01	151E+01	3.00E-03	3.00E-03 4 10E-01		1 64F-05	2F-05	1.21E-10	4F-10	2F.04
MG/L	BARIUM	۵				1.00E-01	7 00E-02	٠,		}	4.02E-09		1
MG/L	BERYLLIUM	91		_	3 40E+00	8 40E+00 7 00E-04		_	3.84E-06		2 82E-11		3E-05
MG/L	CADMIUM	91		•	3.30E+00	2 00E-03	1 00E-02	1 00E-03	1 10E-05		5 03E-10		7E-05
MG/L	CHROMIUM, TOTAL	A-D		•	1.20E+01	2 00E-02 5 00E-03	5 00E-03	1.00E-03	1 10E-04		5 03E-09		5E-03
MG/L	COBALT					2 00E-02 8 00E-01	8 00E-01	4.00E-04	•		2.01E-09		
MG/L	COPPER	۵				2 00E-02 3 00E-01	3 00E-01	1.60E-04	1 10E-04		8.05E-10		
	Total Risk									3E-03		2E-06	8E-03
										Õ	Total Risk =	1E-02	

Disposal Area (Potable Use) (NW Plume) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

:	•								Ingestion	ton	Der	Dermal	Inhalation*
Units	Chemical	WOR	- 1	RfDd	RfDi	EPC	ABSgi	ပ	<u>5</u>	옆	<u>5</u>	皇	
MG/L	ALUMINUM		1 00E+00	1 00E-01		1.30E+01	1 00E-01	1 60E-04	8 31E-01	0 83	6 10E-06	6.10F-05	
MG/L	ARSENIC	∢	3.00E-04	•		3,00E-03	4 10E-01	1 60E-04	1.92E-04	0 64	1.41E-09	1 15E-05	
MG/L	BARIUM	۵	7 00E-02	4	1 43E-04	1.00E-01	7 00E-02	1 60E-04	6.39E-03	0.091	4 69E-08	9.585-06	
MG/L	BERYLLIUM	<del>B</del>	2 00E-03	C/I	5 70E-06	7 00E-04	1.00E-02	1,60E-04	4 47E-05	0 022	3 29E-10	1.64E-05	
MG/L	CADMIUM	<u>9</u>	5 00E-04	ഗ		2 00E-03	1 00E-02	1 00E-03	1.28E-04	0.26	5 87E-09	0.0012	
MG/L	CHROMIUM, TOTAL	A-D	3 00E-03	_	2 86E-05	2 00E-02	5 00E-03	1 00E-03	1.28E-03	0.43	5 87E-08	0 0039	
MG/L	COBALT		6 00E-02	4		2 00E-02	8 00E-01	4 00E-04	1 28E-03	0.021		4.89F-07	
MG/L	COPPER	۵	3 70E-02	•		2 00E-02	3.00E-01	1.60E-04	1.28E-03	0 035	9 39E-09	8 46F-07	
MG/L	LEAD	85				1,00E-02	1 50E-01	4.00E-06	6 42E-04	•	1 18E-10	) !	
MG/L	MANGANESE	۵	1.40E-01	5.60E-03	1 43E-05	2 00E+00	4 00E-02	1 60E-04	1 28E-01	0 91	9 39E-07	1 68E-04	
MG/L	MERCURY	۵			8 57E-05	1 00E-04	1 00E-04	1 00E-03	6 39E-06		2.93E-10	) ) )	
MG/L	NICKEL	۵	2.00E-02	5 40E-03		1 00E-02	2 70E-01	1 00E-04	6 39E-04	0 032	2 93E-09	5 43E-07	
MG/L	SILICON					1 50E+01	2 00E-01	1 60E-04	9 59E-01		7 04E-06	• •	
MG/L	VANADIUM		7 00E-03	~		4 00E-02	1 00E-02	1.60E-04	2 56E-03	0 37	1 88E-08	2.68F-04	
MG/L	DIELDRIN	<b>B</b> 2	5 00E-05	2 50E-05		6 00E-05	5 00E-01	1 60E-02	3 84E-06	0.077	2 82E-09	1 13E-04	
MG/L	HEPTACHLOR EPOXIDE	<b>B</b> 2	1 30E-05	თ		1.00E-05	7 20E-01	1 10E-02	6.39E-07	0 049	3 23E-10	3 45E-05	
MG/L	1,1,2,2-TETRACHLOROETHANE	ပ	6 00E-02	4		2 23E+00	7 00E-01	9 00E-03	1 42E-01	24		0 0014	
MG/L	1,1,2-TRICHLOROETHANE	ပ	4,00E-03	3 24E-03		2 62E-02	8 10E-01	8 40E-03	1 67E-03	0 42		1.99F-04	
MG/L	1,1-DICHLOROETHENE	ပ	9 00E-03	9 00E-03		2 19E-02	1 00E+00	1 60E-02	1 40E-03	0 16	1 03E-06	1 14F-04	
MG/L	1,2-DICHLOROETHANE	B2	3.00E-02	3 00E-02	1 40E-03	2 20E-02	1 00E+00	5 30E-03	1 40E-03	0 047	3 42E-07	1 14E-05	10
MG/L	1,2-DICHLOROPROPANE	B2			1 14E-03	2 78E-02	7 40E-01	1 00E-02	1 78E-03		8 15E-07	!	÷ +
MG/L	BENZENE	∢	3 00E-03	2 91E-03	1.70E-03	2 19E-02	9 70E-01	2.10E-02	1.40E-03	0 47	1 35E-06	4 64E-04	0.82
MG/L	CARBON TETRACHLORIDE	B2	7 00E-04	4 55E-04		2 21E-02	6 50E-01	2 20E-02	1 41E-03	20	1.43E-06	0.0031	!
MG/L	CHLOROFORM	<b>B</b> 2	1 00E-02	2 00E-03		2 42E-02	2 00E-01	8 90E-03	1.54E-03	0.15	6 31E-07	3 15E-04	
MG/L	cis-1,2-DICHLOROETHYLENE	۵	1 00E-02	1 00E-02	1 00E-02	9 56E-02	1 00E+00	1 00E-02	6 11E-03	0 61	2.81E-06	2 81E-04	0.61
MG/L	TETRACHLOROETHYLENE(PCE)	C-B2	1 00E-02	1 00E-02	171E-01	1.82E-02	1 00E+00	4 80E-02	1 17E-03	0 12	2 57E-06	2 57E-04	0 0068
MG/L	trans-1,2-DICHLOROETHENE		2.00E-02	2 00E-02	2 00E-02	2 36E-02	1 00E+00	1 00E-02	151E-03	0 075	6 92E-07	3 46E-05	0 075
MG/L	TRICHLOROETHYLENE (TCE)	85	6 00E-03	9 00E-04		1 83E+00	1 50E-01	1 60E-02	1,17E-01	20	8 61E-05	960 0	
MG/L	VINYL CHLORIDE	٨	3 00E-03	3 00E-03	1 10E-01	2,23E-02	1 00E+00	7 30E-03	1.43E-03	0 48	4 78E-07	1 59E-04	0 013
	Hazard Index								1	30		0.11	4.1

Total Hazard Index ≈ 34 WOE = Weight of Evidence; CDI = Chronic Daily Intake, EPC ≈ Exposure Point Concentration; HQ = Hazard Quotient, HI = Hazard Index, \* = Inhalation Intake (CDI) = ir

## **Scenario Titles**

AOC:

Disposal Area - Onsite - SW Plume

Exposure media: Indoor Air

Receptor:

Hypothetical Future Industrial Worker

Report title:

Dunn Field, Defense Distribution Depot Memphis, Tennessee

Inhalation:

CDI = (Cair \* IR \* ET \* EF \* ED \* CF) / (BW \* AT) Cair (ug/m3): IR (m3/day) EF (days/year) ED (years) CF (mg/ug) BW (kg) AT (days)

Carc	Noncarc
STYLES AND ADDRESS OF THE STREET	A STATE OF THE STA
20	42
250	
25	·
1.00E-03	1.
70	22
25550	9125

41-34-				
Units	Chemical WOE	SFi	RfDi	Mean
ug/m³	1,1,2,2-TETRAC C	0.203		3 391E-05
ug/m³	1,1,2-TRICHLOFC	0.056		9 421E-05
ug/m³	BROMODICHLO B2			9.07E-05
ug/m³	CARBON TETR/ B2	0.0525		0 003307
ug/m³	CHLOROFORM B2	0.0805		0.0004883
ug/m³	cis-1,2-DICHLOF D		0 01	0 0004318
ug/m³	TETRACHLORO C-B2	0.002	0.171	0.00173
ug/m³	trans-1,2-DICHL(		0.02	0.0009935
ug/m³	TRICHLOROETI B2	0 006		0 0010894
ug/m³				
ug/m <sup>3</sup>				
ug/m <sup>3</sup>				
ug/m <sup>3</sup>				
ug/m³				
ug/m <sup>3</sup>				
ug/m <sup>3</sup>				
ug/m³				
ug/m <sup>3</sup>				
ug/m³				
ug/m³				
ug/m³				
ug/m				

## Disposal Area - Onsite - SW Plume, Indoor Air - Hypothetical Future Industrial Worker Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

#### Inhalation

Intake for noncarcinogenic and carcinogenic compounds:

CDI=	Car * IR *EF * ED * CF
	BW * AT

	21. /11				
		Carcinogenic		Noncarcinogenic	
$C_{air} =$	Estimated Indoor Air Concentration (ug/m³)	EPC	_ b	EPC	- b
IR =	Inhalation Rate (m³/day)	20	a,c	20	a,c
EF =	Exposure Frequency (days/year)	250	а	250	а
ED =	Exposure Duration (years)	25	а	25	а
CF =	Conversion Factor (mg/ug)	1 00E-03		1 00E-03	
BW =	Body Weight (kg)	70	а	70	а
AT =	Averaging Time (days)	25550	а	25550	а

### Sources:

a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings. Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

c = Based on an eight hour workday

Disposal Area - Onsite - SW Plume, Indoor Air - Hypothetical Future Industrial Worker Scenario - Inhalation Dunn Field, Defense Distribution Depot Memphis, Tennessee

				ວຶ	Carcinogenic		Non	Noncarcinogenic	ji
Units	Units Chemical	WOE	EPC	SFi	CDI	ELCR	RfDi	8	Ī
ug/m3	1,1,2,2-TETRACHLOROETHANE	ပ	3 4E-05	2.0E-01	2 4E-09	4.8E-10		6.6E-09	
ng/m3	ug/m3 1,1,2-TRICHLOROETHANE	ပ	9 4E-05	5 6E-02	6 6E-09	3.7E-10		1 8E-08	
ng/m3	BROMODICHLOROMETHANE	B2	9.1E-05		6.3E-09			1.8E-08	
ng/m3	CARBON TETRACHLORIDE	B2	3.3E-03	5.3E-02	2.3E-07	1 2E-08		6.5E-07	
ng/m3	CHLOROFORM	B2	4.9E-04	8.1E-02	3.4E-08	2.7E-09	0.0E+00	9.6F-08	
ug/m3	cis-1,2-DICHLOROETHYLENE	Δ	4 3E-04		3.0E-08		1 0E-02	8.5E-08	8 45E-06
ng/m3	TETRACHLOROETHYLENE(PCF	C-B2	1 7E-03	2 0E-03	1.2E-07	2.4E-10	1.7E-01	3.4E-07	1.98E-06
ng/m3	trans-1,2-DICHLOROETHENE		9.9E-04		6.9E-08		2.0E-02	1.9E-07	9.72F-06
ug/m3	ug/m3 TRICHLOROETHYLENE (TCE)	B2	1.1E-03	6.0E-03	7.6E-08	4 6E-10		2.1E-07	

Total HI: 0.00002

Total ELCR: 1.6E-08

Data

ſ	0 00016	MG/L	ALUMINUM
ı	0 00016	MG/L	ARSENIC
ı	0 00016	MG/L	BARIUM
ł	0 00016	MG/L	BERYLLIUM
ı	0 001	MG/L	CADMIUM
ı	0 001	MG/L	CHROMIUM, TOTAL
ı	0.0004	MG/L	COBALT
ı	0.00016	MG/L	COPPER
l	0.000004	MG/L	LEAD * *
ı	0 00016	MG/L	MANGANESE
1	0 001	MG/L	MERCURY ( ) ( )
L	0 0001	MG/L	NICKEL

Disposal Area (Potable Use) (SW Plume) - Hypothetical Future Industrial Worker Scenario

Dunn Field, Defense Distribution Depot Memphis, Tennessee

	etal Beterios Biothodifort Bepot Mempins, Ten		
lanaati.		Carcinogenic	Noncarcinogenic
Ingestio			
	r non-carcinogenic and carcinogenic compounds.		
CDI =	Com * IR * EF * ED		
	BW * AT		
C <sup>a,,,</sup> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	1 a	1 a
EF =	Exposure Frequency (day/year)	250 a	250 a
ED =	Exposure Duration (year)	25 a	25 a
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	9125 a
CDI =	r non-carcinogenic and carcinogenic compounds  Com *SA * PC * ET * EF * ED * CF  BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	2679 b.c	2679 b.c
PC ≃	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0 007 b,e	0 007 b,e
EF =	Exposure Frequency (day/year)	250 a	250 a
ED =	Exposure Duration (year)	25 a	25 a
CF =	Conversion Factor (L/cm³)	1 00E-03	1 00E-03
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	9125 a

### Inhalation.

CDI = Ingestion CDI from above 9

#### References

- a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance<sup>,</sup> "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991
- b = Default factors adapted from EPA Exposure Factors Handbook, August 1997
- c = Surface area represents 1/2 head, 1/2 arms, and the hands of an adult worker
- d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment: Principles and Applications, January 1992
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event
- g = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Disposal Area (Potable Use) (SW Plume) - Hypothetical Future Industrial Worker Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

nhalation*	ELCR																	8 6E-05	9 9E-07		5 8E-06	9.0E-05		4.0E-08		3.0E-06	1.9E-04		intake (CD
	LCR		1,2E-10													2 0E-09	9.1E-11	2 0E-08	2 0E-10	1 0E-10	9 1E-09	5.7E-09		9.3E-10		1.1E-08	5.0E-08	3E-04	= inhalation
Derma	CD	1 36E-07	3.15E-11	1.05E-09	7,34E-12	131E-10	1.31E-09	5 24E-10	2,10E-10	2 63E-12	2.10E-08	6 55E-12	6 55E-11	1 57E-07	4 19E-10	6 29E-11	7 21E-12	7 12E-08	2 78E-09	1 58E-09	4 53E-08	1.86E-07	5 01E-09	1.78E-08	2 84E-09	1 52E-07		Total Risk =	:xposnre;
stion	ELCR		1 6E-05													3.4E-06	3 2E-07	8.4E-05	1.0E-06	9 0E-07	1.4E-05	6 8E-06		1 0E-06		5.6E-06	1.3E-04	Ţ	e Cancer E
ngestion	GD	4 54E-02	1.05E-05	3.49E-04	2 45E-06	6.99E-06	6.99E-05	6.99E-05	6 99E-05	3 51E-05	6.99E-03	3 49E-07	3,49E-05	5.24E-02	1,40E-04	2 10E-07	ന	4	1,77E-05	4	¥			1.98E-05	1.52E-05	5 05E-04			ss Lifetime
	ည	1 60E-04	1 60E-04	1 60E-04	1 60E-04	1.00E-03	1 00E-03	4.00E-04	1 60E-04	4 00E-06	1 60E-04	1.00E-03	1 00E-04	1 60E-04	1 60E-04	1 60E-02	1 10E-02	9 00E-03	8 40E-03	5 80E-03	2.20E-02	8.90E-03	1.00E-02	4.80E-02	1 00E-02	1 60E-02			.CR = Exce
	ABSgl	1 00E-01	4 10E-01	7 00E-02	1.00E-02	1 00E-02	5 00E-03	8.00E-01	3 00E-01	1 50E-01	4,00E-02	1 00E-04	2 70E-01	2.00E-01										1 00E+00	1.00E+00	1.50E-01			ntration; EL
	EPC	1.30E+01	3.00E-03	1 00E-01	7 00E-04	2.00E-03	2 00E-02			1.00E-02	2 00E+00	1.00E-04	1.00E-02	1.50E+01	4.00E-02	6.00E-05	1.00E-05	121E-01	5.05E-03	4 15E-03	3.14E-02	3.19E-01	7.64E-03	5 66E-03	4.34E-03	1 45E-01			oint Concel
	SFI		151E+01		8 40E+00	6 30E+00	4 20E+01				•						9 10E+00		5 60E-02		25E-02	8 05E-02		2 00E-03		6.00E-03			Exposure P.
	SFd		1 50E+00 3.66E+00													3.20E+01	1 26E+01	2 86E-01	7 04E-02	6.33E-02	2.00E-01	3 05E-02		5.20E-02		7 33E-02			(e; EPC = 6
	SFo		1 50E+00														9 10E+00							5 20E-02		1.10E-02			Daily Intal
	WOE		⋖	۵	20	8	Ą		Δ	<b>B</b> 2	Δ	Ω	۵				<b>B</b> 2						ے	C-82	i	2			Chronic
	Chemical	ALUMINUM	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CHROMIUM, TOTAL	COBALT	COPPER	LEAD	MANGANESE	MERCURY	NICKEL	SILICON	VANADIUM	DIELDRIN	HEPTACHLOR EPOXIDE	1,1,2,2-TETRACHLOROETHANE	1,1,2-TRICHLOROETHANE	BROMODICHLOROMETHANE	CAKBON TETRACHLORIDE	CHLOROFORM	CIS-1, Z-DICHLOROFI HYLENE	TETRACHLOROETHYLENE(PCE)	trans-1,2-DICHLOROETHENE	IRICHLOROETHYLENE (TCE)	lotal Kisk		WOE = Weight of Evidence; CDI = Chronic Daily Intake; EPC = Exposure Point Concentration; ELCR = Excess Lifetime Cancer Exposure; * = inhalation intake (CD
:	Units	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MC/L		₩.	1 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	. ∠ 	₩. 100	MG/L	MG/L			Notes:

Disposaf Area (Potable Use) (SW Plume) - Hypothetical Future Industrial Worker Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

Č				. !					Ingestion	tion	ı	Derma	inhalation*
Chemical	١	١		RfDd	RfDi	EPC	ABSgi	ပ	<u></u>	ã	ចូ	옆	g
W	•	1 00E+00		1 00E-01		1 30E+01	1 00E-01	1 60E-04	127E-01	0 13	3 82E-07	3 82E-06	
C A 3 00E-04 1	3 00E-04 1	Τ,	_	.23E-04		3 00E-03	4 10E-01	1 60E-04	2.94E-05	0 098	8 81E-11	7 16E-07	
D 7 00E-02	7 00E-02		4	90E-03	1 43E-04	1 00E-01	7 00E-02	1 60E-04	9 78E-04	0.014	2 94E-09	5 99E-07	
M 81 2.00E-03	2.00E-03		N	2.00E-05	5 70E-06	7 00E-04	1 00E-02	1 60E-04	6 85E-06	0,0034	2 06E-11	1 03E-06	
B1 5 00E-04	5 00E-04		ų)	5 00E-06		2 00E-03	1 00E-02	1 00E-03	1 96E-05	0 039	3 67E-10	7 34E-05	
CHROMIUM, TOTAL A-D 3 00E-03		3 00E-03		1 50E-05	2 86E-05	2 00E-02	5 00E-03	1 00E-03	1 96E-04	0 065	3 67E-09	2 45E-04	
COBALT 6 00E-02 4	6 00E-02 4	6 00E-02 4	4	80E-02		2 00E-02	8 00E-01	4 00E-04	1 96E-04	0 0033	147E-09	3 06E-08	
ER D 370E-02 '	3 70E-02	•	$\overline{}$	1 11E-02		2 00E-02	3 00E-01	1 60E-04	1 96E-04	0 0053	5 87E-10	5 29E-08	
LEAD B2	B2					1 00E-02	1 50E-01	4 00E-06	9 82E-05		7 37E-12		
SE D 140E-01	1 40E-01		ŝ	5 60E-03	1 43E-05	2 00E+00	4 00E-02	1 60E-04	1 96E-02	0 14	5 87E-08	1 05E-05	
RY	۵				8 57E-05	1 00E-04	1 00E-04	1 00E-03	9 78E-07		183F-11		
D 2 00E-02	2 00E-02		3	5 40E-03		1 00E-02	2 70E-01	1 00E-04	9 78E-05	0 0049	1 83E-10	3 40F-08	
						1.50E+01	2 00E-01	1 60E-04	1 47E-01		4 40E-07		
√ 7 00E-03			7.0	7.00E-05		4 00E-02	1 00E-02	1 60E-04	3,91E-04	0.056	1.17E-09	1 68E-05	
B2 5 00E-05	5 00E-05		2.5	2.50E-05		6 00E-05	5 00E-01	1 60E-02	5 87E-07	0 0 1 2	1 76E-10	7 05E-06	
B2 130E-05	1 30E-05	-	6	9.36E-06		1 00E-05	7 20E-01	1.10E-02	9 78E-08	0 0075	2 02E-11	2 16E-06	
1ANE C 6 00E-02 4	6 00E-02 4	4	4	20E-02		1 21E-01	7 00E-01	9 00E-03	1 18E-03	0 0 0 0 0	1 99E-07	4 75E-06	
C 400E-03 3	4 00E-03 3	က	က	24E-03		5 05E-03	8 10E-01	8 40E-03	4 95E-05	0.012	7 79E-09	2 40E-06	
IE B2 2 00E-02 1	2 00E-02 1	Ψ-	-	.96E-02		4 15E-03	9 80E-01	5 80E-03	4.06E-05	0 0020	4 42E-09	2 25E-07	
ACHLORIDE B2 7	~	7 00E-04 4	ч	155E-04		3 14E-02	6.50E-01	2 20E-02	3 07E-04	0 44	1 27E-07	2 79E-04	
82 1.00E-02 2	1.00E-02 2	~	3	00E-03		3 19E-01	2 00E-01	8 90E-03	3 12E-03	031	5 21E-07	2 60E-04	
D 1.00E-02 1	1.00E-02 1	_	<del>-</del>	00E-02	1 00E-02	7 64E-03	1 00E+00	1 00E-02	7.48E-05	0 0075	1 40E-08	1 40E-06	0.0075
CE) C-B2 1 00E-02 1	1 00E-02 1	Ψ.	÷	00E-02	1.71E-01	5 66E-03	1 00E+00	4 80E-02	5 54E-05	0.0055	4.98E-08	4 98E-06	3 24E-04
2.00E-02 2	2.00E-02 2	2	ςi	.00E-02	2 00E-02	4 34E-03	1 00E+00	1 00E-02	4 25E-05	0 0021	7 96E-09	3 98E-07	0 0021
THYLENE (TCE) B2 6 00E-03	6 00E-03	00E-03	~,	9 00E-04		1 45E-01	1 50E-01	1 60E-02	1 41E-03	0 24	4 24E-07	4 71E-04	] •
Hazard Index										1.6		0.0014	0.0099
									,	4-111-1-1	1 :	•	) ) !

Total Hazard Index = 1.6

WOE = Weight of Evidence, CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index, \*= inhalation intake (CDI) = int

## Disposal Area - Onsite - SW Plume, Indoor Air - Hypothetical Future Residential Adult Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

## Inhalation

Intake for noncarcinogenic compounds:

Intake for carcinogenic compounds:

CDI=	C <sub>air</sub> * IR *EF * ED * CF BW * AT	C <sub>ar</sub> *	IR <sub>adj</sub> A	*EF * * CF	
	Sh Ai	Carcinogenic		Noncarcinogeníc	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	EPC	b	EPC	b
IR =	Inhalation Rate (m³/day)	NA		20	а
IRadj =	Adjusted Inhalation Rate (m³-yr)/(kg-day)	13	a,c	NA	
EF ≃	Exposure Frequency (days/year)	350	а	350	а
ED =	Exposure Duration (years)	NA	а	30	а
CF =	Conversion Factor (mg/ug)	1.00E-03		1.00E-03	
BW =	Body Weight (kg)	NA	а	70	а
AT =	Averaging Time (days)	25550	a	10950	а

#### Sources:

a = U S. EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991.

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

c = Age adjusted

Disposal Area - Onsite - SW Plume, Indoor Air - Hypothetical Future Residential Adult Scenario - Inhalation Dunn Field, Defense Distribution Depot Memphis, Tennessee

;				C	Carcinogenic		Nor	Noncarcinogenic	<u>ં</u>
Units	Chemical	WOE	EPC	SFi	CDI	ELCR	RfDi	5	  ∓
ng/m3	ug/m3 1,1,2,2-TETRACHLOROETHANE	ပ	3.39E-05	2.03E-01	6 04E-09	1 23E-09		9.29E-09	
ng/m3	1,1,2-TRICHLOROETHANE	ပ	9 42E-05	5.60E-02	1 68E-08	9.40E-10		2,58E-08	
ug/m3	BROMODICHLOROMETHANE	B2	9.07E-05		1.62E-08			2 48E-08	
ng/m3	CARBON TETRACHLORIDE	B2	3 31E-03	5.25E-02	5.89E-07	3.09E-08		9.06E-07	
ng/m3	CHLOROFORM	B2	4.88E-04	8.05E-02	8.70E-08	7 00E-09	0 0000	1.34E-07	
ng/m3	cis-1,2-DICHLOROETHYLENE	۵	4 32E-04		7.69E-08		1.00E-02	1 18E-07	1.18E-05
ug/m3	<b>TETRACHLOROETHYLENE(PC</b> )	C-B2	1 73E-03	2.00E-03	3.08E-07	6 16E-10	1.71E-01	4.74E-07	2.77E-06
ng/m3	trans-1,2-DICHLOROETHENE		9.93E-04		1.77E-07		2 00E-02	2.72E-07	1,36E-05
ug/m3	ug/m3 TRICHLOROETHYLENE (TCE)	82	1.09E-03	6.00E-03	1 94E-07 1.16E-09	1.16E-09		2.98E-07	

Total HI: 0.00003

Total ELCR: 4.19E-08

1 00E-03

70 a

10950 a

# Disposal Area (Potable Use) (SW Plume) - Hypothetical Future Residential Adult Scenario

Dunn Field, Defen	e Distribution Depot	Memphis, Tennessee
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		<u>Carcinogenic</u>	Noncarcinogenic
Ingestio	n:		
Intake fo	r non-carcinogenic compounds	Age-specific intake (for carcinogenic	compounds only):
CDI =	C * IR * EF * ED	$CDI_{adj} = C_{ow} * EF * CF * IR_{adj}$	
	BW * AT	AT	
C <sub>ow</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	N/A	2 a
$IR_{adj} =$	Age-adjusted Ingestion Rate (L-year/kg-da	y) 1.1 b	N/A
EF ≃	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	10950 a
Dermal:			
	non-carcinogenic compounds	Age-specific intake (for carcinogenic	,
CDI =	CoursA * PC * ET * EF * ED * CF	CDI <sub>adj</sub> = C *SA * PC * ET * EF * CF	
_	BW * AT	AT	
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	N/A	20000 b,c
SA <sub>adj</sub> =	Age-adjusted Surface Area (cm²-yr/kg)	9480 b,c	N/A
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0.007 b,e	0 007 b,e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a

1 00E-03

70 a

25550 a

### Inhalation:

CF =

BW =

AT =

CDI = Ingestion CDI from above f

Body Weight (kg)

Conversion Factor (L/cm3)

Averaging Time (days)

### References:

a = U.S. EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991

b = Age-adjusted ingestion rate for adults, adjusted for body weight and time for carcinogenic exposure

$$\frac{\text{IRadj} = \frac{\text{IRc} \times \text{EDc}}{\text{BWc}} + \frac{\text{IRa} \times (\text{EDa} - \text{EDc})}{\text{BWa}} = \frac{1 \times 6}{15} + \frac{2 \times (30 - 6)}{70}$$

1.09 (L-year)/(kg-day)

b = USEPA Exposure Factors Handbook, August 1997

c = Total Body Surface Area represents whole body (average of male & female adults)

f = Age-adjusted surface area for adults, adjusted for body weight and time for carcinogenic exposure

SAadj = 
$$\frac{SAc \times ED_i}{BWc}$$
 +  $\frac{SAa \times (EDa - EDc}{BWa}$  =  $\frac{6557 \times 6}{15}$  +  $\frac{20000 \times (30-6)}{70}$ 

9480 (cm2-year)/(kg)

d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value; all values adapted from EPA, Dermal Exposure Assessment Principles and Applications, January 1992.

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event

f = follows EPA Region IV guidance (i e , inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Disposal Area (Potable Use) (SW Plume) - Hypothetical Future Residential Adult Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

:									Ingestion	tion	Derma	mai	Inhalation*
Units	Chemical	WOE	SFo	SFd	SFi	EPC	ABSgi	S C	ក្ល	ELCR	ā	ELCR	ELCR
MG/L	ALUMINUM				•	1 30E+01	1 00E-01	1 60E-04	1 93E-01		1 89E-06		
MG/L	ARSENIC	∢	1 50E+00	3 66E+00	1.51E+01	3 00E-03	4 10E-01	1 60E-04	4.46E-05	7F-05	4.36F-10	2F.09	
MG/L	BARIUM	۵				1 00E-01	7.00E-02	1 60E-04	1 49E-03	1	1 45E-08	3	
MG/L	BERYLLIUM	<u>8</u>			8 40E+00	7.00E-04	1.00E-02	1 60E-04	1 04E-05		1 02E-10		
MG/L	CADMIUM	<u>8</u>			6 30E+00	2,00E-03	1.00E-02	1 00E-03	2 97E-05		1 82E-09		
MG/L	CHROMIUM, TOTAL	Ą-D			4 20E+01	2 00E-02	5 00E-03	1,00E-03	2 97E-04		1.82F-08		
MG/L	COBALT					2 00E-02	8 00E-01	4 00E-04	2.97E-04		7.27E-09		
MG/L	COPPER	۵				2 00E-02	3.00E-01	1 60E-04	2 97E-04		2.91E-09		
MG/L	LEAD	<b>B</b> 2				1 00E-02	1 50E-01	4.00E-06	1 49E-04		3 65E-11		
MG/L	MANGANESE	۵				2 00E+00	4 00E-02	1 60E-04	2 97E-02		2 91E-07		
MG/L	MERCURY	۵				1 00E-04	1.00E-04	1.00E-03	1 49E-06		9.09E-11		
MG/L	NICKEL	۵				1.00E-02	2 70E-01	1 00E-04	1.49E-04		9 09E-10		
MG/L	SILICON					1 50E+01	2 00E-01	1 60E-04	2.23E-01		2 18E-06		
MG/L	VANADIUM					4.00E-02	1 00E-02	1.60E-04	5.95E-04		5 82E-09		
MG/L	DIELDRIN	<b>B</b> 2	1 60E+01	3 20E+01	1 61E+01	6.00E-05	5.00E-01	1 60E-02	8.92E-07	1E-05	8.73E-10	3E-08	
MG/L	HEPTACHLOR EPOXIDE	<b>B</b> 2	9.10E+00	1 26E+01	9 10E+00	1.00E-05	7 20E-01	1 10E-02	1.49E-07	1E-06	1.00E-10	100	
MG/L	1,1,2,2-TETRACHLOROETHANE	O	2 00E-01	2 86E-01		1.21E-01	7 00E-01	9 00E-03	1.79E-03	# 2	9 87E-07	3E-07	4E-04
7 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	1,1,2-IRICHLOROETHANE	ပ	5 70E-02	7 04E-02	5.60E-02	5 05E-03	8 10E-01	8.40E-03	7 52E-05	4E-06	3 86E-08	3E-09	4E-06
Z Z	BROMODICHLOROMETHANE	B2	6.20E-02	6 33E-02		4 15E-03	9 80E-01	5.80E-03	6 17E-05	4E-06	2 19E-08	1E-09	!
75 20 1	CARBON LETRACHLORIDE	85	1 30E-01	2 00E-01	25E-02	3.14E-02	6 50E-01	2 20E-02	4 67E-04	6E-05	6.28E-07	1 <b>E-</b> 07	2E-05
٦ . ۵	CHLOROFORM	85	6.10E-03	3,05E-02		3 19E-01	2.00E-01	8 90E-03	4.74E-03	3E-05	2.58E-06	8E-08	4E-04
MG/L	CIS-1,Z-DICHLOROETHYLENE					7 64E-03	1.00E+00		1 14E-04		6 95E-08		
MG/L	I E I KACHLOROETHYLENE(PCE) C	) C-B2	5.20E-02	5.20E-02	2.00E-03	5 66E-03	1.00E+00		8 42E-05	4E-06	2 47E-07	1E-08	2E-07
אַפֿיר ניסיי	trans-1,2-DICHLOROETHENE	i				4 34E-03	1.00E+00		6 46E-05		3 95E-08	<u>;</u>	;
MG/L	TRICHLOROETHYLENE (TCE)	B2	1 10E-02	7 33E-02	6 00E-03	1 45E-01	1 50E-01		2.15E-03	2E-05	2 10E-06	2E-07	1E-05
	lotal Kisk									6E-04		7E-07	8E-04
										1			

Disposal Area (Potable Use) (SW Plume) - Hypothetical Future Residential Adult Non-Carcinogenic Scenario Dunn Field, <u>Defense Distribution Depot Memphis, Tennessee</u>

;									Ingestion	tlon	Derma	ma	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	RfDi	EPC	ABSgi	ပ္ရ	<u>0</u>	옆	<u>0</u>	뎦	오
MG/L	ALUMINUM		1 00E+00	1 00E-01		1.30E+01	1,00E-01	1.60E-04	3.56E-01	0 36	3 99E-06	3 99E-05	
MG/L	ARSENIC	∢	3 00E-04	1.23E-04		3 00E-03	4,10E-01	1 60E-04	8.22E-05	0 27	9 21E-10	7 48E-06	
MG/L	BARIUM	Δ	7 00E-02	4 90E-03	1 43E-04	1 00E-01	7 00E-02	1 60E-04	2.74E-03	0 039	3 07E-08	6 26E-06	
MG/L	BERYLLIUM	9	2 00E-03	2.00E-05	5 70E-06	7 00E-04	1 00E-02	1.60E-04	1.92E-05	9600 0	2 15E-10	1 07E-05	
MG/L	CADMIUM	20	5 00E-04	5 00E-06		2 00E-03	1 00E-02	1 00E-03	5 48E-05	0 11	3 84E-09	7 67E-04	
MG/L	CHROMIUM, TOTAL	A-D	3 00E-03	1 50E-05	2.86E-05	2 00E-02	5 00E-03	1 00E-03	5 48E-04	0 18	3 84E-08	0 0026	
MG/L	COBALT		6 00E-02	4 80E-02		2 00E-02	8 00E-01	4.00E-04	5 48E-04	0 0091	1 53E-08	3 20E-07	
MG/L	COPPER	۵	3 70E-02	1 11E-02		2 00E-02	3 00E-01	1 60E-04	5 48E-04	0 015	6 14E-09	5 53E-07	
MG/L	LEAD	<b>B</b> 2				1 00E-02	1 50E-01	4 00E-06	2 75E-04		7 70E-11		
MG/L	MANGANESE	۵	1,40E-01	5 60E-03	1 43E-05	2 00E+00	4 00E-02	1 60E-04	5 48E-02	0 39	6,14E-07	1 10E-04	
MG/L	MERCURY	۵			8.57E-05	1 00E-04	1 00E-04	1 00E-03	2.74E-06		1 92E-10		
MG/L	NICKEL	۵	2 00E-02	5.40E-03		1 00E-02	2 70E-01	1 00E-04	2.74E-04	0 014	1.92E-09	3 55E-07	
MG/L	SILICON					1 50E+01	2 00E-01	1 60E-04	4 11E-01		4 60E-06	!	
MG/L	VANADIUM		7 00E-03	7 00E-05		4 00E-02	1 00E-02	1 60E-04	1 10E-03	0 16	1 23E-08	1 75E-04	
MG/L	DIELDRIN	B2	5 00E-05	2 50E-05		6 00E-05	5 00E-01	1 60E-02	1 64E-06	0 033	1 84E-09	7 36E-05	
MG/L	HEPTACHLOR EPOXIDE	<b>B</b> 2	1 30E-05	9 36E-06		1 00E-05	7.20E-01	1 10E-02	2.74E-07	0 021	2 11E-10	2 25E-05	
MG/L	1,1,2,2-TETRACHLOROETHANE	ပ	6 00E-02	4 20E-02		1 21E-01	7 00E-01	9 00E-03	3 31E-03	0 055	2.08E-06	4 96E-05	
MG/L	1,1,2-TRICHLOROETHANE	ပ	4,00E-03	3.24E-03		5 05E-03	8.10E-01	8 40E-03	1,38E-04	0 035	8 14E-08	2 51E-05	
MG/L	BROMODICHLOROMETHANE	B2	2 00E-02	1.96E-02		4.15E-03	9 80E-01	5 80E-03	1.14E-04	0 0057	4 62E-08	2 36€-06	
MG/L	CARBON TETRACHLORIDE	B2	7,00E-04	4 55E-04		3.14E-02	6 50E-01	2 20E-02	8 60E-04	12	1 32E-06	0 0029	
MG/L	CHLOROFORM	82	1 00E-02	2 00E-03		3 19E-01	2 00E-01	8 90E-03	8 74E-03	0.87	5 44E-06	0 0027	
MG/L	cis-1,2-DICHLOROETHYLENE	۵	1 00E-02	1 00E-02	1 00E-02	7 64E-03	1 00E+00	1 00E-02	2.09E-04	0 021	1 47E-07	147E-05	0 021
MG/L	TETRACHLOROETHYLENE(PCE)	C-B2	1 00E-02	1.00E-02	171E-01	5 66E-03	1 00E+00	4 80E-02	1.55E-04	0 0 16	5 21E-07	5 21E-05	9 07E-04
MG/L	trans-1,2-DICHLOROETHENE		2 00E-02	2.00E-02	2 00E-02	4 34E-03	1 00E+00	1 00E-02	1.19E-04	0 0059	8 32E-08	4 16E-06	0.0059
MG/L	TRICHLOROETHYLENE (TCE)	B2	6 00E-03	9 00E-04		1 45E-01	1.50E-01	1 60E-02	3.96E-03	99 0	4 43E-06	0 0049	
	Hazard Index									4.5		0.014	0.028

# Disposal Area - Onsite - SW Plume, Indoor Air - Hypothetical Future Residential Child Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

## Inhalation

Intake for noncarcinogenic compounds.

CDI=	Cat * IR *EF * ED * CF
	BW * AT

		Carcinogenic	Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	NA	EPC	
IR =	Inhalation Rate (m³/day)	NA	15	а
EF =	Exposure Frequency (days/year)	NA	350	a
ED =	Exposure Duration (years)	NA	6	a
CF =	Conversion Factor (mg/ug)	NA	1.00E-03	_
BW =	Body Weight (kg)	NA	15	а
AT =	Averaging Time (days)	NA	2190	а

### Sources:

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

Disposal Area - Onsite - SW Plume, Indoor Air - Hypothetical Future Residential Child Scenario - Inhalation Dunn Field, Defense Distribution Depot Memphis, Tennessee

				O	Carcinogenic	<u> </u>	Non	Noncarcinogenic	. <u>5</u>
Units	Chemical	WOE	EPC .	SFi	<u>-</u> 5	ELCR	RfDi	3	Ī
ng/m3	ug/m3 1,1,2,2-TETRACHLOROETHANE	ပ	3.39E-05	ı	:	ı		3.3€-08	
ng/m3	1,1,2-TRICHLOROETH/	ပ	9.42E-05	ŀ	i	;		9.0E-08	
ng/m3	BROMODICHLOROMETHANE	<b>B</b> 2	9 07E-05	:	ŀ	1		8.7E-08	
ng/m3	CARBON TETRACHLORIDE	B2	3.31E-03	ŀ	ł	i		3.2E-06	
ng/m3	CHLOROFORM	B2	4.88E-04	:	i	ŀ	0000	4.7E-07	
ng/m3	cis-1,2-DICHLOROETHYLENE	۵	4.32E-04	1	1	1	1 00E-02	4.1E-07	4.14E-05
ug/m3	<b>TETRACHLOROETHYLENE(PCF</b>	C-B2	1.73E-03	1	ł	1	1.71E-01	1.7E-06	9.70E-06
ng/m3	ug/m3 trans-1,2-DICHLOROETHENE		9.93E-04	1	ŀ	1	2.00E-02	9.5E-07	4 76E-05
ug/m3	ug/m3 TRICHLOROETHYLENE (TCE)	B2	1.09E-03	;	*	•		1.0E-06	

0.0001

Total HI:

ŀ

Total ELCR:

Disposal Area (Potable Use) (SW Plume) - Hypothetical Future Residential Child Scenario

Dunn Field, Defense Distribution Depot Memphis, Tennessee

		Carcinogenic	<u>Noncarcinogenic</u>
Ingestio			
Intake for	r non-carcinogenic and carcinogenic compounds		
CDI =	C * IR * EF * ED		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	1 a	1 a
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a
Dermal:			
Intake for	r non-carcinogenic and carcinogenic compounds		
CDI =	Cnw *SA * PC * ET * EF * ED * CF		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm <sup>2</sup> )	6557 b, c	6557 b, c
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0 007 b.e	0.007 b,e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
CF =	Conversion Factor (L/cm <sup>3</sup> )	1 00E-03	1.00E-03
BW =	Body Weight (kg)	15 a	1.00E-03
AT =	Averaging Time (days)	25550 a	2190 a

### Inhalation:

CDI 

Ingestion CDI from above f

### References:

- a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991.
- b = US EPA Exposure Factors Handbook, August 1997
  - Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998
- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old)).
- d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment Principles and Applications, January 1992.
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0.007 day per event.
- f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supptemental Guidance to RAGS Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Disposal Area (Potable Use) (SW Plume) - Future Residential Child Carcinogenic Scenario (OptionaL)

Dunn Field, Defense Distribution Depot Memphis, Tennessee

;									Ingestion	tion	Derma	na	Inhalation*
Units	Chemical	WOE	OE SFo	SFd	SFI	EPC	ABSgi	ည	<u>5</u>	ELCR	CDC	ELCR	FICR
MG/L	ALUMINUM					1.30E+01	1.00E-01	1 60E-04 7 12E-02	7 12E-02		5.23F-07		
MG/L	ARSENIC	∢	1.50E+00	3 66E+00	1.50E+00 3 66E+00 1 51E+01 3 00E-03	3 00E-03		1.60E-04	1 64E-05	2F-05	1 21E-10	4F-10	2E_0.4
MG/L	BARIUM	۵				1 00E-01	7 00E-02	1.60E-04 5 48E-04	5 48E-04	}	4 02E-09	)	1011
MG/L	BERYLLIUM	9			8 40E+00 7.00E-04	7.00E-04	1.00E-02	1 60E-04	3,84E-06		2.82F-11		3E.05
MG/L	CADMIUM	93			6.30E+00	2 00E-03		1 00E-03	•		5 03E-10		75.05
MG/L	CHROMIUM, TOTAL	ΑĐ			4 20E+01	2 00E-02	5 00E-03	1 00E-03	$\overline{}$		5 03F-09		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
MG/L	COBALT					2 00E-02	8,00E-01	4 00E-04	_		2.01E-09		3
MG/L	COPPER	۵				2 00E-02	3 00E-01	1.60E-04	$\overline{}$		8 05E-10		
	Total Risk									2E-04		2E-07	5E-03
										ē	otal Risk =	5E-03	

Disposal Area (Potable Use) (SW Plume) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

									Ingestion	ţioi	Ded	Dermal	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	RfD	EPC	ABSai	<u>გ</u>	3	운	5	9	9
MG/L	ALUMINUM		1.00E+00	1.00E-01		1 30E+01	1 00E-01	1 60E-04	8 31E-01	0 83	6 10F-06	6 10F-05	,
MG/L	ARSENIC	∢	3 00E-04	1 23E-04		3 00E-03	4 10E-01	1 60E-04	1 92E-04	0 64	1.41E-09	1 155.05	
MG/L	BARIUM	Ω	7 00E-02	4.90E-03	1 43E-04	1 00E-01	7 00E-02	1 60E-04	6 39E-03	0 091	4 69E-08	9.58F-06	
MG/L	BERYLLIUM	<del>1</del> 0	2 00E-03	2 00E-05	5 70E-06	7 00E-04	1 00E-02	1 60E-04	4 47E-05	0 022	3.29E-10	1 64F-05	
MG/L	CADMIUM	20	5.00E-04	5 00E-06		2 00E-03	1 00E-02	1 00E-03	1 28E-04	0.26	5.87F-09	0.0012	
MG/L	CHROMIUM, TOTAL	ΑĐ	3 00E-03	1 50E-05	2 86E-05	2 00E-02	5 00E-03	1 00E-03	1 28E-03	0.43	5 87F-08	0000	
MG/L	COBALT		6 00E-02	4 80E-02		2 00E-02	8 00E-01	4 00E-04	1 28E-03	0.021		4 89F-07	
MG/L	COPPER	۵	3 70E-02	1 11E-02		2 00E-02	3.00E-01	1.60E-04	1.28E-03	0 035	9 395-09	8 46E-07	
MG/L	LEAD	82				1 00E-02	1 50E-01	4 00E-06	6.42E-04	·	1 18E-10		
MG/L	MANGANESE	۵	1 40E-01	5.60E-03	1 43E-05	2 00E+00	4 00E-02	1 60E-04	1.28E-01	0.91	9 39E-07	1 68E-04	
MG/L	MERCURY	Ω			8 57E-05	1 00E-04	1 00E-04	1.00E-03	6 39E-06		2 93E-10		
MG/L	NICKEL	۵	2 00E-02	5 40E-03		1 00E-02	2 70E-01	1 00E-04	6 39E-04	0 032	2 93E-09	5 43E-07	
MG/L	SILICON					1 50E+01	2 00E-01	1 60E-04	9 59E-01		7 04E-06		
MG/L	VANADIUM		7 00E-03	7.00E-05		4 00E-02	1 00E-02	1 60E-04	2 56E-03	0 37	1 88E-08	2 68E-04	
MG/L	DIELDRIN	B2	5 00E-05	2 50E-05		6 00E-05	5 00E-01	1 60E-02	3 84E-06	0.077	2 82F-09	1 13F-04	
MG/L	HEPTACHLOR EPOXIDE	<b>B</b> 2	1 30E-05	9.36E-06		1 00E-05	7 20E-01	1 10E-02	6 39E-07	0.049	3 23F-10	3.45E-05	
MG/L	1,1,2,2-TETRACHLOROETHANE	ပ	6 00E-02	4 20E-02		121E-01	7 00E-01	9 00E-03	7 72E-03	0 13	3 19E-06	7 59F-05	
MG/L	1,1,2-TRICHLOROETHANE	ပ	4 00E-03	3 24E-03		5 05E-03	8 10E-01	8 40E-03	3 23E-04	0.081	1 25E-07	3 84F-05	
MG/L	BROMODICHLOROMETHANE	<b>B</b> 2	2 00E-02	1 96E-02		4 15E-03	9 80E-01	5 80E-03	2 65E-04	0.013	7.07E-08	3.60F-06	
MG/L	CARBON TETRACHLORIDE	<b>B</b> 2	7 00E-04	4 55E-04		3 14E-02	6 50E-01	2 20E-02	2 01E-03	29	2 03E-06	0 0045	
MG/L	CHLOROFORM	<b>B</b> 2	1 00E-02	2 00E-03		3 19E-01	2 00E-01	8 90E-03	2.04E-02	20	8.33E-06	0 0042	
MG/L	as-1,2-DICHLOROETHYLENE	۵	1 00E-02	1 00E-02	1 00E-02	7 64E-03	1 00E+00	1 00E-02	4 89E-04	0 049	2.24E-07	2 24E-05	0 049
MG/L	TETRACHLOROETHYLENE(PCE)	C-B2	1 00E-02	1 00E-02	171E-01	5 66E-03	1 00E+00	4 80E-02	3 62E-04	0 036	7 97E-07	7 97E-05	0.0021
MG/L	trans-1,2-DICHLOROETHENE		2 00E-02	2 00E-02	2 00E-02	4 34E-03	1 00E+00	1 00E-02	2 77E-04	0 0 1 4	1 27E-07	6 37E-06	0.014
MG/L	TRICHLOROETHYLENE (TCE)	B2	6 00E-03	9 00E-04		1 45E-01	1 50E-01	1 60E-02	9 24E-03	1.5	6 78E-06	0 0075	· ·
	Hazard Index									11		0.022	0.065

Offsite Groundwater (MW30) (Potable Use) - Hypothetical Future Residential Adult Scenario

Ingestic	nn.	Carcinogenic	<u>Noncarcinogenic</u>
	or non-carcinogenic compounds.	Age-specific intake (for carcinoge	nio compoundo onlu\
CDI =	C. *IR * FF * FD	$CDI_{adj} = C_{me} * EF * CF * IR_{adj}$	nic compounds only)
	C <sub>ow</sub> * IR * EF * ED BW * AT	AT	
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	N/A	2 a
IR <sub>adj</sub> =	Age-adjusted Ingestion Rate (L-year/kg-day	/) 11b	N/A
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	10950 a
Dermal:			
	r non-carcinogenic compounds	Age-specific ıntake (for carcinoger	nic compounds only):
CDI =	C * SA * PC * ET * EF * ED * CF	CDI <sub>adi</sub> = Cow *SA <sub>adi</sub> * PC * ET * EF * C	
_	BW * AT	ÁT	<del></del>
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	N/A	20000 Б.
SA <sub>odj</sub> =	Age-adjusted Surface Area (cm²-yr/kg)	9480 b,c	N/A
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0 007 b,e	0.007 b.
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
CF =	Conversion Factor (L/cm³)	1 00E-03	1 00E-03
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	10950 a
nhalatic CDI =	on Ingestion CDI from above <sup>f</sup>		
,D( -	ingestion CDI from above		
Referen	ces'		
a = U S	EPA, Human Health Evaluation Manual, Supp	lemental Guidance "Standard Default	Exposure Factors"
	OSWER Directive 9285 6-03, March 25, 199	91.	
) = Age-	adjusted ingestion rate for adults, adjusted for	body weight and time for carcinogenic	exposure
	IRadj = <u>IRc x EDc</u> + <u>IRa x (EDa - E</u>	$\underline{Dc}) = \underline{1 \times 6} + $	2 x (30-6)
	BWc BWa	15	70
- 1105	1.09 (L-year)/(kg-day)		
r = USEI	PA Exposure Factors Handbook, August 1997	, , , , , , , , , , , , , , , , , , ,	
- rotai	Body Surface Area represents whole body (a	verage of male & female adults)	
- Aye-a	adjusted surface area for adults, adjusted for b	ody weight and time for carcinogenic e	exposure.

SAadj = <u>SAc x ED</u> SAa x (EDa - EDc = 20000 x (30-6) BWa

9480 (cm 2-year)/(kg)

d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value; all values adapted from EPA, Dermal Exposure Assessment Principles and Applications, January 1992

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event.

f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Offsite Groundwater (MW30) (Potable Use) - Hypothetical Future Residential Adult Carcinogenic Scenario

Defense Distribution Depot Memphis, Tennessee	
femphis, T	
ion Depot Me	
Distribution	
, Defense I	
Dunn Field, Defen	
4	ı

Inhalation*	ELCR							
nal	ELCR		1E-09	} !			6E-11	16-09
Dermal	<u> </u>	1 85E-06	3 25E-10	2.32E-08	1 89E-08	1 44E-11	8.73E-10	
tion	ELCR		5E-05				1E-06	5E-05
ngestion	CD	1.89E-01	3 32E-05	2.38E-03	3.09E-04	5 87E-05	8 92E-05	
	ပ	1.60E-04	1 60E-04	1 60E-04 2.38E-03	1.00E-03		1.60E-04 8 92E-05	
	ABSgi	0-E-0	4.10E-01	7.00E-02	5.00E-03	1.50E-01	1 90E-01	
	EPC	127E+01 1	50E+00 3 66E+00 1 51E+01 2 23E-03 4.10E-01	1.60E-01	2 08E-02	3.95E-03 1.50E-01	1 40E-02 7 37E-02 1,40E-02 6,00E-03 1 90E-01	
	SFi		1 51E+01				1,40E-02	
	SFd		3 66E+00				7 37E-02	
	SFo		1 50E+00				1 40E-02	
	WOE		∢	۵	A-D	B2	E B2	
	Chemical	ALUMINUM	ARSENIC	BARIUM	CHROMIUM, TOTAL	LEAD	bis(2-ETHYLHEXYL) PHTHALATI	Total Risk
	Units	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	

Total Risk = 5E-05
WOE = Weight of Evidence; CD! = Chronic Daily Intake, EPC = Exposure Point Concentration; ELCR = Excess Lifetime Cancer Exposure, \* = Inhalation intake (CD

Offsite Groundwater (MW30) (Potable Use) - Hypothetical Future Residential Adult Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

:									Ingestion	tion	Det	Dermal	Inhalation*
Sign	Chemical	WOE	RfDo RfDd	RfDd	ŖĎ	EPC	ABSgi	ပ္ရ	<u>5</u>	유	<u></u>	욛	오
MG/L	ALUMINUM		1 00E+00	1 00E-01		1 27E+01	1 1 00E-01 1	160E-04 3 48E-01	3 48E-01	0.3	3 89F-08	3 RGE-05	
ఠ	ARSENIC	<	3 00E-04	1 23E-04		2 23E-03	4 10E-01	1 SOF.04	6 11E 05	, ,	0.000	E 57E 08	
, C	781040	. (				1		100	3	2	01-100	00-100	
۱ واد ا	BAKIOM	ם	7 00E-02	4 90E-03	1 43E-04	1 60E-01 7	, 00E-02	1.60E-04	4 38E-03	0.063	4 90F-08	1 OOF - 05	
<u> </u>	CHROMIUM TOTAL	Q.A	3.00E,03	1 SOF-05	2 SEE OF	00 Han c	200	000		2		0 000	
2			2000		CO-300 7	Z0-300 Z	2005-03	20-100	3 59E-04	7 0	3 985-08	0 003	
۲ ورا	CEAU	82				3 95E-03	1 50E-01	4 00E-06	4 00E-06 1 08E-04		3 03F-11		
ଧ	bis(2-ETHYLHEXYL) PHTHALATE	82	2 00E-02 3 80E-03	3 80E-03		6 00E-03	190E-01	1 60E-04 1 64E-04	1 64F-04	800.0	1 84E-00	4 84E_07	
	Hazard Index									9.0		0,003	

Total Hazard Index = 0.8

WOE = Weight of Evidence, CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index, \* = inhalation intake (CDI) = ir

Offsite Groundwater (MW30) (Potable Use) - Hypothetical Future Residential Child Scenario

Dunn Field	Defense	Distribution	Denot Memni	nis. Tennessee
- Duini 1 1010.	LUCIONS	DISHIDURUH	Dedoc Menior	113. 1 5111163366

		Carcinogenic	Noncarcinogenic
Ingestio	n·		
Intake fo	r non-carcinogenic and carcinogenic compounds		
CDI =	Cm * IR * EF * ED		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	1 a	1 a
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a
Dermal: Intake fo CDI =	r non-carcinogenic and carcinogenic compounds		
CDI ~	<u>C<sub>cw</sub> *SA * PC * ET * EF * ED * CF</u> BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	6557 b, c	6557 b, c
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0.007 b,e	0 007 b,e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 а	6 a
CF ≃	Conversion Factor (L/cm³)	1 00E-03	1 00E-03
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a

#### Inhalation:

CDI = Ingestion CDI from above f

### References:

- a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance. "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991.
- b = US EPA Exposure Factors Handbook, August 1997
  - Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998.
- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old)).
- d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment. Principles and Applications, January 1992.
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event
- f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Offsite Groundwater (MW30) (Potable Use) - Future Residential Child Carcinogenic Scenario (OptionaL)

Dunn Field, Defense Distribution Depot Memphis, Tennessee

									Ingestion	tion	Dermal	mal	Inhalation*
Units	Chemical	WOE	VOE SFo	SFd	SFI	EPC	ABSgi PC	ည	CDI	ELCR	<u>ā</u>	ELCR	ELCR
MG/L	ALUMINUM					1 27E+01	1 00E-01	27E+01 1 00E-01 1 60E-04 6 95E-02	6 95E-02		5 11F-07		
MG/L	ARSENIC	⋖	1 50E+00	3 66E+00	151E+01	2,23E-03	4 10E-01	1 60E-04	1 22E-05	2E-05	8 98E-11	3F-10	2E-04
MG/L	BARIUM	۵				1,60E-01	7 00E-02	1 60E-04	8.76E-04	:	6.43F-09		1 1
MG/L	CHROMIUM, TOTAL A	Α̈́				2 08E-02	5 00E-03	1 00E-03	1 14E-04		5.22E-09		
MG/L	LEAD	<b>B</b> 2				3.95E-03	1 50E-01	4 00E-06	2 16E-05		3 97E-12		
MG/L	bis(2-ETHYLHEXYL) PHTHALATE	B2	1 40E-02	B2 140E-02 737E-02 140E-02 6.00E-03 190E-01 160E-04 329E-05	1 40E-02	6.00E-03	1 90E-01	1 60E-04	3 29E-05	5E-07	2 41E-10	2E-11	5E-07
	Total Risk									2E-05 Tot	Total Risk =	3E-10 2E-04	3E-10 2E-04 2E-04

Offsite Groundwater (MW30) (Potable Use) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

								UCITEDIA	į	Ē	Dermai	Inhalatio
Chemical	WOE	RfDo	RfDd	RfDi	EPC	ABSgi	ပ္	<u>-</u>	옆	G	오	유
ALUMINUM		1 00E+00	1 00E-01		1 27E+01	1 00E-01	1 60E-04	8,11E-01	08	5 96E-06	5 96F-05	
ARSENIC	∢	3.00E-04	1 23E-04		2 23E-03	4 10E-01	1 60E-04	1,43E-04	0.5	1 05E-09	8 52F-06	
BARIUM	۵	7 00E-02	4 90E-03	1,43E-04	1 60E-01	7 00E-02	1 60E-04	1 02E-02	0.15	7 50E-08	1.53E-05	
CHROMIUM, TOTAL	A-D	3.00E-03	$\overline{}$	2 86E-05	2 08E-02	5 00E-03	1 00E-03	1 33E-03	0 4	6 09E-08	0.004	
LEAD	<b>B</b> 2				3.95E-03	1 50E-01	4 00E-06	2 52E-04		4 64E-11		
bis(2-ETHYLHEXYL) PHTHALATE	- 1	2 00E-02	3 80€-03		6 00E-03	1 90E-01	1 60E-04	3 84E-04	0.019	2 82E-09	7 41E-07	
Hazard Index									6.		0.004	
								ř	otal Hazai	rd Index =	1.9	
WOE = Weight of Evidence, CDI ≈ (	Chronic	: Daily Intak	e, EPC ≖ E	xposure P	oint Concer	ıtratıon, HQ	≀ = Hazard	Quotient; HI	= Hazard	Index, *= ir	nhalation inta	ake (CDI)
· · · · · · · · · · · · · · · · · · ·	ALUMINUM ARSENIC BARIUM CHROMIUM, TOTAL LEAD DIS(2-ETHYLHEXYL) PHTHALATE Hazard Index NOE = Weight of Evidence, CDI = (	ALUMINUM ARSENIC ABARIUM CHROMIUM, TOTAL LEAD DIS(2-ETHYLHEXYL) PHTHALATE B2 Hazard Index WOE = Weight of Evidence, CDI = Chronic		ALUMINUM ARSENIC A 3.00E-04 1 23E-04 3ARIUM ARRIUM A-D 7 00E-02 4 90E-03 CHROMIUM, TOTAL A-D 3.00E-03 1 50E-05 B2 A-D 3.00E-02 4 90E-03 DIS(2-ETHYLHEXYL) PHTHALATE B2 2 00E-02 3 80E-03 4azard Index  NOE = Weight of Evidence, CDI = Chronic Daily intake, EPC = E	ALUMINUM  ARSENIC  A 3.00E-04 1 23E-04  3ARIUM  3ARIUM  3ARIUM  3ARIUM  3ABRIUM  3ABRIUM  3ABBRIUM  3BBRIUM  3BBRIUM	ALUMINUM  ARSENIC  ARSENIC  A 3.00E-04 1 23E-04 2 23E-03  3.00E-04 1 23E-04 2 23E-03  3.00E-04 1 23E-04 2 23E-03  3.00E-01 1.43E-04 1 60E-01  CHROMIUM, TOTAL  A-D 3.00E-03 1 50E-05 2 86E-05 2 08E-02  EAD  B2  3.95E-03  3.95E-03  4azard Index  NOE = Weight of Evidence, CDI = Chronic Daily intake, EPC = Exposure Point Concern	ALUMINUM  ARSENIC  AR	ALUMINUM  A 3.00E-04 123E-04  ARSENIC  A 3.00E-04 123E-04  BARIUM  CHROMIUM, TOTAL  A-D 3.00E-03 150E-05 2 86E-05 2 08E-02 5 00E-03 1 00E-01  B2  B2  B2  B3  B2  B3  B2  B3  B5  B2  B3  B5  B3  B5  B2  B2  B3  B5  B3  B5  B3  B5  B3  B5  B5  B5	ALUMINUM  ARSENIC  AR	ALUMINUM A 3.00E-04 123E-04 ASSENIC A 3.00E-04 123E-04 A-D 7 00E-02 4 90E-03 143E-04 1 60E-04 1 40E-04 0 5 B2 3.00E-03 1 50E-05 2 86E-05 2 08E-02 1 60E-04 1 02E-02 0 15 CHROMIUM, TOTAL A-D 3.00E-03 1 50E-05 2 86E-05 2 08E-02 1 00E-03 1 33E-03 0 4 B2 A-D 3.00E-03 3 80E-03 6 00E-03 1 90E-01 1 60E-04 3 84E-04 0.019 Azard Index  AOE = Weight of Evidence, CD1 = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient; HI = Hazard	ALUMINUM ARSENIC ARSENIC ARSENIC ARSENIC ARSENIC ARSENIC AA-D 7 00E-04 1 23E-04 1 40E-01 1 60E-04 1 43E-04 0 5 1 05E-09 ARRUM CHROMIUM, TOTAL A-D 3.00E-03 1 50E-05 2 86E-05 2 00E-03 1 00E-03 1 33E-03 0 4 6 60E-08 B2 A-D 3.00E-03 1 50E-05 2 86E-05 2 00E-03 1 00E-03 1 33E-03 0 4 6 60E-08 B2 A-D 3.00E-03 3 80E-03 6 00E-03 1 60E-04 3 84E-04 0,019 2 82E-09 Azzard Index AOE = Weight of Evidence, CDI = Chronic Daily intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient; HI = Hazard Index, * = i	1 00E+00 1 00E-01 1 127E+01 1 00E-01 1 60E-04 8,11E-01 0 8 5 96E-06 5 3.00E-04 1 23E-04 2 22E-03 4 10E-01 1 60E-04 1,43E-04 0 5 1 05E-09 8 7 00E-02 4 90E-03 1,43E-04 1 60E-01 7 00E-02 1 60E-02 0 15 7 50E-09 1 3.00E-03 1 50E-05 2 86E-05 2 08E-02 5 00E-03 1 00E-03 1 33E-03 0 4 6 69E-08 1 2 00E-02 3 80E-03 2 80E-03 1 50E-01 1 60E-04 3 84E-04 0,019 2 82E-09 7 1 1.9

# Offsite Monitoring Well (MW31), Indoor Air - Hypothetical Future Residential Adult Scenario Dunn Field, Defense Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds:

Intake for carcinogenic compounds:

CDI=	C <sub>atr</sub> * IR *EF * ED * CF BW * AT	C <sub>alr</sub> *	•	*EF * * CF	
	DAA W.I		Α		
		Carcinogenic	_	Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	EPC	_ b	EPC	b
IR =	Inhalation Rate (m³/day)	NA		20	а
IRadj =	Adjusted Inhalation Rate (m³-yr)/(kg-day)	13	a,c	NA	
EF =	Exposure Frequency (days/year)	350	а	350	а
ED =	Exposure Duration (years)	NA	а	30	a
CF =	Conversion Factor (mg/ug)	1.00E-03		1 00E-03	
BW =	Body Weight (kg)	NA	а	70	а
AT =	Averaging Time (days)	25550	а	10950	а

### Sources:

a = U S. EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings. Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

c = Age adjusted

Offsite Monitoring Well (MW31), Indoor Air - Hypothetical Future Residential Adult Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

			•	ပိ	Carcinogenic	_	Non	Noncarcinogenic	: <u>:</u>
Units	Chemical	WOE	EPC	SFi	īgo	ELCR	RfDI	ΙŒ	Ī
ug/m3	ug/m3 1,1,2,2-TETRACHLOROETHANE	ပ	3.4E-05	2.0E-01	6.0E-09	1.2E-09		9.3F-09	
ug/m3	1,1,2-TRICHLOROETHANE	ပ	9.4E-05	5 6E-02	1 7E-08	9 4E-10		2.6E-08	
ng/m3	1,1-DICHLOROETHENE	ပ	3 3E-03	1.8E-01	6.0E-07	1.0E-07		9.2E-07	
ng/m3	1,2-DICHLOROETHANE	B2	1.2E-04	9 1E-02	2 2E-08	2.0E-09	1.4E-03	3.4F-08	2.45E-05
ng/m3	CARBON TETRACHLORIDE	<b>B</b> 2	3.3E-03	5.3E-02	5.9E-07	3.1E-08	!	9.1E-07	1
ng/m3	CHLOROFORM	<b>B</b> 2	4 8E-04	8.1E-02	8 6E-08	60-E-09	0.0E+00	1.3F-07	
ng/m3	ds-1,2-DICHLOROETHYLENE	Δ	4.3E-04		7.7E-08		1.0E-02	1.2E-07	1.19E-05
ng/m3	TETRACHLOROETHYLENE(PCE	C-B2	1.7E-03	2.0E-03	3.1E-07	6.2E-10	1.7E-01	4.8E-07	2 80E-06
ng/m3	trans-1,2-DICHLOROETHENE		1.0E-03		1.8E-07		2.0E-02	2.7E-07	1.37F-05
ug/m3	ug/m3 TRICHLOROETHYLENE (TCE)	B2	1.1E-03	6.0E-03	1.9E-07	1.2E-09		3.0E-07	} !

Total ELCR: 1.48E-07

Total HI: 0.0001

0 007 b,e

350 a

30 a

70 a

10950 a

1.00E-03

Offsite Groundwater (MW31) (Potable Use) - Hypothetical Future Residential Adult Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

Ingestic	on:	<u>Carcinogenic</u>	Noncarcinogenic
_	or non-carcinogenic compounds	Age-specific intake (for carcinoger	arc compounds only)
CDI =	<u> </u>	$CDI_{adj} = \frac{C_{ow} * EF * CF * IR_{adj}}{CDI_{adj}}$	no compounds omy)
C <sub>aw</sub> =	Concentration in groundwater (mg/L)	AT	500
iR =	Ingestion Rate (L/day)	EPC N/A	EPC 2 -
IR <sub>ad)</sub> ≃	Age-adjusted Ingestion Rate (L-year/kg-day	) 1.1 b	2 a N/A
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	10950 a
Dermal:	:		
Intake fo	or non-carcinogenic compounds	Age-specific intake (for carcinogen	ac compounds only):
CDI =		CDI <sub>adj</sub> = C <sub>Dex</sub> *SA <sub>adi</sub> * PC * ET * EF * C	
	BW * AT	AT	<u>4.</u>
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	N/A	20000 b.c
SA <sub>adj</sub> =	Age-adjusted Surface Area (cm²-yr/kg)	9480 b.c	20000 B,0 N/A
PC =	Dermat Permeability Constant (cm/hr)	(Chemical Specific) d	
·	- Contracting Contracting	(Onemical Specific) d	(Chemical Specific) d

0 007 b.e

350 a

1.00E-03

30 a

70 a

25550 a

#### Inhalation:

ET =

EF =

FD =

CF =

BW =

AT =

CDI = Ingestion CDI from above f

Body Weight (kg)

Exposure Time (hr/day)

Exposure Duration (year)

Conversion Factor (L/cm3)

Averaging Time (days)

Exposure Frequency (day/year)

### References:

a = U.S. EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Age-adjusted ingestion rate for adults, adjusted for body weight and time for carcinogenic exposure

$$IRadj = \frac{IRc \times EDc}{BWc} + \frac{IRa \times (EDa - EDc)}{BWa} = \frac{1 \times 6}{15} + \frac{2 \times (30-6)}{70}$$

1.09 (L-year)/(kg-day)

b = USEPA Exposure Factors Handbook, August 1997

c = Total Body Surface Area represents whole body (average of male & female adults)

f = Age-adjusted surface area for adults, adjusted for body weight and time for carcinogenic exposure.

$$SAadj = SAc \times EDi + SAa \times (EDa - EDc = 6557 \times 6 + 20000 \times (30-6)$$
 $BWc BWa 15 70$ 

9480 (cm 2-year)/(kg)

d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value; all values adapted from EPA, Dermal Exposure Assessment. Principles and Applications, January 1992

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event

f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume). USEPA Supplemental Guidance to RAGS. Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Offsite Groundwater (MW31) (Potable Use) - Hypothetical Future Residential Adult Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

:									Ingestion	tion	Dermal	nal	Inhalation*
Units	Chemical	WOE	SFo	SFd	SFI	EPC	ABSgi	PC	<u>5</u>	ELCR	CDI	ELCR	ELCR
MG/L	ALUMINUM					1 36E+01	1 00E-01	1.60E-04	2 02E-01		1 97E-06		
MG/L	ARSENIC	∢	1.50E+00	.50E+00 3 66E+00	151E+01	3.26E-03	4 10E-01	1 60E-04	4.85E-05	7E-05	4 74E-10	2E-09	
MG/L	BARIUM	۵				1 79E-01	7 00E-02	1 60E-04	2 66E-03		2.60E-08	;	
MG/L	CHROMIUM, TOTAL	A-D				2.89E-02	5 00E-03	1.00E-03	4.30E-04		2 63E-08		
MG/L	IRON					4 30E+00	1 50E-01	1 60E-04	6 39E-02		6 25E-07		
MG/L	LEAD	82				1 09E-02	1 50E-01	4.00E-06	1 63E-04		3 98E-11		
MG/L	1,1,2,2-TETRACHLOROETHANE	ပ	2 00E-01	2 86E-01	2 03E-01	4.77E-02	7.00E-01	9 00E-03	7,09E-04	1E-04	3.90E-07	1E-07	1E-04
MG/L	1,1,2-TRICHLOROETHANE	ပ	5 70E-02	7.04E-02	5 60E-02	3 78E-03	8.10E-01	8 40E-03	5 63E-05	3E-06	2 89E-08	2E-09	3E-06
MG/L	1,1-DICHLOROETHENE	ပ	6 00E-01	6 00E-01	1 75E-01	2 22E-02	1,00E+00	1.60E-02	3 30E-04	2E-04	3.23E-07	2E-07	6E-05
MG/L	1,2-DICHLOROETHANE	82	9.10E-02	9 10E-02	9.10E-02	5 68E-03	1 00E+00	5 30E-03	8 45E-05	8E-06	2.74E-08	2E-09	8E-06
MG/L	CARBON TETRACHLORIDE	<b>B</b> 2	1 30E-01	2 00E-01	5 25E-02	2.88E-03	6 50E-01	2,20E-02	4 28E-05	90 <del>-</del> 39	5 76E-08	16-08	2E-06
MG/L	CHLOROFORM	<b>B</b> 2	6 10E-03	3.05E-02	8 05E-02	1 18E-02	2.00E-01	8 90E-03	1.76E-04	1E-06	9.59E-08	3E-09	16-05
MG/L	cis-1,2-DICHLOROETHYLENE	Δ				1 40E-02	1 00E+00	1 00E-02	2 08E-04		1 27E-07	; ;	<b>;</b>
MG/L	TETRACHLOROETHYLENE(PCE) C-B2	) C-B2	5.20E-02	5 20E-02	2 00E-03	3.31E-02	1 00E+00	4,80E-02	4 92E-04	3E-05	1 44E-06	8E-08	1E-06
MG/L	trans-1,2-DICHLOROETHENE					2 35E-02	1.00E+00	1 00E-02	3 50E-04		2.14E-07		
MG/L	TRICHLOROETHYLENE (TCE)	B2	1 10E-02	7 33E-02	6 00E-03	2.62E-01	1.50E-01	1 60E-02	3.89E-03	4E-05	3 81E-06	3E-07	2E-05
	Total Risk									5E-04		76-07	3E-04

WOE = Weight of Evidence; CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, ELCR = Excess Lifetime Cancer Exposure, \* = inhalation intake (CD Notes:

GNV/MW31\_ResA\_Ingest xls / NonCarcinogenic

Offsite Groundwater (MW31) (Potable Use) - Hypothetical Future Residential Adult Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

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:	i								Ingestion	tion	Pe	Dermal	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	RfDi	EPC	ABSgi	ပ္ရ	00	옃	 	유 	皇
MG/L	ALUMINUM		1 00E+00	1 00E-01		1 36E+01	1 00E-01	1 60E-04	3 72F-01	40	4 16F-06	4 16E-05	
Č		•	LOCK	100,					1	,		2	
		<	3 UUE-04	1 23E-U4		3 26E-03	4 10E-01	1 60E-04	8 93E-05	03	1 00E-09	8 13E-06	
MG/L	BARIUM	۵	7 00E-02	4 90E-03	1 43E-04	1 79E-01	7 OOF-02	1 60F-04	4 R9F-03	0.07	S ARE OR	1 12E OF	
Z Z	CHROMILIM TOTAL	<	2000	4 EOE OF	11000	1100				5 9		25.75	
í		ć	-	205-05	20-308 7	Z & SE-0Z	2 UUE-U3	1 00E-03	7 92E-04	03	5 55E-08	0 004	
אַפֿיר : פֿיר	NO.		3 00E-01	4 50E-02		4 30E+00	1.50E-01	1 60E-04	1.18E-01	0 4	132E-06	2 93E-05	
MG/L	LEAD	82				1 09E-02	1 50E-01	4 00F-06	3 00F-04		8 39E-11		
Z O V	1 1 2 2-TETRACHI OBOETHANE	c	8 00E 03	4 200 00		170	1000		11000	0	11000		
1		)	0 00 L-02	4 20E-02		4 / / E-02		200E-03	1 31E-03	0 02	8 23E-07	1 96E-05	
MC/L	1,1,2-1 KICHLOROETHANE	ပ	4 00E-03	3 24E-03		3 78E-03	8 10E-01	8 40E-03	1 04E-04	0.026	6 10F-08	1 88F-05	
MG/L	1,1-DICHLOROETHENE	ပ	9 00E-03	9 00E-03		2 22F-02	1 00F+00	1 60F-02	B ORE DA	9900	8 81E 07	7 585 05	
Ž	1 2.DICHI OROETHANE	Ca	2000	0000	400			1 6 6		3	201	20-11	
	1,1-10,10,11,10,11,10,11,11,11,11,11,11,11,1	70	3000-02	3 00 = 02	1 405-03	3 58E-U3	1 00=+00	5 30E-03	1 56E-04	0 0052	5 78E-08	1 93E-06	
MG/L	CARBON TETRACHLORIDE	<b>B</b>	7 00E-04	4 55E-04		2 88E-03	6 50E-01	2 20E-02	7 89E-05	0 11	1 21F-07	2 67F-04	
MG/L	CHLOROFORM	<b>B</b> 2	1 00E-02	2 00E-03		1 18E-02	2 DOF-01	8 90 5-03	3 25E-04		2 02E 07	2010	
MG/L	CIS-1.2-DICHLOROETHYLENE	_	1 00F-02	1 NOE-02	1 00E-02	1 40 11 02	1005100	100	2000	3 6	021202	10000	Č
		,			100	10101	201100	70-300	40.0	200	70-080 7	CO-360 7	400
ַבְּיִבְּיִבְּיִבְּיִבְּיִבְּיִבְּיִבְּיִ	I E I RACHLOROE I HYLENE(PCE)	C-82	1 00E-02	1 00E-02	1 71E-01	3 31E-02	1 00E+00	4 80E-02	9 06E-04	60 0	3 05E-06	0.0003	0.005
MG/L	trans-1,2-DICHLOROETHENE		2 00E-02	2 00E-02	2 00E-02	2.35F-02	1 00F+00	1 OUF.02	6 44F-04	0.03	4 515 07	20000	200
MG/L	TRICHLOROFITY: FNF (TOF)	8	6 OOF 03	2000		2 82 10 14	100	100	1 1 1 0 1	3 .		2 20E-03	2
		اا	3	2000		2 025	2000	1 00=-02	/ 1/E-U3	7.1	8 035-06	6000	
	Hazard Index									3		0 0 14	c

### Offsite Monitoring Well (MW31), Indoor Air - Hypothetical Future Residential Child Scenario Dunn Field, Defense Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds.

Averaging Time (days)

CDI=	<u>C<sub>air</sub> * IR *EF * ED * CF</u> BW * AT			
	DAA WI	Carcinogenic	Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	NA NA	EPC	b
IR =	Inhalation Rate (m³/day)	NA	15	а
EF =	Exposure Frequency (days/year)	NA	350	а
ED =	Exposure Duration (years)	NA	6	а
CF =	Conversion Factor (mg/ug)	NA	1.00E-03	
BW =	Body Weight (kg)	NA	15	а

NA

2190

а

### Sources:

AT =

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings. Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

Offsite Monitoring Well (MW31), Indoor Air - Hypothetical Future Residential Child Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

:				Ü	Carcinogenic	ပ	Non	Noncarcinogenic	Jic
Units	Chemical	WOE	EPC	SFi	CDI	ELCR	RfDi	ΙΩΌ	Ŧ
ng/m3	ug/m3 1,1,2,2-TETRACHLOROETHANE	ပ	3.39E-05	ł	1	:		3.25E-08	
ng/m3	1,1,2-TRICHLOROETHANE	ပ	9.43E-05	1	i	;		9.04F-08	
ug/m3	1,1-DICHLOROETHENE	ပ	3 34E-03	i	i	1		3.21E-06	
ng/m3	1,2-DICHLOROETHANE	82	1 25E-04	:	i	1	1 40F-03	1 20E-07	8 565.05
ng/m3	CARBON TETRACHLORIDE	<b>B</b> 2	3.32E-03	ł	;	ŀ	) ) !	3 19E-06	
ng/m3	CHLOROFORM	B2	4 83E-04	;	ł	-	0.00E+00	4 63F-07	
ng/m3	cis-1,2-DICHLOROETHYLENE	۵	4,35E-04	ì	1	;	1.00E-02	4 17E-07	4 17E-05
ng/m3	<b>TETRACHLOROETHYLENE(PCI</b>	C-B2	1 75E-03	;	;	}	1.71E-01	1.67F-06	9.79F-06
ng/m3	trans-1,2-DICHLOROETHENE		1.00E-03	;	3	;	2 00E-02	9 62E-07	4.81E-05
ug/m3	ug/m3 TRICHLOROETHYLENE (TCE)	B2	1.09E-03	1	t	1		1 05E-06	

0.0002

Total HI:

;

Total ELCR:

# Offsite Groundwater (MW31) (Potable Use) - Hypothetical Future Residential Child Scenario

Dunn Field, Defense Distribution L	Depot Men	nphis, T	ennessee
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	ore, positive production production prince, voice	Carcinogenic	Noncarcinogenic
Ingestio	n:		
Intake for	r non-carcinogenic and carcinogenic compounds:		
CDI =	<u>C' IR * EF * ED</u>		
	BW * AT		
C <sub>aw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	1 a	1 a
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a
Dermal:			
Intake for	non-carcinogenic and carcinogenic compounds:		
CDI =	C * SA * PC * ET * EF * ED * CF		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	6557 b, c	6557 b, c
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0.007 b,e	0 007 b,e
EF ≈	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
CF =	Conversion Factor (L/cm <sup>3</sup> )	1.00E-03	1 00E-03
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a

### Inhalation.

CDI = Ingestion CDI from above f

#### References:

- a = U.S. EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991.
- b = US EPA Exposure Factors Handbook, August 1997
  - Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998
- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old))
- d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment. Principles and Applications, January 1992.
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0.007 day per event
- f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles white showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Offsite Groundwater (MW31) (Potable Use) - Future Residential Child Carcinogenic Scenario (OptionaL)

Dunn Field, Defense Distribution Depot Memphis, Tennessee

									Indestion	i i	Darms	-62	Inhalation*
Units	Chemical	WOE	SFo	SFd	SFI	EPC	ABSai	ည	CO	ELCR	5	۳ تا	ELCR
MG/L	ALUMINŪM		İ			136E+01	1.00E-01	1 60F-04	1 60F-04 7 43F-02		5 46E.07		
MG/L	ARSENIC	۷	1.50F+00	150E+00 3 66E+00 1 51E+01 3 26E-03	1 51E+01	3 26E-03	10010	1000	1 700 05	40	7 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	L	L
(		. 1	1		2	20100	101	1000		000	2-1-1	ב ב ב	30-04
MG/L	BARIOM	Ω				1.79E-01	1.79E-01 7 00E-02	1 60E-04	9.79E-04		7 19E-09		
MG/L	CHROMIUM, TOTAL	A-D				2 RGE-02	5 OOE 03	1 00E 02	1 500.04		7 27 00		
. ();						1001		2	100		60-3171		
MG/C	TON TON				•	4.30E+00	1.50E-01	1.60F-04 2.36F-02	2.36F-02		1 73E-07		
2 (1)	•	,					•	2	1001		, כר היים		
۲ ورا	LEAD	85				1 09E-02	1 50E-01	4 00E-06 5 99F-05	5 99F-05		1 10F-11		
- CP4	にいるに 作れられる こうる むれいも ひらる マ	(	100	1000							-		
MG	1, 1, 4, 4-1 ET KACHLOROF LAANE	J	2.00E-01	2.00E-01 286E-01 203E-01 477E-02	2 03E-01	4 77E-02	7 00E-01	9 00E-03	2 61E-04	5E-05	1 08E-07	3E-08	5F-05
= 	1 2 TOTAL DOOD TOTAL C 1 4	C	20 HOV B	100	L	100		107	1				
)	יייייייייייייייייייייייייייייייייייייי	ر	3 / 05-02	3 / UE-UZ / U4E-UZ 3 BUE-UZ 3 / BE-U3	2 DUE-UZ	3 /8E-U3	8 10E-01 8 40E-03 Z 0/E-05	8 4UF-U3	2 U/E-05	1E-06	7 99E-09	6E-10	15-06
	lotai Kisk									75.514		3E-77	1
										1		2	10-11
										ř	Total Risk =	5F.04	
										•			

Offsite Groundwater (MW31) (Potable Use) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

									Ingestion	tion	De	Dermal	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	RfDi	EPC	ABSgi	ပ္ရ	<u> </u>	오	<u>a</u>	오	筓
MG/L	ALUMINUM		1 00E+00	1 00E-01		1 36E+01	1 00E-01	1.60E-04	8 67E-01	60	6 37E-06	6 37F-05	
MG/L	ARSENIC	∢	3 00E-04	1 23E-04		3 26E-03	4 10E-01	1 60E-04	2 08E-04	0.7	1 53E-09	1.24F-05	
MG/L	BARIUM	Δ	7 00E-02	4 90E-03	1,43E-04	1.79E-01	7 00E-02	1.60E-04	1 14E-02	0 16	8 38E-08	171F-05	
MG/L	CHROMIUM, TOTAL	ΑĐ	3.00E-03	1 50E-05	2 86E-05	2 89E-02	5 00E-03	1 00E-03	1 85E-03	90	8 48E-08	0.006	
MG/L	IRON		3 00E-01	4 50E-02		4 30E+00	1 50E-01	1 60E-04	2 75E-01	60	2 02E-06	4 49E-05	
MG/L	LEAD	<b>B</b> 2				1 09E-02	1.50E-01	4 00E-06	6 99E-04		1 28E-10		
MG/L	1,1,2,2-TETRACHLOROETHANE	ပ	6 00E-02	4 20E-02		4 77E-02	7.00E-01	9 00E-03	3 05E-03	0 05	1 26E-06	3 00E-05	
MG/L	1,1,2-TRICHLOROETHANE	ပ	4 00E-03	3 24E-03		3 78E-03	8 10E-01	8 40E-03	2 42E-04	0900	9 33E-08	2 88E-05	
MG/L	1,1-DICHLOROETHENE	ပ	9 00E-03	9 00E-03		2 22E-02	1 00E+00	1 60E-02	1 42E-03	0.16	1.04E-06	1 16E-04	
MG/L	1,2-DICHLOROETHANE	<b>B</b> 2	3 00E-02	3 00E-02	1 40E-03	5 68E-03	1 00E+00	5 30E-03	3 63E-04	0.012	8 84F-08	2 95E-06	
MG/L	CARBON TETRACHLORIDE	<b>B</b> 2	7.00E-04	4 55E-04		2 88E-03	6.50E-01	2 20E-02	1 84E-04	0.26	1 86F-07	0.0004	
MG/L	CHLOROFORM	85	1 00E-02	2 00E-03		1 18E-02	2.00E-01	8 90E-03	7 57E-04	008	3 09E-07	1.55E-04	
MG/L	cis-1,2-DICHLOROETHYLENE	۵	1 00E-02	1 00E-02	1 00E-02	1 40E-02	1 00E+00	1 00E-02	8 95E-04	600	4 11E-07	4 11F-05	60.0
MG/L	TETRACHLOROETHYLENE(PCE)	C-B2	1 00E-02	1 00E-02	171E-01	3 31E-02	1,00E+00	4 80E-02	2 12E-03	0.21	4 66E-06	0 0005	0.012
MG/L	trans-1,2-DICHLOROETHENE		2 00E-02	2 00E-02	2 00E-02	2 35E-02	1 00E+00	1 00E-02	1 50E-03	0 08	6 90F-07	3 45F-05	800
MG/L	TRICHLOROETHYLENE (TCE)	<b>B</b> 2	6.00E-03	9 00E-04		2.62E-01	1 50E-01	1 60E-02	1 67E-02	က	1 23E-05	0.014	
	Hazard Index									7		0 021	

nazard index

Total Hazard Index = 7

WOE = Weight of Evidence, CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index, \* = inhalation intake (CDI) = ir

### Offsite Monitoring Well (MW32), Indoor Air - Hypothetical Future Residential Adult Scenario Dunn Field, Defense Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds

Intake for carcinogenic compounds:

CDI=	C <sub>air</sub> * IR *EF * ED * CF BW * AT	C <sub>air</sub> *	IR <sub>adi</sub> A	*EF * * CF	
	···	Carcinogenic		Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	EPC	b	EPC	b
IR =	Inhalation Rate (m³/day)	NA		20	а
IRadj =	Adjusted Inhalation Rate (m³-yr)/(kg-day)	13	a,c	NA	
<b>EF</b> =	Exposure Frequency (days/year)	350	a	350	а
ED =	Exposure Duration (years)	NA	а	30	а
CF =	Conversion Factor (mg/ug)	1 00E-03		1 00E-03	
BW =	Body Weight (kg)	NA	а	70	а
AT =	Averaging Time (days)	25550	а	10950	а

#### Sources:

a = U.S. EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings. Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

c = Age adjusted

0.00002

Total HI:

Total ELCR: 4.35E-08

Offsite Monitoring Well (MW32), Indoor Air - Hypothetical Future Residential Adult Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

			,	Ö	Carcinogenic		Non	Noncarcinogenic	泸
Units	Chemical	WOE	EPC	SFi	GDI	ELCR	RfDi	igo	Ŧ
n3	ug/m3 1,1,2,2-TETRACHLOROETHANE	ပ	3.54E-05	2.03E-01	6 30E-09	1.28E-09		9.70E-09	
ng/m3	1,1,2-TRICHLOROETHANE	ပ	9.80E-05	5.60E-02	1.75E-08	9 77E-10		2.68E-08	
ng/m3	CARBON TETRACHLORIDE	<b>B</b> 2	3.43E-03	5.25E-02	6.12E-07	3.21E-08		9.41E-07	
ng/m3	CHLOROFORM	<b>B</b> 2	5.05E-04	8 05E-02	9.00E-08	7.25E-09	7.25E-09 0.00E+00	1.38E-07	
ng/m3	cis-1,2-DICHLOROETHYLENE	0	4.49E-04		8.00E-08		1.00E-02	1.23E-07	1.23E-05
ည	ug/m3 TETRACHLOROETHYLENE(PCE	C-B2	1.80E-03	2.00E-03	3.20E-07	6.41E-10	1.71E-01	4.93E-07	2.88€-06
υ3	ug/m3 TRICHLOROETHYLENE (TCE)	B2	1.13E-03	6 00E-03	2.01E-07	1.21E-09		3 10E-07	

Offsite Groundwater (MW32) (Potable Use) - Hypothetical Future Residential Adult Scenario

Ingestic	un'	<u>Carcinogenic</u>	Noncarcinogenic Noncarcinogeni
	m: or non-carcinogenic compounds	A	
CDI =	C <sub>ow</sub> * IR * EF * ED	Age-specific intake (for carcinoge	nic compounds only)
CD1 -	BW * AT	$CDI_{adj} = \underline{C_{ow} * EF * CF * IR_{adj}}$	
C <sub>aw</sub> =		AT	
iR=	Concentration in groundwater (mg/L)	EPC	EPC
	Ingestion Rate (L/day)	N/A	2 a
iR <sub>adj</sub> =	Age-adjusted Ingestion Rate (L-year/kg-da		N/A
EF = ED =	Exposure Frequency (day/year)	350 a	350 a
BW=	Exposure Duration (year)	30 a	30 a
AT =	Body Weight (kg)	70 a	70 a
A1 -	Averaging Time (days)	25550 a	10950 a
Dermal:			
	r non-carcinogenic compounds	Age-specific intake (for carcinoger	nic compounds only)
CDI =	Cow *SA * PC * ET * EF * ED * CF	CDI <sub>adi</sub> = Com *SA <sub>adi</sub> * PC * ET * EF *	<u>CF</u>
	BW * AT	AT	
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	N/A	20000 b.
SA <sub>odj</sub> =	Age-adjusted Surface Area (cm²-yr/kg)	9480 b.c	N/A
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ËT =	Exposure Time (hr/day)	0 007 b,e	0.007 b.
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
CF =	Conversion Factor (L/cm <sup>3</sup> )	1 00E-03	1 00E-03
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	10950 a
Inhalatic CDI =			
CDI =	Ingestion CDI from above f		
Referen	ces'		
a = U.S	EPA, Human Health Evaluation Manual, Suj OSWER Directive 9285 6-03, March 25, 1	pplementał Guidance <sup>.</sup> "Standard Defauli	t Exposure Factors"
= Ane-	adjusted ingestion rate for adults, adjusted for	331	
, ,,90-	- IRadj = <u>IRc x EDc</u> + <u>IR</u> a x (EDa		· · · · · · · · · · · · · · · · · · ·
	max coa-	<u>EDc)</u> = <u>1x6</u> +	2 x (30-6)

$$|Radj| = \frac{|Rc \times EDc|}{BWc} + \frac{|Ra \times (EDa - EDc)|}{BWa} = \frac{1 \times 6}{15} + \frac{2 \times (30-6)}{70}$$

1.09 (L-year)/(kg-day)

b = USEPA Exposure Factors Handbook, August 1997

c = Total Body Surface Area represents whole body (average of male & female adults)

f = Age-adjusted surface area for adults, adjusted for body weight and time for carcinogenic exposure

SAadj = 
$$\frac{\text{SAc x ED}_{\text{c}}}{\text{BWc}}$$
 +  $\frac{\text{SAa x (EDa - EDc'}}{\text{BWa}}$  =  $\frac{6557 \times 6}{15}$  +  $\frac{20000 \times (30-6)}{70}$ 

9480 (cm²-year)/(kg)
d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment Principles and Applications, January 1992

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0.007 day per event.

f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles white showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interm, November 1995.

Offsite Groundwater (MW32) (Potable Use) - Hypothetical Future Residential Adult Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

:									Ingestion	stion	Derma	nai	Inhalation*
Units	Chemical	WOE	SFo	SFd	SFI	EPC	ABSgl	PC	CDI	ELCR	<u>g</u>	ELCR	ELCR
MG/L	ALUMINUM					2,70E+01	1,00E-01	1 60E-04	4.01E-01		3.92E-06		
MG/L	ARSENIC	∢	1 50E+00	3.66E+00	151E+01	5 55E-03	4.10E-01	1 60E-04	8 25E-05	1E-04	8.07E-10	3F-09	1E-03
MG/L	BARIUM	Ω				5.11F-01	7 OOF-02	1 60F-04	7 595-03		7.43E.08		3
MG/L	CADMIUM	æ			6.30F+00		1 OOE-02	1001	2 281 08		125-00		į
MG/L	CHROMIUM TOTAL	Α.			2000	· u	5 000-02	1000	7 405 04		60-H05		T-04
MG/L	IRON	1				8 66E+00	1 500.03	1 000	1 20E-04		4.30E-06		
, CA		ć				0000	7	1000	10-367		205-20		
אַפּיר בייי	LEAU	82				2 32E-02	1 50E-01	4 00E-06	3 45E-04		8.42E-11		
MG/L	MANGANESE	Ω				2.03E+00	4 00E-02	1 60E-04	3 02E-02		2 96E-07		
MG/L	VANADIUM					1.58E-02	1 00E-02	1 60E-04	2 34E-04		2 29E-09		
MG/L	bis(2-ETHYLHEXYL) PHTHALATE	E B2	1 40E-02	7.37E-02	1 40E-02	4 60E-02	1 90E-01	1 60E-04	6 84E-04	1 <b>F-</b> 05	6 69F-09	5E-10	70.7
MG/L	1.1.2.2-TETRACHLOROETHANF	C	2 00F-01	2 RRF-01	2 03E-01	4 RSE.02	7 OOE -04	0.000		, 5 5	1 1 0 0	1 L	3 6
		) (		1		100	2000		9451-04	1	2000	2	1E-04
MG/L	1,1,4-1KICHLOKOFIHANE	ပ	5 70E-02	7 04E-02	5.60E-02	2.53E-03	8.10E-01	8.40E-03	3 76E-05	2E-06	1 93E-08	1E-09	2E-06
MG/L	CARBON TETRACHLORIDE	82	1 30E-01	2.00E-01	5 25E-02	2.84E-02	6.50E-01	2 20E-02	4 22E-04	5E-05	5 68E-07	1E-07	2F-05
MG/L	CHLOROFORM	<b>B</b> 2	6.10E-03	3 05E-02	8 05E-02	7.43E-02	2 00E-01	8.90E-03	1.11F-03	7F-06	8 01F-07	20-HC	50.30
MG/L	cis-1,2-DICHLOROETHYLENE	۵				1,03E-02	1 00E+00	1.00E-02	1 53E-04	}	9.35E-08	9	20
MG/L	TETRACHLOROETHYLENE(PCE) C-82	) C-82	5 20E-02	5 20E-02	2.00E-03	2 53E-03	1.00E+00	4 80E-02	3 76F-05	2F-06	1 10E-07	PE-09	80-118
MG/L	TRICHLOROETHYLENE (TCE)	B2	1 10E-02	7		6 84E-02	1.50E-01	1.60E-02	1 02E-03	1E-05	9 95E-07	76-08	6E-06
	Total Risk									3E-04		3E-07	2E-03

WOE = Weight of Evidence; CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, ELCR = Excess Lifetime Cancer Exposure, \* = inhalation intake (CD

Offsite Groundwater (MW32) (Potable Use) - Hypothetical Future Residential Adult Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

:									Ingestion	tion	De	Dermal	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	RfD	EPC	ABSgi	ပ္ရ	G	오	<u>5</u>	皇	오
MG/L	ALUMINUM		1 00E+00	1 00E-01		2 70E+01	1 00E-01	1.60E-04	7 39E-01	20	8 28F-06	8 28F-05	
MG/L	ARSENIC	∢	3.00E-04	1 23E-04		5 55E-03	4 10E-01	1 60E-04	1 52E-04	0 0	1.70F-09	1 38F-05	
MG/L	BARIUM	۵	7,00E-02	4 90E-03	143E-04	5 11E-01	7 00E-02	1 60F-04	1 40F-02	020	1.57E-07	3 20E-05	
MG/L	CADMIUM	. 6	5 00E-04	5 00E-06		1.52E-03	1 00E-02	1 OOF 03	4 16 1-05	200	2 02 00	2,201-03 201-03	
MG/L	CHROMIUM, TOTAL	٩٠	3 00E-03	1 50E-05	2 86E-05	5 04E-02	5 00E-03	1 00E-03	1 38F-03	3 6	9.52E-03	0.00	
MG/L	IRON		3 00€-01	4 50E-02		8 66E+00	1 50E-01	1 60E-04	2 37E-01	80	2 66F-06	5 90F-05	
MG/L	LEAD	82				2 32E-02	1 50E-01	4 00E-06	6.35F-04	•	1 78F-10	t t	
MG/L	MANGANESE	٥	1 40E-01	5 60E-03	1 43E-05	2 03E+00	4 00E-02	1 60E-04	5.57E-02	0 40	6 24E-07	111F-04	
MG/L	VANADIUM		7 00E-03	7.00E-05		1 58E-02	1,00E-02	1 60E-04	4 32E-04	90 0	4 83F-09	6 90F-05	
MG/L	bis(2-ETHYLHEXYL) PHTHALATE	82	2 00E-02	3 80E-03		4 60E-02	1 90E-01	1 60E-04	1 26E-03	ò	141F-08		
MG/L	1,1,2,2-TETRACHLOROETHANE	ပ	6 00E-02	4 20E-02		4 65E-02	7 00E-01	9 00E-03	1 28E-03	0 021	8 03E-07	1 91E-05	
MG/L	1,1,2-TRICHLOROETHANE	ပ	4 00E-03	3 24E-03		2 53E-03	8 10E-01	8 40E-03	6 92E-05	0 017	4 07E-08	1 26F-05	
MG/L	CARBON TETRACHLORIDE	82	7 00E-04	4 55E-04		2 84E-02	6 50E-01	2.20E-02	7 77E-04	-	1 20F-06	0.0026	
MG/L	CHLOROFORM	B2	1 00E-02	2 00E-03		7 43E-02	2 00E-01	8 90E-03	2 04E-03	0.2	1 27E-06	9000	
MG/L	as-1,2-DICHLOROETHYLENE	۵	1 00E-02	1 00E-02	1 00E-02	1 03E-02	1 00E+00	1 00E-02	2 82E-04	0,028	1 97E-07	1 97E-05	0.028
MG/L	TETRACHLOROETHYLENE(PCE)	C-B2	1 00E-02	1 00E-02	1 71E-01	2 53E-03	1 00E+00	4 80E-02	6.93E-05	0 00 0	2 33F-07	2.33E-05	4 05E-04
MG/L	TRICHLOROETHYLENE (TCE)	B2	6 00E-03	9 00E-04		6 84E-02	1 50E-01	1 60E-02	1 87E-03	031	2 10E-06	0 0023	
	Hazard Index									5		0.013	0

Total Hazard Index = 5
WOE = Weight of Evidence, CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index, \* = inhalation intake (CDI) = ir

### Offsite Monitoring Well (MW32), Indoor Air - Hypothetical Future Residential Child Scenario Dunn Field, Defense Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds:

CDI=	Cale * IR *EF * ED * CF
	BW * AT

		Carcinogenic	Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	NA NA	EPC	ь
IR =	Inhalation Rate (m³/day)	NA	15	а
EF =	Exposure Frequency (days/year)	NA	350	а
ED =	Exposure Duration (years)	NA	6	а
CF =	Conversion Factor (mg/ug)	NA	1.00E-03	
BW =	Body Weight (kg)	NA	15	а
AT =	Averaging Time (days)	NA	2190	а

### Sources:

a = U.S. EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991.

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings. Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response.

Offsite Monitoring Well (MW32), Indoor Air - Hypothetical Future Residential Child Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

:					Carcinogenic	<u>.</u>	Non	Noncarcinogenic	ji
Units	Chemical	WOE	EPC	SFi	CDI	ELCR	RfDi	GDI	Ξ
ng/m3	ug/m3 1,1,2,2-TETRACHLOROETHANE	ပ	3 5E-05	!	!	-		3.4E-08	
ng/m3	ug/m3 1,1,2-TRICHLOROETHANE	ပ	9.8E-05	!	ł	ŀ		9.4E-08	
ng/m3	CARBON TETRACHLORIDE	<b>B</b> 2	3 4E-03	:	1	!		3.3E-06	
ng/m3	CHLOROFORM	B2	5.1E-04	ł	ı	1	0.0E+00	4.8F-07	
ng/m3	cis-1,2-DICHLOROETHYLENE	۵	4.5E-04	ł	ł	;	1 0E-02	4.3F-07	-
ng/m3 T	<b>TETRACHLOROETHYLENE(PCE</b>	C-B2	1.8E-03	ł	1	ŀ	1.7E-01	1.7E-06	1.01E-05
ug/m3	ug/m3 TRICHLOROETHYLENE (TCE)	B2	1.1E-03	ł	1	ł		1.1F-06	1

0.0001

Total HI:

1

Total ELCR:

Printed on: 10/25/2001 3 16 PM

# Offsite Groundwater (MW32) (Potable Use) - Hypothetical Future Residential Child Scenario

Dunn Field, Defense Distribution	Depot Memphis,	Tennessee
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		<u>Carcinogenic</u>	Noncarcinogenic
Ingestio	n:		
Intake fo	r non-carcinogenic and carcinogenic compounds:		
CDI =	C * IR * EF * ED		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
łR <sup>°</sup> ≃	Ingestion Rate (L/day)	1 a	1 a
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 а	6 a
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a
Dermal:			
Intake for	r non-carcinogenic and carcinogenic compounds:		
CDI =	C * SA * PC * ET * EF * ED * CF		
	BW * AT		
$C_{gw} =$	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	6557 b, c	6557 b, c
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0.007 b,e	0.007 b,e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
CF =	Conversion Factor (L/cm³)	1.00E-03	1.00E-03
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a

### Inhalation:

CDI = Ingestion CDI from above f

### References:

- a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991.
- b = US EPA Exposure Factors Handbook, August 1997
  - Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998.
- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old))
- d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment. Principles and Applications, January 1992
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event.
- f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Offsite Groundwater (MW32) (Potable Use) - Future Residential Child Carcinogenic Scenario (OptionaL) Dunn Field, Defense Distribution Depot Memphis, Tennessee

		:							ude	ngestion	Dermal	mai	Inhalation
Juits	Chemical	WOE	OE SFo	SFd	SFi	EPC	ABSgi	ပ	<u>5</u>	ELCR	<u>5</u>	ELCR	ELCR
	ALUMINUM					2.70E+01 1 00E-01	1 00E-01	1 60E-04	1 48E-01		1.09E-06		
	ARSENIC	⋖	1 50E+00	3 66E+00	1 50E+00 3 66E+00 1,51E+01 5,55E-03	5.55E-03	4,10E-01	1 60E-04	3.04F-05	50-75	2 23E-10	8F-10	5E-04
	BARIUM	۵				5 11E-01 7 00E-02	7 00E-02	1 60E-04	2 80E-03		2.05F-08	2	1
	CADMIUM	81			6 30E+00	6 30E+00 1.52E-03	1 00E-02	1,00E-03			3 82E-10		5E-05
MG/L	CHROMIUM, TOTAL	A-D				5 04E-02 5 00E-03	5 00E-03	1 00E-03			1 27E-08		
	IRON					8 66E+00	66E+00 1 50E-01	1.60E-04	4.74E-02		3.48E-07		
	LEAD	B2				2.32E-02	2.32E-02 1 50E-01	4 00E-06 1	1 27E-04		2 33E-11		
1	MANGANESE	٥				2 03E+00	03E+00 4 00E-02	1 60E-04 1,11E-02	1.11E-02		8 18E-08		
	lotal Kisk									1E-04		9E-08	6E-04
										è	Total Risk =	7E-04	

Offsite Groundwater (MW32) (Potable Use) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

;									Ingestion	tion	Der	Dermai	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	R Ö	EPC	ABSgi	S	CD	ã	<u>5</u>	요 	유
MG/L	ALUMINUM		1 00E+00	1.00E-01		2,70E+01	1 00E-01	1 60E-04	1 72E+00	17	1 27E-05	1 27F-04	
MG/L	ARSENIC	∢	3 00E-04	1 23E-04		5 55E-03	4 10E-01	1 60F-04	3.55F-04	7	2 60F-09	2 12E 05	
WC/I	BARIUM	c	7 OOE 02	4 90E-03	1 720	7,10	7 00 00	1 000	2000	u C	2000		
		,	100	100	101	- I	70-100	1000	20-202 0	0.0	70-304 Z	4 88 11-03	
MG/L	CADMIUM	'n	5 00E-04	5 00E-06		1 52E-03	100E-02	1 00E-03	9 72E-05	0 19	4 46E-09	60000	
MG/L	CHROMIUM, TOTAL	٩٠٥	3 00E-03	1 50E-05	2 86E-05	5 04E-02	5 00E-03	1 00E-03	3 22E-03	1.	1 48E-07	0 0 0 0	
MG/L	RON		3.00E-01	4 50E-02		8 66E+00	1 50E-01	1 60E-04	5 53E-01	80	4 06E-06	9.03E-05	
MG/L	LEAD	<b>B</b> 5				2 32E-02	1 50E-01	4 00E-06	1.48E-03		2 72E-10		
MG/L	MANGANESE	Δ	1 40E-01	5 60E-03	143E-05	2 03E+00	4 00E-02	1 60E-04	130E-01	6.0	9 55F-07	1 70E-04	
MG/L	VANADIUM		7 00E-03	7 00E-05		1 58E-02	1 00E-02	1 60E-04	1 01E-03	0 14	7.39E-09	1 06F-04	
MG/L	bis(2-ETHYLHEXYL) PHTHALATE		2 00E-02	3 80E-03		4 60E-02	1 90E-01	1 60E-04	2 94E-03		2 16E-08	0	
MG/L	1,1,2,2-TETRACHLOROETHANE	ပ	6 00E-02	4 20E-02		4 65E-02	7 00E-01	9 00E-03	2 98E-03	0 05	1.23E-06	2 93F-05	
MG/L	1,1,2-TRICHLOROETHANE	ပ	4 00E-03	3 24E-03		2.53E-03	8 10E-01	8 40E-03	161E-04	0.040	6 23E-08	1.92E-05	
MG/L	CARBON TETRACHLORIDE	83	7 00E-04	4.55E-04		2 84E-02	6 50E-01	2 20E-02	181E-03	2.6	1835-06	0.0040	
MG/L	CHLOROFORM	<b>B</b> 2	1 00E-02	2.00E-03		7 43E-02	2 00E-01	8 90E-03	4 75E-03	0.5	1 94E-06	0.0010	
MG/L	cis-1,2-DICHLOROETHYLENE	۵	1 00E-02	1 00E-02	1 00E-02	1 03E-02	1 00E+00	1 00E-02	6 58E-04	0 07	3 02E-07	3 02E-05	0 07
MG/L	TETRACHLOROETHYLENE(PCE)	C-B2	1 00E-02	1.00E-02	1 71E-01	2 53E-03	1 00E+00	4 80E-02	1 62E-04	0 016	3 56E-07	3 56E-05	6000 0
MG/L	TRICHLOROETHYLENE (TCE)	B2	6.00E-03	9 00E-04		6 84E-02	1 50E-01	1 60E-02	4 37E-03	0.7	3 21E-06	0 0036	
	Hazard Index									12		0.020	o

nazard index

12

VOE = Weight of Evidence, CDI = Chronic Daily Intake; EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index, \* = inhalation intake (CDI) = ir

# Offsite Monitoring Well (MW33), Indoor Air - Hypothetical Future Residential Adult Scenario Dunn Field, Defense Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds:

Intake for carcinogenic compounds:

CDI=	Calv * IR *EF * ED * CF BW * AT	Cair *		*EF * * CF	
		Carcinogenic		Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	EPC	b	EPC	- b
IR =	Inhalation Rate (m³/day)	NA		20	а
!Radj =	Adjusted Inhalation Rate (m³-yr)/(kg-day)	13	a,c	NA NA	_
EF =	Exposure Frequency (days/year)	350	a	350	а
ED =	Exposure Duration (years)	NA	а	30	a
CF =	Conversion Factor (mg/ug)	1 00E-03		1.00E-03	
BW =	Body Weight (kg)	NA	а	70	а
AT =	Averaging Time (days)	25550	а	10950	а

### Sources:

a = U S. EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991.

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

c = Age adjusted

Offsite Monitoring Well (MW33), Indoor Air - Hypothetical Future Residential Adult Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

JI.	Ŧ	
carcinoger	IGO	3.5E-09
Non	RfDi	
	ELCR	4.6E-10
arcinogenic	CDI	2.3E-09
Ca	SFi	2.0E-01
•	EPC	1.3E-05
	WOE	ပ
	Chemical	1,1,2,2-TETRACHLOROETHANE
	Units	ug/m3

Total ELCR: 4.63E-10 Total HI:

0.0000

Offsite Groundwater (MW33) (Potable Use) - Hypothetical Future Residential Adult Scenario

Dunn Field, Defense Distribution Depot N	Memphis,	Tennessee
--	----------	-----------

		<u>Carcinogenic</u>	Noncarcinogenic
Ingestio			
Intake fo	r non-carcinogenic compounds	Age-specific intake (for carcinogenic	compounds only).
ÇDI ≃	<u>C<sub>ov.</sub> * IR * EF * ED</u>	CDI <sub>adj</sub> = Com * EF * CF * IR <sub>adi</sub>	• • • • • • • • • • • • • • • • • • • •
	BW * AT	AT	
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	N/A	2 a
łR <sub>adj</sub> =	Age-adjusted Ingestion Rate (L-year/kg-da	у) 11 Ь	N/A
EF =	Exposure Frequency (day/year)	350 a	350 a
ED ≃	Exposure Duration (year)	30 a	30 a
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	10950 a
Dermal: Intake for CDI =	r non-carcinogenic compounds.  Cox *SA * PC * ET * EF * ED * CF  BW * AT	Age-specific intake (for carcinogenic CDI <sub>adj</sub> = C <sub>0=</sub> *SA <sub>-dj</sub> *PC*ET*EF*CF	
C <sub>gw</sub> ≃	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	N/A	20000 b,c
SA <sub>adj</sub> =	Age-adjusted Surface Area (cm²-yr/kg)	9480 b,c	N/A
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0 007 b.e	0.007 b.e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
CF =	Conversion Factor (L/cm³)	1 00E-03	1 00E-03
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	10950 a

#### Inhalation:

CDI = Ingestion CDI from above f

### References:

a = U S. EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Age-adjusted ingestion rate for adults, adjusted for body weight and time for carcinogenic exposure.

IRadj = 
$$\frac{IRc \times EDc}{BWc}$$
 +  $\frac{IRa \times (EDa - EDc)}{BWa}$  =  $\frac{1 \times 6}{15}$  +  $\frac{2 \times (30-6)}{70}$ 

1.09 (L-year)/(kg-day)

b = USEPA Exposure Factors Handbook, August 1997

c = Total Body Surface Area represents whole body (average of male & female adults)

f = Age-adjusted surface area for adults, adjusted for body weight and time for carcinogenic exposure

SAadj = 
$$\frac{\text{SAc x ED}_1}{\text{BWc}}$$
 +  $\frac{\text{SAa x (EDa - EDc}}{\text{BWa}}$  =  $\frac{6557 \times 6}{15}$  +  $\frac{20000 \times (30-6)}{70}$ 

9480 (cm 2-year)/(kg)

d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment: Principles and Applications, January 1992

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event

f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Offsite Groundwater (MW33) (Potable Use) - Hypothetical Future Residential Adult Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

									Ingestion	tion	Dermal	nal	Inhalation*
Units	Chemical	WOE	SFo	SFd	SFI	EPC	ABSgi	<b>P</b>	Ю	ELCR	CD	ELCR	ELCR
MG/L	ALUMINUM					111E+01	11E+01 1.00E-01	1 60E-04 1.66E-01	1.66E-01		1.62E-06		
MG/L	ARSENIC	∢	1 50E+00	3 66E+00	151E+01	50E+00 3 66E+00 1 51E+01 6.37E-03 4 10E-01	4 10E-01	1 60E-04	9.47E-05	1E-04	9 26E-10	3E-09	
MG/L	BARIUM	Δ				1.18E-01	7 00E-02	1.60E-04 175E-03	1 75E-03		1 71E-08		
MG/L	CHROMIUM, TOTAL	A-D				2 12E-02	2 12E-02 5 00E-03		1.00E-03 3.15E-04		1 92E-08		
MG/L	IRON					2 88E+00	1,50E-01		1.60E-04 4 29E-02		4 19E-07		
MG/L	LEAD	85				9.72E-03	1.50E-01	3 1.50E-01 4 00E-06	1.45E-04		3.53E-11		
MG/L	1,1,2,2-TETRACHLOROETHANE	O	2 00E-01 2 86E-01 2.03E-01	2 86E-01	2.03E-01	2.23E-03	7 00E-01	2.23E-03 7 00E-01 9 00E-03 3.32E-05	3.32E-05	7E-06	1.83E-08	5E-09	7E-06
	Total Risk									1E-04		9E-09	7E-06

Offsite Groundwater (MW33) (Potable Use) - Hypothetical Future Residential Adult Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

;	,								səbuj	ngestion	Der	Derma	Inhalation
is Is	Chemical	WOE	RfDo	RfDd	RfDi	EPC	ABSgi	ပ	<u>5</u>	럋	<u> </u>	몆	ВH
<del>,</del>	ALUMINUM		1.00E+00	1 00E-01		1 11E+01	1 00E-01	1 60E-04	3 05E-01	03	3 42E-06	3 42E-05	
٦,	ARSENIC	∢	3 00E-04	1 23E-04		6 37E-03	4 10E-01	1.60E-04	1 74E-04	90	1 95E-09	1 59E-05	
<u>بر</u>	BARIUM	۵	7 00E-02	4 90E-03	1 43E-04	1 18E-01	7 00E-02	1 60E-04	3 23E-03	0 05	3 61E-08	7 37E-06	
٦,	CHROMIUM, TOTAL	ΑĐ	3 00E-03	1 50E-05	~	2 12E-02	5.00E-03	1 00E-03	5 80E-04	0.5	4 06E-08	0 003	
봈	RON		3 00E-01	4 50E-02		2 88E+00	1 50E-01	1 60E-04	7 90F-02	0.26	8 85F-07	1 97F-05	
MG/L	LEAD	82				9 72E-03	1 50E-01	4 00E-06		) 	7 45E-11	1	
إي	1,1,2,2-TETRACHLOROETHANE	ပ	6 00E-02 4 20E-02	4 20E-02		2 23E-03	7 00E-01	9 00E-03	_	0 0010	3 86E-08	9 18E-07	
	Hazard Index									1.4		0.003	

Total Hazard Index = 1.4

WOE = Weight of Evidence, CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index, \* = inhalation intake (CDI) = ir

# Offsite Monitoring Well (MW33), Indoor Air - Hypothetical Future Residential Child Scenario Dunn Field, Defense Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds:

CDi=	Car * IR *EF * ED * CF
	BW * AT

		Carcinogenic	Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	NA NA	EPC	b
IR =	Inhalation Rate (m³/day)	NA	15	а
EF =	Exposure Frequency (days/year)	NA	350	а
ED =	Exposure Duration (years)	NA	6	а
CF =	Conversion Factor (mg/ug)	NA	1.00E-03	
BW =	Body Weight (kg)	NA	15	а
AT =	Averaging Time (days)	NA	2190	а

### Sources:

a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings. Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

Offsite Monitoring Well (MW33), Indoor Air - Hypothetical Future Residential Child Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

	1	
ņ	₹	
carcinogen	G	1 2E-08
Non	RfDi	
ic	ELCR	ŧ
Sarcinogen	CDI	:
)	SFi	;
	EPC	1 3E-05
	WOE	ပ
	Chemical	1,1,2,2-TETRACHLOROETHANE
	Units	ug/m3

0.000

Total HI:

1

Total ELCR:

Offsite Groundwater (MW33) (Potable Use) - Hypothetical Future Residential Child Scenario

Dunn Field, Defense Distribution Depot Memphis, Tennessee

		Carcinogenic	Noncarcinogenic
Ingestio	n:	<del></del>	
Intake fo	r non-carcinogenic and carcinogenic compounds.		
CDI ≃	C <sub>m</sub> , IR * EF * ED		
	BW * AT		
$C_{gw} =$	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	1 a	1 a
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a
Dermal: Intake for CDI =	non-carcinogenic and carcinogenic compounds  Com *SA * PC * ET * EF * ED * CF  BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	6557 b, c	6557 b. c
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0 007 b,e	0.007 b,e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 а	6 a
CF =	Conversion Factor (L/cm³)	1 00E-03	1.00E-03
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a

### Inhalation:

CDI = Ingestion CDI from above f

### References:

- a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance. "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991
- b = US EPA Exposure Factors Handbook, August 1997.
  - Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998.
- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old)).
- d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value; all values adapted from EPA, Dermal Exposure Assessment Principles and Applications, January 1992.
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0.007 day per event.
- f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles white showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Offsite Groundwater (MW33) (Potable Use) - Future Residential Child Carcinogenic Scenario (OptionaL) Dunn Field, Defense Distribution Depot Memphis, Tennessee

WOE SFO SFI EPC ABSgI PC  111E+01 100E-01 160E-04  A 150E+00 366E+00 151E+01 6 37E-03 4 10E-01 160E-04  D 118E-01 700E-02 160E-04  A-D 212E-02 5 00E-03 100E-03 2.88E+00 150E-01 160E-04  972E-03 150E-01 160E-04  972E-03 150E-01 4 00E-05  COETHANE C 2.00E-01 2 03E-01 2 23E-03 7 00E-01 9 00E-03	:									Ingestion	tlon	Derma	mai	Inhalation
ALUMINUM ARSENIC ARSENIC ARSENIC ARSENIC ARSENIC ARSENIC A-D CHROMIUM, TOTAL A-D CHROMIUM, TOTAL BARIUM A-D CHROMIUM, TOTAL A-D CHROMIUM, TOTAL B2 1,1,2,2-TETRACHLOROETHANE C 2.00E-01 2 86E-01 2 03E-01 2 23E-03 7 00E-01 Fotal Risk	nits	Chemical	WOE	SFo	SFd	SFI	EPC	ABSgl	P.	ā	ELCR	5	12 12 13	ELCR
ARSENIC A 150E+00 366E+00 151E+01 6 37E-03 4 10E-01 1 60E-04 BARIUM D 118E-01 7 00E-02 1 60E-04 CHROMIUM, TOTAL A-D 2 12E-02 5 00E-03 1 00E-03 IRON B2 82 86E-01 2 03E-01 2 23E-03 7 00E-01 9 00E-03 Fotal Risk	<u>-</u>	ALUMINUM					1 11E+01	1 00E-01	1 60E-04	6.10E-02		4 48E-07		
BARIUM CHROMIUM, TOTAL A-D CHROMIUM, TOTAL A-D IRON LEAD 1,1,2,2-TETRACHLOROETHANE C 2.00E-01 2 86E-01 2 03E-01 2 23E-03 7 00E-01 Fotal Risk	<u>ಕ</u>	ARSENIC		1 50E+00	3 66E+00	151E+01	6.37E-03	4 10F-01	1 60E.04	3 49E-05	5E-05	2 56 10	01.10	KO 134
CHROMIUM, TOTAL A-D 2.12E-01 / 00E-02 CHROMIUM, TOTAL A-D 2.12E-02 5 00E-03 IRON 2.88E+00 1 50E-01 LEAD 9 72E-03 1 50E-01 1,1,2,2-TETRACHLOROETHANE C 2.00E-01 2 86E-01 2 03E-01 2 23E-03 7 00E-01 fotal Risk	2	M HOVO				1					2	6,500-10	2	ב ב ב ב ב ב ב ב ב ב ב ב ב ב ב ב ב ב ב
CHROMIUM, TOTAL A-D 2 12E-02 5 00E-03 IRON 2.88E+00 1 50E-01 LEAD 82 972E-03 1 50E-01 1,1,2,2-TETRACHLOROETHANE C 2.00E-01 2 86E-01 2 03E-01 2 23E-03 7 00E-01	, ,	MOINT OF	ב				1 18E-01	7 00E-02	1 60E-04	6.45E-04		4.74E-09		
IRON 2.88E+00 1 50E-01 LEAD 82 972E-03 1 50E-01 1,1,2,2-TETRACHLOROETHANE C 2.00E-01 2 86E-01 2 03E-01 2 23E-03 7 00E-01	ق	CHROMIUM, TOTAL	A-D				2 12E-02	5 00E-03	1 00E-03	1.16E-04		5 32E-09		
LEAD  1,1,2,2-TETRACHLOROETHANE C 2.00E-01 2 86E-01 2 03E-01 2 23E-03 7 00E-01  Fotal Risk	<u>ال</u>	IRON					2.88E+00	1 50E-01	1 60E-04	1 58E-02		1 16F-07		
1,12,2-TETRACHLOROETHANE C 2.00E-01 2 86E-01 2 03E-01 2 23E-03 7 00E-01	7	LEAD	ä				0 700 00		20 100 1	L				
1,1,2,2-1 ETRACHLOROETHANE C 2.00E-01 2 86E-01 2 03E-01 2 23E-03 7 00E-01	1 .						3 / 25-03		4 UUE-UP	32E-05		9 78E-12		
Fotal Risk	1/5	1,1,2,2-1 ETRACHLOROETHANE	_	2.00E-01	2 86E-01	2 03E-01	2 23E-03		9 00E-03	1 22E-05	2E-06	5 06E-09	1E-09	2E-06
FOLGINISK		1010												
		oldi Nisk						1			5E-05		2E-09	5E-04
											Δ	Total Risk =	6E-04	

Offsite Groundwater (MW33) (Potable Use) - Hypothetical Future Residential Child Non-Carcinogenic Scenario

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									Ingestion	tion	Der	Jermal	Inhalation*
its	Chemical	WOE	RfDo	RfDd	RfDi	EPC	ABSgi	PC	<u> </u>	ğ	<u></u>	오	오
و/ <sub>ل</sub>	ALUMINUM		1 00E+00	) 1 00E-01		1 11E+01	1 00E-01	1 60E-04	7.12E-01	0.7	5 23E-06	5 23E-05	
0/۲ 9/۲	ARSENIC	∢	3 00E-04	1 23E-04		6.37E-03		1 60E-04	4 07E-04	4		2 43F-05	
g/L	BARIUM	Δ	7 00E-02	4 90E-03	1 43E-04	1 18E-01		1 60E-04	7 53E-03	0 11	5 537-08	1 135.05	
MG/L	CHROMIUM, TOTAL	ΑĐ	3 00E-03	1 50E-05	2.86E-05		5 00E-03	1 00E-03	135E-03	5.0	6.21E-08	0.004	
G/L	RON		3 00E-01	4 50E-02			1 50E-01	1 60E-04	184E-01	90	135E-06	3.01E-05	
G/L	LEAD	B2				9,72E-03	1.50E-01	4 00E-06	6.21E-04	,	114E-10	2	
G/L	1,1,2,2-TETRACHLOROETHANE	ပ	6 00E-02	00E-02 4 20E-02		2 23E-03	7 00E-01	9 00E-03	1 43E-04	0 0024	5 90E-08	1 40E-06	
	Hazard Index									3		0.004	

Noncarcinogenic

enic compounde only)

Offsite Groundwater (MW37) (Potable Use) - Hypothetical Future Residential Adult Scenario Dunn Field, Defense Distribution Depot Memphis. Tennessee

Ingestion:	<u>Carcinogenic</u>
Intake for non-carcinogenic compounds	Age-specific intake (for carcinoge
CD1 = C * IB * EE * ED	CDI - C + FF + CF + ID

		rigo-specific intake (for carcinogeriic compi	UUHUS UHIY)
CDI =	C <sub>am</sub> * IR * EF * ED	CDI <sub>adi</sub> = C <sub>ow</sub> * EF * CF * IR <sub>adi</sub>	,,
	BW * AT	AT	
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	N/A	2 a
$IR_{adj} =$	Age-adjusted Ingestion Rate (L-year/kg-day	116	N/A
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	10950 a

#### Dermal.

Intake for non-carcinogenic compounds.

Age-specific intake (for carcinogenic compounds only):

CDI =	C * SA * PC * ET * EF * ED * CF	CDIad = Cow *SAad * PC * ET * EF * CF	oompoundo omy).
	BW * AT	AT	
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	N/A	20000 b.c
SA <sub>adj</sub> =	Age-adjusted Surface Area (cm²-yr/kg)	9480 b,c	N/A
PC ≃	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0 007 b,e	0 007 b.e
<b>EF</b> =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
CF =	Conversion Factor (L/cm³)	1 00E-03	1 00E-03
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	10950 a

#### Inhalation:

CDI = Ingestion CDI from above f

### References:

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991.

b = Age-adjusted ingestion rate for adults, adjusted for body weight and time for carcinogenic exposure

IRadj = 
$$\frac{\text{IRc x EDc}}{\text{BWc}}$$
 +  $\frac{\text{IRa x (EDa - EDc)}}{\text{BWa}}$  =  $\frac{1 \times 6}{15}$  +  $\frac{2 \times (30-6)}{70}$ 

### 1.09 (L-year)/(kg-day)

b = USEPA Exposure Factors Handbook, August 1997

c = Total Body Surface Area represents whole body (average of male & female adults)

f = Age-adjusted surface area for adults, adjusted for body weight and time for carcinogenic exposure

SAadj = 
$$\frac{\text{SAc x ED}}{\text{BWc}}$$
 +  $\frac{\text{SAa x (EDa - EDc}}{\text{BWa}}$  =  $\frac{6557 \times 6}{15}$  +  $\frac{20000 \times (30-6)}{70}$ 

9480 (cm<sup>2</sup>-year)/(kg)

d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment. Principles and Applications, January 1992.

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0.007 day per event.

f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showening/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Offsite Groundwater (MW327) (Potable Use) - Future Residential Child Carcinogenic Scenario (OptionaL)

Dunn Field, Defense Distribution Depot Memphis, Tennessee

<b> </b> *							,
Inhalation,	ELCR			2F-03	}		2E-03
Derma	ELCR	1					
De	GO	2 57E-08	2.87E-10	1.94E-09	7 58E-09		
Ingestion	ELCR						1
nge	8	1 60E-04 3.50E-03	1.60E-04 3 90E-05	1.00E-03 4 22E-05	1.03E-03		
	P.C	1 60E-04	1.60E-04	1.00E-03			
	ABSgi	7.00E-02	1,90E-01	5 00E-03	4,00E-02		
	EPC	6 39E-01	7.13E-03 1	7 71E-03	1 88€-01		
	SFI			4.10E+01			
	SFd						
	SFo						
	WOE	۵	•••	۵	۵		
	Chemical	BARIUM	bis(2-ETHYLHEXYL) PHTHALATE	CHROMIUM, TOTAL	MANGANESE		Total Risk
:	Units	MG/L	MG/L	MG/L	MG/L		

Offsite Groundwater (MW327) (Potable Use) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

11	i	1							Ingestion	tlon	Der	Dermal	Inhalation*
Calits	Chemical	WOE		RfDd	RĐ.	EPC	ABSgl	ပ	9	ğ	ទូ	유 	皇
MG/L	BARIUM	۵	7 00E-02	4 90E-03	1 40E-04	6 39E-0	7 00E.	60F-04	4 ORF-02	0.58		8 12E 05	
Ž	PARA INDITION OFFICE ATE				1	L	1	11				2	
	3(5-4111 41-17 17 17 17 17 17 17 17 17 17 17 17 17 1					7 13 11-0	1 500-01	60E-04	4 55E-04		3 34E-09		
MG/L	CHROMIUM, TOTAL	۵	3 00E-03	1 50E-05	3 00E-05	7 71E-03	5 00E-03	00F-03	4 935-04	0.16	2 26E.08	0.0015	
		(		400					1	2	4 40L-00	200	
100	NAMES OF THE PROPERTY OF THE P	2	1 405-01	40E-01 5 60E-03 1 43E-05	1 43E-05	1 88E-01	4 00E-02	60E-04	1 20E-02	0 086	8 84E-08	1 58E-05	
	Hazard Index									ď		0.0046	

Hazard Index

Total Hazard Index = 0.0016

WOE = Weight of Evidence, CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index, \* = inhalation intake (CDI) = ir

Offsite Groundwater (MW37) (Potable Use) - Hypothetical Future Residential Child Scenario

Dunn Field, Defense Distribution Depot Memphis, Tennessee

	ere, a cremo Broandaron Bopot monipino, 1 on	Carcinogenic	Noncarcinogenic
Ingestio	n:		
Intake fo	r non-carcinogenic and carcinogenic compounds.		
CDI =	Cow * IR * EF * ED		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	1 a	1 a
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 а	6 a
BW≔	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a
Dermal:			
	r non-carcinogenic and carcinogenic compounds		
CDI =	C <sub>0**</sub> *SA * PC * ET * EF * ED * CF		
<u> </u>	BW * AT	ED0	500
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	6557 b, c	6557 b, c
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0.007 b,e	0 007 b,e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 а	6 а
CF =	Conversion Factor (L/cm³)	1 00E-03	1 00E-03
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a

### Inhalation:

CDI = Ingestion CDI from above f

### References:

a = U.S. EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = US EPA Exposure Factors Handbook, August 1997.

Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998.

- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old))
- d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value; all values adapted from EPA, Dermal Exposure Assessment: Principles and Applications, January 1992.
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event
- f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Offsite Groundwater (MW327) (Potable Use) · Future Residential Child Carcinogenic Scenario (OptionaL)

Dunn Field, Defense Distribution Depot Memphis, Tennessee

									2000	1	The C	1	Inhalation*
Inter	1-1-1-1-1	LOSS			į				202	1	Cellia	ē	Maiation
	Chemical	WOE	- 1	Sra	SFI	EPC	ABSgi	ပ	<u></u>	ELCR	<u></u>	FLCR	ELCR
MG/L	BARIUM	۵				6.39E-01	7 00E-02	1 60E-04	1 60E-04 3 50F-03		2 57F-08		
707	THE 14-14-15-10 CIVING TO 1701-15-15										001		
407	#1474141 PR (1144141 PR 1474141	t i				7.13E-03	03 1 90E-01 1 60	1 60E-04	3 90F-05		2 R7F-10		
<u>כ</u>		(			Her.				1		1		
N C	JAIOI WIOMONES	_			4 10E+01	7 71E-03	5 00E-03	1 00E-03	4 22E-05		1 94F-09		2E.03
E ( \$2		(						1			2		1
1	MANGANESE	ב			188E-01 4 00E-02 1 60E-04 1 03E-03	1 88E-01	4 00E-02	1 60E-04	1 03E-03		7 58E-09		

2E-03 Total Risk =

Offsite Groundwater (MW327) (Potable Use) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

									Ingestion	ion	Der	ermal	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	RfDi	EPC		<u>გ</u>	<u> </u>	오	<u>5</u>	약	오
MG/L	BARIUM	Δ		4.90E-03	1 40E-04	6 39E-01	7.00E-02	1 60E-04	4 08E-02	0 58	3 00E-07	6 12E-05	
MG/L	bis(2-ETHYLHEXYL) PHTHALATE					7 13E-03	1.90E-01	1 60E-04	4 55E-04		3 34E-09	•	
MG/L	CHROMIUM, TOTAL	Δ	3 00E-03	1 50E-05	3 00E-05	7 71E-03	5.00E-03	1 00E-03	4 93E-04	0 16	2 26E-08	0 0015	
MG/L	MANGANESE	۵	1 40E-01	5 60E-03		1.88E-01		1 60E-04	1 20E-02	0 086	8.84E-08	٠	
	Hazard Index									8.0			

WOE = Weight of Evidence; CDI = Chronic Daily Intake; EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index, \* = inhalation intake (CDI) = ir

## Offsite Monitoring Well (MW40), Indoor Air - Hypothetical Future Residential Adult Scenario Dunn Field, Defense Depot Memphis, Tennessee

## Inhalation

Intake for noncarcinogenic compounds

Intake for carcinogenic compounds.

CD1=	<u>C<sub>al</sub>, * IR *EF * ED * CF</u> BW * AT	<u>C<sub>air</sub> *</u>	-	<u>*EF * * CF</u> .T	
		Carcinogenic		Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	EPC	_ b	EPC	- ь
IR =	Inhalation Rate (m³/day)	NA		20	а
IRadj =	Adjusted Inhalation Rate (m³-yr)/(kg-day)	13	a.c	NA	_
EF =	Exposure Frequency (days/year)	350	а	350	а
ED =	Exposure Duration (years)	NA	а	30	a
CF =	Conversion Factor (mg/ug)	1.00E-03		1 00E-03	
BW =	Body Weight (kg)	NA	а	70	а
AT =	Averaging Time (days)	25550	а	10950	a

### Sources:

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance. "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

c = Age adjusted

0.0000

Total HI:

Total ELCR: 5.70E-08

Offsite Monitoring Well (MW40), Indoor Air - Hypothetical Future Residential Adult Scenario - Inhalation

Tennessee	
Memohis,	
<ul><li>Depot</li></ul>	
Defense	
Field,	
Dunn	

	ı	
nic	로	
carcinoge	īgo	5.0E-07
Non	RfDi	
0:	ELCR	5.7E-08
ırcinogenic	CDI	3 3E-07
င်ဒ	SFi	1.8E-01
1	EPC	1 8E-03
	WOE	O
	Chemical	1,1-DICHLOROETHENE
	Units	ug/m3

Offsite Groundwater (MW40) (Potable Use) - Hypothetical Future Residential Adult Scenario

Dunn Field, Defense	Distribution Depot	Memphis.	Tennessee

	тога, регензе візтраноп рерог метріп		
Ingestic	on·	<u>Carcinogenic</u>	<u>Noncarcinogenic</u>
	or non-carcinogenic compounds	Ago specific intole (for severa	
CDI =	Cpx * IR * EF * ED	Age-specific intake (for carcinogen	iic compounds only)
	BW * AT	$CDI_{adj} = \frac{C_{ow} * EF * CF * IR_{adj}}{AT}$	
C <sub>aw</sub> ≈	Concentration in groundwater (mg/L)	EPC	550
-uw IR =	Ingestion Rate (L/day)	· -	EPC
iR <sub>adj</sub> ≃	Age-adjusted Ingestion Rate (L-year/kg-da	N/A	2 a
adj — EF =	Exposure Frequency (day/year)		N/A
ED =	Exposure Duration (year)	350 a	350 a
BW =	Body Weight (kg)	30 a	30 a
AT =	Averaging Time (days)	70 a	70 a
A	Averaging time (days)	25550 a	10950 a
Dermal:			
Intake fo	or non-carcinogenic compounds.	Age-specific intake (for carcinogen	ic compounds only)
CDI =	Cow *SA * PC * ET * EF * ED * CF	CDI <sub>adi</sub> = Com *SA <sub>adi</sub> * PC * ET * EF * C	
	BW * AT	AT	<u> </u>
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	N/A	20000 b,d
SA <sub>odj</sub> =	Age-adjusted Surface Area (cm²-yr/kg)	9480 b.c	N/A
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0 007 b,e	0 007 b.e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
CF =	Conversion Factor (L/cm <sup>3</sup> )	1.00E-03	1.00E-03
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	10950 a
		20000 0	10330 a

## Inhalation:

CDI = Ingestion CDI from above f

## References:

a = U.S. EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991.

b = Age-adjusted ingestion rate for adults, adjusted for body weight and time for carcinogenic exposure

$$IRadj = \frac{IRc \times EDc}{BWc} + \frac{IRa \times (EDa - EDc)}{BWa} = \frac{1 \times 6}{15} + \frac{2 \times (30-6)}{70}$$

1.09 (L-year)/(kg-day)

b = USEPA Exposure Factors Handbook, August 1997

c = Total Body Surface Area represents whole body (average of male & female adults)

f = Age-adjusted surface area for adults, adjusted for body weight and time for carcinogenic exposure.

$$SAadj = SAc \times EDi + SAa \times (EDa - EDc) = 6557 \times 6 + 20000 \times (30-6)$$
 $BWc BWa 15 70$ 

9480  $(cm^2-year)/(kg)$ d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value; all values adapted from EPA, Dermal Exposure Assessment: Principles and Applications, January 1992

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event.

f = follows EPA Region IV guidance (i e , inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS. Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Offsite Groundwater (MW40) (Potable Use) - Hypothetical Future Residential Adult Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

Sas aow	u	SES.		7	ŭ	Ü	1 0 0 V	ç	Ingestion		Dermal	mal	Inhalation*
300	300		5	إ	i i	ב ב	ABSGI	٦ ک	כח	בונא	5	FLCR	FICR
BARIUM	۵					3.54E-01	7 00E-02	1,60E-04	1 5 26E-03		5 14F-08		
MANGANESE	۵					1.07E+00	.07E+00 4.00F-02	1.60F-04	1 5RF-02		1 55E-07		
11-DICHI OBORTHENE	10 HOUR 10 HOUR 01	5 00E 01 6 00E 01	100		1 755 01		2 CO 1100 4 CO 1100 C	100	10 11 7		2 1	L	
11-200 - 0.0E-01 - 0.0E-01	10-300 0 10-300 0 O	0.000-01	0.0000	- 1	10-10		1,000=+00	1 005-02	3 4 1 5-03	ZE-03	3 34 08	2E-08	<b>6</b> E-06
lotal Risk										2E-05		2E-08	90-∃9

WOE = Weight of Evidence; CDI = Chronic Daily Intake; EPC = Exposure Point Concentration, ELCR ≈ Excess Lifetime Cancer Exposure; \* = inhalation intake (CD

Offsite Groundwater (MW40) (Potable Use) - Hypothetical Future Residential Adult Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

1	•								Ingestion	tion	Der	Dermal	Inhalation*
onits	Chemical	WOE	RfDo	RfDd	æ	EPC	ABSgi	ည	īg	g	[ 3	유	유
J/0/N	BARIUM	۵	7 00E-02	, 00E-02 4 90E-03	1,43E-04	3.54E-01	1,43E-04 3,54E-01 7 00E-02 1 60E-04 9 68E-03	1 60E-04	9 68E-03	0.14	1	1 08E-07 221E-05	
MG/L	MANGANESE	۵	1 40E-01	5 60E-03	143E-05	1 07F+00	4 00F-02	1 60E-04	140E-01 560E-03 143E-05 107E+00 400E-02 160E-04 202E-02 024	700		2011	
NG/N	1.1-DICHI OROFITHENE	Ç	Q 00E-03	0 000	!	20 200 0	00100	1 6	201100	120		0.040	
		,	200	3 000		Z 30E-03	1 00=+00	1 DUE-UZ	0.29E-05	0/000	7 04E-08	7 82E-06	
	nazard ingex									0.35		8.83E-05	
1	1000		ļ						ř	stal Hazar	Total Hazard Index =	0.35	
Notes	WOE = Weight of Evidence, CDI = Chronic		Daily Intak	:e; EPC = E	xposure Ρι	oint Concen	tration; HQ	= Hazard (	Quotient, HI	= Hazard	Index; * = ir	: Daily Intake; EPC = Exposure Point Concentration; HQ = Hazard Quotrent, HI = Hazard Index; * = inhalation intake (CDI) = 11	ike (CDI) = ir

# Offsite Monitoring Well (MW40), Indoor Air - Hypothetical Future Residential Child Scenario Dunn Field, Defense Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds:

CDI=	Cair * IR *EF * ED * CF
	BW * AT

		Carcinogenic	Noncarcinogenic	
C <sub>atr</sub> =	Estimated Indoor Air Concentration (ug/m³)	NA NA	EPC	b
IR =	Inhalation Rate (m³/day)	NA	15	а
EF =	Exposure Frequency (days/year)	NA	350	а
ED =	Exposure Duration (years)	NA	6	а
CF =	Conversion Factor (mg/ug)	NA	1.00E-03	
BW =	Body Weight (kg)	NA	15	а
AT =	Averaging Time (days)	NA	2190	а

### Sources:

a = U.S. EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991.

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings. Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response.

Offsite Monitoring Well (MW40), Indoor Air - Hypothetical Future Residential Child Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

<u>.</u>		Ī		
ncarcinodenic		CD	1.8E-06	
		RfDi		
<u></u>		ELCR		
Carcinogenic	6	<u>a</u>	1	
J		SF	1	
	l	EPC	1.8E-03	
		WOE	O	
		Chemical	1,1-DICHLOROETHENE	
	11	Units	ug/m3	

0.000

Total HI:

:

Total ELCR:

Offsite Groundwater (MW40) (Potable Use) - Hypothetical Future Residential Child Scenario

Dunn Field, Defense	Distribution	Depot Mem	phis. 1	Tennessee
---------------------	--------------	-----------	---------	-----------

		Carcinogenic	Noncarcinogenic
Ingestio			
Intake fo	or non-carcinogenic and carcinogenic compounds:		
CDI =	Cou " IR * EF * ED		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	1 a	1 a
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a
Dermai:			
Intake fo	r non-carcinogenic and carcinogenic compounds		
CDI =	Cow *SA * PC * ET * EF * ED * CF		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm <sup>2</sup> )	6557 b, c	6557 b, c
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0.007 b <sub>i</sub> e	0 007 b,e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 а
CF =	Conversion Factor (L/cm <sup>3</sup> )	1.00E-03	1 00E-03
<b>~</b> 1			
BW =	Body Weight (kg)	15 a	15 a

### Inhalation:

CDI = Ingestion CDI from above f

### References:

- a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991
- b = US EPA Exposure Factors Handbook, August 1997
  - Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998.
- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old))
- d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value; all values adapted from EPA, Dermal Exposure Assessment. Principles and Applications, January 1992.
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event
- f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Offsite Groundwater (MW40) (Potable Use) - Future Residential Child Carcinogenic Scenario (OptionaL) Dunn Field, Defense Distribution Depot Memphis, Tennessee

:	i	!	,						sebul	tjon	Dermai	nai	Inhalation*
Sits	Chemical	WOE	OE SFo	SFd	SFi	SFo SFd SFi EPC ABSgi PC CDI E	ABSgi	ပ္ရ	<u></u>	ELCR	5	ELCR	ELCR
MG/L	BARIUM	0				3 54E-01	7.00E-02	1 60E-04	1 94F-03		4		
WC.	DANIO ANIDOR	•				1 6 6					1		
1/0/-	UOUNIXONIXIA					1 0/E+00	4 00E-02	1.60E-04	5.84E-03		4 29E-08		
MG/L	1,1-DICHLOROETHENE	ပ	6.00E-01	6.00E-01	1 75E-01	2 30E-03	1,00E+00	1 60E-02	1 26E-05	8E-06	9.24E-09	6F-09	2F-06
									!			)	2

8E-06 6E-09 2E-06 Total Risk = 1E-05

Offsite Groundwater (MW40) (Potable Use) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

					-								
									judes	tion	Der	Jermai	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	RfDi	EPC	ABSgl	ပ္ရ	CD	ç	<u> </u>	오	오
MG/L	BARIUM	۵	7.00E-02	4 90E-03	1,43E-04	4 3 54E-01	7 00E-02 1	1 60E-04	60E-04 2 26E-02	0 32	1.66E-07	3.39F-05	
MG/L	MANGANESE	۵	1 40E-01	5 60E-03	1 43E-05	1 07E+00	4 00E-02		6 81E-02	0.49	5.00F-07	8 935.05	
MG/L	1,1-DICHLOROETHENE	O	9 00E-03	9 00E-03		2 30E-03	2 30E-03 1 00E+00 1		.60E-02 147E-04	0.016	1 08E-07	1 20E-05	
	Hazard Index									0 83		1.35E-04	

Offsite Groundwater (MW42) (Potable Use) - Hypothetical Future Residential Adult Scenario

ngestio ntake fo	n.	<u>Carcinogenic</u>	Noncarcinogenic Noncarcinogeni
	r non-carcinogenic compounds	A	
:DI =		Age-specific intake (for carcinoge	nic compounds only):
,DI –	C <sub>ow</sub> * IR * EF * ED BW * AT	$CDI_{adj} = C_{ow} * EF * CF * IR_{adj}$	
; <sub>aw</sub> =	Concentration in groundwater (mg/L)	AI	
'gw  ₹ =	Ingestion Rate (L/day)	EPC	EPC
∖		N/A	2 a
`adj ¯ F=	Age-adjusted Ingestion Rate (L-year/kg-day)		N/A
r – D =	Exposure Frequency (day/year) Exposure Duration (year)	350 a	350 a
W =	Body Weight (kg)	30 a	30 a
T =	Averaging Time (days)	70 a	70 a
	Averaging Time (days)	25550 a	10950 a
ermal:			
	r non-carcinogenic compounds:	Age-specific intake (for carcinoger	
D1 =		CDI <sub>adj</sub> = <u>C<sub>ow</sub> *SA<sub>adj</sub> * PC * ET * EF * (</u>	<u>CF</u>
	BW * AT	AT	
gw =	Concentration in groundwater (mg/L)	EPC	EPC
A =	Surface Area (cm²)	N/A	20000 b
A <sub>adj</sub> =	Age-adjusted Surface Area (cm²-yr/kg)	9480 b,c	N/A
C =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
T =	Exposure Time (hr/day)	0 007 b,e	0 007 b.
F=	Exposure Frequency (day/year)	350 a	350 a
D =	Exposure Duration (year)	30 a	30 a
F=	Conversion Factor (L/cm <sup>3</sup> )	1 00E-03	1 00E-03
W =	Body Weight (kg)	70 a	70 a
T =	Averaging Time (days)	25550 a	10950 a
halatio	on: Ingestion CDI from above <sup>f</sup>		
DI = eferenc	ces: EPA, Human Health Evaluation Manual, Suppl	emental Guidance "Standard Defaull	Exposure Factors*
DI = eferenc = U S	ces: EPA, Human Health Evaluation Manual, Suppl OSWER Directive 9285 6-03, March 25, 199	1.	
DI = eference = U S	ces: EPA, Human Health Evaluation Manual, Suppl OSWER Directive 9285 6-03, March 25, 199 <sup>o</sup> adjusted ingestion rate for adults, adjusted for b IRadj = <u>IRc x EDc</u> + <u>IRa x (EDa - ED</u>	1. cody weight and time for carcinogenic <u>c)                                   </u>	
DI = eferenc = U S	ces:  EPA, Human Health Evaluation Manual, Supplication  OSWER Directive 9285 6-03, March 25, 199-  adjusted ingestion rate for adults, adjusted for build in the second s	weight and time for carcinogenic	exposure
DI = eferenc = U S   = Age-a	ces:  EPA, Human Health Evaluation Manual, Supplication OSWER Directive 9285 6-03, March 25, 1990 adjusted ingestion rate for adults, adjusted for the IRadj = IRc x EDc + IRa x (EDa - ED BWc BWa 1.09 (L-year)/(kg-day)	1. cody weight and time for carcinogenic <u>c)                                   </u>	exposure 2 x (30-6)
DI = eferenc = U S   = Age-a = USEF	ces:  EPA, Human Health Evaluation Manual, Supplication OSWER Directive 9285 6-03, March 25, 1999 adjusted ingestion rate for adults, adjusted for the IRadj = IRc x EDc + IRa x (EDa - ED BWc BWa 1.09 (L-year)/(kg-day)  PA Exposure Factors Handbook, August 1997	1. cody weight and time for carcinogenic <u>0c)</u> = <u>1 x 6</u> + 15	exposure 2 x (30-6)
DI = eference = U S   = Age-a = USEA	ces:  EPA, Human Health Evaluation Manual, Supplication OSWER Directive 9285 6-03, March 25, 1997  adjusted ingestion rate for adults, adjusted for the light of	1.  cody weight and time for carcinogenic  c) = 1 x 6 +  15  erage of male & female adults)	exposure 2 x (30-6) 70
DI =  eference = U S    = Age-a  = USEA	ces:  EPA, Human Health Evaluation Manual, Supplication OSWER Directive 9285 6-03, March 25, 1999 adjusted ingestion rate for adults, adjusted for the IRadj = IRc x EDc + IRa x (EDa - ED BWc BWa 1.09 (L-year)/(kg-day)  PA Exposure Factors Handbook, August 1997	1.  cody weight and time for carcinogenic  c) = 1 x 6 +  15  erage of male & female adults)  cody weight and time for carcinogenic 6	exposure 2 x (30-6) 70

9480 (cm²-year)/(kg)
d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment. Principles and Applications, January 1992

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event

f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Offsite Groundwater (MW42) (Potable Use) - Hypothetical Future Residential Adult Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

Inhalation*	FLCR			
ermal	ELCR	L	α	
	3	1 90F-09	5 57E-08	
stlon	ELCR			
Inge	<u>5</u>	3 11E-05	5.70F-03	
	ပ္	1.00E-03	1.60F-04	
	ABSgi	1.00E-02	3 83E-01 4 00E-02 1 60E-04 5 70E-03	
	EPC	30E+00 2.09E-03	3 83E-01	
	E	6 30E+00		
	SFd			
	SFo			
	WOE	<del>0</del>	Δ	
	Chemical	SADMIUM	MANGANESE	otal Risk
:	Units	MG/L	MG/L	

Total Risk =

Total Risk =

WOE = Weight of Evidence, CDI = Chronic Daily Intake; EPC = Exposure Point Concentration, ELCR = Excess Lifetime Cancer Exposure, \* = inhalation intake (CD

Offsite Groundwater (MW42) (Potable Use) - Hypothetical Future Residential Adult Non-CarcinogenIc Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

-11-11		1	!						Ingestio	loi.	Der	Dermai	Inhalation*
Sills	Chemical	WOE	RfDo	RfDd	Æ Ö	EP.	ABSgi	ည	<u> </u>	ğ	<u></u>	오	오
MG/L	CADMIUM	81	5 00E-04	5 00E-06		2 09E-03	1 00E-02 1	1 00E-03	5 73F-05	110	4.01E-09	0 0008	
Ž	TOUR OWNER	•	LOV	200	L	1				,			
	MANGAINESE	2	1 40E-UI	40E-01 5 60E-03	ነ 43E-ጊ	3 835-01	4 UUE-02	1 60E-04	35 383E-01 4 00E-02 160E-04 105E-02	2 0075 116	1 18E-07 2 10E-05	2 10E-05	
	Hazard Index									0.19		0 0008	

u.19 v.uvvo

Total Hazard Index = 0.19

WOE = Weight of Evidence; CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index; \* = inhalation intake (CDI) = ir

## Offsite Groundwater (MW42) (Potable Use) - Hypothetical Future Residential Child Scenario

Dunn Field, Defense Distribution Depot Memphis, Tennessee

		Carcinogenic	Noncarcinogenic
Ingestion	n:	· · · · · · · · · · · · · · · · · · ·	
Intake for	non-carcinogenic and carcinogenic compounds:		
CDI =	C * IR * EF * ED		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	1 a	1 a
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 а	6 a
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a
Dermal:			
Intake for	non-carcinogenic and carcinogenic compounds:		
CDI =	Cow *SA * PC * ET * EF * ED * CF		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	6557 b, c	6557 b, c
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0.007 b,e	0.007 b,e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
CF =	Conversion Factor (L/cm <sup>3</sup> )	1 00E-03	1 00E-03
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a

### Inhalation:

CDI = ingestion CDI from above f

## References:

- a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991
- b = US EPA Exposure Factors Handbook, August 1997.
  - Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998.
- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old))
- d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment Principles and Applications, January 1992.
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event
- f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles white showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Offsite Groundwater (MW42) (Potable Use) - Future Residential Child Carcinogenic Scenario (OptionaL) Dunn Field, Defense Distribution Depot Memphis, Tennessee

. Tennessee	
Memphis,	
Depot	
unn Field, Detense Distribution Depot Memphis,	
, Defense	
n Field	
S	

Inhalation*	ELCR	7E-05
Эетта	CDI ELCR	
3	ᄗ	5 26E-10 1.54E-08
ngestion	ELCR	
ebul	<u> </u>	1 15E-05 2 10E-03
	ပ	.00E-02 1 00E-03 1 00E-02 1 60E-04
	ABSgl	2.09E-03 1.00E-02 1.00E-03 1.15E-05 3.83E-01 4.00E-02 1.60E-04 2.10E-03
	EPC	30E+00 2.09E-03 3 83E-01
	SFI	6 30 <u>E</u> +00
	SFd	
!	SFo	
1	WOE	D
	Chemical	CADMIUM MANGANESE
11-11	College	MG/L MG/L

Total Risk = 7E-05

Offsite Groundwater (MW42) (Potable Use) - Hypothetical Future Residential Child Non-Carcinogenic Scenarlo Dunn Field, Defense Distribution Depot Memphis, Tennessee

									Ingest	ioi.	Derma	mal	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	RfD	EPC	ABSgi	ပ	G	운	GS	오	Ş
MG/L	CADMIUM	B1	5 00E-04	5 00E-06		2 09E-03	1 00E-02	1 00E-03	1.34E-04	0.27	6 13E-09	0.0012	
MG/L	MANGANESE	۵	1 40E-01	40E-01 5 60E-03 1 43E-05 3 83E-01 4	1 43E-05	3 83E-01	4.00E-02	~	60F-04 2 45F-02	0 17	1 ROE-07	2 21E OF	
	Hazard Index							1		44.0	10.700	0.0013	

u.44

U.44

U.0013

Total Hazard Index = 0.44

WOE = Weight of Evidence, CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index: \* = Inhalation Intake (CDI) = Ir

## Offsite Monitoring Well (MW44), Indoor Air - Hypothetical Future Residential Adult Scenario Dunn Field, Defense Depot Memphis, Tennessee

## Inhalation

Intake for noncarcinogenic compounds:

Intake for carcinogenic compounds

CDI=	C <sub>air</sub> * IR *EF * ED * CF BW * AT	C <sub>air</sub> *	IR <sub>adi</sub> A	*EF * * CF	
		Carcinogenic	^	Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	EPC	- ь	EPC	- b
IR =	Inhalation Rate (m³/day)	NA		20	a
IRadj =	Adjusted Inhalation Rate (m³-yr)/(kg-day)	13	a,c	NA	-
EF =	Exposure Frequency (days/year)	350	а	350	а
ED =	Exposure Duration (years)	NA	а	30	a
CF =	Conversion Factor (mg/ug)	1.00E-03		1 00E-03	
BW =	Body Weight (kg)	NA	а	70	а
AT =	Averaging Time (days)	25550	а	10950	a

### Sources:

a = U S. EPA, Human Health Evaluation Manual, Supplemental Guidance<sup>-</sup> "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

c = Age adjusted

Total HI: 0.000003

Total ELCR: 4.40E-08

Offsite Monitoring Well (MW44), Indoor Air - Hypothetical Future Residential Adult Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

				ΰ	Carcinogenic		ZON	Noncarcinogenio	٥
	Chemical	WOE	DG	SFI	<u></u>	ELCR	RfD	CDI	=
Ä,	ug/m3 BROMODICHLOROMETHANE	B2	1.0E-04		1.8E-08			2.8E-08	
≾	ug/m3 CARBON TETRACHLORIDE	<b>B</b> 2	3.7E-03	5.3E-02	6.5E-07	3.4E-08		1.0E-06	
픗	CHLOROFORM	<b>B</b> 2	5.4E-04	8.1E-02	9 6E-08	7.7E-09	0.0E+00	1.5E-07	
Ш	ug/m3 TETRACHLOROETHYLENE(PCE)	C-B2	1.9E-03	2.0E-03	3 4E-07	6.9E-10	1.7E-01	5.3E-07	3 09E-06
凹	ug/m3 TRICHLOROETHYLENE (TCE)	B2	1.2E-03	6.0E-03	2 2E-07	1.3E-09		3.3E-07	

Offsite Groundwater (MW44) (Potable Use) - Hypothetical Future Residential Adult Scenario

Driver Could	n /	<b>Contract</b>	_		•
I II INN HIQIN	ΙΙΩΙΔΠΟΔ	Luctubution	$n_{\alpha \alpha \alpha t}$	I do man his	T
Dunn Field,	D0101130	DISHIDURUH	Denou	wemons.	rennessee

		Carcinogenic	Managagina
Ingestio	on:	<u> </u>	<u>Noncarcinogenic</u>
intake fo	r non-carcinogenic compounds.	Age-specific intake (for carcinoger	ic compounds only)
CDI =	C * IR * EF * ED	CDI <sub>adj</sub> = C <sub>mx</sub> * EF * CF * IR <sub>adi</sub>	o compounds orny)
	BW * AT	AT	
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	N/A	2 a
IR <sub>adi</sub> =	Age-adjusted Ingestion Rate (L-year/kg-da		
EF =	Exposure Frequency (day/year)	350 a	N/A
ED =	Exposure Duration (year)	· ·	350 a
BW =	Body Weight (kg)	30 a 70 a	30 a
AT =	Averaging Time (days)	70 a 25550 a	70 a
	The same same same same same same same sam	25550 a	10950 a
Dermal:			
Intake fo	r non-carcinogenic compounds	Age-specific intake (for carcinogen	o compoundo esta
CDI =	C * SA * PC * ET * EF * ED * CF	CDI <sub>adj</sub> = C <sub>ow</sub> *SA <sub>adj</sub> * PC * ET * EF * C	
	BW * AT	AT	<u>5</u>
C <sub>aw</sub> =	Concentration in groundwater (mg/L)	EPC	
SA =			EPC:
JA -	Surface Area (cm²)	N/Δ	EPC
	Surface Area (cm²) Age-adjusted Surface Area (cm²-vr/kg)	N/A	20000 b,c
SA <sub>odj</sub> =	Age-adjusted Surface Area (cm²-yr/kg)	9480 b,c	20000 b,c N/A
SA <sub>sdj</sub> = PC =	Age-adjusted Surface Area (cm²-yr/kg) Dermal Permeability Constant (cm/hr)	9480 b,c (Chemical Specific) d	20000 b,c N/A (Chemical Specific) d
SA <sub>edj</sub> = PC = ET =	Age-adjusted Surface Area (cm²-yr/kg) Dermal Permeability Constant (cm/hr) Exposure Time (hr/day)	9480 b,c (Chemical Specific) d 0 007 b,e	20000 b,c N/A (Chemical Specific) d 0 007 b,e
SA <sub>odj</sub> = PC = ET = EF =	Age-adjusted Surface Area (cm²-yr/kg) Dermal Permeability Constant (cm/hr) Exposure Time (hr/day) Exposure Frequency (day/year)	9480 b,c (Chemical Specific) d 0 007 b,e 350 a	20000 b,c N/A (Chemical Specific) d 0 007 b,e 350 a
SA <sub>sdj</sub> = PC = ET = EF = ED =	Age-adjusted Surface Area (cm²-yr/kg) Dermal Permeability Constant (cm/hr) Exposure Time (hr/day) Exposure Frequency (day/year) Exposure Duration (year)	9480 b,c (Chemical Specific) d 0 007 b,e 350 a 30 a	20000 b,c N/A (Chemical Specific) d 0 007 b,e 350 a 30 a
SA <sub>sdj</sub> = PC	Age-adjusted Surface Area (cm²-yr/kg) Dermal Permeability Constant (cm/hr) Exposure Time (hr/day) Exposure Frequency (day/year) Exposure Duration (year) Conversion Factor (L/cm³)	9480 b,c (Chemical Specific) d 0 007 b,e 350 a 30 a 1 00E-03	20000 b,c N/A (Chemical Specific) d 0 007 b,e 350 a 30 a 1.00E-03
SA <sub>odj</sub> = PC = ET = EF = ED = CF = BW = AT =	Age-adjusted Surface Area (cm²-yr/kg) Dermal Permeability Constant (cm/hr) Exposure Time (hr/day) Exposure Frequency (day/year) Exposure Duration (year)	9480 b,c (Chemical Specific) d 0 007 b,e 350 a 30 a	20000 b,c N/A (Chemical Specific) d 0 007 b,e 350 a 30 a

### Inhalation:

CDI = Ingestion CDI from above f

## References:

a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991.

b = Age-adjusted ingestion rate for adults, adjusted for body weight and time for carcinogenic exposure.

$$IRadj = \frac{IRc \times EDc}{BWc} + \frac{IRa \times (EDa - EDc)}{BWa} = \frac{1 \times 6}{15} + \frac{2 \times (30-6)}{70}$$

1.09 (L-year)/(kg-day)

b = USEPA Exposure Factors Handbook, August 1997

c = Total Body Surface Area represents whole body (average of male & female adults)

f = Age-adjusted surface area for adults, adjusted for body weight and time for carcinogenic exposure

$$SAadj = \frac{SAc \times EDt}{BWc} + \frac{SAa \times (EDa - EDc}{BWa} = \frac{6557 \times 6}{15} + \frac{20000 \times (30-6)}{70}$$

9480 (cm<sup>2</sup>-year)/(kg)

d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment: Principles and Applications, January 1992

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0.007 day per event

f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS. Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Offsite Groundwater (MW44) (Potable Use) - Hypothetical Future Residential Adult Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

Units         Chemical         WOE         4           MG/L         ALUMINUM         A 1.5           MG/L         ARSENIC         A 1.5           MG/L         CADMIUM         B1           MG/L         IRON         D           MG/L         MAGNESE         D           MG/L         BROMODICHLOROMETHANE         B2         6.2           MG/L         BROMODICHLOROMETHANE         B2         6.1           MG/L         CARBON TETRACHLORIDE         B2         1.3           MG/L         CHLOROFORM         B2         6.1           MG/L         TETRACHLOROETHYLENE (TCE)         C-82         5.2           MG/L         TRICHLOROETHYLENE (TCE)         B2         1.1           Total Risk         Total Risk         1.1							nge	Ingestion	Den	Dermal	Inhalation*
ALUMINUM ARSENIC CADMIUM IRON MANGANESE BROMODICHLOROMETHANE B2 CARBON TETRACHLORIDE B2 CHLOROFORM B2 TETRACHLOROETHYLENE(PCE) C-82 TRICHLOROETHYLENE (TCE) FOTAL RISK	OE SFo	SFd	SFI	EPC	ABSgi	ဥ	Ö	ELCR	9	ELCR	ELCR
ARSENIC A CADMIUM IRON MANGANESE D BROMODICHLOROMETHANE B2 CARBON TETRACHLORIDE B2 CHLOROFORM B2 TETRACHLOROETHYLENE(PCE) C-82 TRICHLOROETHYLENE (TCE) B2 Total Risk				4 33E+00	1.00E-01	1.60E-04	6 43F-02		6 20F-07		
CADMIUM IRON MANGANESE BROMODICHLOROMETHANE B2 CARBON TETRACHLORIDE B2 CHLOROFORM TETRACHLOROETHYLENE(PCE) C-82 TRICHLOROETHYLENE (TCE) Total Risk	A 1.50F+00 3.66F+00 1.51F+01	3 66 1 + 00	1515+01	α	4 10F-01	1 60E-04	1 201 04	20.00	1 26 1	L	
IRON IRON MANGANESE  BROMODICHLOROMETHANE  CARBON TETRACHLORIDE  CHLOROFORM  TETRACHLOROETHYLENE (TCE)  Total Risk	. ,			2000	101101	100	+0-367	±0-17	F0-307'I	200	
IRON MANGANESE BROMODICHLOROMETHANE B2 CARBON TETRACHLORIDE B2 CHLOROFORM TETRACHLOROETHYLENE(PCE) C-82 TRICHLOROETHYLENE (TCE) Total Risk	2		6 30E+00	1.56E-03	1 00E-02	1 00E-03 2	2 32E-05		1.42E-09		
MANGANESE D BROMODICHLOROMETHANE B2 CARBON TETRACHLORIDE B2 CHLOROFORM B2 TETRACHLOROETHYLENE (TCE) C-82 TRICHLOROETHYLENE (TCE) B2 Total Risk				1,10E+01	1 50E-01	1 60E-04	1 63E-01		1 59F-06		
BROMODICHLOROMETHANE B2 CARBON TETRACHLORIDE B2 CHLOROFORM B2 TETRACHLOROETHYLENE (TCE) C-82 TRICHLOROETHYLENE (TCE) B2 Total Risk	0			3 88E-01	4 00E-02	1.60E-04	5.76E-03		5.64E-08		
CARBON TETRACHLORIDE B2 CHLOROFORM B2 TETRACHLOROETHYLENE (TCE) C-82 TRICHLOROETHYLENE (TCE) B2 Total Risk	2 6.20E-02	6 33E-02		2 32E-03	9 80E-01	5.80F-03	3 45F-05	2E_06	1 22E-08	na Of	
CHLOROFORM B2 CHLOROFORM B2 TETRACHLOROFTHYLENE (TCE) C-82 TRICHLOROFTHYLENE (TCE) B2 Total Risk	1 200 04		200	1100		1 1 0 0		1	2777	-	
CHLOROFORM B2 TETRACHLOROETHYLENE(PCE) C-82 TRICHLOROETHYLENE (TCE) B2 Total Risk			20-302 0	4 94E-03	0 2011-01	Z.Z.DE-02.Z	4 3/11-00	<b>6E-</b> 06	5 88E-08	1E-08	2E-06
TETRACHLOROETHYLENE(PCE) C-82 TRICHLOROETHYLENE (TCE) B2 Total Risk	32 6 10E-03	3 05E-02	8.05E-02	2 63E-03	2 00E-01	8 90E-03	3.92E-05	2E-07	2.13F-08	6F-10	3E-06
TRICHLOROETHYLENE (TCE) 82  Total Risk	5 20E 03	CO. TOC 3	CO 200 C	CO 575 C	*	00 1		1 6		!!!	1 1
L INICHLOROETHYLENE (TCE) B2 Total Risk	20-102	20-102	Z 00E-03	20-5102	OUF=00.	4,00E-02	3 825-03	7E-00	1 125-07	60- <b>1</b> 9	8E-08
lotal Kisk	32 1 10E-02	7.33E-02	.33E-02 6 00E-03 2.09E-03	2.09E-03	1 50E-01	1 60E-02	1 60E-02 3,11E-05	3E-07	3 04E-08	2E-09	2E-07
								2E-04		3E-08	9E-06
								ၞ	Total Risk =	2E-04	
Notes: WOE = Weight of Evidence; CDI = Chronic Daily Intake, EPC = Exposure Point Concentration; ELCR = Excess Lifetime Cancer Exposure, * = inhalation intake (CD	ronic Daily Intak	ce, EPC = [	Exposure F	oint Conce	intration; E	LCR = Exc	ess Lifetim	e Cancer E	xposure, *	= inhalati	on intake (C□

Offsite Groundwater (MW44) (Potable Use) - Hypothetical Future Residential Adult Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

	;	:							Ingestion	tion	Õ	Dermal	Inhalation*
Jules	Chemical	¥OE	RfDo	RfDd	RfDi	EPC	ABSgi	ပ္ရ	<u> </u>	ğ	ਹਿ ਹੋ	유	[ 달
٠,	ALUMINUM		1 00E+00	1 00E-01		4 33E+00	1 00E-01	1 60E-04	1 18E-01	0 12	1 33E-06	1 33F-05	
٧	ARSENIC	∢	3 00E-04	1 23E-04		8 69E-03	4 10E-01	1 60E-04	2.38F-04	! « . C	2 67E-09	2 17E-05	
Jok Mg/	CADMIUM	<u>8</u>	5 00E-04	5 00E-06		1 56E-03	1 00E-02	1 00E-03	4 27E-05	60 0	2 99F-09	0.006	
7	RON		3 00E-01	4 50E-02		1 10E+01	1 50E-01	1 60E-04	3 00E-01	; <del>-</del>	3.36F-06	7 485.05	
7	MANGANESE	۵	1 40E-01	5 60E-03	1 43E-05	3 88E-01	4 00E-02	1 60E-04	1 06E-02	000	1 19E-07	2 12E-05	
۳	BROMODICHLOROMETHANE	85	2 00E-02	1 96E-02		2 32E-03	9 80E-01	5.80E-03	6.36F-05	0.0032	2 58E-08	1 32E-05	
7	CARBON TETRACHLORIDE	85	7 00E-04	4 55E-04		2 94E-03	6.50F-01	2 20E-02	8 05E-05	0 43	1 2/15 07	3 72E 04	
یے	CHLOROFORM	B2	1 00E-02	2 00E-03		2 63E-03	2 00F-01	8 90E-03	7.21E-05	200	4 40E-08	2 255 05	
ب	TETRACHLOROETHYLENE(PCE)	C-82	1 00E-02	1 00E-02	1 71E-01	2 57E-03	1 00E+00	4 80E-02	7 04E-05	000	2.37E-07	2.22E-05	
AG/L	TRICHLOROETHYLENE (TCE)	B2	6 00E-03	9 00E-04		2 09E-03	1 50E-01	1 60E-02	5 72E-05	0 010	6.41E-08	7 12E-05	
	Hazard Index									2.2		0.0011	

Total Hazard Index = 2.2

WOE = Weight of Evidence, CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index, \* = inhalation intake (CDI) = ir

# Offsite Monitoring Well (MW44), Indoor Air - Hypothetical Future Residential Child Scenario Dunn Field, Defense Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds:

Averaging Time (days)

CDI=	C <sub>abr</sub> * IR *EF * ED * CF BW * AT			
	DIV At	Carcinogenic	Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	NA NA	EPC	b
IR =	Inhalation Rate (m³/day)	NA	15	а
EF =	Exposure Frequency (days/year)	NA	350	а
ED =	Exposure Duration (years)	NA	6	а
CF =	Conversion Factor (mg/ug)	NA	1.00E-03	
BW =	Body Weight (kg)	NA	15	а

NA

2190

а

## Sources:

AT =

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance. "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

Offsite Monitoring Well (MW44), Indoor Air - Hypothetical Future Residential Child Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

Noncarcinogenic	RfDi CDI HI	0,	3.5E-06	0.0E+00 5.1E-07		1.2E-06
ပ္	ELCR		i	;	ŀ	1
Carcinogenic	CDI	l	1	ŀ	1	1
	SFi	ł	;	ł	ŀ	ŀ
•	EPC	1.0E-04	3.7E-03	5.4E-04	1.9E-03	1.2E-03
	WOE	B2	<b>B</b> 2	<b>B</b> 2	C-B2	B2
	Chemical	BROMODICHLOROMETHANE	CARBON TETRACHLORIDE	CHLOROFORM	TETRACHLOROETHYLENE(PCE)	ig/m3 TRICHLOROETHYLENE (TCE)
	Units	ng/m3	ng/m3	ng/m3	ng/m3	ug/m3

Total HI: 0.00001

:

Total ELCR:

# Offsite Groundwater (MW44) (Potable Use) - Hypothetical Future Residential Child Scenario

Dunn Field, Defense Distribution Depot Memphis, Tennessee

	· · · · · · · · · · · · · · · · · · ·	<u>Carcinogenic</u>	Noncarcinogenic
Ingestic	on <sup>.</sup>		
Intake fo	or non-carcinogenic and carcinogenic compounds		
CDI =	Cow * IR * EF * ED		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	€PC
iR <sup>™</sup> ≃	Ingestion Rate (L/day)	1 a	1 a
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 а	6 а
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a
Dermal:			
	r non-carcinogenic and carcinogenic compounds		
CDI =	Cow *SA * PC * ET * EF * ED * CF		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	6557 b, c	6557 b, c
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0.007 b,e	0 007 b,e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 а	6 a
CF =	Conversion Factor (L/cm³)	1 00E-03	1 00E-03
BW =	Body Weight (kg)	15 a	15 a

### Inhalation:

CDI = Ingestion CDI from above

## References:

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance. "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991

b = US EPA Exposure Factors Handbook, August 1997

Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998.

- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old)).
- d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment. Principles and Applications, January 1992
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event.
- f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Offsite Groundwater (MW44) (Potable Use) - Future Residential Child Carcinogenic Scenario (OptionaL) Dunn Field, Defense Distribution Depot Memphis, Tennessee

. Tennessee	
<i>femphis</i>	
n Depot A	
Distribution Depoi	
Jefense	
nn Field, I	

		!							Ingestion	tion	Dermal	lal lal	Inhalation*
Chemical	_	MOE MOE	SFo	SFd	SFI	EPC	ABSgi	<b>P</b>	ō	ELCR	<u>-</u>	ELCR	ELCR
ALUMINUM						4 33E+00	1 00E-01	1 60E-04	60E-04 237E-02		174E-07		
ARSENIC		∢	1 50E+00	3 66E+00	1 50E+00 3 66E+00 1.51E+01 8 69E-03	8 69E-03	4 10E-01	1 60E-04	4 76E-05	7E-05	3.50F-10	1E.09	7E-04
CADMIUM		9			6 30E+00	1 56E-03			8 55E-06	} !	3 92E-10	3	5F-05
RON					•	1 10E+01	1 50E-01		6 01E-02		4.41E-07		)
MANGANESE		Δ				3 88E-01	4 00E-02		2 12E-03		1 56F-08		
<b>BROMODICHLORON</b>	<b>METHANE</b>	<b>B</b> 2	6.20E-02	6.33F-02		2 32E-03	9 80E-01	5 BOE 03	1 27E 0E	70 00	1000	27	
TO A CHULL TO CO CO	1					7			7/11/2	2	2000	75.10	
CARBON IEIRACH	-ORIDE		1.30E-01	2.00E-01	5.25E-02	2 94E-03	2 94E-03 6 50E-01	2 20E-02	1,61E-05	2E-06	1 63E-08	3E-09	8F-07
CHLOROFORM		B2	6.10E-03	3 05E-02	8 05E-02	2.63E-03	2 00E-01	1 8 90E-03		9F-08	5 89F-09	2F.10	1 H
Total Risk										8E-05	22.2	7E-09	8E-04
										To	Total Risk =	9E-04	· !

Offsite Groundwater (MW44) (Potable Use) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

14094									sebu	ngestion	De	Derma	Inhalation*
Units	Chemical	WOE		RfDd	RfDi	EPC	ABSgi	D C	<u>5</u>	ç	<u>5</u>	Ŧ	오
MG/L	ALUMINUM		1 00E+00	1.00E-01		4 33E+00	1 00E-01	1 60E-04	2.76E-01	0 28	2 03E-06	2 03F-05	
MG/L	ARSENIC	4	3 00E-04	1 23E-04		8 69E-03	4 10E-01	1 60E-04	5 56E-04	6	4.08F-09	3.32E-05	
MG/L	CADMIUM	9	5 00E-04	5 00E-06		1 56E-03	1 00E-02	1 00E-03	9 97E-05	0.20	4.58E-09	0.000	
MG/L	IRON		3 00E-01	4 50E-02		1 10E+01	1 50E-01	1 60E-04	7.01E-01	23	5 15E.06	1.14F-04	
MG/L	MANGANESE	۵	1 40E-01	5 60E-03	1.43E-05	'n	4 00E-02	1 60E-04	2 48E-02	0 18	1 82F-07	3.25E-05	
MG/L	BROMODICHLOROMETHANE	<b>B</b> 2	2 00E-02	1 96E-02		2 32E-03	9 80E-01	5 80E-03	1.48E-04	0.0074	3 95E-08	2.01E-06	
MG/L	CARBON TETRACHLORIDE	<b>B</b> 2	7 00E-04	4 55E-04		2 94E-03	6 50E-01	2 20E-02	1.88E-04	0.27	1 90E-07	4.17F-04	
MG/L	CHLOROFORM	<b>B</b> 2	1 00E-02	2 00E-03		2 63E-03	2 00E-01	8 90E-03	1 68E-04	0 017	6 88E-08	3.44F-05	
MG/L	TETRACHLOROETHYLENE(PCE)	C-B2	1 00E-02	1 00E-02	171E-01	2 57E-03	1 00E+00	4 80E-02	1 64E-04	0 0 16	3 62E-07	3.62F-05	
MG/L	TRICHLOROETHYLENE (TCE)	B2	6 00E-03	9 00E-04		2 09E-03	1 50E-01	1 60E-02	134E-04	0.022	9 80E-08	1 09E-04	
	Hazard Index									20		0.0017	1
									f	Anna Lineau	Total Managed Index	4	

# Indoor Air Inhalation Pathway when the estimated indoor air concentration is known

## **Scenario Titles**

AOC:

Offsite Monitoring Well (MW51)

Exposure media: Indoor Air

Receptor:

Hypothetical Future Residential Adult

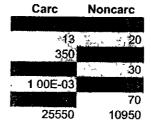
Report title:

Dunn Field, Defense Depot Memphis, Tennessee

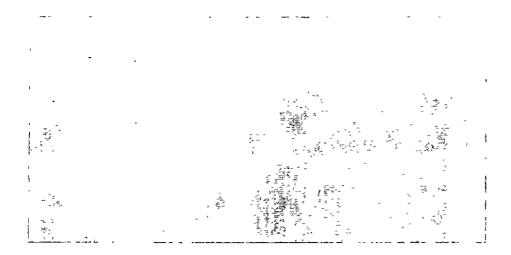
Inhalation:

CDI = (Cair \* IR \* ET \* EF \* ED \* CF) / (BW \* AT)

Cair (ug/m3). IR (m3/day) EF (days/year) ED (years) CF (mg/ug) BW (kg) AT (days)



Units  ug/m³   Chemical  1,1-DICHLOROE C TETRACHLORO C- TRICHLOROETI B2	-B2	SFi 0.175 0 002 0.006	<b>0.171</b>	Mean 0.0049243 0 0026332 0.0016321	
ug/m³ ug/m³					



# Offsite Monitoring Well (MW51), Indoor Air - Hypothetical Future Residential Adult Scenario Dunn Field, Defense Depot Memphis, Tennessee

## Inhalation

Intake for noncarcinogenic compounds

Intake for carcinogenic compounds.

CD!=	Cair * IR *EF * ED * CF	Cair *		*EF * * CF	
	BW * AT	Carcinogenic	Α	T Noncarcinogenic	
Cair =	Estimated Indoor Air Concentration (ug/m³)	EPC	- b	EPC	- ь
IR =	Inhalation Rate (m³/day)	NA		20	а
IRadj =	Adjusted Inhalation Rate (m³-yr)/(kg-day)	13	a,c	NA	
EF =	Exposure Frequency (days/year)	350	а	350	а
ED =	Exposure Duration (years)	NA	а	30	а
CF =	Conversion Factor (mg/ug)	1.00E-03		1.00E-03	
BW =	Body Weight (kg)	NA	а	70	а
AT =	Averaging Time (days)	25550	а	10950	а

### Sources:

a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance<sup>-</sup> "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991.

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response c = Age adjusted

Offsite Monitoring Well (MW51), Indoor Air - Hypothetical Future Residential Adult Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

	<b> </b>	<b> </b> 68	90	<u>,</u>
عاد	₹	37189	4	
Noncarcinogenic	īg	1.3E-06	7.2E-07	4.5E-07
Non	RfDi		1.7E-01	
0	ELCR	1.5E-07	9.4E-10	1.7E-09
Carcinogenio	CDI	8.8E-07	4.7E-07	2.9E-07
Ö	SFi	1.8E-01	2.0E-03	6 0E-03
'	EPC	4.9E-03	2.6E-03	1.6E-03
	WOE	ပ	C-82	B2
	Chemical	1,1-DICHLOROETHENE	<b>TETRACHLOROETHYLENE(PCE</b>	TRICHLOROETHYLENE (TCE)
	Units	ng/m3	ng/m3 T	ug/m3 T

Total ELCR: 1.56E-07

Total HI: 3.72E+04

1

Offsite Groundwater (MW51) (Potable Use) - Hypothetical Future Residential Adult Scenario

Juliu I icia, Delelis	e Distribution Depot	Memphis, Tennessee

		<u>Carcinogenic</u>	Noncarcinogenic
Ingestio			
Intake for	r non-carcinogenic compounds	Age-specific intake (for carcin	nogenic compounds only)
CDI =	Cow * IR * EF * ED	CDI <sub>adj</sub> = Com * EF * CF * IR <sub>adi</sub>	3,,,, ,
	BW * AT	AT	
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	N/A	2 a
IR <sub>adi</sub> =	Age-adjusted Ingestion Rate (L-year/kg-da		
EF =	Exposure Frequency (day/year)	350 a	* ****
ED =	Exposure Duration (year)	30 a	30 a
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	10950 a
Dermal: Intake for CDI = Cgw = SA = SA <sub>adj</sub> = PC = ET = EF = ED = CF =	ron-carcinogenic compounds  Cow *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)  Surface Area (cm²)  Age-adjusted Surface Area (cm²-yr/kg)  Dermal Permeability Constant (cm/hr)  Exposure Time (hr/day)  Exposure Frequency (day/year)  Exposure Duration (year)  Conversion Factor (L/cm³)	Age-specific Intake (for carcin CDI <sub>adj</sub> = C <sub>OW</sub> *SA <sub>adj</sub> * PC * ET * E  AT  EPC  N/A  9480 b,  (Chemical Specific) d  0.007 b,  350 a  30 a  1 00E-03	EF*CF  EPC  20000 b,c  c N/A  (Chemical Specific) d
BW =	Body Weight (kg)	700 <u>2</u> -03	70 a
AT =	Averaging Time (days)	25550 a	10950 a

#### Inhalation:

CDI = Ingestion CDI from above f

## References:

a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance. "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Age-adjusted ingestion rate for adults, adjusted for body weight and time for carcinogenic exposure.

$$\frac{1 \text{Radj} = \frac{1 \text{Rc} \times \text{EDc}}{\text{BWc}} + \frac{1 \text{Ra} \times (\text{EDa} - \text{EDc})}{\text{BWa}} = \frac{1 \times 6}{15} + \frac{2 \times (30-6)}{70}$$

## 1.09 (L-year)/(kg-day)

b = USEPA Exposure Factors Handbook, August 1997

c = Total Body Surface Area represents whole body (average of male & female adults).

f = Age-adjusted surface area for adults, adjusted for body weight and time for carcinogenic exposure.

$$SAadj = \frac{SAc \times EDi}{BWc} + \frac{SAa \times (EDa - EDc}{BWa} = \frac{6557 \times 6}{15} + \frac{20000 \times (30-6)}{70}$$

9480 (cm 2-year)/(kg)

d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value; all values adapted from EPA, Dermal Exposure Assessment Principles and Applications, January 1992

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event.

f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles white showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Offsite Groundwater (MW51) (Potable Use) - Hypothetical Future Residential Adult Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

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Inhalation	FICE				4F-05	1 11	0	6E-07	4E-05
Dermal	ELCR				1E-07	e c	)	7E-09	2E-07
Den	CD	1 92F-07	4 675 07	֝֝֝֝֝֡֝֝֝֝֝֓֓֓֝	2.43E-07	7 5111.08	1	1 00E-07	
ngestion	ELCR				1E-04	1F.06	2	1E-06	ZE-04
sebu	<u> </u>	1.97E-02	4 78F-02		2 48E-04	2 56F-05		1.02E-04	
	ပ္ရ	1 60E-04	_		1.60E-02	4 ROF-02		1.60E-02	:
	ABSgl	1.00E-01	1.50E-01		1.00E+00	1 00F+00		1 50E-01	
	FPC	132E+00 1	3211100		1 67E-02	1,72E-03 1,00F+00 ,		6.00E-03 6 89E-03 1 50E-01	
	S				1 1.75E-01 1	2.00E-03		6.00E-03	
	SFd			1		20E-0		7.33E-02	
	SFo				6,00E-01 6.	5 20E-02		1 10E-02 7	
	WOE			(	ر	C-B2	-	29	
	Chemical	ALUMINUM	RON		1,1-DICHLOROFINER	TETRACHLOROETHYLENE(PCE) (	ì	I KICHLOKOE I HYLENE (I CE)	Total Risk
;	Units	MG/L	MG/L		ر اور	MG/L	-	NG/L	

WOE = Weight of Evidence; CDI = Chronic Daily Intake; EPC = Exposure Point Concentration, ELCR = Excess Lifetime Cancer Exposure; \*= inhalation intake (CD

Offsite Groundwater (MW51) (Potable Use) - Hypothetical Future Residential Adult Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

:	,								Ingestion	tion	Dei	Dermal	Inhalation*
Units	Chemical	WOE		RfDd	RfDi	EPC	ABSgi	ည	CD	ğ	<u></u>	옃	오
MG/L	ALUMINUM		1 00E+00	1 00E-01		1.32E+00	1 00E-01	1 60E-04	3 62E-02	0 04	4 05E-07	4 05E-06	
MG/L	RON		3 00E-01	4.50E-02		3 21E+00	Ψ.	1 60E-04	8 80F-02	· 60	9 86F-07	2 19F-05	
MG/L	1,1-DICHLOROETHENE	ပ	9 00E-03	9 00E-03				1 60F-02 4	4 57E-04	200	5 125.07	5. 10L 05	
MG/I	TETRACHI OROFITHYI ENE/POR	E) C.B.	1 OOF 02	1 000	1715.04	1 75 0 0		20 100 4	100	3	2017	2000	100
		7	70.	20-02	2	20-127	_	4 80E-02	4 / 1 = -03	0.0047	1 58E-U/	1 585-05	2 76E-04
ارد اورا	INICHLORUE I HYLENE (I CE)	B2	6 00E-03	9 00E-04		6 89E-03	1 50E-01	1 60E-02	1.89E-04	0 031	2 11E-07	2 35E-04	
	Hazard Index									4.0		3.34E-04	2.76E-04

WOE = Weight of Evidence, CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index, \* = inhalation intake (CDI) = ir

# Offsite Monitoring Well (MW51), Indoor Air - Hypothetical Future Residential Child Scenario Dunn Field, Defense Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds

CDI=	Cair * IR *EF * ED * CF
	BW * AT

		Carcinogenic	Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	NA NA	EPC	ь
IR =	Inhalation Rate (m³/day)	NA	15	а
EF =	Exposure Frequency (days/year)	NA	350	а
ED =	Exposure Duration (years)	NA	6	а
CF =	Conversion Factor (mg/ug)	NA	1.00E-03	
BW =	Body Weight (kg)	NA	15	а
AT =	Averaging Time (days)	NA	2190	а

### Sources:

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991.

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings. Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

Offsite Monitoring Well (MW51), Indoor Air - Hypothetical Future Residential Child Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

Noncarcinogenic	CDI	4.7E-06	1 2.5E-06 1.48E-05	1.6E-06
Z	RfDi		1.7E-0	
nic	ELCR	1	:	:
Carcinogenic	IGO	!	;	1
	SFi	1	ŀ	1
	EPC	4.9E-03	2.6E-03	1 6E-03
	WOE	ပ	C-82	B2
	Chemical	ug/m3 1,1-DICHLOROETHENE	ug/m3 TETRACHLOROETHYLENE(PCE	ug/m3 TRICHLOROETHYLENE (TCE)
,	Units	ng/m3	ng/m3	ug/m3

Total HI: 1.48E-05

i

Total ELCR:

Offsite Groundwater (MW51) (Potable Use) - Hypothetical Future Residential Child Scenario

Dunn Field, Defe	ense Distribution	Depot Mem	phis. Tennessee

Incest!		<u>Carcinogenic</u>	Noncarcinogenic
Ingestic			
	or non-carcinogenic and carcinogenic compounds.		
CDI =	Cow * IR * EF * ED		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	1 a	1 a
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a
Dermal: Intake fo	or non-carcinogenic and carcinogenic compounds.		
CDI =	<u>C,,,, *SA * PC * ET *</u> EF * ED * CF		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	6557 b, c	6557 b, c
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0 007 b.e	0 007 b,e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
CF =	Conversion Factor (L/cm³)	1.00E-03	1.00E-03
BW =	Body Weight (kg)	1.00≛-03 15 a	
AT=			15 a
A1 ~	Averaging Time (days)	25550 a	2190 a

### Inhalation:

CDI = Ingestion CDI from above f

### References:

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = US EPA Exposure Factors Handbook, August 1997

Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998

c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old))

d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment. Principles and Applications, January 1992.

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0.007 day per event.

f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Inhalation\* ELCR

Dermal ELCR 2E-05 2E-08 2E-07

4E-08 1E-09 2E-09

CDI 5 32E-08 1.29E-07 6 71E-08 2 08E-08 2 77E-08

Offsite Groundwater (MW51) (Potable Use) - Future Residential Child Carcinogenic Scenario (OptionaL) Dunn Field, Defense Distribution Depot Memphis, Tennessee

•		!		. !					Inges	ngestion
Chemical		WOE	WOE SFO	SFd	SFI	EPC C	ABSgi	ပ္ရ	<u>5</u>	ELCR
ALUMINUM						132E+00	132E+00 100E-01 160E-04 724E-03	1.60E-04	7 24F-03	
RON						3.21E±00	1 50E-04	1 605 04	1 765 00	
						1		100	70-07	
1,1-DICHLOROETHENE		ပ	6 00E-01	6 00E-01	1 75E-01	1.67E-02	1 00E+00	1 60E-02	9.14E-05	
TETRACHI OROFIHYI FINE	(H)	C.R.	5 20E.02	5 20E-02	2005.02	4 70E.03	4 00 1	00 000	100	
	]	2	201040	201-05	3	20-17	50,100	4,000	8.45E-00	
TRICHLOROETHYLENE (TCE) B2 1 10E-02 7	Ω̈́	85	1 10E-02	110E-02 733E-02 600E-03 689E-03 150E-01 160E-02 378E-05	6 00E-03	6 89E-03	1 50E-01	1 60E-02	3 78E-05	4E-07

30 35	20-17 10-10-10-10-10-10-10-10-10-10-10-10-10-1
9 V U	7E-05
40	Total Risk ≖
4	5
Total Risk	

Offsite Groundwater (MW51) (Potable Use) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

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									Ingestion	tion	Dec	Jermai	Inhalation*
Units	Chemical	WOE		RfDd	ÆÐ	EPC	ABSgi	<u>م</u>	20	오	ā	유 	ç
MG/L	ALUMINUM		1 00E+00	1 00E-01		1.32E+00	1 00E-01	1 1 60E-04	8 45E-02	0 08	6 20E-07	6 20F-06	
MG/L	RON		3 00E-01	4.50E-02		3.21E+00	1 50E-01	1.60E-04	2 05E-01	0.7	1.51F-06	3.35E_05	
MG/L	1,1-DICHLOROETHENE	ပ	9,00E-03	9 00E-03		1 67E-02	1 00E+00	1 60E-02	1 07F-03	0.12	7.83E-07	8 70E-05	
MG/L	TETRACHLOROETHYLENE(PCE)	C-B2	1 00E-02	1 00E-02	1 71E-01	1 72E-03	1 00E+00	4.80E-02	1 10E-04	0.011	2 42F-07	2.42E-05	9000
MG/L	TRICHLOROETHYLENE (TCE)	82	6 00E-03	9 00E-04		6 89E-03	1 50E-01	1 60E-02	4 41E-04	0.073	3 24E-07	3.59E-04	
	Hazard Index											70 07 4	2000

Hazard Index

Total Hazard Index = 5.10E-04 0.0006

Total Hazard Index = 1.0

WOE = Weight of Evidence; CDI = Chronic Daily Intake, EPC = Exposure Point Concentration; HQ = Hazard Quotient, HI = Hazard Index, \* = inhalation intake (CDI) ≈ ir

# Offsite Monitoring Well (MW54), Indoor Air - Hypothetical Future Residential Adult Scenario Dunn Field, Defense Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds:

Intake for carcinogenic compounds:

CDI=	Calr * IR *EF * ED * CF	C <sub>air</sub> *	IR <sub>adj</sub>	<u>*EF * * CF</u>	
	BW * AT		Α	T	
		Carcinogenic		Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	EPC	b	EPC	Ь
IR =	Inhalation Rate (m³/day)	NA		20	а
IRadj =	Adjusted Inhalation Rate (m³-yr)/(kg-day)	13	a,c	NA	
EF =	Exposure Frequency (days/year)	350	а	350	а
ED =	Exposure Duration (years)	NA	а	30	a
CF =	Conversion Factor (mg/ug)	1 00E-03		1 00E-03	
BW =	Body Weight (kg)	NA	а	70	а
AT =	Averaging Time (days)	25550	а	10950	а

## Sources:

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

c = Age adjusted

0.0001

Total HI:

Total ELCR: 4.84E-08

Offsite Monitoring Well (MW54), Indoor Air - Hypothetical Future Residential Adult Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

				ပ	Carcinogenic	•	Š	Noncarcinogenic	nic
Units	Chemical	WOE	EPC	SFi	CDI	ELCR	RfDi	<u>a</u>	Ŧ
ug/m3	ug/m3 1,1,2,2-TETRACHLOROETHANE	ပ	3.8E-05	2.0E-01	6.7E-09	1.4E-09		1.0E-08	
ng/m3	1,1,2-TRICHLOROETHANE	ပ	1.0E-04	5.6E-02	1.8E-08	1.0E-09		2 8E-08	
ng/m3	BENZENE	∢	7.1E-04	2.7E-02	1.3E-07	3.4E-09	1.7E-03	1.9E-07	1.14E-04
ng/m3	CARBON TETRACHLORIDE	B2	3.5E-03	5 3E-02	6.2E-07	3.3E-08		9.6E-07	<b>!</b>
ng/m3	CHLOROFORM	<b>B</b> 2	5.6E-04	8.1E-02	1.0E-07	8.1E-09	0 0E+00	1.5E-07	
ng/m3	cis-1,2-DICHLOROETHYLENE	۵	4.55E-04		8.11E-08		1.00E-02	1.25E-07	1.25E-05
ng/m3	TETRACHLOROETHYLENE(PCE	C-82	1.80E-03	2 00E-03	3.20E-07	6.40E-10	1.71E-01	4.92E-07	
ug/m3	ug/m3 TRICHLOROETHYLENE (TCE)	B2	1 16E-03	6 00E-03	2.06E-07	1.24E-09		3.17E-07	

30 a

70 a

10950 a

1 00E-03

Offsite Groundwater (MW54) (Potable Use) - Hypothetical Future Residential Adult Scenario

Dunn Field, Defense Distribution Depot Memphis, Tennessee	Dunn Field,	. Defense	Distribution	Depot	Memphis,	Tennessee
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		<u>Carcinogenic</u>	Noncarcinogenic
Ingestic			
	or non-carcinogenic compounds:	Age-specific ıntake (for carcınogei	nic compounds only)
CDI =	Cow * IR * EF * ED CDI	$_{\text{adj}} = \frac{C_{\text{cos}} * \text{EF} * \text{CF} * \text{IR}_{\text{adj}}}{\text{EF}}$	
	BW * AT	AT	
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	N/A	2 a
${R_{adj}} =$	Age-adjusted Ingestion Rate (L-year/kg-day)	1.1 b	N/A
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	10950 a
Dermal:			
Intake fo	or non-carcinogenic compounds	Age-specific intake (for carcinoger	nic compounds only):
CDI =	- ·	adj = Cow *SAadi * PC * ET * EF * (	
	BW * AT	AT	<del>=-</del>
C <sub>ow</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA ≃	Surface Area (cm²)	N/A	20000 b,c
$SA_{adj} =$	Age-adjusted Surface Area (cm²-yr/kg)	9480 b,c	N/A
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0.007 b,e	0.007 b,e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED -			

30 a

70 a

25550 a

1 00E-03

#### Inhalation:

ED =

CF =

BW =

AT =

CDI = Ingestion CDI from above f

Body Weight (kg)

Exposure Duration (year)

Averaging Time (days)

Conversion Factor (L/cm3)

## References

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance. "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Age-adjusted ingestion rate for adults, adjusted for body weight and time for carcinogenic exposure

## 1.09 (L-year)/(kg-day)

b = USEPA Exposure Factors Handbook, August 1997

c = Total Body Surface Area represents whole body (average of male & female adults)

f = Age-adjusted surface area for adults, adjusted for body weight and time for carcinogenic exposure

SAadj = 
$$\frac{\text{SAc x ED}_{\text{c}}}{\text{BWc}}$$
 +  $\frac{\text{SAa x (EDa - EDc}}{\text{BWa}}$  =  $\frac{6557 \times 6}{15}$  +  $\frac{20000 \times (30-6)}{70}$ 

9480 (cm²-year)/(kg)
d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment: Principles and Applications, January 1992

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event.

f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showening/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4

Bulletins, Human Health Risk Assessment, Interim, November 1995

Offsite Groundwater (MW54) (Potable Use) - Hypothetical Future Residential Adult Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

									Indestion	fion	Darmal	la r	Intrologion*
Units	Chemical WO	VOE	SFo	SFd	ES.	FPC	ABSOL	٥	5	5	٤		majation 7: 65
Č							32		3	ברני	3	ברצ	FLCR
N Č	NON					5.49E+00	1.50E-01	1 60E-04	8.17E-02		7 99F-07		
WG/L	1.1.2.2-TETRACHLOROFTHANE	c c	2 OUF-01	2 RGE_01	2 025-01	0 10E 02	7 00 100	0000	1 250	i c	L	1	
3		) (		1	100	2			1,000 L	ก ก	7.45E-U8	ZE-08	3E-05
MG/L	1,1,2-1 KICHLOKOETHANE	ပ	70E-02	7 04E-02	5 60E-02	2.37E-03	8 10E-01	8 40E-03	3.53F-05	2F-06	1 81E.08	100	90.00
Č	BENJENE	<		1 LO	100	L				1 1	3		20-22
J .		(		20-2100	Z / UE-0Z	Z.ZZE-03	Z.ZZE-03 9 /0E-01	Z 10E-0Z	3 30E-05	2E-06	4 23E-08	2E-09	95.07
٦/٥ ع	CARBON TETRACHLORIDE	8	30F-01	2 OOF-01	5 25F 02	6 14F-03	6 50E-01		0 125 05	11	1 000 04	1 6	11
•		1		1	70-101	2	3		2000	C	70-07	2E-08	5F-06
MC/L	CHICKOFORM	B2 6	5.10E-03	3.05E-02	8 05E-02	6 24E-03	2 00E-01	8.90E-03	9 28F-05	6F.07	5 05E-08	00'uc	70.00
Ž	Cis-1 2-DICHI OROFITHYI FINE	_				1	100			1		21.73	ב ב ב
		נ				-		1,005-02	4.43にも4		1 3/E-0/		
MG/L	TETRACHLOROETHYLENE(PCE) C-82 5 20E-02 5 20E-02 2 00E-03	.B2 5	20E-02	5 20E-02	2 00E-03	1,87E-03	1 00E+00	4 80E-02	2.78F-05	1F-06	8 15E.08	45.00	90
Č		7	L	L	2000	1			)	1			00-10
ING/L	INICHEUROBINITENE (ICE) BZ	7	10E-02	/ 33E-02	10E-02 / 33E-02 6 00E-03	6.14E-02	1 50E-01	1 60E-02	9 13E-04	1 5 5	8 93E-07	7E-08	5E-06
	lotal Risk									SE-05		15-07	55.05

Offsite Groundwater (MW54) (Potable Use) - Hypothetical Future Residential Adult Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

;									Ingestion	tion	Der	Dermal	Inhalation*
Cnits	Chemical	WOE	RfDo	RfDd	RfDi	EPC	ABSgi	ည	īgo	ğ	<u></u>	g	오
MG/L	IRON		3 00E-01	4 50E-02		5 49E+00	1 50E-01	1 60E-04	1 51E-01	0.5	1 69E-06	3.75E-05	
MG/L	1,1,2,2-TETRACHLOROETHANE	Ų	6 00E-02	4 20E-02		9 10E-03	7 00E-01	9 00E-03	2 49E-04	0 004	1 57E-07	3 745-06	
MG/L	1,1,2-TRICHLOROETHANE	ပ	4 00E-03	3 24E-03		2 37E-03	8 10E-01	8 40E-03	6 50E-05	0.0163	3 82E-08	1 18E-05	
MG/L	BENZENE	∢	3 00E-03	2 91E-03	1 70E-03	2 22E-03	9 70E-01	2 10E-02	6.08E-05	0 0 0 2 0 3	8 935-08	3 07E-05	0.0357
MG/L	CARBON TETRACHLORIDE	82	7 00E-04	4 55E-04		6 14E-03	6 50E-01	2 20E-02	1 68E-04	0.24	2 59E-07	0.000	)
MG/L	CHLOROFORM	<b>B</b> 2	1 00E-02	2 00E-03		6 24E-03	2 00E-01	8 90E-03	1 71E-04	0.017	1 07E-07	5 33E-05	
MG/L	cis-1,2-DICHLOROETHYLENE	۵	1 00E-02	1 00E-02	1 00E-02	151E-02	1 00E+00	1 00E-02	4 14E-04	0.041	2 90E-07	2 90F-05	0.041
MG/L	TETRACHLOROETHYLENE(PCE) C-B2	C-B2	1.00E-02	1 00E-02	171E-01	187E-03	1 00E+00	4 80E-02	5 11E-05	0.0051	1 72E-07	1 72E-05	2.99E-04
MG/L	TRICHLOROETHYLENE (TCE)	82	6 00E-03	9 00E-04		6 14E-02	1.50E-01	1 60E-02	1 68E-03	0.28	1.88E-06	0 0021	
	Hazard Index									1.1		0.0028	0.1

## Offsite Monitoring Well (MW54), Indoor Air - Hypothetical Future Residential Child Scenario Dunn Field, Defense Depot Memphis, Tennessee

## Inhalation

Intake for noncarcinogenic compounds:

CDI=	Cair * IR *EF * ED * CF
	BW * AT

		Carcinogenic	Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	NA NA	EPC	b
IR =	Inhalation Rate (m³/day)	NA	15	а
EF =	Exposure Frequency (days/year)	NA	350	а
ED =	Exposure Duration (years)	NA	6	а
CF =	Conversion Factor (mg/ug)	NA	1 00E-03	
BW =	Body Weight (kg)	NA	15	а
AT =	Averaging Time (days)	NA	2190	а

### Sources:

a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings. Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

Offsite Monitoring Well (MW54), Indoor Air - Hypothetical Future Residential Child Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

					1				•
				,	Carcinogenic	<u>.</u>		Noncarcinogenic	2
Units	Chemical	WOE	EPC	SFi	CDI	ELCR	RfDi	ΙQΟ	Ī
က	ug/m3 1,1,2,2-TETRACHLOROETHANE	ပ	3.79E-05	1	1	1		3.63E-08	1
ന	ug/m3 1,1,2-TRICHLOROETHANE	ပ	1.03E-04	ł	ŀ	ł		9.91E-08	
ng/m3	BENZENE	∢	7.10E-04	ı	1	ł	1.70E-03	6.81E-07	4.00E-04
ო	ug/m3 CARBON TETRACHLORIDE	<b>B</b> 2	3.50E-03	ł	ł	ł		3 35E-06	• •
က	CHLOROFORM	<b>B</b> 2	5.62E-04	ł	:	ŧ	0.00E+00	5.39E-07	
ng/m3	cis-1,2-DICHLOROETHYLENE	۵	4.55E-04	ļ	ı	ł	1 00E-02	4.36E-07	4.36E-05
ug/m3	TETRACHLOROETHYLENE(PCF	C-82	1.80E-03	ŀ	1	i	1.71E-01	1.72E-06	1.01E-05
္က	ug/m3 TRICHLOROETHYLENE (TCE)	B2	1.16E-03	1	:	ì		1.11E-06	

0.0005

Total HI:

ł

Total ELCR:

Offsite Groundwater (MW54) (Potable Use) - Hypothetical Future Residential Child Scenario

Dunn Field, Defense Distribution Depot Memphis, Tennessee

		Carcinogenic	Noncarcinogenic
Ingestio		<del></del>	· · · · <del>·</del>
intake fo	r non-carcinogenic and carcinogenic compounds		
CDI =	Cow * IR * EF * ED		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	1 a	1 a
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a
Dermal:			
Intake for	r non-carcinogenic and carcinogenic compounds:		
CDI =	C * SA * PC * ET * EF * ED * CF		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm <sup>2</sup> )	6557 b, c	6557 b, c
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0 007 b,e	0.007 b,e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
CF =	Conversion Factor (L/cm <sup>3</sup> )	1.00E-03	1 00E-03
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a

## Inhalation:

CDI = Ingestion CDI from above f

### References:

- a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991.
- b = US EPA Exposure Factors Handbook, August 1997.
  - Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998.
- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old))
- d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value; all values adapted from EPA, Dermal Exposure Assessment Principles and Applications, January 1992
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0.007 day per event
- f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Offsite Groundwater (MW54) (Potable Use) - Future Residential Child Carcinogenic Scenario (OptionaL) Dunn Field, Defense Distribution Depot Memphis, Tennessee

:									Ingestion	tion	Dermal	nal	Inhalation*
- 1	Chemical	WOE	SFo	SFd	SFI	EPC	ABSgi	S S	īgo	ELCR	- - - -	ELCR.	ELCR
	RON					5,49E+00	1.50E-01	1.60E-04	3 01E-02		2 21F-07		
	1,1,2,2-TETRACHLOROETHANE	ပ	2.00E-01	2 86E-01	2 03E-01	9 10E-03	7.00E-01	9.00E-03	4.99F-05	1F-05	2 06 1 - 08	90,18	1E_05
	1,1,2-TRICHLOROETHANE	ပ	5 70E-02	7 04E-02	5 60F-02	2.37F-03	8 10F-01	8 40E-03	1 305.05	75.03	7 010 0	1 1	7 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
							3		2	ì	2000	ļ	2
	BENZENE	∢	5 50E-02	5 67E-02	2 70E-02	2.22E-03	9.70E-01	2.10E-02	1 22E-05	7E-07	1 17E-08	7E-10	3E-07
	CARBON TETRACHLORIDE	<b>B</b> 2	1.30E-01	2,00E-01	5 25E-02	6 14E-03	6 50F-01	2.20F-02	3.36F-05	4E-08	3 40E-08	71.00	20.00
		ć	LOT	L						j		2	21-00
	איאטרטאטונט	Z	6.10E-03	3.05E-02	8 05E-02	6 24E-03	2.00E-01	8.90E-03	3,42E-05	2E-07	1 40E-08	4E-10	3E-06
	as-1,2-DICHLOROETHYLENE	۵				1 51E-02	1 00E+00	1 00E-02	8.29E-05		3 80F-08		
	TETRACHLOROETHYLENE(PCE)		C-B2 5 20E-02 5 20E-02 2 00E-03	5 20E-02	2 00E-03	1 87E-03	1.00E+00	.00E+00 4 80E-02	1 02E-05	5F-07	2 25F-08	1F-09	2E.08
	Total Risk									2E-05		3E-08	2E-05
										Ī	Total Risk =	4E-05	

Offsite Groundwater (MW54) (Potable Use) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense <u>Distribution Depot Memphis</u>, Tennessee

:									Ingestion	ilon	Der	Dermai	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	RfD	EPC	ABSgi	S C	CD	댶	<u>a</u>	옆	皇
MG/L	IRON		3 00E-01	4 50E-02		5 49E+00	1 50E-01	1 60E-04	3 51E-01	12	2 58E-06	5 73F-05	
MG/L	1,1,2,2-TETRACHLOROETHANE	ပ	6.00E-02	4 20E-02		9 10E-03	7 00E-01	9 00E-03	5 82E-04	0 0 0 0	2 40E-07	5 72F-06	
MG/L	1,1,2-TRICHLOROETHANE	Ų	4 00E-03	3 24E-03		2 37E-03	8 10E-01	8.40E-03	1 52E-04	0 038	5 85E-08	1.81E-05	
MG/L	BENZENE	∢	3 00E-03	2.91E-03	1 70E-03	2 22E-03	9 70E-01	2 10E-02	1 42E-04	0.0473	137E-07	4 70F-05	0.00
MG/L	CARBON TETRACHLORIDE	B2	7 00E-04	4 55E-04		6 14E-03	6 50E-01	2 20E-02	3 92E-04	0.0	3 96F-07	0000	2
MG/L	CHLOROFORM	<b>B</b> 2	1 00E-02	2 00E-03		6 24E-03	2 00E-01	8 90E-03	3.99E-04	000	1 63E-07	8 15F-05	
MG/L	cis-1,2-DICHLOROETHYLENE	۵	1 00E-02	1.00E-02	1 00E-02	1 51E-02	1 00E+00	1 00E-02	9.67E-04	0 10	4 44F-07	4 44F-05	0.10
MG/L	TETRACHLOROETHYLENE(PCE)	C-82	0 0 0 1 0	0.010	0 17	0 0019	10	0 048	1.19E-04	0.012	2 63E-07	2 63E-05	6 98F-04
MG/L	TRICHLOROETHYLENE (TCE)	B2	09000	9 00E-04		90 0	0.15	0 016	0.0039	20	2 88E-06	0.0032	
	Hazard Index									2.6		0.0044	0

# Offsite Monitoring Well (MW71), Indoor Air - Hypothetical Future Residential Adult Scenario Dunn Field, Defense Depot Memphis, Tennessee

## Inhalation

Intake for noncarcinogenic compounds:

Intake for carcinogenic compounds:

CDI=	Cair " IR "EF " ED " CF	<u>C<sub>air</sub> *</u>	IR <sub>adi</sub>	<u>*EF * * CF</u>	
	BW * AT		À	T	
		Carcinogenic		Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	EPC	ъ	EPC	b
IR =	Inhalation Rate (m³/day)	NA		20	а
IRadj =	Adjusted Inhalation Rate (m³-yr)/(kg-day)	13	a.c	NA	
EF =	Exposure Frequency (days/year)	350	a	350	а
ED =	Exposure Duration (years)	NA	а	30	а
CF =	Conversion Factor (mg/ug)	1 00E-03		1 00E-03	
BW =	Body Weight (kg)	NΑ	а	70	а
AT =	Averaging Time (days)	25550	а	10950	a

## Sources:

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response c = Age adjusted

Total HI: 0.00002

Total ELCR: 5.42E-08

Offsite Monitoring Well (MW71), Indoor Air - Hypothetical Future Residential Adult Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

				ບຶ	Carcinogenic		Non	Noncarcinogenic	<u>:</u>
Units	Chemical	WOE	EPC	SFi	9	ELCR	RfDI	CD	Ī
ng/m3	ug/m3 1,1,2,2-TETRACHLOROETHANE	ပ	4 2E-05	2.0E-01	7.5E-09	1.5E-09		1.1E-08	
ng/m3	ug/m3 1,1,2-TRICHLOROETHANE	ပ	1.2E-04	5.6E-02	2.1E-08	1.2E-09		3.3E-08	
ng/m3	CARBON TETRACHLORIDE	B2	4 3E-03	5 3E-02	7.7E-07	4.0E-08		1.2E-06	
ng/m3	CHLOROFORM	B2	6 2E-04	8.1E-02	1.1E-07	8.8E-09	0.0E+00	1 7E-07	
ng/m3	cis-1,2-DICHLOROETHYLENE	Δ	5.6E-04		1.0E-07		1.0E-02	1.5E-07	1 54E-05
ng/m3	TETRACHLOROETHYLENE(PCE)	C-82	2.3E-03	2.0E-03	4.1E-07	8.1E-10	1 7E-01	6.2E-07	3.64E-06
ug/m3	ug/m3 TRICHLOROETHYLENE (TCE)	82	1.4E-03	6.0E-03	2.5E-07	1.5E-09		3.9E-07	

10950 a

Offsite Groundwater (MW71) (Potable Use) - Hypothetical Future Residential Adult Scenario

Dunn Field, Def	ense Distribution D	Depot Memphis,	Tennessee
-----------------	---------------------	----------------	-----------

		<u>Carcinogenic</u>	Noncarcinogenic
Ingestic			
	r non-carcinogenic compounds	Age-specific intake (for carcinogenic	compounds only):
CDI =	Cov * IR * EF * ED	CDI <sub>adj</sub> = <u>C<sub>ree</sub> * EF * CF * IR<sub>adi</sub></u>	
	BW * AT	AT	
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	N/A	2 a
$IR_{adj} =$	Age-adjusted Ingestion Rate (L-year/kg-dage)	ay) 1.1 b	N/A
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	10950 a
Dermal: Intake fo CDI =	r non-carcinogenic compounds:  Cow *SA * PC * ET * EF * ED * CF  BW * AT	Age-specific intake (for carcinogenic CDI <sub>adj</sub> = C <sub>gw</sub> *SA <sub>adj</sub> *PC*ET*EF*CF	compounds only).
C <sub>aw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	N/A	20000 b,c
SA <sub>edj</sub> =	Age-adjusted Surface Area (cm²-yr/kg)	9480 b.c	N/A
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0 007 b.e	0 007 b,e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
CF =	Conversion Factor (L/cm <sup>3</sup> )	1 00E-03	1.00E-03
BW =	Body Weight (kg)	70 a	70 a

25550 a

### Inhalation.

AT =

CDI = Ingestion CDI from above f

Averaging Time (days)

## References:

a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance<sup>-</sup> "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Age-adjusted ingestion rate for adults, adjusted for body weight and time for carcinogenic exposure.

1.09 (L-year)/(kg-day)

b = USEPA Exposure Factors Handbook, August 1997

c = Total Body Surface Area represents whole body (average of male & female adults)

f = Age-adjusted surface area for adults, adjusted for body weight and time for carcinogenic exposure

SAadj = 
$$\frac{SAc \times ED_{i}}{BWc}$$
 +  $\frac{SAa \times (EDa - EDc}{BWa}$  =  $\frac{6557 \times 6}{15}$  +  $\frac{20000 \times (30-6)}{70}$ 

9480 (cm 2-year)/(kg)

d = Dermal Permeability Constant for water (0.001) used for constituents without a PC value; all values adapted from EPA, Dermal Exposure Assessment Principles and Applications, January 1992

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event.

f = follows EPA Region IV guidance (i e , inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Offsite Groundwater (MW71) (Potable Use) - Hypothetical Future Residential Adult Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

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inn Field, Defense Distribution Depot Memphis, Tennessee	
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Inhalation*	ELCR	4F-04	ָ בְּיִלְ בְיִילְ	24-06	2E.05	ט ק	1.0.2 1.0.3	!		2E-07	,	2E-05	2E-03
	LCR	3E-07		200	1F-07	5	2E-07	! 		1 80- 80-	1 1	2E-07	9E-07
Derma	<u> </u>	1 13F-08	00	4.UUT-00	7.36F-07	5	7 42E-06	8 30E.08	200	2 80E-07	1111	2 93E-06	
tion	ELCR	4E-04	90 50	200	7E-05	1 1	8E-05			90 <del>-</del> 35	10	3F-05	6E-04
ngestion	ā	2.06E-03	2000 08	00.000	5 48E-04		1 36E-02	137F-04		3.54E-05	60 100	3.00E-03	
	ပ္ရ	1 9 00E-03	CO 1107 0	, , , , , ,	2,20E-02 E		8.90E-03 '	1.00F+00 1.00F-02 1.37F-04		4.80E-02 ç	00 000	1 PUE-UZ	
	ABSgi	7.00E-01	0.101		6 50E-01		2 00E-01	1.00F+00		1 00E+00	TOT .	1 2012-01	
	EPC	1.38E-01	2 69E.03	2	3 68E-02	L	9 18E-01	9 23E-03		6.41E-03	100	2.02=-01	
	SFI	2 03E-01	7 D4E-02 5 60E-02	1	5,25E-02	100	8 055-02		100	Z.00E-03	1000	0 00=-03	
	SFd	2.86E-01	7 04F-02	1	2 00E-01	L	3,05E-02		1	20-10Z		1.105-02 7.335-02	
	SFo	2 00E-01			1,30E-01	107	0 TOE-03		100	5.ZUE-UZ	4000	1.10E-UZ	
	WOE	ပ	c	)	82		2	Ω	2	Ş	á	6	
•	Chemical	1,1,2,2-TETRACHLOROETHANE	1.1.2-TRICHLOROETHANE		CARBON TETRACHLORIDE		MINOLONG TO	cis-1,2-DICHLOROETHYLENE	CLOOK TANK EXPLANTS	IEIRACHLOROEIHTLENE(POE) C-BZ 3.20E-UZ 3.20E-UZ	(もくて) ロスロ シコチかくのく コンパロト	INCLIENCE (10E)	lotal Kisk
:	Units	MG/L	MG/L		MG/L	2	(d.	MG/L	CN.	Z Č	2		

Offsite Groundwater (MW71) (Potable Use) - Hypothetical Future Residential Adult Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

:									Sebul	gestion	Del	)ermal	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	æ	EPC	ABSgi	ပ္ရ	<u>5</u>	g	- -	요 	멸
MG/L	1,1,2,2-TETRACHLOROETHANE	ပ	6 00E-02	4.20E-02		1 38E-01	7 00E-01	9 00E-03	3 79E-03	0.063	2.38F-06	5 68E-05	
MG/L	1,1,2-TRICHLOROETHANE	ပ	4 00E-03	3 24E-03		2 69E-03	8 10E-01	8 40E-03	7.36E-05	0.018	4 33F-08	1.34E-05	
MG/L	CARBON TETRACHLORIDE	85	7 00E-04	4.55E-04		3 68E-02	6.50E-01	2 20E-02	1 01E-03	7 7	1 55E-08	0.0034	
MG/L	CHLOROFORM	8	1 DOE-02	2.00E-03		9 18E-01	2 DOE-01	8 00E-03	2 5111.03	+ u	1 575.05	0.000	
MG/I	GS-1 2-DICHI OROFTHYI FINE	<u> </u> _	1 00E-02	1 00E-02	4 AOE 02	0 22 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100010	1000	201102	200	20110	0000	i c
		<b>ו</b>	201.02	100 L	100 L	2 4 2 1 - 0 2	201100	1 00E-02	4 33E-04	0700	201	1.77	0.025
MG/L	IETRACHLOROETHYLENE(PCE) C-B2	C-82	1 00E-02	1 00E-02	171E-01	6 41E-03	1 00E+00	4 80E-02	1.76E-04	0 0 18	5 90E-07	5 90E-05	0.0010
MG/L	TRICHLOROETHYLENE (TCE)	B2	6 00E-03	9 00E-04		2 02E-01	150E-01	1 60E-02	5 52E-03	60	6 19E-06	0 00 0	•
	Hazard Index									2		070	,

# Offsite Monitoring Well (MW71), Indoor Air - Hypothetical Future Residential Child Scenario Dunn Field, Defense Depot Memphis, Tennessee

#### Inhalation

Intake for noncarcinogenic compounds:

CDI=	Cair * IR *EF * ED * CF
	BW * AT

		Carcinogenic	Noncarcinogenic	
$C_{air} =$	Estimated Indoor Air Concentration (ug/m³)	NA	EPC	b
!R =	Inhalation Rate (m³/day)	NA	15	а
EF =	Exposure Frequency (days/year)	NA	350	а
ED =	Exposure Duration (years)	NA	6	а
CF =	Conversion Factor (mg/ug)	NA	1.00E-03	
BW =	Body Weight (kg)	NA	15	а
AT =	Averaging Time (days)	NA	2190	а

### Sources:

a = U.S. EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

Offsite Monitoring Well (MW71), Indoor Air - Hypothetical Future Residential Child Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

WOE         EPC         SFI         CDI         ELCR           DETHANE         C         4.2E-05             ANE         C         1.2E-04             DRIDE         B2         4.3E-03             IYLENE         D         5.6E-04           (           FORE(PCI         C-B2         2.27E-03           1           FORE)         B2         142E-03           1						Carcinogenic	<u>.</u> 2	Non	Noncarcinogenic	<u> </u>
C 4 2E-05	Units	Chemical	WOE	EPC	SFi	CD	ELCR	RfDi	IGS	Ŧ
C 1.2E-04	ng/m3	1,1,2,2-TETRACHLOROETHANE	ပ	4 2E-05	<b> </b>		;		4.0E-08	
CARBON TETRACHLORIDE B2 4.3E-03 ( CHLOROFORM	ng/m3	1,1,2-TRICHLOROETHANE	ပ	1.2E-04	;	:	;		1.2E-07	
CHLOROFORM B2 6.2E-04 (cis-1,2-DICHLOROETHYLENE D 5.6E-04	ng/m3	CARBON TETRACHLO	B2	4.3E-03	ł	ł	1		4.1E-06	
IYLENE D 5.6E-04 1 -ENE(PCI C-B2 2.27E-03 1 (TCF) R2 1.42E-03 1	ng/m3	CHLOROFORM	B2	6 2E-04	:	i	ŀ	0.0E+00	5.9E-07	
LENE(PCE C-B2 2.27E-03 1. E/TCF) B2 1.42E-03	ug/m3		۵	5.6E-04	:	ŀ	ł	1.0E-02	5.4E-07	5 40E-05
F (TCF) B2 142F_03	ug/m3	<b>TETRACHLOROETHY</b>	C-B2	2 27E-03	:	;		1.71E-01	2.18E-06	1.28E-05
- Co 32::	ug/m3	ug/m3 TRICHLOROETHYLENE (TCE)	B2	1.42E-03	ı	;	ŀ		1.36E-06	

0.0001

Total HI:

ł

Total ELCR:

Offsite Groundwater (MW71) (Potable Use) - Hypothetical Future Residential Child Scenario

Dunn Field, Defense Distribution Depot Memphis, Tennesse
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		Carcinogenic	<u>Noncarcinogenic</u>
Ingestio			
Intake for	r non-carcinogenic and carcinogenic compounds		
CDI =	Cow * IR * EF * ED		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
IR =	Ingestion Rate (L/day)	1 a	1 a
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a
Dermal:			
Intake for	non-carcinogenic and carcinogenic compounds:		
CDI =	Cnw *SA * PC * ET * EF * ED * CF		
	BW * AT		
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
SA =	Surface Area (cm²)	6557 b, c	6557 b. c
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
ET =	Exposure Time (hr/day)	0.007 b,e	0 007 b,e
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	6 a	6 a
CF =	Conversion Factor (L/cm <sup>3</sup> )	1.00E-03	1.00E-03
BW =	Body Weight (kg)	15 a	15 a
AT =	Averaging Time (days)	25550 a	2190 a

## Inhalation:

CDI = Ingestion CDI from above f

### References:

- a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991.
- b = US EPA Exposure Factors Handbook, August 1997
  - Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998
- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old))
- d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value; all values adapted from EPA, Dermal Exposure Assessment: Principles and Applications, January 1992
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event.
- f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Offsite Groundwater (MW71) (Potable Use) - Future Residential Child Carcinogenic Scenarlo (OptionaL)

Dunn Field, Defense Distribution Depot Memphis, Tennessee

:									Ingestion	tion	Dermal	nal	Inhalation*
Galts		WOE	SFo	SFd	SFI	EPC	ABSgi	ပ္ရ	<u> </u>	ELCR	3	ELCR	ELCR
MG/L	y N		2.00E-01	2 86E-01	2.03E-01	1 38E-01	ı_	9	7 57E-04	2E-04	3.13E-07	9E-08	2E-04
MG/L	1,1,2-TRICHLOROETHANE		5.70E-02	7.04E-02	5 60E-02	2 69E-03	8 10E-01	3 40E-03	1.47E-05	8E-07	5 67E-09	4E-10	8E-07
MG/L	CARBON TETRACHLORIDE	<b>B</b> 2	1 30E-01	2 00E-01	2 00E-01 5 25E-02	3 68E-02	6 50E-01	2 20E-02	2.02E-04	3E-05	2 04E-07	4E-08	1E-05
MG/L	CHLOROFORM		6 10E-03	3 05E-02	8 05E-02	9 18E-01	2 00E-01	3 90E-03	5 03E-03	3E-05	2 05E-06	6E-08	4E-04
MG/L		۵				9 23E-03	1 00E+00	1 00E-02	5 06E-05		2 32E-08		1
MG/L	Ű	C-B2	5 20E-02	5.20E-02	: 00E-03	6 41E-03	1 00E+00	1 80E-02	3 51E-05	2E-06	7 74E-08	4E-09	7E-08
MG/L	TRICHLOROETHYLENE (TCE)	<b>B</b> 2	1 10E-02	7 33E-02	6 00E-03 2 02E-01	2 02E-01	1.50E-01	1 60E-02	1 10E-03	1E-05	8 11E-07	6E-08	7E-06
	I OTAL KISK									2E-04		3E-07	6E-04
										Ę O	Total Risk =	8E-04	

Offsite Groundwater (MW71) (Potable Use) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

									Sebuj	tion	Der	Jerma	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	RfÖ	EPC	ABSgi	ပ္ရ	9	ğ	<u></u>	오	ç
MG/L	1,1,2,2-TETRACHLOROETHANE	ပ	6 00E-02	4 20E-02		1.38E-01	7 00E-01	9 00E-03	8.83E-03	0.15	3.65F-06	8 69F-05	
MG/L	1,1,2-TRICHLOROETHANE	ပ	4 00E-03	3 24E-03		2.69E-03	8 10E-01	8 40E-03	•	0.043	6.62F-08	2 04E-05	
MG/L	CARBON TETRACHLORIDE	B2	7.00E-04	4 55E-04		3 68E-02	6 50E-01	2 20E-02	٠,	3.4	2.38E-06	0.0052	
MG/L	CHLOROFORM	82	1.00E-02	2 00F-03		9 18F-01	2 OOF-01	8 90E-03		י מ	2 400.05	0.002	
MG/L	CIS-1,2-DICHLOROETHYLENE		1 00F-02	1.00F-02	1 00F-02	9 23F-03	1 005+00	1 OOF 02		0.00	27401-03	2100	010
		6	٠,	1 1000	1	111	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	100	•	500	70-21.7	CO-31 / 7	600 O
) N	IETRACHLOROFIHYLENE(FCE) C-82	2. 2. 2. 3.	_	1 00E-02	171E-01	6,41E-03	1 00E+00	4 80E-02	4 10E-04	0 041	9 03E-07	9 03E-05	0.0024
MG/L	TRICHLOROETHYLENE (TCE)	B2	6 00E-03	9 00E-04		2 02E-01	1 50E-01	1 60E-02 1	1.29E-02	2.1	9 47E-06	0.011	
	Hazard Index									ç		0000	ľ

### Offsite Monitoring Well (MW76/77), Indoor Air - Hypothetical Future Residential Adult Scenario Dunn Field, Defense Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds:

Intake for carcinogenic compounds:

CDI=	Cale * IR *EF * ED * CF	C <sub>ale</sub> *	IR <sub>adi</sub>	<u>*EF * * CF</u>	
	BW * AT		Á	T .	
		Carcinogenic	_	Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	EPC	ь	EPC	b
IR =	Inhalation Rate (m³/day)	NA		20	а
IRadj =	Adjusted Inhalation Rate (m³-yr)/(kg-day)	13	a,c	NA	
EF =	Exposure Frequency (days/year)	350	а	350	а
ED =	Exposure Duration (years)	NA	а	30	а
CF =	Conversion Factor (mg/ug)	1 00E-03		1 00E-03	
BW =	Body Weight (kg)	NA	а	70	а
AT =	Averaging Time (days)	25550	а	10950	а

### Sources:

a = U S. EPA, Human Health Evaluation Manual, Supplemental Guidance. "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

c = Age adjusted

Offsite Monitoring Well (MW76/77), Indoor Air - Hypothetical Future Residential Adult Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

				1		-			
;			•	င်ဒ	Carcinogenic	45	Non	Noncarcinogenic	nic Sir
Units	Chemical	WOE	EPC	SFi	CDI	ELCR	RfDi	iαS	Ī
ng/m3	BENZENE	٧	5 8E-04	2.7E-02	1.0E-07	2.8E-09	1.7E-03	1 6F-07	9 35E-05
ug/m3	CARBON TETRACHLORIDE	B2	3.0E-03	5.3E-02	5.3E-07	2.8E-08	!	8 1E-07	2000
ng/m3	1,2-DICHLOROETHANE	B2	1.1E-04	9 1E-02	2 0E-08	1.9E-09	1.4F-03	3.111.08 8.0.111.08	2 24E_05
ng/m3	cis-1,2-DICHLOROETHYLENE	۵	3.8E-04		6.9E-08	1	1.0E-02	1.1E-07	1.27E-05
ug/m3	ug/m3 trans-1,2-DICHLOROETHENE		8 8E-04		1.6E-07		2.0E-02	2.4E-07	1.21E-05

Total HI: 0.0016

Total ELCR: 5.24E-08

Offsite Groundwater (MW76\_77) (Potable Use) - Hypothetical Future Residential Adult Scenario

Dunn Field	Defence	Distribution	Donot Ma	أمنط سمس	T
<u>Dunn Field,</u>	Deterior	DISTIDUTION	Depot Me	mpnis, i	ennessee

		Carcinogenic	Noncarcinogenic
Ingestion			
	non-carcinogenic compounds.	Age-specific intake (for carcinogenic	compounds only)
CDI =	Cout IR + EF + ED	$CDI_{adj} = C_{obs} * EF * CF * IR_{adj}$	
_	BW * AT	AT	
C <sub>gw</sub> =	Concentration in groundwater (mg/L)	<b>ÉPC</b>	EPC
IR =	Ingestion Rate (L/day)	N/A	2 a
IR <sub>adj</sub> =	Age-adjusted Ingestion Rate (L-year/kg-da	y) 11b	N/A
EF =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
BW =	Body Weight (kg)	70 a	70 a
AT =	Averaging Time (days)	25550 a	10950 a
Dermal: Intake for CDI = C <sub>gw</sub> =	non-carcinogenic compounds:  Cow *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)	Age-specific intake (for carcinogenic CDI <sub>adj</sub> = C <sub>gu</sub> *SA <sub>adj</sub> *PC*ET*EF*CF AT EPC	compounds only)
SA =	Surface Area (cm²)	N/A	
SA <sub>edi</sub> ≃	Age-adjusted Surface Area (cm²-yr/kg)	9480 b,c	20000 b,c
PC =	Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	N/A
ET =	Exposure Time (hr/day)	0 007 b.e	(Chemical Specific) d
EF≈	Exposure Frequency (day/year)	350 a	0.007 b,e 350 a
ED =	Exposure Duration (year)	30 a	30 a
CF =	Conversion Factor (L/cm <sup>3</sup> )	1 00E-03	= = =:
BW =	Body Weight (kg)	700 <u>2</u> -03 70 a	1 00E-03 70 a
AT =	Averaging Time (days)	25550 a	10950 a

### Inhalation:

CDI = Ingestion CDI from above f

### References:

a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Age-adjusted ingestion rate for adults, adjusted for body weight and time for carcinogenic exposure

$$IRadj = \underbrace{IRc \times EDc}_{BWc} + \underbrace{IRa \times (EDa - EDc)}_{BWa} = \underbrace{1 \times 6}_{15} + \underbrace{2 \times (30-6)}_{70}$$

### 1 09 (L-year)/(kg-day)

b = USEPA Exposure Factors Handbook, August 1997

c = Total Body Surface Area represents whole body (average of male & female adults)

f = Age-adjusted surface area for adults, adjusted for body weight and time for carcinogenic exposure.

SAadj = 
$$\frac{\text{SAc x ED}}{\text{BWc}}$$
 +  $\frac{\text{SAa x (EDa - EDc}}{\text{BWa}}$  =  $\frac{6557 \times 6}{15}$  +  $\frac{20000 \times (30-6)}{70}$ 

9480 (cm2-year)/(kg)

d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment. Principles and Applications, January 1992

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0.007 day per event

f = follows EPA Region IV guidance (i e , inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Offsite Groundwater (MW76/77) (Potable Use) - Hypothetical Future Residential Adult Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

											•		
1114		(	1	. ! (	į				Honsellon		Derma	na	Inhalation*
Units	Chemical	WOE	SFo	SFd	SFi	EPC	ABSgi	ည	<u>0</u>	ELCR	<u> </u>	ELCR	FLCR
MG/L	BENZENE	∢	5 50E-02	5 67E-02	2.70E-02	2.53E-03	9 70E-01	2 10E-02	3.76E-05	2F-06	4 R2F_08	30,00	15.08
	CARRON TETRACHI OBIDE	á	1 20 11 04	נים מים מים	CO LLUC 4	500	L		L	1 1			
) (		7	י מכוני	7 000	20-307 0	50-100 T	© 50E-01	Z.Z0E-0Z	Z 45E-05	3H-06	3.30E-08	7E-09	1E-06
MG/L	. 1,2-DICHLOROETHANE	<b>B</b> 2	9 10E-02	9 10E-02	9 10E-02	1 60E-03	1,00E+00	5.30E-03	2 38E-05	2F-06	7,71F-09	711-10	2E-06
MG/L	CIS-1,2-DICHLOROETHYLENE	۵				R ROF-02	1 00F+00	1 00F 02	1 21E-03	;	100	1	25-70
2	T. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	l									0.000		
<u>۱</u> اور	II SIN STATE OF CHILDENE					2.33E-02	1 00E+00	1 00E-02	3 46E-04		2 11E-07		
MG/L	1,1,2,2-TETRACHLOROETHANE	ပ	2.00E-01	2 86E-01	2 03E-01	2 40E+00	7	9.00E-03	3.57E-02	7F.03	1 96E-05	SE-OS	70.03
10 KA	かんり しょうしょうしゅう しょうしょうしょうしょうしょう	6	200	L	100	1	1			1	00100		, י
) . ()	O (BOA) CENTINATION OF THE SECTION O	Z-PZ	5.205-02	5 ZUE-0Z	2 00E-03	5 /5E-03	1.00E+00	4 80E-02	8 55E-05	4E-06	2 51E-07	1E-08	2E-07
MG/L	1,1,2-TRICHLOROETHANE	ပ	5.70E-02	7 04E-02	5 60E-02	4,75E-03	8.10E-01	8 40E-03	7 06E-05	4E-06	3 63F-08	2E-00	46-08
MG/L	TRICHLOROFTHY! FNF (TCE)	2	1.10E-02	7 335-02	8 00E-03	1815100	4 KOT 04	1 80 100	00 000	11	11000		
(	(10.)	1	1	7				1,000	20-360 2	1 1 1 1	4 3411-05	20-117	15-04
MG/L	CHLOROFORM	<b>B</b> 2	6 10E-03	3.05E-02	8 05E-02	2 48E-03	2.00E-01	8 90E-03	3 68E-05	2E-07	2.00E-08	6E-10	35-06
MG/L	VINYL CHLORIDE	۷	7 20E-01	7 20E-01	1.54E-02	1 55E-03	1 00E+00	7.30E-03	2.31E-05	2E-05	1.03E-08	7E-09	4E-07
	lotal Risk									7E-03		7E-06	7E-03

Notes:

Offsite Groundwater (MW76/77) (Potable Use) - Hypothetical Future Residential Adult Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

									Ingestion	tion	Del	Dermai	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	29 19	EPC	ABSgi	ပို	00	운	<u>5</u>	皇	g
MG/L	BENZENE	4	3 00E-03	2 91E-03	1 70E-03	2 53E-03	9 70E-01	2 10E-02	6 92E-05	0.023	1 02E-07	3 49F-05	0.041
MG/L	CARBON TETRACHLORIDE	B2	7 00E-04	4 55E-04		1 65E-03	6.50E-01	2 20F-02	4 52F-05	0.065	S GEE-DR	1 53E-04	
MG/L	1,2-DICHLOROETHANE	B2	3 00E-02	3 00E-02	1.40E-03	1 60F-03	1 00F+00	5.30E-03	4 38E-05	1 46E-03	1 63E-08	5 42E-07	0.0313
MG/L	cis-1,2-DICHLOROETHYLENE	۵	1 00E-02	1 00E-02	1 OOE-02	8 ROF-02	1 OOF+OO	1 OOF 02	2.41E-03	200	1 60 1 08	1 80 0 0	
MG/L	trans-1,2-DICHLOROETHENE	•	2 00E-02	2 00E-02	2 00E-02	2 33E-02	1 00F±00	1000.02	6 37E-04	0.035	7 46E 07	1.03E-04	0 0 33
MC.	1 1 2 2 TETOACUI ODOCTUANIC	Ç				1000	100	40-100-0	1000	700	7	CO-1107 7	7000
) E	1, 1, 2, 2-1 E 1 PACALOROE 1 AZAR	د	9 UUE-UZ	4.20E-02		Z 40E+00	/ UDE-01	9 00E-03	6 58E-02	-	4 14E-05	0 0010	
MG/L	TETRACHLOROETHYLENE(PCE)	C-82	1 00E-02	1.00E-02	171E-01	5 75E-03	1.00E+00	4 80E-02	1 58E-04	0.016	5 29F-07	5.29E-05	60000
MG/L	1,1,2-TRICHLOROETHANE	ပ	4 00E-03	3.24E-03		4.75E-03	8 10E-01	8 40F-03	130F-04	0.033	7 65E-08	2 365.05	
MG/L	TRICHLOROETHYLENE (TCE)	B2	6.00E-03	9 00F-04		1615+00	1 50E-01	1 50E-02	4 40 11.02	2	4 03E 06	0.055	
MG/L	CHLOROFORM	83	1 00E-02	2.00E-03		2 48F-03	2 OOF 01	8 90E-02	6 78E-05	2007	4 325-03	2 11 05	
MG/L	VINYL CHLORIDE	⋖	3 00E-03	3.00E-03	1 10E-01	1 55E-03	1 00E+00	7 30E-03	4 25F-05	0.0142	7 17E-08	7 23E-06	3 ARE.04
	Hazard Index									6		0.056	0.35

Notes

### Offsite Monitoring Well (MW76/77), Indoor Air - Hypothetical Future Residential Child Scenario Dunn Field, Defense Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds

CDI=	Car * IR *EF * ED * CF
	BW * AT

		Carcinogenic	Noncarcinogenic	
$C_{air} =$	Estimated Indoor Air Concentration (ug/m³)	NA NA	EPC	b
IR =	Inhalation Rate (m³/day)	NA	15	а
EF =	Exposure Frequency (days/year)	NA	350	а
ED =	Exposure Duration (years)	NA	6	а
CF =	Conversion Factor (mg/ug)	NA	1 00E-03	
BW =	Body Weight (kg)	NA	15	а
AT =	Averaging Time (days)	NA	2190	а

### Sources:

a = U S. EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991.

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings. Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response.

Offsite Monitoring Well (MW76/77), Indoor Air - Hypothetical Future Residential Child Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

:			4	0	Carcinogenic	<u>:</u>	Non	Noncarcinogenic	jį.
Units	Chemical	WOE	EPC	SFi	CDI	ELCR	RfDi	<u>1</u> 2	Ξ
ng/m3	BENZENE	∢	5 8E-04	1	1	,	1.7E-03	5.6E-07	3.27E-04
.ng/m3	CARBON TETRACHLORIDE	<b>B</b> 2	3.0E-03	1	:	1		2.8E-06	
ng/m3	1,2-DICHLOROETHANE	B2	1.1E-04	ı	1	ı	1.4E-03	1.1E-07	7.84E-05
ug/m3	cis-1,2-DICHLOROETHYLENE	۵	3.8E-04	ı	ŀ	1	1.0E-02	3 7E-07	3.69E-05
ng/m3	trans-1,2-DICHLOROETHENE		8.8E-04	:	;	ı	2.0E-02	8.5E-07	4.24E-05
, gu/m3	1,1,2,2-TETRACHLOROETHANE	ပ	0	ł	:	ı		2.9E-08	
ng/m3	<b>TETRACHLOROETHYLENE(PCE</b>	C-B2	0	;	1	ı	1 7E-01	1.5E-06	8.64E-06
ug/m3	1,1,2-TRICHLOROETHANE	ပ	8.4E-05	ł	1	ł		8.1E-08	
ng/m3	TRICHLOROETHYLENE (TCE)	B2	9.7E-04	ł	;	ł		9.3E-07	
ng/m3	CHLOROFORM	B2	4.4E-04	1	ı	ŀ	0.0E+00	4.2E-07	
ug/m3	VINYL CHLORIDE	A	3.7E-03	:	:		1.1E-01	3.6E-06	3.27E-05

0.0005

Total HI:

Total ELCR:

Offsite Groundwater (MW76/77) (Potable Use) - Hypothetical Future Residential Child Scenario Dunn Field, Defense Distribution Depot Memohis, Tennessee

icio, Defense Distribution Depot Memprils, Tent	1163366	
· · · · · · · · · · · · · · · · · · ·	<u>Carcinogenic</u>	Noncarcinogenic
n:		
r non-carcinogenic and carcinogenic compounds:		
BW * AT		
Concentration in groundwater (mg/L)	EPC	EPC
Ingestion Rate (L/day)	1 a	1 a
Exposure Frequency (day/year)	350 a	350 a
Exposure Duration (year)	6 а	6 a
Body Weight (kg)	15 a	15 a
Averaging Time (days)	25550 a	2190 a
r non-carcinogenic and carcinogenic compounds:		
BW*AT		
Concentration in groundwater (mg/L)	EPC	EPC
Surface Area (cm²)	6557 b, c	6557 b, c
Dermal Permeability Constant (cm/hr)	(Chemical Specific) d	(Chemical Specific) d
Exposure Time (hr/day)	0 007 b,e	0.007 b,e
Exposure Frequency (day/year)	350 a	350 a
Exposure Duration (year)	6 a	6 a
Conversion Factor (L/cm <sup>3</sup> )	1 00E-03	1.00E-03
Body Weight (kg)	15 a	15 a
Averaging Time (days)	25550 a	2190 a
	on: or non-carcinogenic and carcinogenic compounds:  Cow * IR * EF * ED  BW * AT  Concentration in groundwater (mg/L) Ingestion Rate (L/day) Exposure Frequency (day/year) Exposure Duration (year) Body Weight (kg) Averaging Time (days)  or non-carcinogenic and carcinogenic compounds:  Cow *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L) Surface Area (cm²) Dermal Permeability Constant (cm/hr) Exposure Time (hr/day) Exposure Frequency (day/year) Exposure Duration (year) Conversion Factor (L/cm³) Body Weight (kg)	r non-carcinogenic and carcinogenic compounds:  Cow * IR * EF * ED  BW * AT  Concentration in groundwater (mg/L)  EPC  Ingestion Rate (L/day)  Exposure Frequency (day/year)  Exposure Duration (year)  Averaging Time (days)  From carcinogenic and carcinogenic compounds:  Cow *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)  Surface Area (cm²)  Dermal Permeability Constant (cm/hr)  Exposure Time (hr/day)  Exposure Frequency (day/year)  Exposure Frequency (day/year)  Exposure Duration (year)  Conversion Factor (L/cm³)  Body Weight (kg)  EPC  (Chemical Specific) d  (Che

### Inhalation.

CDI = Ingestion CDI from above f

### References:

- a = U S. EPA, Human Health Evaluation Manual, Supplemental Guidance<sup>-</sup> "Standard Default Exposure Factors" OSWER Directive 9285.6-03, March 25, 1991
- b = US EPA Exposure Factors Handbook, August 1997.
  - Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998
- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old))
- d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment Principles and Applications, January 1992.
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event
- f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS' Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Offsite Groundwater (MW76/77) (Potable Use) - Future Residential Child Carcinogenic Scenario (OptionaL)

<u>Dunn Field, Defense Distribution Depot Memphis, Tennessee</u>

:	;	:						•	Ingestion	tion	Derma	nal	Inhalation*
Conts	Chemical	WOE		SFd	SFi	EPC	ABSgi	PC	G C	ELCR	<u> </u>	ELCR	ELCR
MG/L	BENZENE	⋖	5.50E-02	5.50E-02 5 67E-02	2 70E-02	2 53E-03	9.70E-01	2.10E-02	1 38E-05	8E-07	1.33F-08	8F-10	4F-07
MG/L	CARBON TETRACHLORIDE	<b>B</b> 2	1 30E-01	2.00E-01	5.25E-02	1 65E-03		2 20E-02	9.04E-06	11.06	9 13F-09	1 L	5E-07
MG/L	1,2-DICHLOROETHANE	<b>B</b> 2	9.10E-02		9.10E-02		1 00E+00		8 77E-06	8F-07	2 13F-09	21.40 10.40	8F-07
MG/L	cis-1,2-DICHLOROETHYLENE	۵				8 80E-02	1 00E+00		4 82E-04	1	2.21E-07	1	5
MG/L	trans-1,2-DICHLOROETHENE					2.33E-02	1.00E+00	•	1 27E-04		5 85E-08		
MG/L	1,1,2,2-TETRACHLOROETHANE		2.00E-01	2 86E-01	2 03E-01	2 40E+00	7.00E-01	တ	1 32E-02	3E-03	5 43E-06	2E-06	3E-03
MG/L	TETRACHLOROETHYLENE(PCE)	C-B2	5 20E-02	5.20E-02	2.00E-03	5 75E-03 1		4 80E-02	3.15E-05	2E-06	6 94E-08	4E-09	6F-08
MG/L	1,1,2-TRICHLOROETHANE	ပ	5.70E-02	7 04E-02	5 60E-02	4 75E-03	8 10E-01 8 40E-03 2 60E-05	8 40E-03	2 60E-05	1E-06	1 00E-08	7E-10	1E-06
	l otal Kisk									3E-03 To	fotal Risk =	2E-06 5E-03	3E-03

Offsite Groundwater (MW76/77) (Potable Use) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

									Ingestion	tion	Dec	Dermai	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	RfDi	EPC	ABSgi	PC	50	ğ	G	£	£
MG/L	BENZENE	∢	3 00E-03	2 91E-03	1 70E-03	2 53E-03	9 70E-01	2.10E-02	1.61E-04	0.054	1 56F-07	5 25E_05	00.0
MG/L	CARBON TETRACHLORIDE	<b>B</b> 2	7 00E-04	4 55E-04		1 65F-03	6.50F-01	2 20E-02	1 05E-04	0.151	1 07 1 07	20000	0
MG/L	1.2-DICHLOROETHANE	B2	3 00E-02	3 00F-02	1.40F-03	1 60F-03	1 00 1 -00	5 30 102	1 025-04	3.475	2 40 11 0 0	2,34E-04	0
70 Y		(		100					10717	2	00-36+7	10-3E-0	9/00
NO.	הושל זהן של אל התלולי אין י-פוס	ב	1 005-02	1 00E-02	1 00E-02	8 805-02	100+100	1 00E-02	5 63E-03	0 26	2.58E-06	2 58E-04	0.56
MG/L	trans-1,2-DICHLOROETHENE		2 00E-02	2 00E-02	2 00E-02	2.33E-02	1 00E+00	1 00E-02	1 49E-03	0 07	6 82E-07	3 41F-05	200
MG/L	1,1,2,2-TETRACHLOROETHANE	O	6.00E-02	4.20E-02		2 40E+00	7 00E-01	9 00E-03	1 53E-01	2.6	6.34F-05	0.0015	5
MG/L	TETRACHLOROETHYLENE(PCF) C-B2	C-B3	1 00F-02	1 OOF 02	1 71E.01	5 75E_03	1 00 1	4 805.02	2 SPE 04	000	1000		,000
		, ,		100	-	2	200	4 OOE-02	10000	200	0 101-0	2010	0 0021
MG/L	1,1,2-I KICHLOROE I HANE	ပ	4 00E-03	3 24E-03		4 75E-03	8.10E-01	8 40E-03	3 04E-04	0.08	117E-07	3 61E-05	
MG/L	TRICHLOROETHYLENE (TCE)	<b>B</b> 2	6,00E-03	9 00E-04		1615+00	1 50E-01	1.60E-02	1 03E-01	17	7.55E-05	0.08	
MG/L	CHLOROFORM	<b>B</b> 2	1.00E-02	2 00E-03		2.48E-03	2 00E-01	8 90E-03	1 58E-04	0 0 16	6 46E-08	3 23E-05	
MG/L	VINYL CHLORIDE	٧	3 00E-03	3 00E-03	1 10E-01	1 55E-03	1 00E+00	7 30E-03	9 91E-05	0 0330	3 32E-08	1.11F-05	9 01E-04
	Hazard Index									12		0.09	0.8

WOE = Weight of Evidence; CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient; HI = Hazard Index, \* = inhalation intake (CDI) = ir

Notes

### Offsite Monitoring Well (MW79), Indoor Air - Hypothetical Future Residential Adult Scenario Dunn Field, Defense Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds

Intake for carcinogenic compounds:

Cair * IR *EF * ED * CF	<u>C*</u>	IR <sub>adi</sub> *	<u>EF * * CF</u>	
BW * AT		ÁΤ	-	
	Carcinogenic	1	Noncarcinogenic	
Estimated Indoor Air Concentration (ug/m³)	EPC	ъ _	EPC	b
Inhalation Rate (m³/day)	NA		20	а
	13	a,c	NA	
Exposure Frequency (days/year)	350	а	350	а
Exposure Duration (years)	NA	а	30	а
Conversion Factor (mg/ug)	1 00E-03		1 00E-03	
Body Weight (kg)	NA	а	70	а
Averaging Time (days)	25550	а	10950	а
	BW * AT  Estimated Indoor Air Concentration (ug/m³) Inhalation Rate (m³/day) Adjusted Inhalation Rate (m³-yr)/(kg-day) Exposure Frequency (days/year) Exposure Duration (years) Conversion Factor (mg/ug) Body Weight (kg)	Estimated Indoor Air Concentration (ug/m³)  EPC  Inhalation Rate (m³/day)  Adjusted Inhalation Rate (m³-yr)/(kg-day)  Exposure Frequency (days/year)  Exposure Duration (years)  Conversion Factor (mg/ug)  Body Weight (kg)  Carcinogenic  ANA  13  EPC  NA  NA  NA	BW * AT  Carcinogenic  Estimated Indoor Air Concentration (ug/m³)  Inhalation Rate (m³/day)  Adjusted Inhalation Rate (m³-yr)/(kg-day)  Exposure Frequency (days/year)  Exposure Duration (years)  Conversion Factor (mg/ug)  Body Weight (kg)  AT  AT  AT  AT  Carcinogenic  b  NA  a  4, c  13  a, c  15  AT  Carcinogenic  NA  A  10  AT  D  AT  D  D  D  D  D  D  D  D  D  D  D  D  D	BW * AT  Carcinogenic  Estimated Indoor Air Concentration (ug/m³)  EPC  Inhalation Rate (m³/day)  Adjusted Inhalation Rate (m³-yr)/(kg-day)  Exposure Frequency (days/year)  Exposure Duration (years)  Conversion Factor (mg/ug)  Body Weight (kg)  AT  Noncarcinogenic  NA  20  NA  20  NA  350  a 350  a 350  Exposure Duration (years)  NA  a 30  Conversion Factor (mg/ug)  NA  AT  Noncarcinogenic  NA  20  NA  20  NA  350  a 350  a 350  Exposure Duration (years)  NA  a 70

### Sources:

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response c = Age adjusted

Offsite Monitoring Well (MW79), Indoor Air - Hypothetical Future Residential Adult Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

				Ö	Carcinogenic		Non	Noncarcinogenic	Si
Units	Chemical	WOE	EPC	SFI	CDI	ELCR	RfDI	Igo	₹
ng/m3	ug/m3 1,1-DICHLOROETHENE	ပ	3.2E-03	1.8E-01	5.7E-07	1.0E-07		8.8E-07	
ug/m3	ug/m3 1,2-DICHLOROETHANE	<b>B</b> 2	1 2E-04	9.1E-02	2.2E-08	2.0E-09	1.4E-03	3.3E-08 2.37E-05	.37E-05
ng/m3	BENZENE	∢	6.2E-04	2.7E-02	1 1E-07	3.0E-09	1.7E-03	1.7E-07	9.95F-05
ng/m3	ug/m3 CHLOROFORM	<b>B</b> 2	4.7E-04	8.1E-02	8.3E-08	6.7E-09	0.0E+00	1.3E-07	
ng/m3	cis-1,2-DICHLOROETHYLENE	۵	4.1E-04		7.3E-08		1.0E-02	1.1E-07	1.13E-05
ng/m3	ug/m3 TETRACHLOROETHYLENE(PCF	C-B2	1.65E-03	2 00E-03	2.93E-07	5.86E-10	1.71E-01	4 5E-07	2.64F-06
ug/m3	ug/m3 TRICHLOROETHYLENE (TCE)	B2	1.04E-03	6.00E-03	1.85E-07	1.11E-09		2.8E-07	

0.0001

Total HI:

Total ELCR: 1.13E-07

Offsite Groundwater (MW79) (Potable Use) - Hypothetical Future Residential Adult Scenario

Dunn Field,	Defense	Distribution	Depot	Memphis.	Tennessee

_		<u>Carcinogenic</u>	Noncarcinogenic Noncarcinogenic
ngestic			
	or non-carcinogenic compounds	Age-specific intake (for carcinoger	nic compounds only)
CDI =	Com * IR * EF * ED	CDI <sub>adj</sub> ≈ C <sub>ou</sub> * EF * CF * IR <sub>adi</sub>	
	BW * AT	AT	
) <sub>gw</sub> =	Concentration in groundwater (mg/L)	EPC	EPC
R =	Ingestion Rate (L/day)	N/A	2 a
R <sub>adj</sub> =	Age-adjusted Ingestion Rate (L-year/kg-day	) 1.1 b	N/A
F =	Exposure Frequency (day/year)	350 a	350 a
ED =	Exposure Duration (year)	30 a	30 a
3W =	Body Weight (kg)	70 a	70 a
\T =	Averaging Time (days)	25550 a	10950 a
	or non-carcinogenic compounds	Age-specific intake (for carcinogen	
	or non-carcinogenic compounds	$CDI_{adj} = \underline{C_{ow}}^*SA_{adj}^*PC^*ET^*EF^*C$	
ntake fo	or non-carcinogenic compounds  Com *SA * PC * ET * EF * ED * CF		
ntake fo CDI = C <sub>aw</sub> = SA =	or non-carcinogenic compounds  Cow *SA * PC * ET * EF * ED * CF  BW * AT	$CDI_{adj} = \frac{C_{ow} *SA_{adj} * PC * ET * EF * C}{AT}$	EPC
ntake fo CDI = C <sub>aw</sub> = SA = SA <sub>edj</sub> =	or non-carcinogenic compounds  Cow *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)	CDI <sub>adj</sub> = <u>C<sub>ow</sub>*SA<sub>adj</sub>*PC*ET*EF*C</u> AT EPC	<u>CF</u>
ntake fo CDI = C <sub>aw</sub> = SA = SA <sub>edj</sub> = PC =	Concentration in groundwater (mg/L)  Surface Area (cm²)  Age-adjusted Surface Area (cm²-yr/kg)  Dermal Permeability Constant (cm/hr)	CDI <sub>adj</sub> ≃ <u>C<sub>ow</sub>*SA<sub>adj</sub>*PC*ET*EF*C</u> AT EPC N/A	EPC 20000 b,c
ntake fo CDI = C <sub>aw</sub> = SA = SA <sub>edj</sub> = PC = ET =	or non-carcinogenic compounds  Cgw *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)  Surface Area (cm²)  Age-adjusted Surface Area (cm²-yr/kg)  Dermal Permeability Constant (cm/hr)  Exposure Time (hr/day)	CDI <sub>adj</sub> ≃ <u>C<sub>ow</sub> *SA<sub>adj</sub> * PC * ET * EF * C</u> AT EPC N/A 9480 b,c	EPC 20000 b,c N/A
ntake fo CDI = Caw = SA = SA <sub>edj</sub> = C = ET = EF =	or non-carcinogenic compounds  Cgw *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)  Surface Area (cm²)  Age-adjusted Surface Area (cm²-yr/kg)  Dermal Permeability Constant (cm/hr)  Exposure Time (hr/day)  Exposure Frequency (day/year)	CDI <sub>adj</sub> = C <sub>ow</sub> *SA <sub>adj</sub> * PC * ET * EF * C AT EPC N/A 9480 b,c (Chemical Specific) d	EPC 20000 b,d N/A (Chemical Specific) d
ntake for color to the color to	or non-carcinogenic compounds  Cgw *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)  Surface Area (cm²)  Age-adjusted Surface Area (cm²-yr/kg)  Dermal Permeability Constant (cm/hr)  Exposure Time (hr/day)  Exposure Frequency (day/year)  Exposure Duration (year)	CDI <sub>adj</sub> = C <sub>ow</sub> *SA <sub>adj</sub> * PC * ET * EF * C AT EPC N/A 9480 b,c (Chemical Specific) d 0 007 b,e	EPC 20000 b,d N/A (Chemical Specific) d 0 007 b,e
ntake for CDI =  CDI =  SA =  SA <sub>edj</sub> =  C =  ET =  EF =  CF =  CF =	or non-carcinogenic compounds  Cgw *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)  Surface Area (cm²)  Age-adjusted Surface Area (cm²-yr/kg)  Dermal Permeability Constant (cm/hr)  Exposure Time (hr/day)  Exposure Frequency (day/year)  Exposure Duration (year)  Conversion Factor (L/cm³)	CDI <sub>adj</sub> = C <sub>ow</sub> *SA <sub>adj</sub> * PC * ET * EF * C AT  EPC  N/A  9480 b,c  (Chemical Specific) d  0 007 b,e  350 a	EPC 20000 b,d N/A (Chemical Specific) d 0 007 b,e 350 a
ntake for color to the color to	or non-carcinogenic compounds  Cgw *SA * PC * ET * EF * ED * CF  BW * AT  Concentration in groundwater (mg/L)  Surface Area (cm²)  Age-adjusted Surface Area (cm²-yr/kg)  Dermal Permeability Constant (cm/hr)  Exposure Time (hr/day)  Exposure Frequency (day/year)  Exposure Duration (year)	CDI <sub>adj</sub> = C <sub>ow</sub> *SA <sub>adj</sub> * PC * ET * EF * C AT  EPC  N/A  9480 b,c  (Chemical Specific) d  0 007 b,e  350 a  30 a	EPC 20000 b,c N/A (Chemical Specific) d 0 007 b,e 350 a 30 a

### Inhalation:

CDI = Ingestion CDI from above f

### References:

a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance<sup>-</sup> "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991.

b = Age-adjusted ingestion rate for adults, adjusted for body weight and time for carcinogenic exposure.

$$IRadj = \frac{IRc \times EDc}{BWc} + \frac{IRa \times (EDa - EDc)}{BWa} = \frac{1 \times 6}{15} + \frac{2 \times (30-6)}{70}$$

1.09 (L-year)/(kg-day)

b = USEPA Exposure Factors Handbook, August 1997

c = Total Body Surface Area represents whole body (average of male & female adults)

f = Age-adjusted surface area for adults, adjusted for body weight and time for carcinogenic exposure.

$$SAadj = SAc \times EDi + SAa \times (EDa - EDc) = 6557 \times 6 + 20000 \times (30-6)$$
 $BWc BWa 15 70$ 

9480 (cm<sup>2</sup>-year)/(kg)

d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value; all values adapted from EPA, Dermal Exposure Assessment: Principles and Applications, January 1992.

e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0 007 day per event

f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS. Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995.

Offsite Groundwater (MW79) (Potable Use) - Hypothetical Future Residential Adult Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

									Ingestion	lon	Derma	<u>_</u>	Inhalation*
Units	Chemical	WOE	SFo	SFd	SFI	EPC	ABSgl	ည	20	ELCR	3	ECE	E CB
MG/L	BENZENE	٨	5 50E-02	5.67E-02 2 70E-02	2 70E-02	1 45E-03	1—	2 10E-02	2.16E-05	ı	2 77F-08	2F-76	6E-07
MG/L	1,2-DICHLOROETHANE	B2		9 10E-02	9 10E-02	5 18E-04		5.30F-03 7.70F-06	7 70F-06		2 49E-09	1 L	76.07
MG/L	1,1-DICHLOROETHENE	ပ	6,00E-01	6.00E-01	175E-01	4.10E-02	1 00E+00	1.60F-02	6 10F-04	4F-04	5 965-07	4E.07	200
MG/L	cis-1,2-DICHLOROETHYLENE	۵				2 01E-03	•	1 00E-02	2.99E-05	<u>.</u>	1 82F.08	֝֝֝֝֝֝֝֝֡֝֝֓֓֓֓֓֓	† 0-1
MG/L	TETRACHLOROETHYLENE(PCE) C-B2		5 20E-02	5 20E-02	2.00E-03	2 53E-02	1.00E+00	4 80E-02	3.76E-04	2F-05	1 10E-06	SE_OB	8E.07
MG/L	TRICHLOROETHYLENE (TCE)			7.33E-02	6 00E-03	2 10E-02	1 50E-01	1.60E-02	3 12E-04	3 E	3 05E-07	1 C	20.00
MG/L	CHLOROFORM	<b>B</b> 2	- 1		8 05E-02	1 01E-03	2,00E-01	8 90E-03	1.49E-05	90-196 80-196	8.13E-09	2E-10	1E-06
	Total Risk	1								4E-04		4E-07	1E-04

Notes:

Offsite Groundwater (MW79) (Potable Use) - Hypothetical Future Residential Adult Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

:									sebul	tion	Der	Dermal	Inhalation*
Units	Chemical	WOE	RfDo	RfDd	RfDi	EPC	ABSgi	S C	G	ğ	<u></u>	穿	쟢
MG/L	BENZENE	⋖	3 00E-03	2 91E-03	1 70E-03	1 45E-03	9 70E-01	2 10E-02	3 97E-05	0 013	5 84E-08	2 01E-05	0.023
MG/L	1,2-DICHLOROETHANE	85	3 00E-02	3 00E-02	1 40E-03	5 18E-04	1,00E+00	5 30E-03	1 42E-05	4.73E-04	5.26E-09	1 75E-07	0 0 10
MG/L	1,1-DICHLOROETHENE	ပ	9 00E-03	9 00E-03		4 10E-02	1 00E+00	1 60E-02	1 12E-03	0.12	1.26E-06	1 40F-04	•
J'oyi	cis-1,2-DICHLOROETHYLENE	۵	1 00E-02	1 00E-02	1 00E-02	2 01E-03	1.00E+00	1 00E-02	5 50E-05	900 0	3 85E-08	3.85E-06	900 0
MG/L	TETRACHLOROETHYLENE(PCE)	C-82	1 00E-02	1 00E-02	1 71E-01	2 53E-02	1 00E+00	4 80E-02	6 93E-04	690 0	2 33E-06	2 33E-04	0.0041
MG/L	TRICHLOROETHYLENE (TCE)	<b>B</b> 2	6 00E-03	9 00E-04		2 10E-02	1 50E-01	1 60E-02	5 75E-04	0.10	6 44F-07	7 16F-04	· · · · ·
MG/L	CHLOROFORM	B2	1 00E-02	2 00E-03	;	1 01E-03	2 00E-01	œ	2 75E-05	0 0028	1.72E-08	8 58E-06	
	Hazard Index									0.31		0.0011	0.04

Total Hazard Index = 0.4 WOE = Weight of Evidence, CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index, \* = inhalation intake (CDI) = ir

Notes

### Offsite Monitoring Well (MW79), Indoor Air - Hypothetical Future Residential Child Scenario Dunn Field, Defense Depot Memphis, Tennessee

### Inhalation

Intake for noncarcinogenic compounds.

CDI=	Cair * IR *EF * ED * CF
	BW * AT

		Carcinogenic	Noncarcinogenic	
C <sub>air</sub> =	Estimated Indoor Air Concentration (ug/m³)	NA	EPC	b
JR =	Inhalation Rate (m³/day)	NA	15	а
EF =	Exposure Frequency (days/year)	NA	350	а
ED =	Exposure Duration (years)	NA	6	а
CF =	Conversion Factor (mg/ug)	NA	1 00E-03	
BW =	Body Weight (kg)	NA	15	а
AT =	Averaging Time (days)	NA	2190	а

### Sources:

a = U.S EPA, Human Health Evaluation Manual, Supplemental Guidance. "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991

b = Indoor air concentrations estimated using the Johnson - Ettinger Model (1991) for Subsurface Vapor Intrusion into Buildings Calculations were performed using the Groundwater Tier II Model in excel format provided by the USEPA Office of Emergency and Remedial Response

Offsite Monitoring Well (MW79), Indoor Air - Hypothetical Future Residential Child Scenario - Inhalation Dunn Field, Defense Depot Memphis, Tennessee

	_		E-05	3.48E-04		3,94E-05	9 23E-06	
nic	Ξ		8.3	3.48		3.94	9 23	
Noncarcinogenic	<u>G</u> S	3.07E-06	1.16E-07	5.92E-07	4.48E-07	3.94E-07	1.58E-06	9.9E-07
Non	RfDi		1.40E-03	1.70E-03	0.00E+00	1 00E-02	1.71E-01	i
2	ELCR		ŀ	1	:	1	;	:
Carcinogenic	CDI	!	:	!	1	ł	;	1
U	SFi	:	1	1	ŀ	ı	1	:
	EPC	3 2E-03	1.2E-04	6.2E-04	4.7E-04	4.1E-04	1.6E-03	1 0E-03
	WOE	ပ	82	∢	<b>B</b> 2	۵	C-B2	B2
	Chemical	ug/m3 1,1-DICHLOROETHENE	ug/m3 1,2-DICHLOROETHANE	BENZENE		cis-1,2-DICHLOROETHYLENE	TETRACHLOROETHYLENE(PCE)	1g/m3 TRICHLOROETHYLENE (TCE)
:	Units	ng/m3	ng/m3	ng/m3	ng/m3	ng/m3	ng/m3	ug/m3

0.0005

Total HI:

1

Total ELCR:

Offsite Groundwater (MW79) (Potable Use) - Hypothetical Future Residential Child Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

	oncarcinogenic
Ingestion:	
Intake for non-carcinogenic and carcinogenic compounds:	
CDI = <u>C<sub>oo</sub> * IR * EF * ED</u>	
BW * AT	
C <sub>gw</sub> = Concentration in groundwater (mg/L) EPC	EPC
IR = Ingestion Rate (L/day) 1 a	1 a
EF = Exposure Frequency (day/year) 350 a	350 a
ED = Exposure Duration (year) 6 a	6 a
BW = Body Weight (kg) 15 a	15 a
AT = Averaging Time (days) 25550 a	2190 a
Dermal: Intake for non-carcinogenic and carcinogenic compounds:  CDI = Cow *SA * PC * ET * EF * ED * CF  BW * AT	
C <sub>gw</sub> = Concentration in groundwater (mg/L) EPC	EPC
SA = Surface Area (cm <sup>2</sup> ) 6557 b. c	6557 b. c
PC = Dermal Permeability Constant (cm/hr) (Chemical Specific) d (Ch	iemical Specific) d
ET = Exposure Time (hr/day) 0 007 b.e	0.007 b.e
EF = Exposure Frequency (day/year) 350 a	350 a
ED = Exposure Duration (year) 6 a	6 a
CF = Conversion Factor (L/cm³) 1.00E-03	1.00E-03
BW = Body Weight (kg) 15 a	15 a
AT = Averaging Time (days) 25550 a	2190 a

### Inhalation:

CDI = Ingestion CDI from above f

### References:

- a = U S EPA, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" OSWER Directive 9285 6-03, March 25, 1991.
- b = US EPA Exposure Factors Handbook, August 1997
  - Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance, May 1998.
- c = Total Body Surface Area represents whole body (average of male & female children (1-6 years old)).
- d = Dermal Permeability Constant for water (0 001) used for constituents without a PC value, all values adapted from EPA, Dermal Exposure Assessment. Principles and Applications, January 1992.
- e = 10 minute event x 1 hour/60 minutes x 1 day/24 hours = 0.007 day per event
- f = follows EPA Region IV guidance (i.e., inhalation of groundwater volatiles while showering/bathing is accounted for by doubling the ingestion volume), USEPA Supplemental Guidance to RAGS. Region 4 Bulletins, Human Health Risk Assessment, Interim, November 1995

Offsite Groundwater (MW79) (Potable Use) - Future Residential Child Carcinogenic Scenario (OptionaL)

Dunn Field, Defense Distribution Depot Memphis, Tennessee

:	;								luges	ngestion	Der	Dermal	Inhalation*
Chits	Chemical	WOE	SFo	SFd	SFi	EPC	ABSgl PC	<u>۳</u>	00	ELCR	<u>0</u>	ELCR	ELCR
MG/L	BENZENE		5.50E-02	5.67E-02	2 70E-02	1.45E-03	9.70E-01	2 10F-02	10	4F-07	7 66F-09	4F-10	2E-07
MG/L	1,2-DICHLOROETHANE	<b>B</b> 2	9 10E-02	9 10E-02	9 10E-02	5.18E-04	1.00F+00 5.30F-03	5 30F-03	2 84E-06	3E-07	6 90E-10	6F-13	3E-07
MG/L	1,1-DICHLOROETHENE	Ų	6 00E-01	6 00E-01 6 00E-01 1,75E-01	1.75E-01	4 10E-02	1 00F+00	1 60F-02	2 25E-04	л 5 5	1 655-07	1 1 1	70-11-0 10-11-0 10-11-11-11-11-11-11-11-11-11-11-11-11-1
MG/L	cis-1,2-DICHLOROETHYLENE	۵				2 01E-03	1 00 1 +00	1 00E-02	1 10E-05	ָ ֖֖֖֖֡	5.05E-00	2	) 
MGAL	L TETRACHLOROETHYLENE(PCE) C-82 5 20E-02 5 20E-02 2 00E-03 2 5	C-85	5 20E-02	5 20E-02	2.00E-03	2.53E-02	1 00E+00 4 R0E-02	4 ROF-02	1 39F-04	7E-06	3.05E-03	2E_02	35.07
707	TOTAL DISTRICT CAR (TOTAL)	á	107	100	L	1			1 (			1	2
1		70	70-301	1 335-02	0 UUE-U3	2 10E-02	1 505-01	1 60E-02	1 15E-04	1E-06	8 45E-08	60 <del>-</del> 39	7E-07
MG/L	CHLOROFORM	<b>B</b> 5	6.10E-03	3 05E-02	8 05E-02	1 01E-03	2.00E-01 8 90E-03	8 90E-03	5 51E-06	3E-08	2.25E-09	7E-11	4E-07
	1 2 2												
	I DIZI KISK									1E-04 To	Total Risk =	1E-07 2E-04	4E-05
												!	

Offsite Groundwater (MW79) (Potable Use) - Hypothetical Future Residential Child Non-Carcinogenic Scenario Dunn Field, Defense Distribution Depot Memphis, Tennessee

unn Field, Defense Distribution Depot Memphis, Tennessee	
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fense Dr	
riela, Def	
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									Ingestion	tion	De.	)erma	Inhalation*
Units	Chemical	WOE		RfDd	R.D	EPC	ABSgi	ပ	CD	오	<u>5</u>	웃	皇
MG/L	BENZENE	4	3 00E-03	2.91E-03	1 70E-03	3 1.45E-03 9	9 70E-01	2 10E-02	9 27E-05	0 031	8 93E-08	3 07F-05	0.05
MG/L	1,2-DICHLOROETHANE	<b>B</b> 2		3 00E-02	1 40E-03	5.18E-04	1 00E+00	5 30E-03		0.001	8 05E-09	2 68E-07	2000
MG/L	1,1-DICHLOROETHENE	ပ		9 00E-03		4 10E-02	1 00F+00 1 60F-02	1 60E-02		200	1 92 1 06	2 145.04	t 70 0
MG/L	cis-1,2-DICHLOROETHYLENE	۵	1 00E-02	1 00E-02	1.00F-02	2 01F-03	1 00F+00	1 00E-02	. ~	0.013	5 80E 08	5 POL 04	4
MG/L	TETRACHLOROETHYLENE(PCE)	) C-B2	1 00F-02	1 00F-02	1 71E-01	2.53E-02	٠,	4 80E-02	1 62E-03	2 6	2 55 11-00	2 666 04	0000
MG/L	TRICHLOROETHYLENE (TCE)	g C	6 00F-03	9 00E-04		2 10E-02	1 50E-01	1.50E.02	1 2/1 03	2 6	0.000.0	3 30E-04	900.0
MG/L	CHLOROFORM			2 00E-03		1 01E-03	2 00E-01	- ∞	6 42E-05	0 006	2 62E-08	1.31E-05	
	Hazard Index									0.73		0.0017	1.0

nazard index

V.7.3

V.7.3

V.7.3

Total Hazard Index = 0.8

WOE = Weight of Evidence, CDI = Chronic Daily Intake, EPC = Exposure Point Concentration, HQ = Hazard Quotient, HI = Hazard Index; \* = inhalation intake (CDI) = ir

Notes.

Appendix G-6

Appendix G-6
Depth-to-Water and Soil Type Classifications Input for Johnson-Ettinger Indoor Air Modeling of Groundwater

Dunn Field RI

SCS type         Thickness (ft)         SCS type         Thickness (ft)           NA         NA         NA         NA           NA         NA         NA         39           SI         4         SC         27           SIC         5         SC         33           SIC         5         SC         33           SIC         5         SC         38           SIC         9         SIC         75           SI         5         SC         32           SI         10         SC         44           SI         10         SC         44           SI         10         SC         36           SI         12         SC         36           SI         12         SC         34           SI         12         SC         36           SI         12         SC         40           SI         10         SC         40           SI         10         SC         40           SI         10         SC         31           SI         10         SC         31           SI				Soil Stratum A	Soil Stratum A	Soil Stratum B	Soil Stratum B	Soil Stratum C	Soil Stratum
Onsite         62         NA         NA         NA         NA         NA           I Onsite         77         38.5         C         0         39         39           Offsite         68         30         C         5         5C         37           Offsite         64         25         SIC         5         5C         37           Offsite         53         20         SIC         5         5C         37           Offsite         77         38.5         C         0         NA         39           Offsite         77         38.5         C         9         SIC         108           Offsite         56         19         SIC         108         75         108           Offsite         56         19         SIC         25         3C         32         44           Offsite         56         18         SI         18         SC         9         44           Offsite         67         25         SI         10         NA         44         1           Offsite         67         25         SI         5C         37         44         1     <	Well	Loc	DTW (ft bgs)	Thickness (ft)	SCS type	Thickness (ft)	SCS type	Thickness (ft)	SCS type
Offsite         77         38.5         C         0         39         39         7           Offsite         68         30         C         5         SC         27         7           Offsite         68         25         SIC         5         SC         33         7           Offsite         53         20         SIC         5         SC         28         28           Offsite         77         38 5         C         0         NA         39         75           Offsite         77         38 5         SI         5         SC         108         75           Offsite         56         25         SI         6         SC         9         75         108           Offsite         56         25         SI         18         SI         16         5         25         14         12         14         12         14	MW-06	Onsite	62	NA	NA	NA	NA	AN	NA.
Offsite         47         16         SI         4         SC         27           Offsite         68         30         C         5         SC         33           Offsite         53         20         SIC         5         SC         37           Offsite         77         38 5         C         0         NA         39           Offsite         135         25         SI         2         SC         108           Offsite         56         25         SI         C         75         108           Offsite         56         25         SI         SC         25         108           Offsite         56         19         SI         SC         32         44           Offsite         67         25         SI         10         NA         44           Offsite         67         25         SI         12         SC         34           Offsite         67         31         12         SC         36         36           Offsite         67         25         SI         44         44         44           Offsite         60         31	MW-12 (NW Plume)	Onsite	2.2	38.5	O	0		39	S
Offsite         68         30         C         5         SC         33           Offsite         64         25         SI         2         SC         37           Offsite         53         20         SIC         5         SC         28           Offsite         135         25         SI         NA         39         108           Offsite         56         19         SI         5         SC         108         NA           Offsite         56         19         SI         6         SC         35         108           Offsite         56         19         SI         18         SC         9         17           Offsite         82         28         SI         10         SC         44         10           Offsite         67         25         SI         10         NA         44         10           Onsite         80         31         SI         12         45         10           Offsite         86         32         SI         46         47         10           Offsite         86         33         SI         10         80         <	MW-30	Offsite	47	16	S	4	SC	27	S
Offsite         64         25         SI         2         SC         37           Offsite         53         20         SIC         5         26         28           Offsite         77         38 5         C         0         NA         39         108           Offsite         135         25         SI         5         108         75         108           Offsite         56         25         SI         6         SC         32         75           Offsite         56         19         SI         18         SC         32         74           Offsite         82         28         SI         10         SC         44         74           Offsite         67         25         SI         12         SC         34         44           Offsite         67         25         SI         12         SC         36         14           Offsite         67         31         SI         12         SC         36         14           Offsite         86         33         SI         10         SC         36         40           Offsite         50	MW-31	Offsite	89	30	O	5	SC	33	S
Offsite         53         20         SIC         5         SC         28           Onsite         77         38 5         C         0         NA         39           Offsite         135         25         SI         75         108           Offsite         92         SI         75         108           Offsite         56         19         SI         55         25           Offsite         56         19         SI         5C         32           Offsite         45         18         SI         10         SC         34           Offsite         67         25         SI         10         NA         44         44           Onsite         80         31         SI         12         SC         36         44           Onsite         67         25         SI         NA         44         44           Onsite         80         31         SI         8         SL         40           Offsite         67         25         SI         40         40           Offsite         60         32         SI         10         SC         40	MW-32	Offsite	64	25	SI	2	SC	37	S
Onsite         77         38 5         C         0         NA         39           Offsite         135         25         SI         2         SC         108           Offsite         56         25         SI         75         75           Offsite         56         19         SI         75         75           Offsite         56         19         SI         5C         25         32           Offsite         45         18         SI         10         SC         44         44           Offsite         67         25         SI         12         SC         36         44           Offsite         86         33         SI         8         SL         45           Offsite         86         33         SI         8         SL         45           Offsite         86         33         SI         10         SC         40           Offsite         86         33         SI         8         SL         45           Offsite         86         32         SI         10         SC         40           Offsite         62         32	MW-33	Offsite	53	20	SIC	5	SC	28	S
Offsite         135         25         SI         2         SC         108         108         To         To	MW-35	Onsite	7.2	38 5	U	0	Ϋ́Α	39	S
Offisite         92         8         SC         9         SIC         75         75           Offisite         56         26         26         51         6         5C         25         32           Offisite         45         18         SI         18         SC         9         74	MW-37	Offsite	135	25	SI	2	SC	108	S
Offsite         56         25         SI         6         SC         25           Offsite         56         19         SI         5         SC         32           Offsite         45         18         SI         10         SC         44           Offsite         67         25         SI         10         SC         44           Offsite         79         31         SI         12         SC         36           Onsite         80         31         SI         12         SC         36           Offsite         80         33         SI         8         SL         45           Offsite         50         22         SI         10         SC         40           Offsite         62         30         SI         10         SC         40           Offsite         62         30         SI         10         SC         31           Offsite         62         30         SI         10         SC         31           Offsite         68         23         SI         10         SC         31           Onsite         68         23	MW-40	Offsite	92	8	SC	თ	SIC	75	S
Offsite         56         19         SI         5         SC         32           Offsite         45         18         SI         10         SC         44           Offsite         67         25         SI         10         SC         44           Offsite         67         31         SI         12         SC         34           Onsite         79         31         SI         12         SC         36           Offsite         86         33         SI         8         SL         45           Offsite         80         32         SI         10         SC         40           Offsite         50         22         SI         10         SC         40           Offsite         62         30         SI         10         SC         38           Offsite         62         30         SI         10         SC         31           Offsite         68         23         SI         10         SC         36           Offsite         68         23         SI         10         SC         31	MW-42	Offsite	99	25	S	9	SC	25	S
Offsite         45         18         SI         18         SC         9           Offsite         82         28         SI         10         SC         44           Offsite         67         25         SI         0         NA         44           Offsite         67         31         SI         12         SC         36           Onsite         86         33         SI         8         SL         45           Offsite         80         32         SI         10         SC         40           Offsite         50         22         SI         10         SC         40           Offsite         62         30         SI         10         SC         38           Offsite         62         30         SI         10         SC         38           Offsite         62         30         SI         10         SC         38           Offsite         68         23         SI         10         SC         31	MW-44	Offsite	99	19	SI	വ	SC	32	S
Offsite         82         28         SI         10         SC         44           Offsite         124         15         C         51         S         44           Offsite         67         25         SI         0         NA         44           Onsite         79         31         SI         12         SC         36           Onsite         86         33         SI         12         SC         37           Offsite         86         33         SI         10         SC         40           Offsite         50         22         SI         10         SC         40           Offsite         62         30         SI         10         SC         36           Offsite         62         30         SI         10         SC         36           Offsite         62         30         SI         1         SC         36           Offsite         68         23         SI         10         SC         37         37	MW-51	Offsite	45	18	S	18	SC	6	S
Offsite         124         15         C         51         S         44           Offsite         67         25         SI         0         NA         44           Onsite         79         31         SI         12         SC         36           Onsite         80         33         SI         12         SC         37         45           Offsite         86         33         SI         10         SC         40         40           Offsite         50         22         SI         10         SC         40         26           Offsite         73         25         SI         10         SC         38         31           Offsite         62         30         SI         1         SC         31         31           Onsite         68         23         SI         10         SC         35         35	MW-54	Offsite	82	28	S	10	SC	44	S
Offsite         67         25         SI         0         NA         44           Onsite         79         31         SI         12         SC         36           Onsite         80         31         SI         12         SC         37           Offsite         82         33         SI         10         SC         45           Offsite         50         22         SI         10         SC         40           Offsite         73         25         SI         10         SL         26           Offsite         62         30         SI         1         SC         31           Offsite         62         30         SI         1         SC         31	MW-67	Offsite	124	15	ပ	51	S	44	SIC
Onsite         79         31         SI         12         SC         36           Onsite         80         31         SI         12         SC         37         37           Offsite         86         33         SI         10         SC         45         45           Offsite         50         22         SI         10         SC         40         8           Offsite         73         25         SI         10         SL         26         3           Offsite         62         30         SI         1         SC         31         3           Onsite         68         23         SI         10         SC         35         35	MW-71	Offsite	29	25	S	0	ΑN	44	S
Onsite         80         31         SI         12         SC         37         77           Offsite         86         33         SI         8         SL         45         45           Offsite         82         32         SI         10         SC         40         40           Offsite         73         25         SI         10         SL         26         7           Offsite         62         30         SI         10         SC         31         31           Onsite         68         23         SI         10         SC         35         35	MW-74	Onsite	462	31	SI	12	SC	36	S
Offsite         86         33         SI         8         SL         45         45           Offsite         82         32         SI         10         SC         40         40           Offsite         50         22         SI         26         40         26         26           Offsite         73         25         SI         10         SL         38         31           Offsite         62         30         SI         1         SC         31         31           Onsite         68         23         SI         10         SC         35         35	MW-75	Onsite	80	31	SS	12	SC	37	S
Offsite         82         32         SI         10         SC \( \)         40         40           Offsite         50         22         SI         2         SL         26           Offsite         73         25         SI         10         SL         38           Offsite         62         30         SI         1         31           Onsite         68         23         SI         10         SC         35	MW-76	Offsite	86	33	S	8	SL	45	S
Offsite         50         22         SI         26         26           Offsite         73         25         SI         10         SL         38           Offsite         62         30         SI         1         SC         31           Onsite         68         23         SI         10         SC         35	MW-77	Offsite	82	32	S	10	SC	40	S
Offsite         73         25         SI         10         SL         38         38           Offsite         62         30         SI         1         SC         31           Onsite         68         23         SI         10         SC         35	WW-78 (N Plume)	Offsite	20	22	SI	2	SL	26	S
Offsite         62         30         SI         1         SC         31           Onsite         68         23         SI         10         SC         35	MW-79	Offsite	73	25	S	10	SL	38	S
Onsite 68 23 SI 10 SC	MW-80	Offsite	62	30	IS	-	SC	31	S
	1W-15 (SW Plume)	Onsite	68	23	S	10	သင	35	S

Soil Classification:

C Clay
CL Clay Loam
L Loam
LS Loamy Sand
S Sand
SC Sandy Clay
SCL Sandy Clay

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

S R

YES

YES

			-	-
		ENTER User-defined stratum A soil vapor permeability,	(cm²)	
		e o	• -	
		ENTER Soul stratum A SCS Soil type (used to estimate soil vapor	permeability)	ENTER Stratum C soil water-filled porosity, $\theta_{w}^{c}$
		ENTER SCS soil type directly above	water table	ENTER Stratum C soil total porosity,
		Soit stratum drecity above water table,	(Enter A, B, or C)	ENTER Stratum C soil dry bulk density, P. C
į	oride	ENTER ENTER st add up to value of L <sub>wr</sub> (cell D28) Thickness Thickness of soil of soil stratum B, stratum C, (Enter value or 0) (Enter value or 0) h <sub>B</sub>	(cm) 1005 84	ENTER Stratum B soil water-filled porosity, $\theta_{\omega}^{E}$
Съепса	Carbon tetrachloride	Totals must add up to value of L <sub>wr</sub> (cell D28)  Totals must add up to value of L <sub>wr</sub> (cell D28)  Intckness Thickness  Intckness of soil of soil  of soil of soil of soil  atum A, (Enter value or 0) (Enter value on P <sub>r</sub> N <sub>r</sub>	(cm) 152 4	ENTER Stratum B soil total porosity, n <sup>8</sup>
		ENTER Totals mu Thickness of soil stratum A,	(cm) 914.4	ENTER Stratum B soli dry bulk density, p (a/cm³)
	[ <b>1</b>	ENTER Depth below grade to water table, Lwr	(cm) 2072 64	ENTER Stratum A sol water-tilled porosity, 8,4 (cm <sup>3</sup> /cm <sup>3</sup> )
ENTER Inital groundwater conc . Cw	2 879285714	ENTER Depth below grade to bottom of enclosed space floor, L	(cm)	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)
ENTER Chemical CAS No (numbers only,	56235	ENTER Average soil groundwater temperature,	(C)	ENTER Stratum A sold dry bulk density, P <sub>b</sub> (g/cm³)
ENTER Chemical CAS No (numbers only	56235	ENTER Average soil/ groundwater temperature,	(°C)	ENTER Stratum A soil dry bulk density,

						ı	Г	1							
ENTER	Stratum C	soil water-filled	porosity	9	(cm³/cm³)		0.3								
ENTER	Stratum C	soil total	porosity.	ِ اور ا	(unitless)		0 43								
ENTER	Stratum C	soll dry	bulk density,	` &	(g/cm³)		17		ENTER		ludoor	air exchange	rate.	<b>.</b>	(1/h)
ENTER	Stratum B	soil water-filled	porosity,		(cm³/cm³)		0.27		ENTER		Floor-wall	seam crack	wdth,	*	(ED)
ENTER	Stratum B	soil total	porosity,	<b>a</b> c	(unitless)		0 42		ENTER		Enclosed	space	height,	ī	(cm)
ENTER	Stratum B	soil dry	bulk density,	<b>"</b> e	(g/cm³)		1.7		ENTER	Enclosed	Space	floor	width,	×,	(шо)
ENTER	Stratum A	soil water-filled	porosity,	φ,	(cm³/cm³)		0.2		ENTER	Enclosed	space	floor	length,	La	(cm)
ENTER	Stratum A	soil total	porosity,	Ψ	(unitless)		0 43		ENTER		Soil-bidg	pressure	drfferential,	РΔ	(g/cm-s²)
ENTER	Stratum A	soil dry	bulk density,	<b>₹</b> £	(g/cm³)		15		ENTER	Enclosed	space	floor	thickness,	Lord	(cm)

ENTER					
	ENTER	ENTER	ENTER	ENTER	
Averaging Averaging			Target	Target hazard	
time for	osure	Exposure	risk for	quotient for	
noncarcinogens,	duration,	frequency,	carcinogens,	noncardinogens,	
AT <sub>C</sub> AT <sub>NC</sub> Ef	Ω	<b>.</b>	<u>Έ</u>	면	
(yrs) (yrs) (yrs	(yrs)	(days/yr)	(nuitless)	(nnitless)	
70 30 30	9	350	1 0E-06	-	

groundwater concentration

	Leiny s	Henry's	Enthalpy of			Organic	Pure		
	law constant	law constant	vaporization at			carbon	component	Ç	
≩	at reference	reference	the normal	boiling	Critical		water	risk	Reference
n water,	temperature,	temperature,	boiling point,	point,	temperature,	o	solubility,	factor,	conc.
	I	T,	ΔH <sub>ν,b</sub>	ᆸ	۲		s	URF	Se
cm²/s)	(atm-m³/mol)	(၃)	(cal/mol)	(k)	(%K)	(cm <sub>3</sub> /g)	(mg/L)	(µg/m <sub>3</sub> )-1	(mg/m <sub>3</sub> )
8 80E-06	3 05E-02	52	7,127	349 90	556 60	1 74E+02	7 93E+02	1 SE-05	0 0E+00

## INTERMEDIATE CALCULATIONS SHEET

Floor- wall seam penmeter, Xonea	3,844	Diffusion path (ength,	(cm)	2057 64			
Water-filed porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 294	Total overall effective diffusion coefficient,	امر (cm²/s)	7 93E-04			
Aur-filled porosity in capillary zone, $\theta_{a,ct}$ $(cm^3/cm^3)$	0 136	Capillary zone effective diffusion coefficient,	D**a (cm²/s)	5 46E-04			
Total porosity in capillary zone,	0 43	Stratum C effective diffusion coefficient,	Deff c (cm²/s)	4 74E-04	Reference	conc, RfC (mg/m³)	NA
Thickness of capillary zone, Lez	17 05	Stratum B effective diffusion coefficient,	D" <sup>8</sup> (cm²/s)	7 99E-04	Und	factor, URF (µg/m³) ¹	1 5E-05
Stratum A sout effective vapor permeability, k, (cm²)	5 97E-10	Stratum A effective diffusion coefficient,	D <sup>eff</sup> <sub>A</sub> (cm²/s)	3 16E-03	Infinite source bidg	conc. C <sub>busting</sub> (µg/m³)	3 32E-03
Stratum A soll relative air permeability. kg (cm²)	767 0	Vapor viscosity at ave. soil temperature,	μτs (g/cm-s)	1 77E-04	Infinite source indoor attenuation	coefficient,	3 89E-06
Stratum A soll intrinsic permeability, k	7 49E-10	Henry's law constant at ave groundwater temperature,	H' <sub>TS</sub> (unifless)	8 53E-01	Exponent of equivalent foundation Peciet	number, exp(Pe <sup>l</sup> ) (unitless)	1 15E+03
Stratum A effective total fluid saturation,  Se (cm³/cm³)	0.365	Henry's law constant at ave groundwater temperature,	H <sub>rs</sub> (atm-m³/mol)	2 02E-02	Area of	crack, Acada (cm²)	3 84E+02
Stratum C soil air-filled porosity. $\theta_a^c$ $(cm^3/cm^3)$	0 130	Enthalpy of vaporization at ave groundwater temperature,	ΔH <sub>vTS</sub> (cal/mol)	7,798	Crack effective diffusion	coefficient, D <sup>creck</sup> (cm <sup>2</sup> /s)	3.16E-03
Stratum B soul alr-filled porosity, $\theta_a^g$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade,	Zanack (cm)	15	Average vapor flow rate	Into bidg , Q <sub>sea</sub> (cm³/s)	5 70E-01
Stratum A soil air-filled porosity, $\theta_{\bullet}^{\star}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio,	n (unitless)	4 16E-04	Crack	radius, f <sub>erack</sub> (cm)	010
Source- building separation, L <sub>T</sub>	2057 64	Area of enclosed space befow grade,	Pag (cm³)	9 24E+05	Source	conc, C <sub>rours</sub> (µg/m³)	8 53E+02
Exposure duration, t	9 46E+08	Bldg ventilation rate,	Obudding (cm <sup>3</sup> /s)	5 63E+04	Convection	length, اب (cm)	15

המאם-אטוא המאם-אטוא	RIGHT-BASED GROUNDWATER CONCENTRATION CALCULATIONS	EK CONCENTR	ATION CALCI	JLATIONS	INCREMENTAL	INCREMENTAL RISK CALCULATIONS
indoor exposure groundwater conc, carcinogen (µg/L)	Indoor exposure groundwater conc , noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc, (µg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc (µg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotent from vapor intrusion to indoor air, noncarcinogen (unitiess)
4 88E+01	₹	4 88E+01	4 88E+01   7.93E+05	4 88E+01	AN	₹N

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

VLOOKUP TABLES	Soil Properties Lookup Table	N (unitless) M (unitless) 8, (cm³/cm³) 8, (cm³/cm³) Mean Grain Diameter (cm)	0 083 0 38	0 237 0 41 0 095	0359 043 0078	0.561 0.41 0.057	2 68 0 627 0 43 0 045 0 044	0 187 0 38 0 100	0324 039 0100	0.270 0.46 0.034	0.083 0.26 0.070	0 43	0 291 0 45 0 067	
	S	a (1/cm)	0 008	0.019	0 036	0 124	0 145	0 027	0 059	0 016	0 005	0 0 10	0 020	
		K, (cm/h)	0.20	0.26	104	14 59	29 70	0 12	131	0.25	0 0 0	200	0.45	

				Chemic	Chemical Properties Lookup Table	o Table						
	Organic			Pure		Henry's	Henry's			Enthaloy of		
	carbon			component		law constant	law constant	Normal		vanonzation at	100	
	partition	Diffusivity	Diffusivity	water	Henry's	at reference	rafaranca	, Poline	, september 1	the some	į .	Dofesson
	coefficient,	ın aır,	in water,	solubility,	law constant	temberature	temperature		temperature	boiling point	factor a	Reference Copy
	Ž,	<b>"</b>	<u>*</u>	s	Ì	I	'n	면	Te	ΔH,	LR.	2 2 2 2 3 2 3 3 3 3 3 3 3 3 3 3 3 3 3
CAS No Chemical	(cm³/g)	(cm <sup>2</sup> /s)	(cm²/s)	(mg/L)	(nutless)	(atm-m³/mol)	(၃)	સ્	(K)	(cal/mol)	(mg/m³)	(mg/m <sub>3</sub> )
50293 007	2.63E±08	1 375 03	A 95E 06	2000	1000	4000	1				1	
50208 Bonne (a) and a second	0011001	20-10-1	07406	70-2007	3 325-04	8 10E-06	52	533 15	72075	11,000	9 7E-05	00=+00
Section of Delivery	1 025+06	4 30E-02	90-H00 6	1 62E-03	4 63E-05	1,135-06	25	715 90	969 27	15,000	2 1E-03	0.0E+00
51285 2,4-Uinitrophenoi	1 00E-02	2 73E-02	90-390 6	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0E+00	7 0E-03
53703 Dibenz(a,h)anthracene	3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2.1E-03	0 0E+00
56235 Carbon tetrachloride	1 74E+02	7 80E-02	8 80E-06	7 93E+02	1.25E+00	3 05E-02	25	349 90	556 60	7,127	1 5E-05	0 OE+00
56553 Benz(a)anthracene	3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	15,000	2,16-04	0.000
57749 Chlordane	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 995-03	4 856-05	52	624 24	885 73	13,000	3 7E-04	0 OE+00
58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	22	596 55	839 36	13,000	3 7E-04	0 OE+00
60571 Dieldrin	2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1515-05	25	613 32	842 25	13,000	4 6E-03	0 0E+00
65850 Benzoic Acid	6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10,000	0 00+00	1 4E+01
67641 Acetone	5 75E-01	1 245-01	1 14E-05	1 00E+06	1 595-03	3 88E-05	25	329 20	508 10	6,955	0.000	3.5E-01
67663 Chloroform	3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6,988	2 35-05	0.05+00
67721 Hexachloroethane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	52	458 00	695 00	9.510	4 0E-06	005+00
71363 Butanol	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 616-04	8 80E-06	25	390 88	563 05	10.346	0.00	3.5E-01
71432 Benzene	5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342	8 35-06	0.0F+00
71556 1,1,1-Trichloroethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7.136	0 0E+00	1 OF+00.
72208 Endrin	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	718 15	986 20	12.000	00+00	1 1E-03
72435 Methoxychlor	977E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0 0E+00	1 8E-02
72548 000	1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05	00+400
72559 DDE	4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	. 25	636 44	860 38	13,000	9 7E-05	0 0E+00
74839 Methyl bromide	1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	52	276 71	467 00	5.714	00+300	5 05-03
75014 Vinyl chloride (chloroethene)	1 86E+01	1 068-01	1 23E-06	2 76E+03	1 11E+00	2 71E-02	25	259 25	432 00	5,250	8.4E-05	0 OE+00
75092 Methylene chloride	1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	313 00	510 00	6,706	4 7E-07	3 0E+00
74150 Carbon distringe	4 5/E+01	104E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	52	319 00	552 00	6,391	0 0E+00	7 0E-01
75274 Promodorm	8 731101	1 495-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	22	422 35	00 969	9,479	1 1E-06	0 0E+00
75242 1 1-Dickbooothoo	9 461 94	2 98E-02	1 06E-05	6 74E+03	6 565-02	1 60E-03	22	363 15	585 85	7,000	1 8E-05	0 0E+00
19545 1, t-Dictioned and	3 105+01	/ 42E-UZ	1 055-05	5 06E+03	2 30E-01	5 61E-03	22	330 22	523 00	6,895	0 0E+00	5 0E-01
70504 1,1-Digmoreunyrene	5 89E+01	9 00E-02	1 04 E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6,247	5 OE-05	0 0E+00
/6448 heptachio	141E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	22	603 69	84631	13,000	1 35-03	0 0E+00
7/4/4 Hexachlorocyclopentadiene	2,00E+05	1 61E-02	7 21E-06	1 80E+00	1 11E+00	2 71E-02	25	512 15	746 00	10.931	0 0E+00	7 0E-05
78591 Isophorone	4 68E+01	6 235-02	6 76E-06	1 20E+04	2 72E-04	6 635-06	25	488 35	715 00	10.271	2 7F-07	00+00
78875 1,2-Dichloropropane	4 37E+01	7 82E-02	8 735-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7.590	0.05+00	4 OF D3
79005 1,1,2-Trichloroethane	5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8 322	1 8 L S	000+000
79016 Inchloroethylene	1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25	360 36	544 20	7.505	75.08	00+100
79345 1,1,2,2-Tetrachloroethane	9 33E+01	7 10E-02	7 90E-06	2 97E+03	141E-02	3 44E-04	25	419 60	661.15	8 996	5 H C	001
83329 Acenaphthene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 S5E-04	25	550 54	803 15	12 155	00100	2 4 10 0
									!	·	33.1	, ,

6 of 7

unitless)

carcinogens, TR

(days/yr)

(yrs) ဗ္က

Ā

(SES)

Used to calculate nsk-based

1 0E-06

320

8

70

groundwater concentration

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

× YES CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

VERSION 1.2 September, 1998

User-defined stratum A soil vapor permeability, ENTER 뜽 ENTER
Sol
stratum A
SCS
soll type
(used to estimate of soll vapor ENTER Stratum C soil water-filled ermeability) (cm<sub>3</sub>/cm<sub>3</sub>) porosity, о ф 60 SCS soil type directly above ENTER Stratum C soil total porosity, ENTER water table 0 43 ပို့ Sorl stratum directly above water table, (Enter A, B, or C) Indoor air exchange ENTER Stratum C soil dry bulk density, ENTER ENTER (g/cm³) 쯗 (1/h) ENTER ENTER ENTER

Totals must add up to value of L<sub>wr</sub> (cell D28)

Thickness Thickness

Thickness of soil of soil of soil of soil stratum C, stratum A, (Enter value or 0) ENTER
Target hazard
quotient for
noncarcinogens,
THQ ENTER Stratum B soil water-filled porosity, seam crack width, (cm<sub>3</sub>/cm<sub>3</sub>) Floor-wall ENTER (cm) 9 Ę ₹ Trichloroethylene Chemical ENTER Stratum B soil total porosity, Enclosed unitless) ENTER space height, ENTER Target nsk for 3048 (E) Ŧ, 488 ENTER Stratum B soil dry bulk density, Thickness of soil stratum A, Exposure frequency, EF ENTER Enclosed space floor width, (g/cm<sup>3</sup>) ENTER (E) ځ 762 ٠<u>٩</u> 961 ENTER Stratum A soll water-filled porosity bu Depth
below grade
to water table,
Lwr ENTER 2225 04 ENTER Enclosed space floor length, Exposure duration, ED (yrs) (cm<sub>3</sub>/cm<sub>3</sub>) ENTER (cm) ĵ 961 ENTER
Averaging
time for
noncarcinogens,
AT<sub>NC</sub> ENTER Initial groundwater conc , below grade to bottom of enclosed space floor, ENTER Stratum A soil total porosity, Soil-bidg pressure differential, (µg/L) (unitless) ENTER Depth ENTER (a/cm-s<sup>2</sup>) 2 ۲numbers only, soil dry bulk density, ENTER
Averaging
time for
carcinogens, groundwater temperature, ENTER Stratum A CAS No no dashes ENTER Enclosed space floor thickness, 79016 ENTER Average (g/cm<sup>3</sup>) SOL ဉ 9 **₹** 5

### CHEMICAL PROPERTIES SHEET

						_	7
		Reference	couc	35	(mg/m <sub>3</sub> )	0.0E+00	
	Gilt	risk	factor,	UR.	(mg/m <sup>3</sup> )	17E-06	
Pure	component	water	solubility,	S	(mg/L)	1 10E+03	
Organic	carbon				(cm <sub>3</sub> /g)	1 66E+02 ( 1 10E+0	
		Critical	temperature,	ို	કુ. કુ.	544 20	
	Normat	polling	point,	۳	(%)	360 36	
Enthalpy of	vaporization at	the normal	boiling point,	ΔH,δ	(cal/mol)	7,505	
Henry's	law constant	reference	temperature,	Ļ	(၁့)	52	
Henry's	_	at reference	-		(atm-m³/mol)	1 03E-02	
		Diffusivity	in water,	₫	(cm <sup>2</sup> /s)	9 10E-06	
		Diffusivity	ın aır,	മ്	(cm <sup>2</sup> /s)	7 90E-02	

# INTERMEDIATE CALCULATIONS SHEET

Floor-wall seam permeter,	3,844	Diffusion path length, L <sub>d</sub>	2210 04	
Water-filed porosity in capillary zone, $\theta_{w,\alpha}$	0 294	Total overall effective diffusion coefficient, Deff cm²/s)	7 35E-04	
Au-filled porosity in capil'ary zone, $\theta_{acc}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 136	Capillary zone effective diffusion coefficient, D <sup>eff</sup> cm²/s)	5 55E-04	
Total porosity in capillary zone, net (cm³/cm³)	0 43	Stratum C C effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	4 82E-04	Reference conc. Rrc (mg/m³)
Thickness of capitlary zone, L <sub>z</sub>	17 05	Stratum B B effective diffusion coefficient, D <sup>off</sup> (cm <sup>2</sup> /s)	8 11E-04	Unut nsk factor, URF (µg/m³)-1
Stratum A soul effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, D <sup>off</sup> (cm²/s)	3 20E-03	Infinite source bldg conc , Coucans (µg/m³)
Stratum A soil relative air permeability.	0 746	Vapor viscosity at ave soil temperature, Hrs (g/cm-s)	1 77E-04	infinite source indoor attenuation coefficient, $\alpha$ (unitless) 3 73E-06
Stratum A soil intinisic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (untless)	2 78E-01	Exponent of equivalent foundation Pectet number, exp(Pe') (unitless) 339E+03
Stratum A effective total flux saturation,  S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0419	Henry's law constant at ave groundwater temperature, H <sub>TS</sub>	6 60E-03	Area of crack, Area (cm²)
Stratum C soft air-filled porosity, $\theta_a^c$ $(cm^3/cm^3)$	0 130	Enthalpy of vaporization at ave groundwater temperature, $\Delta k k$ , rs (cal/mol)	8,483	Crack effective diffusion coefficient, Dome (cm <sup>2</sup> /s)
Stratum B soil air-filled porosity, $\theta_{\mathbf{a}}^{\mathbf{g}}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.150	Crack depth below grade, Zonek (cm)	15	Average vapor flow rate into bldg , Qua (cm²/s)
Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio,  1	4 16E-04	Crack radius, radius, (cm)
Source- building separation, L <sub>T</sub>	2210.04	Area of enclosed space below grade, A <sub>B</sub>	9 24E+05	Source vapor conc, Cuurce (µg/m³)
Exposure duration, t (sec)	9,46E+08	Bidg ventiation rate, Quedra (cm <sup>3</sup> /s)	5 63E+04	Convection path langth, L <sub>p</sub> (cm)

NCREMENTAL RISK CALCULATIONS.	Hazard quotient from vapor Intrusion to indoor air, noncarcinogen (unitless)
INCREMENTAL F	Incremental rask from vapor vapor strusion to indoor air, carcinogen (unitiess)
JLATIONS	Final indoor exposure groundwater conc. (µg/L)
ATION CALCI	Pure component water solubility.  S (µg/L)  1.10E+06
R CONCENTR	Risk-based indoor exposure groundwater conc. (µg/L)
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	indoor exposure groundwater conc , noncarcinogen {µg/L}
RISK-BASE	Indoor exposure groundwater conc , carcinogen (µg/L)

0 0E+00 0 0E+00 0 0E+00 0 0E+00 0 0E+00 0 0E+00 0 0E+00 0 0E+00 3 0E+01 3 5E-01 3 0E+00 1 1E-03 1 1E-03 1 1E-03 3 0E+00 0 0E+00

Soul Properties Lookup Table α (1/cm) N (unitiess) M (unitiess) 0 008 109 0.083 0 019 131 0.237 0 036 156 0.359 0 124 2.28 0.561	8 - 9 -	8 - 9 -	Φ.	6, (cm³/cm³) 038 041 043	9, (cm³/cm³) Me 0 068 0 095 0 078 0 057	ายก Gram Diameter				
2970 0145 268 012 0027 123 131 0059 148 025 0016 137 007 0.010 123 045 0020 141 442 0075 189			0 627 0 187 0 324 0 270 0 083 0 187 0 291	0 43 0 38 0 39 0 40 0 43 0 43 0 45	0 045 0 100 0 100 0 030 0 070 0 089 0 065					
Organic				Chemica Pure	Chemical Properties Lookup Table	kup Table Henry's	Henv's			Enthalpy of
:				component		law constant	law constant	Normal		Vaportzation at
partition Diffusivity Diff coefficient in air in a	_	ءَ مَ	Diffusivity in water	water	Henry's		reference	bouling	Critical	the normal
c '		•	<u>a</u> *'		T T		temperature, T <sub>R</sub>	poditi P	temperature, T <sub>c</sub>	boting point, ∆H <sub>v.a</sub>
(cm <sup>-/</sup> g) (cm <sup>-/</sup> s)	ı	_	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m³/mot)	(၁)	8	( <sup>R</sup> K)	(cal/mol)
2 63E+06 1 37E-02 4	37E-02	40	95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000
2 735-02	30E-02		90-190	1 62E-03	4 63E-US	1135-06	25	715 90	969 27	15,000
10	2 02E-02		5 18E-06	2 49E-03	6 03E-07	4 44E-U/	S %	605 28	827 85	15,000
7 80E-02		w	8 80E-06	7 93E+02	1 25E+00	3 05E-02	22 22	349 90	556 60	72.127
3 98E+05 5 10E-02	5 10E-02		9 00E-06	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	15,000
	1 42E-02		7 34E-06	5 80E+00	1 99E-03 5 74E-04	4 85E-05	25	624 24	885 73	13,000
<del></del> 1	1 25E-02		4 74E-06	1 95E-01	6 19E-04	151E-05	3 23	613 32	842 25	13,000
5 75F-01 5 36E-02	5 36E-02 1 24E-01		7 97E-06	3 50E+03	6 31E-05	1546-06	52	720 00	751 00	10,000
_	1 04E-01		1 00E-05	7 92E+03	1 50E-01	3 66F-03	9 ×9	329 20	508 10	6,955
	2 50E-03		6 805-06	5 00E+01	1 59E-01	3 88 E-03	22	458 00	695 00	9,510
5 89E+01 8 80E-02			9 30E-06	7 40E+04 1 75E+03	3 61E-04	8 80E-06	52	390 88	563 05	10,346
7 80E-02	80E-02	w	80E-06	1 33E+03	7 05E-01	172E-02	2 %	347 24	545 00	7 136
1 235+04 1 255-02 4 0 775±04 1 665:02	4 4	4 4	74E-06	2 505-01	3 08E-04	7.51E-06	25	718 15	986 20	12,000
1 69E-02 4	14	14	76E-06	9 DOE-02	0 48E-04	1 585-05	25 25	651 02	848 49	14,000
1 44E-02 5	S.	2	87E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44	860 38	13,000
**************************************			215-05 235-06	1 52E+04 2 76E+03	2 56E-01	6 24 E-03	52 52	276 71	467 00	5,714
1,17E+01 1 01E-01 1	_	: =	17E-05	1 30E+04	8 98E-02	2.115-02	5 K	213 00	432.00	5,250
1 04E-01	-	1 00	00E-05	1 19E+03	1 24E+00	3 025-02	3 53	319.00	552.00	9,700
1 49E-02 1	-	1 03E	8	3 10E+03	2 19E-02	534E-04	S 1	422 35	00 969	9.479
2 98E-02		1 06E	ဗို	674E+03	6 56E-02	1 60E-03	25	363 15	585 85	2,000
7 42E-02	_	105	05E-05	5 06E+03	2 305-01	5 61E-03	25	330 55	523 00	6,895
- 1	- 1	4 6	94E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6,247
9 00E+05 1 12E-02 5	0 1	6 6	995-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000
7.474 nexactionocycloperizatione	~ "	- 4	21E-06	1 80E+00	111E+00	2 715-02	25	512 15	746 00	10,931
7 825 02		0 0	0 725 00	1 20E+04	2 /2E-04	6 635-06	52	488 35	715 00	10,271
01 7 80E-02		-	90.000	Z 80E+03	1 155-01	2 80E-03	25	369 52	572 00	7,590
7 90E-02		0.	9 10E-06	1 10E+03	3 /4E-02 4 22E-01	9 12E-04 1 03E-02	25	386 15	602 00	8,322
7	7 10E-02		7 90E-06	2 97E+03	1 416-02	3 44E-04	25	419 60	544 20 661 15	7,505 8 998
7 08E+03 4 21E-02	4 21E-02		7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155

Reference conc , RfC (mg/m³)

Unit nsk factor, URF

(mg/m³)

				3	VLOOKUP TABLES							
84662 Diethylphthalate	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	22	567 15	757 00	13,733	0 0E+00	2,85+00
84742 Di-n-butyl phthalate	3 39E+04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10	52	613 15	798 67	14,751	0 0E+00	3 5E-01
6568/ Butyl benzyl phthalate	5 75E+04	1 74E-02	4 83E-06	2 69E+00	5 17E-05	1 26 <b>E</b> -06	52	990 99	839 68	13,000	0 0E+00	7 0E-01
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 00E-06	52	632 28	890 45	13,000	1 4E-06	0 OE+00
86/3/ Fluorene	1 38E+04	3 63E-02	7 88E-06	1 985+00	2,61E-03	6 37E-05	52	570 44	870 00	12,666	0 0E+00	1 4E-01
60/40 Carbazote	20411-02	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	52 5	627 87	00 668	13,977	5 7E-06	0 0E+00
87865 Pentachlomphenol		5 60 11.02	0 10E-00	3 23E+00	0.4F-01	8 15E-03	27 2	486 15	738 00	10,206	2 2E-05	00±±00
88062 2,4,6-Trichlorophenol	3 815 +02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 785-06	3 5	502 15 519 15	749.03	000,66	3.46-05	00000
91203 Naphthalene	2 00E+03	5 90E-02	7 50E-06	3 10 -01	1 98E-02	4 83E-04	52	491 14	748 40	10.373	0.05+0.0	1 4 1 -01
91941 3,3-Dichlorobenzidine	7 245+02	1 94E-02	6 74E-06	3 11 € +00	1 64E-07	4 00E-09	52	560 26	754 03	13,000	38.04	0 0E+00
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 205-03	52	417 60	630 30	8,661	0 0E+00	7 0E+00
95467 Z-Metnylphenol (o-dresol) 95501 1.2-Dichloroberzene	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05 7 79E-02	1 20E-06	52	464 19	697 60	10,800	0.000	1 8E-01
95578 2-Chtorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3.905-03	8 15	433 37	705 00	00/6	0.05+00	2 0E-01
95954 2,4,5-Trichlorophenol	1 60E+03	2 916-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	3 23	526 15	759 13	13 000	0.00	2 5 E 0 1
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09€+03	9 84E-04	2,40E-05	52	483 95	719 00	10,566	00=+00	2 00.03
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20	8,501	0 0E+00	1 0E+00
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10€+02	1 13E-01	2 76E-03	52	418 31	636 00	8,737	00+300	1 0E+00
105673 c.4-Uimemyiphenoi 106423 c.Xvlene	2 09E+02	2 84E-02	8 695-06	7 87E+03	8 20E-05	2 00E-06	52 52	484 13	707.60	11,329	0 0E+00	7 0E-02
106467 1.4-Dichlorobenzene	6 17F+02	5 90F-02	7 905-06	7 385+01	6 DET -0.0	7 495-03	9 4	411 52	616.20	8,525	0.01100	7 0E+00
106478 p-Chloroaniline	661E+01	4 83E-02	1 01E-05	5 305+03	1 36E-05	3.325-03	3 50	503.65	754 00	11,680	001+00	8 UE-01
107062 1,2-Dichloroethane	1 74E+01	1 04E-01	90E-06	8 52E+03	4 01E-02	9 78E-04	2 2	356 65	561 00	7,643	2 6F-05	001100
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	52	345 65	519 13	7,800	0 0E+00	2 0E-01
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03	52	412 27	617 05	8,523	0 0E+00	7 0E+00
108683   Oluene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03	£2 :	383 78	591 79	7,930	0 0E+00	4 0E-01
108952 Phenol	2 19E+02	7 30E-02	8 /UE-U5	4 /2E+02	1 52E-01	3 71E-03	5 2	404 87	632 40	8,410	00000	2 0E-02
11144 Bis(2-chloroethyl)ether	- 155E+01	6 92E-02	7 53E-06	1 725+04	7.385-04	1805-05	0 K	455 UZ 451 15	659 79	026,01	0.0E+00	2 15+00
115297 Endosulfan	2 14E+03	115E-02	4 55E-06	5 105-01	4 59E-04	1 12E-05	22 52	674.43	942.94	14,000	0.05+00	245.00
117817 Bis(2-ethylhexyt)phthalate	1 51E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	52	657 15	908 00	15,999	4 0E-06	0 0E+00
117840 Di-n-octyl phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
118741 Hexachiorobenzene	5 50E+04	5 42E-02	5,91E-06	6 20E+00	5 41E-02	1 32E-03		582 55	825 00	14,447	4 6E-04	0 0E+00
120821 1.2 4-Trichlorobenzene	2 85E+04	3 24E-02	7 /4E-06	4 34E-02	2 67 E-03	6 51E-05	55	615 18	873 00	13,121	0000	1 1E+00
120832 2,4-Dichlorophenol	147E+02	3 46E-02	8 77E-06	4 50F+03	3 02E-02	3 17F-05	6 K	480 13 482 48	708 17	10,471	001400	2 0E-01
121142 2,4-Dintrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	22	590 00	814 00	13,467	195-04	0.05+00
124481 Chlorodibromomethane	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04		416 14	678 20	8,000	2 4E-05	0 OE+00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	52	394 40	620 20	8,288	5 8E-07	0 0E+00
129000 Pyrana 156592 del 2 Dicklorostmisso	1 05=+05	2 72E-02	7 24E-06	1 35E-01	4 51E-04	1 10E-05		667 95	936.00	14,370	00=+00	116-01
156605 trans-1.2-Dichlomethylene	5.25E+01	7 07F-02	1.19E-05	5 30E+03	3.855-01	4 U/E-U3 0 30F-03	S 12	333 65	544 00	6 717	001100	3 55-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-08		320 83 809 15	1078.24	17,000	2 1E-04	0 0F+00
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1,50E-03	4 55E-03	111E-04		715 90	969 27	15,000	2 15-04	0 0E+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	161E-05		655 95	905 00	13,815	0 0E+00	1 4E-01
207069 Benzo(k)#Joraninene 218019 Chrysene	1 23E+06	2.26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07	52	753 15	1019 70	16,000	2 15-05	000+00
309002 Aldrin	2 45 € + 06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 705-04		603.01	839.37	13,000	4 9F-03	00+100
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		596 55	839.36	13,000	185-03	0 0E+00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839.36	13,000	5 3E-04	0 0E+00
542/56 1,3-Dichloropropene 606202 2 6-Dichlorop	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	587.38	000'2	3.7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamine		5.45F-02	8 17E-06	9 895+03	9 235-05	2 25E-06		558 00	746.97	17,938	2 2 4 5 6 6 7 7 8 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8	004400
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 005-01	3 906-04	9515-06	22 22	613 96	848 76	13.000	2 6E-03	000
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 305-06	5 62E-02	4 67E-01	1 14E-02	25	629 88	1750 00	14,127	0 0E+00	3 OE-04
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	52	657 15	873 31	14,000	3 2E-04	0 0E+00
11090625 Aradior 1250 (PCB-1260) 11007601 Ameliar 1254 (PCB-1254)	2.905.405	1 38E-02	4.32E-06	8 00E-02	1.89E-01	4 60E-03	52	402 50	539 37	19,000	유 수 5	00000
12674112 Arador 1016 (PCB-1016)	3.305+04	2 22E-02	5.425.06	3 /UE-UZ	1 105-02	2 005-03	8 8	377.50	512.27	000,81	20.0	00+00
53469219 Aroclor 1242 (PCB-1242)	3 30E+04	2 14E-02	5 31E-06	3 40E-01	2 13E-02	5 20E-04	3 8	345 50	482.20	18,000	1 1 1 1 1 1 1 1 1 1	00.00
												•

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

ENTER YES

ENTER

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below) ő

		ENTER	User-defined stratum A	permeability,	s S	(cm²)	
				Q			
		ENTER	stratum A SCS	(used to estimate OR	soil vapor	permeability)	IS.
		ENTER	SUS	sort type	directly above	water table	S
		ENTER	Soil	d:rectly above	water table,	(Enter A, B, or C)	0
	lene	ENTER I Lwr (cell D28)	Thickness of soil stratum C	(Enter value or 0)	မိ	(cm)	1158 24
Сћетса	Tetrachloroethylene	INTER ENTER ENTER Totals must add up to value of L <sub>w1</sub> (cell D28)	Thickness of soil stratum B	ô	ቴ	(cm)	3048
		ENTER Totals mu	Thickness	stratum A,	Ę	(cm)	762
		ENTER	Depth below grade	to water table,	ال <sub>ي</sub>	(cm)	2225 04
Initial groundwater conc., C <sub>w</sub> (µg/L)	253	ENTER Depth	below grade to bottom of enclosed	space floor,	<b>ל</b>	(cm)	15
Chemical CAS No (numbers only, no dashes)	127184	ENTER	Average soit/ groundwater	temperature,	° ,	<u>(</u> )	16

Endosed Sod-bkg			7.0	0.27	1/	0.43	03
	ENTER	ENTER	ENTER	ENTER	ENTER		
	Enclosed	Enclosed	T escion	Floorwall	2		
	floor	floor	space	seam crack	air exchange		
Ĭ	length,	width,	height,	width,	rate.		
	ٿ	w M	ı T	*	E.		
(cm) (g/cm-s²)	(cm)	(cm)	(cm)	(cm)	(1/h)		
15 40	1961	190	488	01	37.0		

ENTER
Stratum C
soil water-filled
porosity,  $\theta_{\rm w}^{\rm c}$   $({\rm cm}^3)$ 

ENTER Stratum C soit total porosity,

ENTER
Stratum C
soil dry
bulk density,
Poc
(g/cm³)

ENTER
Stratum B
soil water-filled
porosity,  $\theta_w^B$ (cm<sup>3</sup>/cm<sup>3</sup>)

ENTER Stratum B soil total porosity,

ENTER Stratum B soil dry bulk density, P<sub>b</sub> (g/cm³)

ENTER
Stratum A
soil water-filled
porosity,  $\theta_{w}^{A}$   $\{cm^{3}\}$ 

ENTER Stratum A soil total porosity,

ENTER Stratum A soil dry bulk density, p<sub>b</sub><sup>4</sup> (g/cm³)

ENTER	Target hazard	quotient for	noncarchogens,	완	(unitless)	-	Jeed to calculate risk-based	
ENTER	Target	risk for	carcinogens,	팑	(unitless)	1 0E-06	Used to calcu	
ENTER		Exposure	frequency,	H	(days/yr)	350		
ENTER		Exposure	duration,	0	(yrs)	30		
ENTER	Averaging	time for	noncarcinogens,	ATNC	(yrs)	30		
ENTER	Averaging	time for	cardinogens,	ΑT <sub>C</sub>	(yrs)	70		

		Reference	conc,	Ric	(mg/m³)		20.00
	ž				(µg/m³) <sup>-1</sup>		1000
9 5 L	component	water	solubility,	S	(mg/L)		CO. FOC C
O Baille	carbon	partition	coefficient,	ኝ	(cm <sub>3</sub> /g)		A EEE . 00
		Critical	temperature,	ř	(°K)		
	Normal	poiling	point	<b>-</b>	( <b>,</b> K)		07 700
Ettillalpy of	vaporization at	the normal	boiling point,	۵H٬۰	(cal/mol)	•	07 700 000 0
		reference			(၁)		36
		at reference			(atm-m³/mol)		1 CU 3/8 F 80-30C 8 CU 30C 4
					(cm <sup>2</sup> /s)		8 20E-08
		Diffusivity	in air,	<b>a</b>	(cm <sup>2</sup> /s)		7 20E.02

Floor- wall seam perimeter, Xarea	3,844	Diffusion path length, La	2210 04	
Water-filled porosity in capillary zone, $\theta_{w,ca}$	0 294	Total overall effective diffusion coefficient, D*f (cm²/s)	6.68E-04	
Air-filled porosity in capillary zone, $\theta_{\mathbf{u},\mathbf{c}}$	0 136	Capillary Zone Zone effective diffusion coefficient, Doff cm²/s)	5 05E-04	
Total porosity in capitlary zone,	0.43	Stratum C C effective diffusion coefficient, Deff (cm²/s)	4 38E-04	Reference conc , RfC (mg/m³)
Thickness of capillary zone, Let (cm)	17 05	Stratum B B effective duffusion coefficient, Deff (cm²/s)	7 38E-04	Unit nsk factor, URF (µg/m³) <sup>-1</sup>
Stratum A soil effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, Deff (cm²/s)	2 92E-03	infinite source bldg conc , C <sub>buston</sub> (μg/m³)
Stratum A soil relative air permeability.	0 746	Vapor viscosity at ave soil temperature, $\mu_{TS}$ $(g/cm-s)$	1 77E-04	Infinite source indoor attenuation coefficient, $\alpha$ (unitiess)
Stratum A soil intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'7s (unitless)	4 71E-01	Exponent of equivalent foundation Peciet number, exp(Pe <sup>f</sup> ) (unitless)
Stratum A effective total fluid saturation, S <sub>b</sub>	0.419	Henry's faw constant at ave groundwater temperature, Hrs (atm-n³/moi)	1 12E-02	Avea of crack, Aveack (cm <sup>2</sup> ) 384E+02
Stratum C soil aur-filled porosity, $\theta_0^c$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 130	Enthalpy of vaporization at ave groundwater temperature, ΔH, 15 (cal/mol)	9,492	Crack effective diffusion coefficient, Donat (cm²/s)
Stratum B soul aur-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zanak (cm)	15	Average vapor flow rate into bldg , Qua (cm³/s)
Stratum A soil air-filled porosity, $\theta_b^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitless)	4 16E-04	Crack radius, fanck (cm)
Source- building separation, L <sub>T</sub>	2210 04	Area of enclosed space below grade, A <sub>8</sub>	9 24E+05	Source vapor conc , C <sub>source</sub> (µg/m³)
Exposure duration, t	9 46E+08	Bidg. ventilation rate, Quarter (cm <sup>3</sup> /s)	5 63 <b>E</b> +04	Convection path length, L <sub>P</sub> (cm)

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SK-BASE	RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	ER CONCENTR	ATION CALCI	ULATIONS	INCREMENTAL	VCREMENTAL RISK CALCULATIONS
1	1 1 1		ć		incremental	Hazard
nagar	Indoor	KISK-Dased	Pure Pure	Final	risk from	quotient
exposure	exposite	indoor	component	Indoor	vapor	from vapor
groundwater	groundwater	exposare	water	exposure	intrusion to	intrusion to
conc ,	conc,	groundwater	solubility,	groundwater	indoor air,	indoor air,
arcinogen	noncarcinogen	couc,	S	conc '	carcinogen	noncarcinogen
(µg/L)	(hg/L)	(ng/L)	(µg/L)	(mg/L)	(unitless)	(unitless)
55E+03	ΑN	2 55E+03	2 00E+05	2.55F+03	ΔN	ΦN

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCS Soil Type	Κ. (cm/h) α	Sc α (1/cm)	Soa Properties Lookup Table N (unitless) M (unitless)	ookup Table M (unifless)	B. (cm³/cm³)	A (cm <sup>3</sup> /cm <sup>3</sup> )	Macon Council							
0	ı	lg	La	0.083	95.0	( iii) iii) ii	(Inc.) (Gain Chainele (Gri)	19						
<u>ರ</u>	0.26	0.019	133	0 237	0.30	9000	2000	7 9						
1	2	0.036	1.56	0.350	7 0	0000	810 V	<u> </u>						
ST	14.59	0.124	0 0		? ;	200	0.020	3 9						
S	29 70	0 145	2 68	0.627	0.43	200	3 6	2 5						
SC	0 12	0 027	1 23	0 187	0 0	0 100	0.035	1 %						
30.	131	0 059	148	0 324	66.0	0.00	0.000	3 8						
<u>S</u>	0.25	0.016	1 37	0 270	0.46	0.03	7000	9 4						
Sic	0 02	0 00	1 09	0.083	0.26	0200	0.0038	2 0						
SICT	0 07	0 0 10	1 23	0 187	0 43	680 0	0.0056	2 42						
S	0.45	0 050	141		0 45	0 067	0 0 11	ı <del>-</del> -						
	4 42	200	189	0 471	041	0 065	0 030	Q						
					Chemic	Chemical Properties Lookup Table	okup Table							_
	ŏ	Organic			Pure	-	Henry's	Hannie			Cotholist			
	3	carbon			component		s ( min )	law constant	Mormal		Entitiety of	1		
	Da	partition	Diffusivity	Diffusionity	rejen	Henry's	market of the	aw collisidill	TO I		vaponzation at	Ĕ		
_	903	coefficient	in air	In water	>	law constant	at relevence	rererence		Chtical	the normal	HSK.	Reference	
		<b>Y</b>	c	c			(emperatore,	iemperature,	politi	temperature,	bolling point,	tactor,	. SOOS	
N SAC	į	, (c)	(cm <sup>2</sup> /c)	, 2 2 2 2	າ ີ	C :	E .	<u>~</u> ;		Ľ,	ΔHζ	퓠	Z S	
	5	(cm/g)	(cm /s)	(cm//s)	(mg/L)	(unitless)	(atm-m²/mol)	(Ç)	( <del>}</del>	(K)	(cal/mol)	(mg/m <sub>3</sub> )	(mg/m³)	
50293 0.01	r	9012000	1	L	4		!							
50328 Benzo(a)mene	<b>4</b> <del>-</del>	2 03E+06	1 37 E-02	4 90#-00 00 100 0	2 50E-02	3 32E-04	8 10 = 0			720 75	11,000	9 7E-05	0 0€+00	
51285 2 4-Dinitrophenol		1 005.00	2 72 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	90-100 6	1 625-03	4 635-05	1135-06	. 25		969 27	15,000	2 1E-03	0 0E+00	
53703 Dibent(a b)anthercene	•	3 805.06	70-100	900000	Z 19E+03	1 825-05	4 44E-07			827 85	15,000	0 0E+00	7 0E-03	
56235 Carbon tetrachloads	3 4	240,000	7072707	071910	2 49E-03	6 03E-07	1 47E-08	_		990 41	16,000	2 1E-03	0.00	
56553 Benzielenden		1 /4E+UZ	7 80E-02	8 80 5 06	/ 93E+02	1 25E+00	3 05E-02			556 80	7,127	1 5E-05	0 0E+00	
57749 Chlordana		3 90E+U3	105-02	30 CE 08	9 40E-03	1 37E-04	3 34E-06			1004 79	15,000	2 15-04	0 0E+00	
58899 (anoma HCH (tradapa)	- •	1075+03	1050	4 3/11/06	5 60E-02	1 99E-03	4 85E-05	25		885 73	13,000	3.7E-04	0 0E+00	
60571 Dialden	- (	200	70-174	000 111	00+400	3 /4H-04	1 405-05			839 36	13,000	3 7E-04	0 OE+00	
65850 Barzoic Acid	<b>,</b> «	8 00E 04	70-367	4 /45-05	1 855-01	6 19E-04	1516-05	5 25	613 32	842 25	13,000	4 6E-03	00=+00	
67641 Acetone		0.000.0	3 305-02	9797	3 50 = +0.3	6 31E-05	1 546-06		720 00	751 00	10,000	0.000	1 4E+01	
67663 Chlomform	ښ.	3.08E+01	240.0	1000	1 00E+06	1 29 1 29	3 88E-05		329 20	508 10	6,955	0 0E+00	3 55-01	
67721 Hexachloroethane	· ·	1 78E+03	2 50 11 03	80508	5 000 101	2000	3 66E-03		334 32	536 40	6,988	2 3E-05	0 0E+00	
71363 Butanol		6 92F+00	8 00E-02	9 305-06	7 406+04	2 845 04	200 C	2,5	458 50	695 00	9,510	4 0E-06	0.000	
71432 Benzene	6	5 89E+01	8 80E-02	9 80E-06	1 75F+03	2 28 F-01	00-100 0 00-100 0		20,020	563 05	10,346	0 0E+00	3 5E-01	
71556 1,1,1-Trichloroethane	-	1 10E+02	7 80E-02	8 80E-06	133F+03	7.055-01	1725-03		244	91 700	245,7	8 3E-06	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
72208 Endrin	-	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7.516-06	3 42	719 15	00 00	7,130	0.00	1 UE+00	
72435 Methoxychlor	, CD	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 586-05		651.02	900 2008	12,000	001100	20 10 10 10 10 10 10 10 10 10 10 10 10 10	
72548 DDD	-	1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06		639 90	863 77	200,41	80.30	005400	
72559 DDE	4	47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44	86038	13,000	0 71.05	00+100	
74839 Methyl bromide	-	05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03		276 71	467.00	5 714	00+40	20.00	
75014 Vinyl chloride (chloroethene)	-	86E+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2 71E-02		259 25	432 00	5.250	8 4E-05	00100	
75092 Methylene chlonde	-	17E+01	1 015-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	3 25	313 00	510 00	6 706	4 7F-07	200	
75150 Carbon disuffide	4	4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24Ë+00	3 02E-02		319 00	552 00	6.391	00++00	7 OF-01	
7527 Bromotom	70 L	8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04		422 35	00 969	9,479	1 15-06	00+00	
752/4 Bromodichloromethane	ກີ	5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	3 25	363 15	585 85	2,000	18E-05	0 0E+00	
75343 1,1-Dichloroethane	mi	3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03		330 55	523 00	6,895	0 0E+00	5 0E-01	
75554 t, I-Dichloroemylene	ñ	10 L	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02		304 75	576 05	6,247	50E-05	005+00	
77474 Hevsehlorsmilesented		1 41E+05	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03		603 69	846 31	13,000	1 35-03	0 0 0 0 0	
74/4 nexaciliotocyclobentaciene 78501 lemborope		Z 00E+05	1 615-02	7.215-06	1 805+00	1 11E+00	2 715-02		512 15	746 00	10,931	0 0E+00	7 0E-05	i
78875 1.2-Dichlomorphane	1	4 37F±01	7 825-02	9 735 06	2 000 104	2 /2E-04	6 63E-06		488 35	715 00	10,271	2 7E-07	0 0E+00	U
79005 1.1.2-Trichloroethane	ŕk	5.015+01	7 BOE-02	90-30-8	4 425+03	1.135.6	2 805-03	52	369 52	572 00	7,590	0 0E+00	4 0E-03	' '
79016 Trichloroethylene	; =	1 66E+02	7 90E-02	9 10E-06	1 10E+03	3 /4E-02 4 22F-01	9 125-04	2 4	386 15	602 00	8,322	166-05	0 OE+00	ł
79345 1, 1, 2, 2-Tetrachloroethane	o	33E+01	7 10E-02	7 90E-06	2 97E+03	1 416-02	3 44F-04	3 15	419.60	544 20 661 15	7,505	17E-08	0000	(
83329 Acenaphthene	7 (	08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	}	550 54	803 15	8,996 12 155	5 8E-05	0 0E+00	3 6
										; ;	} :	7 2	110-31 7	5 :
						•								

138E-04   318E-07   318E	84562 Diethylphthalate 84742 Di-n-butyl phthalate 85687 Butyl benzyl phthalate	2 88E+02 3 39E+04 5 75E+04	2 56E-02 4 38E-02 1 74E-02	6 35E-06 7 86E-06 4 83E-06	1 08E+03 1 12E+01 2 69E+00	1 85E-05 3 85E-08 5 17E-05	4 51E-07 9 39E-10 1 26E-06	22 22	567 15 613 15 660 60	757 00 798 67 839 68	13,733 14,751 13,000	0 0E+00 0 0E+00	2 8E+00 3 5E-01
9.96E-02         9.96E-03	86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6 35E-06	3 516+01	2 05E-04	500E-06	323	632 28	890 45	13,000	1 4E-06	7 0E-01 0 0E+00
9.9E-64         6.0E-62         8.0E-64         8.0E-64 <t< th=""><th>86748 Carbazole</th><th>3 39E+03</th><th>3 90E-02</th><th>7 03E-06</th><th>7 48E+00</th><th>6 26E-07</th><th>6 3/E-05 1 53E-08</th><th>8 K</th><th>570 44 627 87</th><th>870 00</th><th>12,666</th><th>0 0E+00</th><th>1.45-01</th></t<>	86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	6 3/E-05 1 53E-08	8 K	570 44 627 87	870 00	12,666	0 0E+00	1.45-01
SECTION   SECT	87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 165-06	3 23E+00	334E-01	8 15E-03	8 1	486 15	738 00	10,206	2 2E-05	0 00+100
200F-501         500F-502         500F-503         500F-504         500F-503         500F-504	88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	2 44E-08 7 78E-06	S 23	582 15 519 15	813 20 749 03	14,000 000,01	3.4E-05	0 06+00
Name	91203 Naphthalene	2 00 0 0 0	5 90E-02	7 50E-06		1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	1 4E-01
9.164-02   9.064-02   9.064-03   9.064-04	95476 o-Xylene	3 63E+02	1 94E-02 8 70E-02	1 00E-05		1 64E-07 2 13E-01	4 00E-09 5 20E-03	55 £	550 26	754 03	13,000	1 3E-04	0.000
8464-07 5016-07 700-06-07 100-		9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	2 2	464 19	697 60	10.800	0 OE+00	1 8F-01
Control   Cont	95501 1,2-Dichlorobenzene 95578 2-Chlorophend	6 17 E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	\$ 5	453 57	705 00	9,700	0 0E+00	2 0E-01
8.6E-07         7.0E-02         8.0E-04         9.0E-04         9.0E-04 <t< th=""><th>95954 2,4,5-Trichiarophenol</th><th>1 60€+03</th><th>2 91E-02</th><th>3 46E-06 7 03E-06</th><th>1 20E+03</th><th>1 78E-04</th><th>3 90E-04 4 34E-06</th><th>2 22</th><th>447 53 526 15</th><th>675 00 759 13</th><th>9,572</th><th>001100</th><th>185-02</th></t<>	95954 2,4,5-Trichiarophenol	1 60€+03	2 91E-02	3 46E-06 7 03E-06	1 20E+03	1 78E-04	3 90E-04 4 34E-06	2 22	447 53 526 15	675 00 759 13	9,572	001100	185-02
7.76E-02         7.00E-03         7.76E-03         7.76E-03         7.76E-03         7.76E-03         7.76E-03         7.76E-03         7.76E-03         7.76E-03         7.76E-03         7.70E-03	98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	52	483 95	719 00	10,566	00000	2 0E-03
1985-100         1985-100	100414 Ethylbenzene 100425 Styrene	3 63E+02 7 76E+02	7 50E-02 7 10E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	<b>%</b>	409 34	617.20	8,501	00+300	100+00
98 BEACO         78 BEACO	105679 2,4-Dimethylphenol	2,09E+02	5 84E-02		7 87E+03	8.20E-05	2 00E-06	3 23	484 13	707 60	11.329	0.05+00	1 0E+00
Victor   V	106423 p-Xylene	3 89E+02	7 69E-02		1 85E+02	3 14E-01	7 66E-03	56	411 52	616.20	8,525	0 0E+00	7 0E+00
Victor   Overal   O	105457 1,4-Dichloropenzene 106478 n-Chlorophiline	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	52 5	447 21	684 75	9,271	0 0E+00	8 0E-01
4,07E+20         9,00E+20	107062 1,2-Dichtoroethane	174E+01	1 04E-01		8 52E+03	4 01E-02	9 78E-04	52 52	356 65	734 00 561 00	7,643	0 UE+00	1 4E-02
100E-02   100E-02   100E-02   100E-02   100E-03   100E	108054 Vinyl acetate	5 25E+00	8 50E-02		2 00E+04	2 10E-02	5 12E-04	52	345 65	519 13	7,800	0 0E+00	2 0E-01
2 19E+02         7 30E-03         7 20E-04         5 52E-04	Tubaba m-Aylene 108883 Tolliene	4,07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 345-03	52 5	412 27	617 05	8,523	0 0E+00	7 0E+00
188E-01         920E-02         75E-06         172E-04         738E-04         190E-05         245 02         694 20           14E-03         15E-07         55E-06         172E-04         738E-04         10E-05         25 6715         699 73           214E-03         11E-07         51E-02         55E-06         10E-07         75E-07         25 6715         699 73           214E-03         11E-07         51E-02         56E-06         20E-04         45E-02         66E-06         20E-07         66E-06         20E-07         66E-06         20E-07         66E-07         25 66E-06         20E-07         20E-07         25 66E-06         20E-07         20E-0		2 19 = +02	7 306-02	8 70E-06	3 20E+02 4 72E+02	1 52E-01	3 71E-03	S 53	383 /8 404 87	591.79 632 40	7,930	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4 0E-01
156E+01   196E-02   456E-06   5 10E-01   4 59E-04   1 12E-06   25 61415   659 79     151E+07   5 11E-02   3 66E-06   3 40E-01   4 18E-04   1 12E-06   25 6174   3 942 94     151E+07   3 51E-02   3 66E-06   3 40E-01   4 18E-04   1 12E-06   25 6174   3 942 94     151E+07   3 51E-02   3 66E-06   3 40E-01   4 18E-04   1 12E-06   25 6174   3 962 20     151E+07   3 51E-02   3 58E-06   2 00E+02   2 74E-03   3 68E-05   25 6174   3 962 20     150E+04   3 24E-02   7 74E-06   3 49E-02   2 67E-03   3 75E-03   2 5 822 5     170E+05   3 00E-02   3 00E+02   3 00E+02   3 75E-03   2 67E-03   3 75E-03	108952 Phenol	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	52	455 02	694 20	10,920	0 OE +00	2 1 = +00
SECTION   STEED   ST		1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	25	451 15	629 79	000'6	3 3E-04	0 0E+00
8 22E+07         151E-02         358E-06         2 00E-02         2 74E-03         6 68E-05         25 704 05         6 86E-05         25 704 05         8 22E-04         6 68E-05         25 704 05         8 22E-04         8 22E-04         2 74E-02         2 74E-02         2 74E-02         2 74E-03         2 56E-03	117817 Bis(2-ethylhexyl)phthalate	1515+07	3 5 t E-02	3 66E-06	3 40E-01	4 39E-04 4 18E-06	1 125-05	S 53	674 43 657 15	942 94 806 00	14,000	0 0E+00	2 15-02
50E-04         4 A2E-02         59IE-06         6 A1E-02         59IE-04         5 A2E-03         5 50E-04         5 A2E-03         5 50E-04         5 A2E-03         5 50E-04         5 50E-04         5 A2E-03         5 50E-04         5 50E-04 <th< th=""><th>117840 Di-n-octyl phthalate</th><th>8 32E+07</th><th>1 51E-02</th><th>3 58E-06</th><th>2 00E-02</th><th>2 74E-03</th><th>6 68E-05</th><th>22</th><th>704 09</th><th>862 22</th><th>15,000</th><th>0 0E+00</th><th>7 OE-02</th></th<>	117840 Di-n-octyl phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05	22	704 09	862 22	15,000	0 0E+00	7 OE-02
2 55E+04         3 00E-03         3 00E-03         3 00E-03         2 55E-03	118741 Hexachlorobenzene	5 50E+04	5 42E-02	591E-06	6 20E+00	5 41E-02	1 32E-03	52	582 55	825 00	14,447	4 6E-04	0 0E+00
147E+02         346E+02         877E-06         450E+03         130E-04         317E-06         256E+03         130E-04         317E-06         256E+03         130E-04         130E-04         256E+03         256E-03         256         256         256E-04         256E-05         256E-0	120821 1,2,4-Trichlorobenzene	2 95E + 04 1 78E + 03	3 24E-02 3 00E-02	7 74E-06 8 23E-06	4 34E-02 3 00E+02	2 67E-03 5 82E-02	6 51E-05 1 42E-03	, 25 25 26 27 28 28 28 28 28 28 28 28 28 28 28 28 28	615 18 486 15	873 00	13,121	00+400	116+00
95E+01         2 03E-01         7 06E-06         2 70E+02         3 80E-06         9 27E-08         25         590 00         814 00           915E+01         1 96E-02         1 06E-06         2 70E+02         3 21E-02         1 83E-04         25         461 4         678 20           1 55E+02         2 72E-02         1 32E-02         7 54E-01         1 45E-02         7 54E-01         4 54E-04         1 10E-03         25         40         670 00         814 00           1 55E+01         7 36E-02         7 24E-06         1 35E-01         4 51E-04         1 10E-03         25         334 40         620 20         670 00         814 00	120832 2.4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1,30E-04	3 175-06	22	482 15	708 17	11,000	000	1 16-02
6 31E+01         198E-02         108E-03         2 06E+03         3 21E-02         7 83E-04         25         446         678 20           1 55E+02         7 20E-02         1 20E-06         2 00E+03         2 54E-01         1 84E-02         25         394 40         620 20           1 55E+01         7 30E-02         7 24E-06         1 35E-01         4 57E-04         4 07E-03         25         394 40         620 20           3 55E+01         7 30E-02         1 35E-01         1 67E-03         2 56E-05         5 39E-03         25         33.05         544.00           3 55E+01         7 07E-02         1 30E-02         1 50E-03         4 55E-03         1 60E-06         2 50E-05         5 66E-05         5 66E-05         5 66E-05         5 66E-05         1 60E-06         2 50E-03         5 66E-05         5 66E-06         2 50E-03         5 66E-06         2 50E-05         5 66E-05	121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	52	90 00	814 00	13,467	1 9E-04	0 0E+00
1055-05   1756-07   1756	124461 Uniorodipromometriane 127184 Tetrachloroathylene	6 31E+01	1 96E-02 7 20E-03	1 05E-05	2 60E+03	3 21E-02 7 54E-01	7 83E-04	52	416 14	67820	8,000	2 4E-05	0 0E+00
8         55E+01         7 36E-02         1 13E-05         3 50E+01         4 07E-03         2 53E+01         7 36E-02         1 13E-05         6 50E+03         1 67E-01         4 07E-03         2 50E+03         2 50E+03         2 50E-03         5 18E-03         2 5 18B-03	129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	1 35E-01	4516-04	1 10E-05	2 53	667.95	936,00	14.370	0 0E+00	1 15-01
8         55E=401         707E-02         119E-05         630E-03         385E-01         939E-03         26         320 85         516 50           347E+06         190E-02         566E-06         2 20E-05         656E-05         116E-04         25         809 15         1078 24           123E+06         2 26E-02         56E-06         8 00E-04         3 40E-05         8 29E-07         25         655         909 27           107E+06         2 26E-02         55E-06         8 00E-04         3 40E-05         8 29E-07         25         655         909 27           123E+06         2 26E-02         56E-06         8 00E-04         3 40E-05         2 46E-07         25         774 15         979 00           2 48E-05         2 48E-02         1 80E-01         4 80E-03         1 70E-04         25         603 01         839 37           2 45E-06         1 80E-01         4 80E-03         1 70E-04         2 56E-05         1 70E-04         2 56E-05         1 70E-05         2 744 15         979 00           2 45E-06         1 80E-01         3 0E-05         1 70E-04         2 56E-05         1 70E-04         2 56E-05         1 70E-04         2 56E-05         1 70E-04         2 56E-05         1 70E-04         2 56E-05<	156592 cts-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1,67E-01	4 07E-03	52	333 65	544 00	7,192	0 0E+00	3 5E-02
1.23E-06 2.26E-02 5.6E-06 8.00E-04 3.40E-05 1.0E-04 25 6.05 9.05 9.05 9.05 9.05 9.05 9.05 9.05 9	155505 trans-1,2-Dichloroethylene 193395 Indeno(1.2 3-cd)nyrene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03	52	320 85	516 50	6,717	0 0E+00	7 0E-02
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123E+06         2 26E-02         5 56E-06         8 00E-05         3 40E-05         8 29E-07         26 753 15         1019 70           3 98E+05         2 48E-02         6 21E-06         1 60E-03         3 88E-03         9 46E-05         25         744 15         979 00           3 98E+05         2 48E-02         4 80E-06         1 80E-01         6 97E-03         1 70E-04         25         603 01         839 37           1 22E+06         1 32E-02         7 34E-06         2 00E-00         4 35E-04         1 06E-05         2 5 665         839 36           1 22E+03         1 42E-02         7 34E-06         2 40E-01         3 05E-05         7 44E-07         25         596 55         839 36           4 57E+01         6 26E-02         1 00E-05         2 80E-03         7 26E-01         7 76E-02         7 46E-07         2 5 58 00         770 00           8 22E+01         3 27E-02         7 26E-06         1 82E-02         3 06E-05         2 25E-06         2 5 58 00         7 70 00           8 22E-04         1 16E-02         2 30E-06         3 80E-05         3 80E-06         3 80E-05         3 80 00         7 70 00           8 22E-04         1 16E-02         2 45E-06         1 2 46E-04         1 14E-02         2 5 58 0	206440 Ftuoranthene	1 07E+05	3 02E-02		2 06E-01	6 60E-04	161E-05	55	655 95	905 00	13,815	0 0E+00	1 46-01
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1.26E+03         142E-02         7.34E-06         2.40E-01         3.05E-05         7.44E-07         25         596.55         839.36           4.57E+01         6.26E-02         1.00E-05         2.80E+03         7.26E-01         1.77E-02         25         381.15         587.38           6.92E+01         5.27E+02         7.26E-06         1.82E+02         3.06E-05         7.46E-07         25         58.00         770.00           8         2.40E+01         5.45E-02         8.17E-06         9.82E-03         9.23E-05         2.56E-06         7.46 B.7           8         2.20E+04         1.32E-02         8.17E-06         9.81E-06         2.56E-06         7.46 B.7           5.20E+04         1.32E-02         4.34E-06         7.40E-01         2.46E-04         6.00E-06         8.87 E.87           5.20E+05         1.6E-02         4.97E-01         2.46E-04         6.00E-08         2.567 I.8         873.31           1         2.90E+05         1.38E-02         4.34E-06         7.40E-01         2.46E-04         6.00E-03         2.50E-03	319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06		4 35E-04	1 06E-05	3 13	596 55	839.36	13,000	185-03	00+400
45/E+01 6 26E-02 100E-05 2 80E+03 7 26E-01 177E-02 25 38115 587 38 6 92E+01 3 27E-02 7 26E-06 182E+02 3 06E-05 7 46E-07 25 580 770 00 178E-01 5 45E-02 8 17E-06 9 99E-03 9 23E-05 7 46E-07 25 558 00 770 00 178 27 240E-04 132E-02 4 23E-06 2 06E-06 182E-04 25 613 9 8 1750 00 178 87 25 18 18 18 18 18 18 18 18 18 18 18 18 18	319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	52	596 55	839 36	13,000	5 3E-04	0 0E+00
8 25E+01 3 27E-02 ( 20E+05 1 32E+02 3 00E+05 7 46E-07 25 588 00 770 00 3 00E+05 7 25 588 00 770 00 3 00E+05 7 25 588 00 770 00 3 00E+05 1 32E-02 8 17E-06 2 06E+01 3 00E+02 8 17E-06 2 06E+01 3 00E+02 6 30E+04 132E-02 4 67E-01 14E-02 25 698 8 1760 00 2 57E+05 1 16E-02 4 34E-06 7 40E-01 2 46E-04 6 00E+08 25 697 15 873.31	542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02	22	381 15	587 38	2,000	3 7E-05	2 0E-02
832E+04 132E-02 4 23E-06 2 00E-01 3 90E-04 9 51E-06 2 5 91396 448 76 5 00E+01 3 07E-02 6 30E-06 5 62E-02 4 67E-01 114E-02 2 5 629 88 1760 00 2 57E+05 116E-02 4 34E-06 7 40E-01 2 46E-04 6 00E-06 2 5 629 88 1760 00 2 57E+05 116E-02 4 34E-06 7 40E-01 2 46E-04 6 00E-06 2 5 657 15 873.31 2 90E+05 138E-02 4 32E-02 8 90E-02 1 89E-01 4 60E-03 2 5 375 0 512.27 2 90E-04 2 22E-02 5 42E-06 4 20E-01 119E-02 2 90E-04 2 5 340E-04 2 340E-04 2 34E-06 4 20E-01 119E-02 2 90E-04 2 5 340E-04 2 340E-04 2 340E-04 2 340E-04 2 34E-06 4 20E-01 119E-02 2 90E-04 2 5 940E-04 2 9	621647 N-Nitrosodi-n-propytamine	2 40E+01	5 45E-02	7.20E-06 8.17E-06	1 82E+02 9 89E+03	3 06E-05 9 23E-05	7 46E-07	55 K	558 00	770 00	12.938	196-04 0-04 0-04	0 0 0 0 0
5 20E+01 3 07E-02 6 30E-06 5 62E-02 4 67E-01 114E-02 25 629 88 1760 00 2 57E+05 116E-02 4 34E-06 7 40E-01 2 46E-04 6 00E-06 25 657 15 873.31 2 20E+05 1 38E-02 4 32E-06 8 00E-02 1 89E-01 4 60E-03 25 657 15 873.31 2 20E+05 1 38E-02 4 32E-02 2 00E-03 25 402 50 539 37 3 30E+04 2 22E-02 5 42E-06 4 20E-01 119E-02 2 90E-04 25 340 50 475 22 3 30E+04 2 22E-02 5 42E-06 4 20E-01 119E-02 2 90E-04 25 340 50 475 22	1024573 Heptachlor epoxide	8 32€ +04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9.515-06	3 53	613 96	848 76	13.000	2 6F-03	00+100
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2 90E+05 138E-02 4 32E-06 8 00E-02 189E-01 4 60E-03 25 402 50 539 37 10 10 10 10 10 10 10 10 10 10 10 10 10	8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 005-06	52	657 15	873.31	14,000	3 2E-04	0 0E+00
25 377 50 51227 1 50E-02 5 00E-02 8 20E-02 2 00E-03 25 377 50 512 27 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11096825 Aroclor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	52	402 50	539 37	19,000	1 0E-04	0 0E+00
3.00E-04 2.14E-02 5.4xE-04 4.20E-04 1.9E-04 2.30E-04 2.30	12574112 Applier 1016 (PCB-1034)	2 00E+05	1 55E-02	3 UOE-U6	5 70E-02	8 20E-02	2 00E-03	3 2	377 50	512.27	19,000	1 0E-04	0 C
	53469219 Aroclor 1242 (PCB-1242)	3.30E+04	2 22E-02 2 14E-02	5.31F-06	3.40E-01	7 19E-02	2 90E-04 5 20E-04	5 5	340 50	475 22	18,000	2 2 4 5 5	0.01+00

VERSION 1.2 September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

× 8

ENTER Initial groundwater

ENTER

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below) YES

	ENTER	User-defined stratum A	soli vapor permeability, k,	(cm²)					
	ENTER	stratum A SCS	(used to estimate OR soil vapor	permeability)	Si	ENTER	Stratum C soil water-filled	porosity, 9,,c	(cm³/cm³)
	ENTER		soil type	water table	S	ENTER	Stratum C soil total	porosity, n <sup>c</sup>	(unifiess)
	ENTER	Soil	directly above water table,	(Enter A, B, or C)	O	ENTER	Stratum C soil dry	bulk density, Pe <sup>c</sup>	(g/cm³)
hylene	ENTER f Lwr (cell D28)	Thickness Thickness of soil of soil stratum B stratum C	(Enter value or 0)	(cm)	1158 24	ENTER	Stratum B soit water-filled	porosity,	(cm³/cm³)
Chemical cis-1,2-Dichloroethylene	NTER ENTER ENTER Totals must add up to value of Lw1 (cell D28)	Thickness of soil stratum B	(Enter value or 0)	(cm)	3048	ENTER	Stratum B soil total	pomesity. n <sup>8</sup>	(unitless)
	ENTER Totals mu	Thickness	stratum A,	(wo)	762	ENTER	Stratum B soil dry	bulk density, Po B	(g/cm³)
	ENTER	Depth below grade	to water table,	(cm)	2225 04	ENTER	Stratum A soil water-filled	porosity,	(cm <sub>3</sub> /cm <sub>3</sub> )
groundwater conc., C.w. (ug/L) 2 0075	ENTER Depth	below grade to bottom of enclosed	space floor, Lr	(cm)	15	ENTER	soil total	porosity.	(unitless)
Chemical CAS No (numbers only. no dashes)	ENTER	Average soll/ groundwater	temperature,	(C)	16	ENTER	soil dry	bulk density, Pb^A	(g/cm³)

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Stratum A	Stratum A	Stratum A	Stratum B	Stratum B	Stratum B	Stratum C	Stratum C	Stratum
soil dry	soil total	soil water-filled	soil dry	sort total	soit water-filled	soil dry	soul total	soil water-filled
ulk density,	porosity.	porosity.	bulk density,	porosity.	porosity,	bulk density,	porosity.	Dorosity.
<b>√</b> 4	<b>₹</b> _	√,*θ	ී්ද්	9 E		ه	O <u>r</u>	ຜູ້
(g/cm³)	(unitless)	(cm <sub>3</sub> /cm <sub>3</sub> )	(g/cm³)	(unitless)	(cm³/cm³)	(a/cm³)	(unifiess)	(cm <sub>3</sub> /cm <sub>3</sub> )
15	0.43	0.2	1.7	0 42	0 27	1.7	0 43	03
FNTER	An Fan		O I I	OT LAND	011111111111111111111111111111111111111	C U		
Enclosed	i	Enclosed	Enclosed			מייי		
space	Soil-bidg	space	space	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
thickness,	differential,	length,	width,	height	width	rate.		
Lorack	ď	ָר <u>ָר</u>	×	· £	*	E C		
(cm)	(g/cm-s <sup>2</sup> )	(E)	(E)	(cm)	(EB)	(1/4)		
15	40	961	961	488	0.1	0.45		
!							_	
Y					COLLEGE			

ENTER	Target hazard	quotient for	noncarcinogens,	兒	(unifiess)		Jsed to calculate risk-based	groundwater concentration
ENTER	Target	nsk for	carcinogens,	표	(unitless)	1 0€-06	Used to calcu	groundwater
ENTER		Exposite		Ш	(days/yr)	350		
ENTER	1	Exposure	duration	<b>a</b>	(yrs)	30		
ENTER	Averaging	101 <b>8</b> IDI	noncarcinogens,	ATNC	(yrs)	30		
ENTER	Averaging	TOT BILLIO	cardnogens,	ΑTc	(yrs)	70		

	ence	<u>و</u>	ပ္ခ	Én'	1	
						1
รี	цsк	factor,	LR.	(ug/m <sup>3</sup> ) <sup>-1</sup>		0.00
component	water	solubility,	S	(mg/L)		00.000
carbon	partitlon	coefficient,	ጜ	(cm <sub>3</sub> /g)		, C. L. D.
						514 00 0 00 10 0 0 0 0 0 0 0 0 0 0 0 0 0
Normal	polling	point,	卢	( <b>X</b>		
vaponzation at	the normal	boiling point,	ΔHν.b	(cal/mot)		7 400   222 65
IAW CONSTANT	reference	temperature,	Ļ.	(၁)		36
iaw constant	at reference	temperature,	I			4 07E-03
				(cm <sup>2</sup> /s)		1 135,05
1	Diffusivity	in air,	<b>o</b> " "	(cm <sub>2</sub> /s)		7.36E.02 1.13E.05
	iaw constant iaw constant vaporization at Normal carbon component	Diffusivity at reference reference the normal bolling Critical partition water risk	Diffusivity at reference reference the normal bolling Critical partition water risk in water, temperature, temperature, boiling point, temperature, coefficient, solubility, factor,	Diffusivity at reference reference the normal bolling Critical partition water risk in water, temperature, boiling point, temperature, coefficient, solubility, factor, $D_w$ H $T_R$ $\Delta H_{v,o}$ $T_B$ $T_C$ $K_{co}$ $S$ URF	ten component Unit reference the normal bolling Critical partition water risk temperature, bolling point, temperature, coefficient, solubility, factor, T <sub>R</sub> ΔH <sub>ve</sub> S URF (°C) (cal/mot) (°K) (cm³/g) (mg/L) (μg/m³/s)	taw constant. Taw constant is appointation at reference reference reference reference the normal boiling point, temperature, coefficient, point, temperature, coefficient, Doint, temperature, coefficient, H T <sub>R</sub> Ah <sub>V,b</sub> T <sub>B</sub> T <sub>C</sub> K <sub>co</sub> (atm-m³/mol) (°C) (cal/mol) (°K) (°K) (cm³/g)

Floor-wall seam permeter, X-rest (cm)	3,844	Diffusion path length,	2210 04	
Water-filled porosity in capillary zone, $\theta_w = \theta_w a$ (cm <sup>3</sup> /cm <sup>3</sup> ).	0 294	Total overall effective diffusion coefficient, Deff (cm²/s)	6 93E-04	
Air-filled porosity in captillary zone, $\theta_{a,ct}$ $(cm^3/cm^3)$	0 136	Capillary  zone effective diffusion coefficient, $D^{eff}_{aa}$ (cm <sup>2</sup> /s)	5 24E-04	
Total porosity in capillary zone,	0 43	Stratum C C effective diffusion $coefficient,$ $D^{**}_{C}$ $(cm^{2}/s)$	4 56E-04	Reference conc , RfC (mg/m³)
Thickness of capillary zone, L <sub>ee</sub>	17 05	Stratum B B effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	7 60E-04	Unit dsk factor, URF (ug/m³)-1
Stratum A soil effective vapor permeability, k, (cm²)	6 98 <b>E</b> -10	Stratum A A effective diffusion coefficient, Det (cm²/s)	2 98E-03	Infinite source bidg conc. Conc. (µg/m³)
Stratum A soll relative air permeability, $k_{ra}$ $(cm^2)$	0 746	Vapor viscosity at ave soil temperature, µrs (g/cm-s)	177E-04	Infinite source indoor attenuation coefficient, a (unitiess)
Stratum A soll Intinsic permeability, k <sub>1</sub>	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)	1 15E-01	Exponent of equivalent foundation Pecter number, exp(Pe) (unitless)
Stratum A effective total fluid saturation, S <sub>to</sub> (cm³/cm³)	0 419	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol)	2 72E-03	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )
Stratum C soil air-filed porosity, $\theta_{\mathbf{a}}^{c}$ $(\mathbf{cm}^{3}/\mathbf{cm}^{3})$	0 130	Enthalpy of vaporization at ave groundwater temperature, AH, rs (cal/mol)	7,674	Crack effective diffusion coefficient, Dard (cm²/s)
Stratum B soil air-filled porosity, $\theta_a^a$ (cm³/cm³)	0 150	Crack depth below grade, Zmox (cm)	15	Average vapor flow rate into bidg , Qua (cm <sup>3</sup> /s)
Stratum A soll air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio,  n (unitless)	4 16E-04	Crack radius, forect (cm)
Source- building separation, L <sub>1</sub>	22 10 04	Area of enclosed space below grade, Ae	9 24E+05	Source vapor conc., Ceurs (µg/m³)
Exposure duration, t	9 46E+08	Bidg ventilation rate, Quatana (cm <sup>3</sup> /s)	5 63E+04	Convection path length, L, (cm)

INCREMENTAL RISK CALCULATIONS:

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RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS.

	Final	Indoor	exposure	groundwater	conc,	(µ9/L)
	Pure	component	water	solubility,	တ	(µg/L)
į	Risk-based	indoor	exposure	groundwater	canc.,	(hg/L)
	Indoor	exposnre	groundwater	couc'	noncarcinogen	(µg/L)
	Indoor	exposure	groundwater	conc,	carcinogen	(µg/L)

	_	
Hazard quotient from vapor intrusion to indoor air,	noncarcinogen (unitless)	ΑN
Incremental risk from vapor intrusion to indoor air,	(unitless)	NA
Final indoor exposure groundwater	(µg/L)	8 88E+04
Pure component water solubility,	(µg/L)	3 50€+06
Risk-based indoor exposure groundwater	(µg/L)	8 88E+04
Indoor exposure groundwater conc,	(µg/L)	8 88E+04
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ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

		ľ				VLOOKUP TABLES	LES					
SCS Soil Type	K, (cm/h)	α (1/cm)	Soil Properties Lookup Table N (unitless) M (unitless)	ookup Table M (unitless)	e. (cm³/cm³)	B. (cm³/cm³)	Meen Grain Diameter (cm)					
၁	0 20	0 00	l <sub>o</sub>	0.083	0.38	0.068	Mean Stain Danied (GII)					
<u></u>	0.26	0 0 0 19	131	0.237	0 0	360	2000				•	
<u>ب</u>	2	0 036	1 56	0 359	0.43	0.078	9100					
S	14 59	0 124	2 28	0 561	0 41	0 057	0.040					
(n)	29 70	0 145	2 68	0 627	0 43	0 045	0.044					
ر د د د د د د د د د د د د د د د د د د د	0 12	0 027	1 23	0 187	0 38	0 100	0 025					
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: <u>:</u>	0,00	9100	13/	0.270	0.46	0.034	0 0046					
SICI	700	0.000	90.	0.083	0.26	0.070	0 0039					
10.00	) O O	0.00	123	0.187	0 43	0 0 0 0	0 0026					
SL	4 42	0.020	1 89	0 471	0 41	/90 0 0 065	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0					
					Chemic	Chemical Properties Looking Table	Ario Tabla					
		Organic				or rappelles Lox	Honeye	Honord			) · · · · · · · · · · · · · · · · · · ·	
		carbon			component		law constant	law constant	Normal		tenmalpy of	1
		partition	Ddfusivity	Diffusivity	water	Henry's	at reference	reference	boiling	Critical	the normal	<u> </u>
		coefficient,	in air,	ın water,	solubility.	law constant	temperature,	temperature,	point	temperature,	bailing point,	factor,
N SAC		, , , ,	ري ريار <mark>ک</mark>	, , , ,	σ ·	Î :	± - :	۳ ,	<b>-</b>	ည .	ΔH <sub>v,b</sub>	URF
CUEUICA		(gr /g)	(cm /s)	(cm <sup>-</sup> /s)	(mg/L)	(unitless)	(atm-m²/mol)	<u>ရ</u>	£	( <del>K</del> )	(cal/mol)	(mg/m <sub>3</sub> )
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11.000	9 7E-05
50328 Benzo(a)pyrene		1 02€+06		9 00E-06	1 62E-03	4 63E-05	1 135-06	25	715 90	969 27	15 000	2.1E-03
51285 2,4-Dintrophenol		1 00E-02	2 73E-02	9 OGE-OG	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	00=+00
53/03 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03
See		1 /4E+02		8 805-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	1 5E-05
57749 Chlordane		3 90E+U3	5 10E-02	9 00E-06	9 40E-03	1375-04	3345-06	25	708 15	1004 79	15,000	2 16-04
58899 gamma-HCH (Lindane)	_	1 07E+03	1 42E-02	7.34E-06	5 COE -02	5 74E-04	4 805-05	2 2	624 24	885 73	13,000	3.7E-04
60571 Dieldrin		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 196-04	1516-05	S 50	613.32	842 25	13,000	3.71.04
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 546-06	25.	720 00	751.00	13,000	2010
67641 Acetone		575E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	52	329 20	508 10	6.955	001+00
67663 Chloroform		3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6.988	2.3E-05
57721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00	695 00	9,510	4 05 06
71432 Benzene		6 92E+00	8 005-02	9 305-06	7 40E+04	3 616-04	8 80E-06	25	390 88	563 05	10,346	0 0E+00
71556 1.1.1-Trichloroethane		1 10F+02	7 80F-02	9000 8	1 335+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342	8 3E-06
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3.08E-04	7.515-06	ט גי	347.24	245 00 986 20	7,136	00+100
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	12,000	00+400
72548 DDD		1 00 € + 06	1 695-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14.000	6 9E-05
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 615-04	2 105-05	25	636 44	860 38	13,000	9 7E-05
75014 Vind chloride (chlorostroso)	1000.	1 055-01	/ 28E-02	1.21E-05	1 52E+04	2 56E-01	6 24 E-03	52	276 71	467 00	5,714	0 0E+00
75092 Methylene chloride	<u> </u>	1175+01	1016-01	1175-05	2 /bE+U3	1 115+00	2716-02	525	259 25	432 00	5,250	8 4E-05
75150 Carbon disuffide		4 57E+01	1 045-01	1.005-05	11971-03	9 30C-02	2 195-03	<b>S</b> 8	313.00	510 00	902'9	4 7E-07
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34 E-04	5 P	422.35	552 00 698 00	6,391	0 05+00
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585.85	000 2	2 H
75343 1,1-Dichloroethane		3 16E+01		1 05E-05	5 06E+03	2 30E-01	5 61E-03	25	330 55	523 00	588.8	005+00
75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6,247	505-05
7243 Heptachior		1 41E+06		5 69E-06	180E-01	4 47E-02	1 09E-03	25	603 69	84631	13,000	38.63
78501 Isonbowne	919	2 00E+05	1 61E-02	7 215-06	1 80E+00	1 11E+00	2 71E-02	52	512 15	746 00	10,931	0 0E+00
78875 1.2-Dichlomoropane		4 37F+01		8 73E-08	2 000100	2 / ZE-04	6 63E-06	25	488 35	715 00	10,271	2 7E-07
79005 1,1,2-Trichloroethane		5 01E+01	7 805-02	8 80E-06	4 42E+03	3 74 15-02	2 805-03	S 25	369 52	572 00	7,590	00=+00
79016 Trichloroethylene		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	3 (2E-04	3 57	360.36	544 20	8,322	1 SE 05
79345 1,1,2,2-Tetrachloroethane	je	9 33E+01		7 90E-06	2 97E+03	1 41E-02	3 445-04	1 52	419 60	661 15	506'Y	7 7 7 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
83329 Acenaphthene		7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	52	550 54	803 15	12,155	0.07+0.0
											ļ Ī	3

Reference conc , RfC (mg/m³)

Diethylphthaiate 2.6	2 88E+02	2 56E-02	6 35E-06		VLOOKUP TABLES 1 85E-05	4 51 5-07	25	567 15	757 00	13,733	00 € +00	2.85+00
ဗ	3 39E+04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9,39E-10	, e	613 15	798 67		001100	2 8E+00
Ġ.	5,75E+04	174E-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06	25 e	960 60	839 68		00=+00	7.00-01
	1 28E+03	3 12E-02	0 35E-Ub	3.51E+01	2.05E-04	5 00E-06	52 6	632 28	890 45			0 0E+00
e	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6.26E-07	1535-08		5/0 44 697 87	97000		001100	14E-01
r)	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34 E-01	8 15E-03	3 53	186,15	738 00	10.206	9 /E-06 2 2E-05	005+00
0,0	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00 E-06	2 44Ë-08		582 15	813 20			0 0E+00
8	2 00E+03	5 90E-02	7.50E-06	3 10E+01	3 19E-04 1 98E-02	/ /8E-06 4 83E-04	0 K	51915	749 03		3.1E-06	0 0E+00
7	7 24E+02	1 94E-02	6 74E-06	3 11E+00	1 64E-07	4 00E-09			754 03	13,000	13F-06	1 4E-01
წ	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	25 4		630 30		00+300	7 DE+00
t	9 12E+01	/ 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06			09 269		0 0E+00	1 8E-01
- 6	3 88F+02		90500	1 56E+02	7.79E-02	1 90E-03	85 t		705 00	9,700	0E+00	2 0E-01
, -	1 60E+03	291E-02	7.035-06	1 206 +04	1 28E-04	3 90E-04	67 4 67 4		675 00		0 0E+00	1 8E-02
- 9	6 46E+01	7 60E-02	8 60E-06	2 096+03	9 84 5-04	2 40E-05	0 4		759 13	13,000	0 0E+00	3 550
3	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	3.72	403 33	617 20		0 0E+00	2 0E-03
7.7	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03			636.00	6,737	06+00	200
20	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	25		707 60		00+100	7 OF-03
en .	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03		411 52	616 20			7 0E+00
9	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	25 4		684 75			8 OE-01
9 ,	6 61E+01	4 83E-02	101E-05	5 30E+03	1 36E-05	3 32E-07		503 65	754 00			1 4E-02
- 10	- /4E+01	8 50E-01	905-06	8 52E+03	4 U1E-02	9 78E-04			561 00			0 0E+00
4	4 07E+02	7 00E-02	7 80F-06	1 61F+02	3 01E-02	2 - ZE-04	0, 1		51913		0.000	2 0E-01
-	1 82E+02	8 70E-02	8 605-06	5 26E+02	2 72E-01	6.635-03		383.78	501703		0.000	7 0E+00
2	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03			632 40		001100	2 CE 0
28	2 88E+01	8 20E-02	9 10E-06	8 285+04	1 63E-05	3 98E-07			694 20		0 0 1 0 0	2 1E+00
<u>.</u> .	1.55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05			629 79			0 0E+00
Ν· •	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05			942 94			2 1E-02
- 00	8 32F±07	3 31E-02	3 585-06	3 40E-01	4 18E-06	1 02E-07	522		806 00	15,999		0 0E+00
9 40	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5.41F-02	9 00E-U3		704 09 582 66	862 22 835 00			7 0E-02
29	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6.516-05			873.00	12 121	4 5E-04	1 4 m + 00
-	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1.42E-03	25 4		725 00		005+00	2 OF 0.1
4	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3.17E-06			708 17		0 0E+00	1 1E-02
on 6	9 55E+01	2 03E-01	7.06E-06	2 70E+02	3 80E-06	9 27E-08			814 00			0 0E+00
ο <del>-</del>	55F+02	7 20E-02	1 05E-05 8 20E-06	2 60E+03	3 21E-02	7 83E-04 4 84E 93	255		678 20			0.000
-	1 05E+05	2 72E-02	7 24E-06	1.35E-01	4 515-04	1 10 10 1		394 40 667 05	620.20			0.05+00
9.5	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03			544 00	7,192	001100	3.55-01
52	5 25E+01	7 07E-02	1 195-05	6 30E+03	3 85E-01	9 39E-03	25		516 50		00000	7 0E-02
ω . 4 ι	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06		•	1078 24			0 0E+00
4 5	23E+06	2 205-02	3 55E-U5	1 505-03	4 55E-03	1 11E-04		715 90	969 27			0 0E+00
	1 23E+05	3 04E-04	5 55E-00	70 300 8	9 40E 05	1616-05		,	905 00			1 4E-01
6.	3 98 05	2.48F-02	6.21F-06	1605.03	3 88E-03	10-3E-0			07.610			0.0E+00
2 2	2 45E+06	1 32E-02	4 86F-06	1.80 F-01	8 97F-03	9 46E-U3			979 00	15,455	2.1E-06	000+00
7	23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1.061-05			830 36			
12	26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07			839.36		30.00	
4	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02			587.38	2002		2 0F-02
9	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07			770 00			0 0E+00
24	40E+01	5 45E-02	8 17E-06	9 89E+03	9.23E-05	2,25E-06			746 87			0 0E+00
80	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9 51E-06			848 76			0 0E+00
CV 1	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02			1750 00		0 0E+00	3 0E-04
2	57E+05	1,16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06		15	873 31		3 2E-04	0 0E+00
N 0	2 90E+05	1 38E-02 1 56E 02	4 32E-06	8 00E-02	189E-01	4 60E-03	25	S :	539 37			0 OE+00
) e	3.30E+04	1 30E-02	3 00E-06	20-02	8 20E-02	2.00E-03		ල ද	512.27			0 0E+00
	30E+04	2 14E-02	5315-06	3 40E-01	2 13F-02	2 30E-04	0 K	340 50	4/5 22	18,000	10 10 10 10 10 10 10 10 10 10 10 10 10 1	0.01+00
,	; !	} ! !	) 	, , ,	4 101-76	V 4VE-V-1		6	40 <i>c</i> 20			2017

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

S YES

VERSION 1.2 September, 1998

User-defined stratum A soil vapor permeability, ENTER б ENTER
Sol
Sol
stratum A
SCS
sol type
(used to estimate 0
soil vapor CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below) SCS soil type directly above ENTER Soul stratum directly above water table, ENTER ENTER ENTER ENTER
Totals must add up to vatue of L<sub>WT</sub> (cell D28)
Thickness Thickness
Thickness of soil of soil of soil stratum B, stratum C, stratum A, (Enter value or 0) (Enter value or 0) ,1-Dichloroethylene Chemical Thickness of soil stratum A, Depth below grade to water table, Lwr ENTER (cm) groundwater conc , below grade to bottom of enclosed space floor, ENTER Initial ENTER Depth C, (1/64) numbers only, groundwater temperature, Chemical CAS No no dashes) Average 75354 ENTER Sol

	ı	Ш						
ENTER Stratum C soil water-filled porosity,  8,,c 6,,c //m³/m³/m³/	(112)	03						
Stratum C soil total porosity,	(coamin)	0 43						
ENTER Stratum C soll dry bulk density, p <sub>b</sub> p <sub>b</sub>		1.7	ENTER	Indoor	air exchange	rate	<u></u>	(1/h)
ENTER Stratum B soil water-filled porosity.  B <sub>w</sub> (cm²/cm²)	,	0.27	ENTER	Floor-wall	seam crack	width,	*	(ma)
ENTER Stratum B soil total porosity.		0 42	ENTER	Enclosed	space	height,	f	(ca)
ENTER Stratum B soil dry bulk density, P <sub>B</sub> (q/cm <sup>3</sup> )		17	ENTER Enclosed	space	floor	width,	×	(mo)
ENTER Stratum A soil water-filled porosity, $\theta_{w}^{A}$ (cm <sup>3</sup> /cm <sup>3</sup> )		0.2	ENTER	space	floor	length,	ٿ	(cm)
ENTER Stratum A soul total porosity, n^A (unitless)		0.43	ENTER	Soil-bidg	pressure	differential,	ΔP	(g/cm-s <sup>2</sup> )
ENTER Stratum A S soil dry bulk density, p p <sub>A</sub> (g/cm³) (t		1.5	ENTER Enclosed	space	floor	thickness,	Lorect	(cm)

ermeability)

water table

(Enter A, B, or C)

(G

(E)

2225 04

16

	177		1			
	BDIG-NOS	space	space	Fuciosed	Floor-wall	ludoor
	pressure	floor	floor	Space	seam crack	air exchange
	differential,	tength,	width,	height,	width,	rate
	ΔР	ٿ	×	ī	*	Ш
	(g/cm-s²)	(cm)	(cm)	(сш)	(cm)	(1/h)
4 1	40	961	1961	488	01	0.45
	ENTER	ENTER	ENTER	ENTER	ENTER	
	Averaging			Target	Target hazard	
time for	thre for	Exposure	Exposure	risk for	quotient for	
carcinogens,	noncardnogens,	duration,	frequency,	cardinogens,	noncardnogens,	
	AT <sub>RC</sub>	<b>B</b>	15	, ₹	, of	
	(yrs)	(yrs)	(days/yr)	(unitiess)	(unitless)	
1						
ı	30	30	350	1 0E-06	1	
				Used to cafci	Used to calculate nsk-based	
				of companions	and include a constant and included	

groundwater concentration

conc , RfC (mg/m³)	tactor, URF (µg/m³) 1	S (mg/L)	Coernicient, Koc (cm³/g)	(°K)	(°K)	Louinty point, temperature, coefficient, solubility, factor, conc., $\Delta H_{\rm vb}$ $T_{\rm B}$ $T_{\rm C}$ $K_{\rm cc}$ $S$ URF RfC (cal/mol) (°K) (°K) (cm³/g) (mg/L) (μg/m³)¹ (mg/m³)² (mg/L) $R_{\rm cc}$	(°C)	(cm²/s) (cm²/s) (atm-m³/mol)	Cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)
RfC	A.	ω	Ϋ́	٦ °	۳	ΔH <sub>v,b</sub>	Ļ		₫ '	_ റീ
cond,	factor,	solubility,	coefficient,	temperature,	point,	bolling point,	temperature,		in water,	in air,
Reference	risk	water	partition	Critical	boiling	the normal	reference		Diffusivity	Diffusivity
	Ž	component	carbon		Normal	vaporization at	law constant			
		Pure	Organic			Enthalpy of	Henry's	Henrys		

Floorwall seam perimeter, Xask (cm)	3,844	Diffusion path tength, Le (cm)	
Water-filed porosity in capillary zone, $\theta_{w,\alpha}$ $(cm^3/cm^3)$	0 294	Total overall effective diffusion coefficient, Deff (cm²/s) 8.34E-04	
Aur-filled porosity in capt!ary zone, \$\textit{\textit{0}}_{\textit{0}}, \textit{\textit{0}}_{\textit{0}}, \textit{0}_{\textit{0}}, \textit{\textit{0}}_{\textit{0}}, \textit{\textit{0}}_{\textit{0}}, \textit{\textit{0}}_{\textit{0}}, \textit{0}_{\textit{0}}, \text	0 136	Capitlary zone effective diffusion coefficient, Def  (cm²/s)	
Total porosity in capullary zone, n <sub>te</sub>	0 43	Stratum C effective diffusion, Deffic (cm²/s) Reference conc. RrC (mg/m³)	Ş
Thickness of capillary zone,	17 05	Stratum B B effective diffusion coefficient, D <sup>off</sup> s (cm <sup>2</sup> /s) 9 22E-04 9 22E-04 Unit nsk factor, URF	2000
Stratum A soil effective vapor permeability, k,	6 98E-10	Stratum  A effective diffusion coefficient, Deff (cm²/s) 3 65E-03 Infinite source bldg conc. Cector (ug/m³)	3 202 00
Stratum A soil relative air permeability, k <sub>ra</sub> (cm²)	0 746	Vapor viscosity at ave soil temperature, trs (g/cm-s) (g/	1 00 00 T
Stratum A sort intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)  7 88E-01  Exponent of equivalent foundation Pectet number, exp(Pef) (unitless)	22 22
Stratum A effective total flud saturation, S <sub>to</sub>	0419	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol) 187E-02 187E-02 Area of crack, Area of crack, (cm²) 384E+02	1, 1, 2,
Stratum C sot aur-filled porosity, $\theta_4^{ \rm c}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 130	Enthalpy of vaporization at ave groundwater temperature, ΔH <sub>v,13</sub> (cal/mol) 6,353 (cal/mol) Crack effective diffusion coefficient, Drack (cm²/s) 365E-03	
Stratum B soll air-filled porosity, e.e. (cm³/cm³)	0 150	Crack depth below grade, Zoxx (cm).  Average vapor flow rate into bldg , Qual (cm <sup>3</sup> /s)	
Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, 1 (unitless) 4 16E-04 Crack radius, faax (cm)	
Source- building separation, L <sub>7</sub>	2210 04	Area of enclosed space space below grade, Ae (cm²) 924E+05 Source vapor conc, Cuarce (ug/m³)	
Exposure duration, t	9 46€+08	Bldg ventilation rate,  Quatars (cm³/s)  Convection path length,  Lp  (cm)	

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CONCENTRATION CALCULA
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INCREMENTAL RISK CALCULATIONS.

Hazard quotient	from vapor intrusion to	ındoor air,	noncarcinogen	(nutless)	NA
Incrementat risk from	vapor intrusion to	indoor air,	carcinogen	(unitless)	Ϋ́
Final	Indoor exposure	groundwater	conc,	(µ9/L).	1 52E+01
	component water			(hg/L)	2 25E+06
Risk-based	indoor exposure	groundwater	, conc	(ng/L)	1 52E+01
Indoor	exposure groundwater	conc,	noncarcinogen	(µg/c)	ΑN
Indoor	exposure groundwater	conc ,	carcinogen	(Mg/L)	1 52E+01

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

	į	, s	Soil Properties L	roperties Lookup Table		VLOOKUP TABLES	LES					
SCS Soil Type	K, (cm/h)	a (1/cm)	N (unitless)	M (unitless)	θ, (cm³/cm³)	8, (cm³/cm³)	Mean Grain Diameter (cm)					
	0.20	800 0	109	0 083	8E 0	890 0	0 0005					
	5 6 6	8000		0.237	140	0000	0 0 16					
	1 59	0 030	- 26	0.554	4.6	00/8	0.020					
	29 70	0 145	2 68	0 627	0.43	0.045	0.000					
	0 12	0 027	1 23	0 187	8		2000					
	131	0 059	148	0 324	0 39	0100	6200					
	0.25	0 016	1 37	0 270	0.46	0 0 0 34	0.0046					
	0 02	0 005	1 09	0 083	0.26	0.070	0 0038					
	0 0 2	0 010	1 23	0 187	0 43	0 089	0.0056					
	0.45	0 020	141	0 291	0.45	0 067	0.011					
	4 42	0 075	1 89	0 471	0.41	0 065	0 030					
					Chomod	Or Control of Control	Total				}	
		Organia				Cremical Properties Lookup Table	wup Table	11.00				
		carbon			a to a control		S KING	Henry's	1		Enthalpy of	1
		partition	Difficient	Deficeration	water	Попод	at reference	iaw constant	BLEON	5	vaponzation at	<u>.</u>
		coefficient	in air	in water	collishing	late constant	at twice all the	Halerence	Bullion 1	Catto	the hormal	ž.
		¥.	d	c	'S	1	'a irba arri a'	ieniperature, T	, F	temperature, ∓	polling point,	ractor,
CAS No Chemical		(g/ <sub>с</sub> шо)	(cm²/s)	(cm <sup>2</sup> /s)	(ma/L)	(unatless)	(atm-m³/mol)	<u>«</u> وَ	- £	- §	40-رامس/رمیا	OR:
TOO 50503			1									
50328 Benzo(a)pvrene		2 63E+06	1 3/E-02 4 30E-02	905506	2 50E-02	3 325-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05
51285 2.4-Dinitrophenol		1 00F-02	2 73F-02	90-300 6	2 79F±03	1 825-05	1 135-06	52	715.90	969 27	15,000	2 1E-03
53703 Dibenz(a.h)anthracene		3 80E+06	2 02E-02	5 18F-06	2.49F-03	6 03E-07	77-11-1-1	C 7	2700	827 83	000,61	0.05+00
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25F+00	3 05 11 10	3 4	340 00	950 41	16,000	275
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	15,000	2 15-02
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3 7F-04
58899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80€+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04
60571 Dieldrin		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	22	613 32	842 25	13,000	4 6E-03
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10,000	0 0E+00
67641 Acetone		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 885-05	25	329 20	508 10	6,955	0 0E+00
		3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6,988	2 3E-05
5//21 Hexachloroethane		1 78E+03	2 505-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	52	458 00	695 00	9,510	4 0E-06
71432 Benjana		6 92E+00	8 00E-02	9 305-06	7 40E+04	3 61E-04	8 805-06	52	390 88	563 05	10,346	0.0E+00
71556 1.1.1-Tuchloroethane		1 10F±02	2 AOE-02	8 60 FI OS	1 /5E+03	2 28E-01	5 56E-03	£ 18	353 24	562 16	7,342	8 3E-06
72208 Endrin		1 23F +04	1 25E-02	4 74F-06	2 505-01	7 03E-01	1 / 2E-UZ	8 8	347 24	545 00	7,136	0 05 +00
72435 Methoxychlor		9 77E+04	1 56E-02	4 46 F-06	4 50E-02	5 48F-04	1 58E-06	6 4	CL 817	986 20	12,000	00100
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 DOE-08	C 40	20 029	04049	000,41	0.00+000
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 106-05	35.55	R36 44	860.38	13,000	0 20-03
74839 Methyl bromide		1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	22	276 71	467 00	5 714	00400
75014 Vinyl chlonde (chloroethene)	e)	186E+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2 716-02	32	259 25	432 00	5.250	8 45-05
75092 Methylene chloride		1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 195-03	25	313 00	510 00	6.706	4 7E-07
75150 Carbon disuffide		4 57E+01	1 046-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	52	319 00	552 00	6,391	0 0E+00
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422 35	00 969	9,479	1 1E-06
752/4 Bromodichioromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	52	363 15	585 85	7,000	1 8E-05
75343 1,1-Dichloroethane		3 16E+01	7.42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	25	330 55	523 00	6,895	00+300
75354 1,1-Dichloroemylene		5 895+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	22	304 75	576 05	6,247	5 0E-05
70446 Heptacallor		1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	135-03
//4/4 Hexachiorocyclopentadiene	ē	2 00E+05	1 61E-02	7 21E-06	1 80E+00	111E+00	2 71E-02	25	512 15	746 00	10,931	0 0E+00
70091 tsupinorone 70076 1 3-Dublomanone		4 585+01	6 23E-02	6 765-06	1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10,271	2 7E-07
70075 1 2-Dichloropiopane		4 3/11+01	7 825-02	8 731-06	2 80E+03	1 15E-01	2 805-03	52	369 52	572 00	7,590	0 0E+00
2003 1,1,2-1ficationograms		3 0 1E+0 1	7 805-02	8 80 10 6	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8,322	1 6E-05
79745 1 1 2 2-Tetrachlomethans		0 335+04	7 405 02	9 10E-06	1 105+03	4 22E-01	1 03E-02	25	360 36	544 20	7,505	1 7E-06
7377 Acensolythene	_	7 085+03	4 215 02	7 505 05	2 97E+03	1 41E-02	3 44E-04	52	419 60	661 15	966'8	5 BE-05
Sistemedellow 67		000100	70-317 <b>4</b>	1 0811-00	4 245+00	6 36E-03	1 55E-04	22	550 54	803 15	12,155	0 0E+00

OAPPORT		1	!		VLOOKUP TABLES							
	2 88 = +02	2 56E-02	6 35E-06	1 08E+03	1,85E-05	4 51E-07		567 15	757 00	13,733	0 0E+00	2 8E+00
66887 State Date of the state o	するよりない	4 385-02	/ 86E-06	1 12E+01	3 85E-08	9.39E-10		613 15	798 67	14,751	0 0E+00	3 55-01
86306 N-Nitrosodrabendemine	1 205104	9 125 02	4 83E-U5	2 595+00	9 1/15-05	1 26E-06		660.60	839 68	13,000	0 0E+00	7 0E-01
86737 Filoraba	1385+03	3,125-02	7 69 0 06	10+U1+0.+	2 00E-04	5 UOE-06		632 28	890 45	13,000	1 4E-06	00000
86748 Carbazole	3 39 03	3 90E-02	7.035-06	7 48F+00	6 26F-03	6 3/ E-03	5 K	5/U 44	870 00	12,666	0 0E+00	1 4E-01
	5 37 E+04	5 61E-02	6 16E-06	3 23€+00	3346-01	8 15E-03		486 15	738.00	13,977	3 /H-08	00000
87855 Pentachlorophenol	5 92E+02	\$ 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08		582 15	813.20	14 000	3.48.05	2014
88062 2,4,6-Trichlorophenol	3 81 = +02	3 18E-02	6 25E-06	8 00E+02	3 195-04	7 78E-06		519 15	749 03	12.000	3 15-06	00+00
91203 Naphthalene	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04		491,14	748 40	10,373	0 0E+00	46.03
9194 : J.a-Dichloropenzigine 95476 o.Xvlene	7 24E+02	1 94E-02	6 74E-06	3 116+00	1 64E-07	4 00E-09		560 26	754 03	13,000	1 3E-04	0 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 305-06	2 60F+04	4 925-02	3 ZUE-U3	, , ,	417 60	630 30	8,661	0 0E+00	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 905-02	7 90E-06	1 56E+02	7 79E-02	1 905-05	5 K	464 19	705.00	10,800	0 0 0 0 0	18E-01
95578 2-Chlorophenol	3 88E+02	5 01 6-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	22 52	147 53	705 00 675 00	9,700	0.01100	2 OE-01
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 785-04	4 34E-06	22 52	526 15	759 13	13,000	001100	20 C
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	32	483 95	719 00	10.566	001.00	2 0E-03
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20	8,501	00=100	1 00+00
100425 Styrene 105879 2 4-Dimothulahonat	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03	, 23	41831	636 00	8,737	0 0 0 0	1 0E+00
106423 p.Xvlene	2 09E+02	3 84E-02	8 68E-06	7 87E+03	8 20E-05	2 00E-06		484 13	707 60	11,329	0 OE+00	7 0E-02
106467 1.4-Dichlorobenzene	6 17F±02	6 90E-02	7 905.08	7 385±02	3 14m-01	7 60 11-03	, 8, 1	411 52	616,20	8,525	00=+00	7 0E+00
	6 61E+01		1015-05	5.300+03	1 36F-05	2 43E-U3	8 8	447 21 503 85	584 75	9,271	00=100	8 OH O
107062 1,2-Dichtoroethane	174E+01	1 04E-01	90-306-6	8 52E+03	4 01F-02	9 785-04		356.65	794 00	11,689	00E+00	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	2 2	345.65	519 13	7 200	2 0E-03	20100
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03		412.27	617 05	8 523	001100	7.05+00
	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03		383 78	591 79	7.930	00=+00	4 0E-01
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03		404 87	632 40	8,410	0 0E+00	2 0E-02
111444 Bis/2 objects/this	2 88E+U1	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07		455 02	694 20	10,920	0.05+00	2 1E+00
115297 Endosulfan	2 14F+03	1 15E-02	4.55E-06	1 /2E+04 5 10E-01	7.38E-04	1 80E-05		451.15	659 79	000'6	3 3E-04	0 0E+00
117817 Bis(2-ethylhexyl)phthalate	1516+07	3 51E-02	3.66F-06	3.40F-01	4 18E-06	1.026-02	9 8	6/443	942 94	14,000	0.05+00	2 15-02
117840 Di-n-octyt phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2.74E-03	6 68E-05		704.09	862 22	15,989	4 UE-U6	7 00.00
	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03		582 55	825 00	14,447	4 6E-04	00=+00
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05		615 18	873 00	13,121	00+300	1 1E+00
120821 1,2,4-Inchlorobenzene	1.78E+03	3 00E-02	8.23E-06	3 00E+02	5 82E-02	1 42E-03		486 15	725 00	10,471	0 0E+00	2 0E-01
121142 2 4-Districtules	14/E+02	3 46E-02	8 //E-06	4 50E+03	1 30E-04	3 17E-06		482 15	708 17	11,000	0 0E+00	1.1E-02
124481 Chlorodibromomethane	6.31E+01	1 96F-02	1.055-05	2 /UE+02 2 60F+03	3 24E-08	9276-08	52 2	590 00	814 00	13,467	2 년 6	0 OE +00
127184 Tetrachtoroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1.845-04		394.40	62020	000,5	2 41 - 53 5 - 13 - 53 5 - 13 - 13 - 13	001100
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	1 35E-01	4 51E-04	1 10E-05		667.95	936 00	14.370	0.05+00	1110
156592 cis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3,50E+03	1 67E-01	4 07E-03		333 65	544 00	7,192	000+00	3 5E-02
156605 trans-1,2-Dichloroethylene	5.25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516 50	6,717	0 0E+00	7 0E-02
205992 Benzo(hiftuoranthene	3 4/E+06 1 23E+06	1 90E-02	5 56E-05	2 ZUE-05	6 561-05	1 605-06		809 15	1078 24	17,000	2 1E-04	0 0E+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 81E-04	0 K	715 80	969.27	15,000	2.1E-04	0.05+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07		753 15	1019 70	16,000	2 1E-05	0.05+00
218019 Chrysene	3 98E+05	2 48E-02	6 215-06	1 60E-03	3 88E-03	9 46E-05		714 15	979 00	16,455	2 1E-06	00±
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 805-01	6 97E-03	1 70E-04		603 01	839 37	13,000	4 9E-03	0 0E+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 345-06	2 00E+00	4 35E-04	1 06E-05		596 55	839 36	13,000	1 8E-03	0 0E+00
542756 13-Dichloropmone	1 20E+03	1 42E-02	7.34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5 3E-04	0 OE+00
606202 2,6-Dinitrotoluene	6 92E+01	3 27 F-02	7.265-06	1 825+03	3 06E-03	1 //E-02 7 /EE-07	52 4	381 15	587 38	7 000	3.7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 895 +03	9 23E-05	2 25E-06		00 000	746.87	11,930	- 50-F0 -	00+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9 51 E-06		613.96	848 76	13,000	2 65-03	00+00
	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02		629 88	1750 00	14.127	000+00	3 0E-04
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2,46E-04	6 00E-06	52	657 15	873 31	14,000	3 2E-04	0 0E+00
11097691 Amdor 1254 (PCB-1250)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03		402 50	539 37	19,000	1 0E-04	00±00
12674112 Aroclor 1016 (PCB-1016)	3.30F±04	2 22E-02	3 00E-06	3 / OE-02	1 100.03	2 00E-03		377.50	5122/	19,000	10E-04	001100
53469219 Arador 1242 (PCB-1242)	3 30E+04	2 14E-02	5 31E-06	3 40E-01	2 13E-02	5 20E-04	9 %	345 50	4/5 22	18,000	1 0F-04	00+400
				!	1			}	)	>	)   	

VERSION 12 September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" In "YES" box and initial groundwater conc below)

		ENTER	User-defined stratum A soil vapor permeability, k, (cm²)	
			В	
		ENTER	e timate or lity)	S
		ENTER	SCS soil type directly above water table	S
		ENTER	Soll stratum drectly above water table, (Enter A. B. or C)	U
	ane	ENTER (Lwr (cell D28)	Thuckness of sod stratum C, (Enter value or 0) hc (cm)	1158 24
Chemical	1,2-Dichloroethane	NTER ENTER ENTER Totals must add up to value of L <sub>w1</sub> (cell D28)	Thickness Thickness  Thickness of soil of soil of soil stratum B, stratum C, stratum A, (Enter value or 0) (Enter value or 0) h <sub>A</sub> h <sub>B</sub> h <sub>C</sub> (cm) (cm)	304 8
		ENTER Totals mu	Thickness of soil stratum A, h,	762
	_	ENTER	Depth below grade to water table, Lwr (cm)	2225 04
ENTER Initial groundwater conc, C <sub>W</sub> (µg/L)	0.5175	ENTER Depth	below grade to bottom of enclosed space floor, L <sub>F</sub>	15
ENTER Chemical CAS No numbers only, no dashes)	107062	ENTER	Average soll/ groundwater temperature, T <sub>s</sub>	16

· ·	П						
ENTER Stratum C soil water-filled porosity, $\theta_w^c$ $(cm^3/cm^3)$	03						
ENTER Stratum C soul total porosity, n <sup>c</sup> (unilless)	0 43						
ENTER Stratum C soil dry bulk density, Pc Pc (g/cm³)	17	ENTER	Indoor	rate, ER	(1/h)	0.45	
ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>8</sup> (cm³/cm³)	0.27	ENTER	Floor-wall seam crack	width,	(cm)	0.1	
ENTER Stratum B soil total porosity, n <sup>8</sup> (unitless)	0 42	ENTER	Enclosed	height, H	(cm)	488	!
ENTER Stratum B soul dry bulk density, P <sub>B</sub> (g/cm <sup>3</sup> )	17	ENTER Enclosed	space	width,	(Em)	961	1
ENTER Stratum A soul water-filled porosity, 6,*^^ (cm³)/cm³)	0.2	ENTER Enclosed	space	length, La	(cm)	961	į
ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	0.43	ENTER	Soil-bldg pressure	differential, ΔP	(g/cm-s²)	40	
ENTER Stratum A soll dry bulk density, p.^A (g/cm³)	15	ENTER Enclosed	space	thickness,	(cm)	15	

ENTER Target hazard	quotient for noncardnogens, THO	(nurtless)	-	Jsed to calculate risk-based groundwater concentration
ENTER Target	nsk for carcinogens, TR	(unitless)	1 0E-06	Used to calculate ris groundwater concer
ENTER	Exposure frequency, EF	(days/yr)	350	-
ENTER	Exposure duration, ED	(yrs)	30	
ENTER Averaging	time for noncarcinogens, AT <sub>MC</sub>	(yrs)	30	
ENTER Averaging		(yrs)	20	

1017

						ŀ	г
					(mg/m <sub>3</sub> )		
	žŠ	risk	factor,	S.R.	(µg/m³) 1		100
Pure				vs	(mg/L)		1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Organic	carbon	partition	coefficient,	ج چ	(cm <sub>3</sub> /g)		4 745 .04
		Critical	temperature,	Ľ	(%) (c		00 100
	Normat	boiling	point,	<u>_</u>	(°K)		35.65
Enthalpy of	vaporization at	the normal	boiling point,	۵H۷	(cai/mol)		7 643 356 65
S SUUBL	aw constant	reference	temperature,	۳	(్ధి)		75
	w constant	it reference	emperature,	I	itm-m³/mol)		104E-01 9 90E-08 9 78E-04
		Diffusivity	in water,	ភ្នំ	(cm <sup>2</sup> /s) (a		905.08
		Diffusivity	in arr,	្ន	(cm <sup>2</sup> /s)		1045-01

Floor-wall seam perimeter, Xasak (cm)	3,844	Diffusion path length, Le	2210 04	
Water-filled porosity in capillary zone, $\theta_w = \theta_w = (cm^3/cm^3)$	0 294	Total overall effective diffusion coefficient, Doff (cm²/s)	1 01E-03	
Aur-filled porosity in capillary zone, $\theta_a = (cm^3/cm^3)$	0 136	Capt'ary zone effective diffusion coefficient, D <sup>eff</sup> cm²/s)	7 62E-04	
Total porosity in capillary zone, na (cm³/cm³)	0 43	Stratum C C effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	6 67E-04	Reference conc. RfC (mg/m³)
Thickness of captilary zone,	17 05	Stratum B B effective diffusion coefficient, D <sup>off</sup> (cm <sup>2</sup> /s)	1 09E-03	Unit nsk factor, URF (µg/m³) 1
Stratum A soul effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, D <sup>off</sup> (cm²/s)	4 22E-03	Infinite source bldg conc., Cuestra (µg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub> (cm²)	0 746	Vapor viscosity at ave soil temperature, µrs (g/cm-s)	1.77E-04	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)
Stratum A soil intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitiess)	2 64E-02	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitiess)
Stratum A effective total fluid saturation,  Sus  (cm <sup>3</sup> /cm <sup>3</sup> )	0419	Henry's taw constant at ave groundwater temperature, H <sub>11s</sub> (atm-m <sup>3</sup> /mol)	6 27E-04	Area of crack, Avest (cm²)
Stratum C soil aur-filled porosity, $\theta_a^C$ (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, AH.,75 (cal/mol)	8,457	Crack effective diffusion coefficient, Done (cm²/s)
Stratum B soil air-füled porosity, $\theta_{\bullet}^{B}$ $(cm^{3}/cm^{3})$	0 150	Crack depth below grade, Z <sub>crack</sub> (cm)	15	Average vapor flow rate into bidg , Qua (cm <sup>3</sup> /s)
Stratum A soil air-fitled porosity, $\theta_{\bullet}^{A}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, η (untless)	4.16E-04	Crack radius, fasek (cm)
Source- building separation, L <sub>1</sub>	2210 04	Area of enclosed space below grade, A <sub>e</sub> (cm²)	9 24E+05	Source vapor conc , Cesses (ug/m³)
Exposure duration, τ	9 46E +08	Bidg. ventilation rate, Quaring (cm <sup>3</sup> /s)	5.63E+04	Convection path length, L <sub>p</sub> (cm)

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RISK-BASE	RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	ER CONCENTR	ATION CALCI	JLATIONS	INCREMENTAL	INCREMENTAL RISK CALCULATIONS
<u>;</u>	1	i i	Ć	-	Incremental	Hazard
INGOOL	indoor	Kisk-pased	Pure	Final	risk from	quotlent
exposnre	exposure	ndoor	component	indoor	vapor	from vapor
roundwater	groundwater	exposure	water	exposure	intrusion to	intrusion to
conc,	conc.,	groundwater	solubility,	groundwater	indoor air,	indoor air,
arcinogen	noncarcinogen	conc.,	Ø	conc.,	carcinogen	noncarcinogen
(µg/L)	(μg/L)	(ng/L)	(µg/L)	(mg/L)	(unitless)	(unitless)

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

2 16-03 2 16-03 1 16-04 3 76-04 3 76-04 3 76-04 3 76-04 3 76-04 0 06-00 0 06-0

		S	Soil Properties Lookup Table	ookup Table		VLOOKUP TABLES	ES	_				
SCS Soil Type	K, (cm/h)	a (1/cm)	N (unitless)	M (undess)	θ, (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)					
<u>်</u>	0.20	0 008	1 09	0 083	038	0 068	0 0002					
<u></u>	9 5	800	131	0.237	041	0 095	0 0 16					
SI	14 59	0 124	2 28	0.561	0.43	0.057	0.020					
SO .	29 70	0 145	2 68	0 627	0 43	0 045	0.040					
000	0 12	0 027	1 23	0 187	0 38	0 100	0 025					
Jos.	131	0 059	1 48	0 324	0 39	0 100	0 028					
, <u>c</u>	0 22	0 016	1 37	0 270	0.46	0 034	0 0046					
) 	0 02	0 005	109	0 083	0.26	0 0 0 0	0 0038					
100	000	0000	2.	0.187	0 43	6800	9500 0					
TS.	4 42	0.020	1 89	0 471	0 45	0 065	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0					
					Chemic	Chemical Properties Lookun Table	kun Tabla					- 1
		Organic			Pure		Henry's	Henry's			Enthaîny of	
		carbon			component		law constant	law constant	Normal		vaporization at	
	- ;	partition	Deffusivity	Diffusivity	water	Henry's	at reference	reference	Boiling	Critical	the normal	
	ช	coefficient,	ביים רו	ın water,	solubility,	law constant	temperature,	temperature,	تہ	temperature,	boiling point,	4
CAS No Chemical		(GW,VG)	(cm <sup>2</sup> /s)	(cm²/s)	(ma/L)	(unitless)	r (atm=m³/mol)	۳ ( <u>ر</u>	<u>.</u> 8	် န်		
											(Cavision)	4
50293 DDT 50328 Benzo(a)nvrene		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	52	533 15	720 75	11,000	•
51285 2 4-Dinitrophenol		1 00 5 00	4 30E-02	90-H00 6	1 625-03	4 6311-05	1 13E-06	52	715 90	969 27	15,000	• •
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18F-06	2 / 9E+03	1 62E-U5	4 445-07	25	605 28	827 85	15,000	Ο.
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93F+02	1 25F+00	3 055-03	67	340 00	990 41	000,91	
56553 Benz(a)anthracene		3 98€+05	5 105-02	90-300 6	9 40E-03	1 37E-04	3346-06	25.2	708 15	1004 79	15.000	
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	52	624 24	885 73	13,000	
58899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	٠,,
SOS CONTRACTOR ACA		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	25	613 32	842 25	13,000	4
67641 Acatona		6 000-01	5.36E-02	7.97E-06	3 50E+03	6 315-05	154E-06	52	720 00	751 00	10,000	0
67663 Chloroform		3 985+01	1045-01	1 146-03	1 00E+06 7 92E+03	1 505-03	3.88E-05	25	329 20	508 10	6,955	Ο,
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5,00E+01	1 595-01	3.885-03	C 42	334 32 458 00	536 40	6,988	
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	25	390 88	563 05	9,510	, c
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342	, ~
71556 1,1,1-Irichioroethane		1 10E+02	7 80E-02	8 805-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0
72435 Methovochlor		1 23E+04 9 77E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	718 15	986 20	12,000	0
72548 DDD		1 00 1 - 06	1 695-02	4 76E-06	4 30E-02	1 64 174	1 38E-03	S #	651 02	848 49	14,000	ο,
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	22 22	636.44	860 38	13,000	0
74839 Methyl bromide		1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	52	276 71	467 00	5.714	, c
75014 Vinyl chloride (chloroethene)	ue)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2 71E-02	25	259 25	432 00	5,250	, w
75052 Methylene Chloride		1175+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	52	313 00	510 00	6,706	4
75757 Remoferm		4 3/6+01	1046-01	1 00E-05	1 196+03	1 24E+00	3 02E-02	<b>5</b> 2	319 00	552 00	6,391	0
75274 Bromodichloromethane		5.50F+01	2 98F-02	1.06E-05	5 74E+03	2 19E-02 6 56E-03	5 34 F-04	5 72	422 35	696 00	9,479	~
75343 1,1-Dichloroethane		3 16E+01	7 42F-02	1 05F-05	5 06E+03	2 30E-01	1 00 H 5 A	C t	202 13	200		-,
75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	26115-02	67 87	304 75	525 OU	6,895	о <b>"</b>
76448 Heptachlor		141E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	32	603 69	846.31	13,000	, 4
77474 Hexachlorocyclopentadiene		2 00E+05	1 61E-02	7.21E-06	1 80E+00	1 11E+00	2 71E-02	25	512 15	746 00		٠ ٥
78591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00		, N
788/5 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7,590	0
79005 1,1,2-Inchlorethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8,322	-
79345 1.1.2 2-Tetrachloroethans		935+01	7 10E-02	9 10E-06	1 TUE+U3	4 ZZE-01	1 03 E-02	25	360 36	544 20	7,505	***
83329 Acenaphthene		7 08E+03	4 215-02	7.695-06	4 24F+00	141E-02 6 36E-03	3 445-04	52	41960	661 15	966'8	4O
		1	] ]		** * * * * * * * * * * * * * * * * * *	77.7	40-100 -	q	220 24	803 15	12,155	0

Reference

Unit nsk factor, URF

RfC (mg/m³) COUC.

(mg/m³)

94559 Clothedebitedes	1 1 0	i i	e i		VLOOKUP TABLES	•						
84742 Di-n-butyl ohthalate	3 396+04	4 38F-02	7 86F-06	1 125+03	1 85E-05 3 85E-05	4 51E-07	52 %	567 15	757 00	13,733	0.05+00	2 8E+00
85687 Butyl benzyl phthalate	5 75E+04	1 74E-02	4 83E-06	2 69E+00	5 17E-05	1.26E-06	3 5	660.60	13007	14,71	0.000	3.5E-01
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6 35E-06	3 516+01	2 05E-04	5 00 = 06	3 52	632.28	890.45	13,000	14100	7 OF 01
86737 Fluorene	1 38E+04	3 63E-02	7 88E-06	1 98E+00	2 61E-03	6 37E-05	52	570 44	870 00	12,666	00+400	201100
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6.26E-07	1 53E-08	52	627 87	899 00	13,977	5 7E-06	00+100
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	00=00
88062 2 4 6-Telephonophanol	3 875 +02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	52	582 15	813 20	14,000	3 4E-05	0 0E+00
91203 Naphthalene	2 00E+03	5 90E-02	7 505-06	3 10E+01	3 19E-04	7 78E-06 4 83E-04	5 K	519 15	749 03	12,000	3.15-06	00+300
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 11E+00	1 64E-07	4 00E-09	2 2	560 26	754 03	13,000	1 3F-03	145-01
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2,13E-01	5 20E-03	22	417 60	630 30	8.661	00+100	204
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1,20E-06	25	464 19	697 60	10,800	000+00	1 8E-01
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1.56E+02	7 796-02	1 90E-03	22	453 57	705 00	9.700	0 0E+00	2 0E-01
95578 Z-Chlorophenoi 05054 2.4 E-Tricklomphenoi	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	55	447 53	675 00	9,572	0 0E+00	1 8E-02
93934 Z.4,3-Trichioropriendi 98953 Nitrobenzene	1 60E+03	2 91E-02	000000	1 20E+03	1 78E-04	4 34E-06	52	526 15	759.13	13,000	0 0E+00	3 5E-01
100414 Ethylbenzene	3 63E+02	7 50E-02	2 80E-06	1 69F+02	3 235-04	2 40E-05 7 88E-03	5 K	483 95	719 00	10,566	00=+00	2 0E-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03	3 5	403 34	636.00	6,5UC	00#+00	00+100
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	8	484 13	707 60	11,329	001+00	7 04.05
	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	58	411 52	616.20	8,525	00=+00	7 00+00
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03		447 21	684 75	9,271	00+300	8 0E-01
100478 p-Chloroantine 107082 1 2 Dishlossettess	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07		503 65	754 00	11,689	0 05+00	1 4E-02
108054 Vinvl acetate	5 25E+00	8 505-02	9 205-08	2 00E+04	2 10E-02	4 78 F-04	8 8	356 65 346 66	561 00	7,643	2 65-05	0000
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3015-01	7.345-03		412.27	817 05	20,4	00-110	20102
108883 Toluene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03	22	383.78	591.79	7 830	00+100	2000
108907 Chlorobenzene	2 19E+02	7 30E-02	8 705-06	4 72E+02	1 52E-01	3 71E-03	82	404 87	632 40	8.410	00+100	2010
108952 Phenot	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	52	455 02	694 20	10,920	0 OE+00	2 1E+00
	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	52	45115	629 79	000'6	3 35-04	0 0E+00
11529/ Endosultan 117817 Ris/2-athulboxullahtholote	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	52	674 43	942 94	14,000	0 05+00	2 1E-02
117840 Di-n-octyl phthatata	8 325 +07	3 51E-02 1 51E-02	3.585-06	3 40E-01	4 18E-Ub	1 02E-07	, 22 32	657 15	806 00	15,999	4 0E-06	0 0 0 0 0 0 0
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5.415-02	1 32F-03	3 %	704 US	835.00	13,000	0 0E+00	7 05-02
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6.51E-05	2 52	515 18	873 00	13 121	4 00 10 0	1 1 1 0 0
120821 1,2,4-Trichtorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03	32	486 15	725 00	10,471	00+100	2 0E-01
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06	25	482 15	708 17	11,000	0 OE+00	1 1E-02
121142 2,4-Dinitrololuene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	25	590 00	814 00	13,467	1.95-04	0 0E+00
127184 Tetrachioroethdene	1 550+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04	52 5	416 14	678 20	8,000	2 46-05	0 0E+00
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	2 VUE+U2 1 35F-01	7.04E-03	1 84E-02	52 55	394 40 667 06	620 20	8,288	5 8E-07	0000
156592 cis-1,2-Dichloroethytene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03	2 22	333 65	544 00	7,192	001100	3.5
156605 trans-1,2-Dichtoroethylene	5 25E+01	7,07E-02	1 19E-05	6 30E+03	3 85E-01	9,39E-03	52	320 85	516 50	6,717	00+100	7 0E-02
193395 Indeno(1,2,3-cd)pyrene 205002 Benzo(NM:smmthsss	3 47 E + 06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06	52	809 15	1078 24	17,000	2 1E-04	0 0E+00
206440 Fluoranthana	1 07E+05	3.025-02	5 35E-06	1 50E-03	4 35E-U3 6 60E-D4	1 11E-04	8 8	715 90	969 27	15,000	2 1E-04	00000
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40 E-05	8 29E-07	2 5	553 15	1019 70	16,010	2 1F-05	004100
218019 Chrysens	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05	52	714 15	979.00	16,455	2 1E-06	00+00
309002 Aldnn	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	52	603 01	839 37	13,000	4 9E-03	0 0E+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05	52	596 55	839 36	13,000	1 8E-03	00=+00
51955/ Deta-MCH (Deta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	32	596 55	839 36	13,000	5 3E-04	0 0E+00
606202 2.6-Dinitrotoluene	6 92F+01	3 27 E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02	8 8	381 15	587 38	7,000	3.7E-05	205-02
621647 N-Ntrosodi-n-propylamine	2 40E+01	5 45F-02	8 17 1-06	9 895+03	9 23 12-03	2 2512 06	3 6	220.00	7,000	2,320	- с 10- с 40- п	20 4
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9.51E-06	3 2	509 d0 613 96	848.76	13,000	2 65.03	00+100
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02	32	629 88	1750 00	14,127	000+00	3 0E-04
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	22	657 15	873 31	14,000	3 2E-04	0 0E+00
11096825 Arodor 1260 (PCB-1260) 11097691 Arodor 1264 (PCB-1264)	2.90E+05	1 38E-02	4 32E-06	8 00E-02	1.89E-01	4 60E-03	52	402 50	539 37	19,000	1 06-04	0 0E+00
12674112 Arador 1016 (PCB-1016)	3.30F+04	7.22E-02	5 42E-06	3 /UE-02 4 20E-01	8 20E-02	2 00E-03	2 2	377 50	512.27	19,000	96.04	00 00 00 00 00 00 00 00 00 00 00 00 00
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02	531E-06	3,40E-01	2.13E-02	5 20E-04	9 19	340,50 345,50	475 22 482 20	18,000 18,000	1 OH 04	0000
									1		!	

6 of 7

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

		ENTER	User-defined stratum A soil vapor permeability,	k, (cm²)		
			æ	•	٦	
	:	ENTER	ate	sou vapor permeability)	SI	ENTER Stratum C soil water-filled porosity, $\theta_w^c$ $(\alpha m^3/cm^3)$
		ENTER	SCS soil type	directly above water table	S	ENTER Stratum C soil total porosity, n <sup>c</sup> (untless)
		ENTER	Soil stratum directly above	water table, (Enter A, B, or C)	U	ENTER Stratum C soil dry bulk density, $\rho_{\rm b}^{\rm c}$ (g/cm³)
		ENTER (Lwr (cell D28)	Thickness Thickness of soil of soil stratum B, stratum C, (Enter value or 0)	CCII)	1158 24	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ (cm³/cm³)
Chemical	Benzene	INTER ENTER ENTER Totals must add up to value of Lwr (cell D28)	Thickness of soil stratum B, (Enter value or 0)	(cm)	304 8	ENTER Stratum B soul total porosity, n for
		ENTER Totals mu	Thickness of soil stratum A,	(cm)	762	ENTER Stratum B soil dry bulk density, P <sub>b</sub> (g/cm³)
1 5		ENTER	Depth below grade to water table,	(cm)	2225 04	ENTER Stratum A soil water-filled propsity, $\theta_{w}^{A}$ ( $\alpha m^{3}/\alpha m^{3}$ )
ENTER Inital groundwater conc, Cw (ug/L)	5	ENTER Depth	below grade to bottom of enclosed space floor,	(cm)	15	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)
Chemical CAS No (numbers only, no dashes)	11432	ENTER	Average solf groundwater temperature, T.	(2)	16	ENTER Stratum A soil dry bulk density, Po (g/cm³)

5	air exchange	rate,	띪	(1/h)	0.45						
	seam crack	width,	3	(cm)	0.1	ENTER	Target hazard	quotient for	noncaranogens	된	(unitless)
	space	height,	ī	(cm)	488	ENTER	Target	nsk for	cardinogens,	또	(unitless)
	floor	width,	W	(cm)	961	ENTER		Exposure	frequency,	毌	(days/yr)
	floor	length,	ů,	(cm)	961	ENTER		Exposure	duration,	ED	(yrs)
•	pressure	differential,	ΔР	(g/cm-s²)	40	ENTER	Averaging	time for	noncarcinogens,	AT	(yrs)
	floor	thickness,	Lorect	(cm)	15	ENTER	Averaging	time for	cardinogens,	ΑT <sub>C</sub>	(yrs)

Used to calculate nsk-based groundwater concentration 1 of 7

1 0E-06

Reference conc, RfC (mg/m³)	0.00
Unit risk factor, URF (µg/m³)*1	8.3E-06
Pure component water solubility, S S (mg/L)	1 75E+03
Organic carbon partition coefficient, K <sub>sc</sub> (cm³/g)	5 89E+01   1 75E+(
Critical temperature, T <sub>c</sub> (*K)	562.16
Normal boiling point, T <sub>B</sub>	353 24
Enthalpy of vaponization at the normal boiling point, AH, b (cal/mol)	7,342
Henry's law constant reference temperature, T <sub>R</sub>	25
Henry's law constant at reference temperature, H (atm-m³/mol)	5 56E-03
Diffusivity In water, D <sub>w</sub> (cm²/s)	9 80E-06
Diffusivity in air,  D.  (cm²/s)	8.80E-02

Floor wall seam permeter, X <sub>on</sub> a	3,844	Diffusion path length, L <sub>d</sub> (cm)
Water-filled porosity in capillary zone, $\theta_w = (cm^3/cm^3)$	. 1 1	Total overall effective diffusion coefficient, D*T (cm²/s)
Au-filled porosity in capillary zone, $\theta_{\bullet, cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.136	Capillary  zone effective diffusion coefficient, D** (cm²/s)
Total porosity in capillary zone, no capillary (con ° (cm ³) (cm ³) (cm ³) (cm ³)	0 43	Stratum C c effective diffusion coefficient, Deff c (cm²/s)  Reference conc , RfC (mg/m³)
Thickness of capillary zone, La	17 05	Stratum B effective diffusion coefficient, D eff a (cm²/s) 9.05E.04 9.05E.04 Unit nsk factor, URF (µg/m³)**
Stratum A soll effective vapor permeability.	6 98E-10	Stratum  A effective diffusion coefficient, Deff (cm²/s) 357E-03 Infinite source bidg conc. Chading
Stratum A soil relative air permeability, kg (cm²)	0.746	Vapor viscosity at ave soil temperature, Hrs (g/cm-s) (g/cm-s) 177E-04 Infinite source indoor attenuation coefficient, a Unitless)
Stratum A soil soil inthinsic permeability, k	9 36 <b>E-</b> 10	Henry's law constant at ave groundwater temperature, H'rs (unitless)  1 53E-01  Exponent of equivalent foundation Peclet number, exp(Pe!)  (unitless)
Stratum A effective total fluid saturation, Sta	0.419	Henry's law constant at ave groundwater temperature,  Hrs  (atm-m³/mol)  3.64E-03  Area of crack,  Area of crack,  Area of crack,  Area of crack,
Stratum C sol au-filled porosity, $\theta_a^c$ (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, ΔH, rs (cal/mol)  Crack effective diffusion coefficient, Donat (cm²/s)
Stratum B soil art-filled porosity, $\theta_a^B$ (cm³/cm³)	0,150	Crack depth below grade, Zoot (Cm) 15 16 Average vapor flow rate into bldg , Quad (Cm <sup>3</sup> /s)
Stratum A soit air-filled porosity, $\theta_{a}^{A}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio,  n (unifiess) 4 16E-04 Crack radius, faxe (cm)
Source- building separation, L <sub>7</sub>	2210 04	Area of enclosed space below grade,  A <sub>B</sub> (cm²)  9 24E+05  Source vapor conc ,  Cware (µg/m³)
Exposure duration, t (Sec)	9 46E+08	Bidg. ventilation rate, Questing (cm³/s)  Convection path length, L (cm)

RESULTS SHEET

RISK-BASEL	RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	R CONCENTR	ATION CALC	ULATIONS	INCREMENTAL	NCREMENTAL RISK CALCULATIONS
10 10 10		3	ć	i L	incremental	Hazard
2002	Indodi	KISK-Dased	7.Ce	Final	risk from	quotient
exposure	exposure	indoor	component	ındoor	vapor	from vapor
groundwater	groundwater	exposure		exposure	intrusion to	intrusion to
conc ,	conc,	groundwater	solubility,	groundwater	indoor air,	Indoor air,
carcinogen	noncarcinogen	conc,	ဟ	conc.,	carcinogen	noncarcinogen
(µg/L)	(µg/L)	(µg/L)	(hg/L)	(mg/L)	(nuitless)	(unitless)
4.75E+02	NA	4 75E+02	1 75E+06	4 75E+02	AN	¥

ERROR SUMMARY BELOW. (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

					יייייייייייייייייייייייייייייייייייייי	
		Soil Properties Lookup Table	Lookup Table			
K, (cm/h)	α (1/cm)	N (unitless)	M (unitless)	θ, (cm³/cm³)	9, (cm³/cm³)	Mean Grain Diameter (cm)
0.20		1 09				0 0002
0.26		131	0 237			0.016
4		1 56	0 359			0 0 0 0
14.55						0.040
29 70		2 68				7700
0 12	720.0		0 187	0 38	0 100	0.025
131		148	0 324			0000
0 25		1 37	0 270			0 0048
0 02		1 09	_			60000
0 0		1 23	0 187			9500 0
0 45		141	0 291	0 45		0 0 11
4 42		1.89	0 471	0 41	_	0.030

	•				Circuit a l'operites Louville I able	up lable						
	Organic			Pure		Henry's	Henry's			Enthalpy of		
	carpon			component		law constant	law constant	Nomal		vaporization at	Çart	-
	partition	Officerenty	Diffusivity	water	Henry's	atreference	reference	boling	Critical	the normal	rısk	Reference
	coemicient,	ın air.	in water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,	conc,
	¥.	o" '	<u>.</u> *	w	ì	I	۳	<u>"</u> "	Ļ	۵H,	AR.	RfC
CAS No Chemical	(cm²/g)	(cm²/s)	(cm <sub>2</sub> /s)	(mg/L)	(unitless)	(atm-m³/mol)	(၁)	( <sup>R</sup> )	(K)	(cal/mol)	(mg/m <sup>3</sup> )	(mg/m³)
50293 DDT	2 635+06	1 37E-02	4 95E-06	2.505-02	3.305,04	80.30t 8	y.	533 46	37.007	44	, ,	L
50328 Benzo(a)nyrene	30+110	7 305 02	90 1100	1000	20 1100	0 101-00	3 :	200	0/07/	000,11	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00+00
51285 2 4 Deliterational	201.00	100100		50-370 I	4 63E-U3	1 135-06	52	715 90	969 27	15,000	2 1E-03	0 0 0 0
21202 Z,4+Difficulting	1 00E-02	2 /35-02		2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0E+00	7 0E-03
53/03 Dibenz(a,h)anthracene	3 80E+06	2 02E-02		2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16.000	2 15-03	00+30 O
56235 Carbon tetrachloride	1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7.127	1.5F-05	00+100
56553 Benz(a)anthracene	3 98E+05	5 10E-02	90E-06	9 40E-03	1 37E-04	3 34E-06	52	708 15	1004 79	15,000	2 TE 5	00+U
57749 Chlordane	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13 000	3 7 E	00+100
58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839.38	13,000	3.7E-04	00+00
60571 Dieldrin	2 14E+04	1 25E-02	4 74E-06	195E-01	6 19E-04	1 51E-05	25	613 32	842 25	13 000	4 6H 03	00+100
65850 Benzoic Acid	6 00E-01	536E-02	7 97E-06	3 50 € + 03	6 31E-05	1 54E-06	25	720 00	751.00	10,000	0.05+00	1 45 +04
67641 Acetone	5 75E-01	1 24E-01	1 14E-05	1005+06	1 595-03	3 88E-05	52	329 20	508 10	6.955	00+100	2 4 4 C
67663 Chloroform	3 98E+01	1045-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6.988	2 3 T-05	00+00
67721 Hexachloroethane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	52	458 00	695 00	9.510	4 OF 56	00+00
71363 Butanol	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	25	390 88	563 05	10.346	0.05+00	3.55.01
71432 Benzene	5 89E+01	8 80E-02	9 80E-06	175E+03	2 28E-01	5 56E-03	25	353 24	562 16	7.342	8 3F-08	005+00
71556 1,1,1-Trichloroethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7.136	0 0F+00	201
72208 Endrin	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	718 15	986 20	12,000	00E+00	1 4 1 03
72435 Methoxychior	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14 000	00+100	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
72548 DDD	1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	8 9F.05	00.00
72559 DDE	4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10F-05	3 5	636 44	86038	000,65	20-00	000
74839 Methyl bromide	1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	35.	278 71	467.00	3,50	CO-11/ 6	00120
75014 Vinyl chloride (chloroethene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2 715-02	25.55	259 25	432.00	ייה מיני	201200	20-110-0
75092 Methylene chloride	1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	32 <u>1</u>	313 00	510.00	6 706	10 H	00+100
75150 Carbon disulfide	4 57E+01	104E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	52	319 00	552 00	6.391	0.05+00	7.05.01
75252 Bromoform	8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422 35	00 969	9.479	1 1F-06	00110
75274 Bromodichloromethane	5 50E+01	2 98E-02	1 06E-05	674E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 8E-05	00+00
75343 1,1-Dichloroethane	3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61 6-03	25	330 55	523 00	6,895	00+300	5 OF 01
75354 1,1-Dichloroethylene	5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	52	304 75	576 05	6.247	5000	0.05+00
76448 Heptachlor	1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	84631	13.000	1 35-03	00+000
77474 Hexachlorocyclopentadiene	2 00E+05	161E-02		1 80E+00	1 11E+00	2 716-02	52	512 15	746 00	10.931	0.05+0.0	7 OF 05
78591 Isophorone	4 68E+01	6 23E-02		1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10.271	2 7E-07	00+10
78875 1,2-Dichloropropane	4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7.590	00+400	0000
79005 1,1,2-Trichloroethane	5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602.00	200. A	100	00.00
79016 Trichloroethylene	1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25	360.36	544 20	7.505	76.00	00+100
79345 1,1,2,2-Tetrachloroethane	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 445-04	25.	419.60	661 15	900 8	000	00-1-00
83329 Acenaphthene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1.55E-04	3,5	550 54	803 15	956,0	00.70	00+300
							ì		2	7, 130	2010	7 IE-01

84662 Diethylphthalate	2 88E+02	2 56E-02	6 35E-06	-	VLOCKUP I ABLES 1 85E-05	4 51E-07	52	567 15	757 00	13,733	0 0 0 0 0	2.8F+00
Di-n-butyl phthalate	3 39 €+04	4 38E-02	7 86E-06	1 12E+01	3 855-08	9 39E-10	22	613 15	798 67	14.751	001100	2 50.01
Butyl benzyl phthalate	5 75E+04	1 74E-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06	32	09 099	839 68	13,000	20+110	2 0 0
N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 00E-06	52	632 28	890 45	13,000	145-06	201
Fluorene	1 38E+04	3 63E-02	7 88E-06	1 98E+00	2 61E-03	6 37E-05	22	570,44	870 00	12,666	0 0F+00	14.0
Carbazole	3.39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	52	627 87	899 00	13.977	5 7F-06	00+110
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	00+400
renachiorophenol 2 4 S.Tricklopphenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	52	582 15	813.20	14,000	3 4E-05	0 0E+00
Naphthalana	2010102	5 10E-02	7 505.06	3 105 101	3 19E-04	7.78E-06	<b>8</b> 8	519 15	749 03	12,000	3 1E-06	0 0E+00
3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74 E-06	3 11 = +00	1 64F-07	4 00E-04	6 %	560 26	754.03	10,373	000+00	146-01
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20F-03	3 %	417.60	734 03	13,000	2 C	004400
2-Methylphenal (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04		1 20E-06	22	464 19	697.60	0000		1 on the
1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	22	453 57	705 00		0.05+00	2000
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90€-04	\$2	447 53	675 00		00+100	1 8F-02
2,4,5-Trichtorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	52	526 15	759 13		00+00	3.5F-01
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	52	483 95	719 00		000+000	2 0E-03
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20		0 0E+00	1 0E+00
100423 Stylelle 105679 2 4-Dimethylaborol	/ /8E+02	7 10E-02	8 005-06	3 105+02	1 13E-01	2 76E-03	52	41831	636 00		0.000	1 0E+00
o-Xvlene	3.89F+02	2 84E-02	8 69E-06 8 44E-06	7.87E+U3	8 20E-05	2 00E-06	52	484 13	707 60		0 0E+00	7 0E-02
1.4-Dichlorobenzene	6 17 1 102	6 90E-02	7 905-06	7 205-102	10-11-0	7 00E-03	9 5	411 52	616.20	8,525	0 0 0 0	7 05+00
106478 p-Chloroanline	6.61F+01	4 83F-02	1011105	7 30E+01	9 90E-02	2 43E-U3	2 5	447.21	684 75		000	8 0E-01
1,2-Dichloroethane	1 74E+01	104E-01	90E-06	8 52E+03	4 01E-02	3 32E-0/ 9 78E-04	6 K	358 65	754 00	11,689	00=+00	1 4E-02
Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	52	345 65	519 13		0.01100	20E-00
08383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03	25	412 27	617 05		0.05+00	708+00
08883 Toluene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2.72E-01	6 63E-03	25	383 78	591 79		00+00	4 DE-01
Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03	52	404 87	632 40		0 OE+00	2 0E-02
Prienoi Din/3 objects/bull-selves	2 88E+01	8 20E-02	9 105-06	8 28E+04	1 63E-05	3 98E-07	52	455 02	694 20		0 0E+00	2 1E+00
Endosultan	2 14E±03	1 155-02	7 55E-06	F 10E 04	7.38E-U4	1805-05	52 1	451 15	629 79		3.3E-04	0 0 0 + 00
17817 Bis(2-ethylhexyl)ohthalate	1.51E+07	3.51E-02	3.55E-06	2 40m-01	4 59E-04	1 12E-05	52 12	674 43	942 94		0.05+00	2 1E-02
17840 Di-n-octyl phthalate	8 32E+07	151E-02	3.58E-06	2 00E-02	2 74E-03	6 68E-05	8 K	704 NG	806 UU 862 22	15,999	4 01-08	0 0E+00
Hexachtorobenzene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03	2 2	582 55	825.00	14 447	4 6F-04	0.05+0.0
Anthracene	2 95E+04	3 24E-02	7 74 E-06	4 34E-02	2 67E-03	6 51E-05	52	615 18	873 00		0.05+00	1 1E+00
1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03	52	486 15	725 00		0.000	2 0E-01
2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06	52	482 15	708 17	11,000	0 0E+00	1 1E-02
Z114Z Z,4-Uinitrotoluene  24484 Chlorodhamometham	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	25	290 00	814 00	13,467	1 95-04	0 0E+00
Chlorodipromomentarie Tetrachlorodibulene	4 55 E + 01	1 96E-02	1 05 E-05	2 60E+03	3 21E-02	7 83E-04	25	416 14	678 20	8,000	2 4E-05	0 0E+00
29000 Pyrene	1 05E+05	2 72E-02	7.24E-06	1.35F-01	4 51E-04	1 4011.05	8 8	394 40	620 20		5 8E-07	0 0E+00
56592 cis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 505+03	1 67E-01	4 07E-03	3 %	333.65	930 GC		004400	25 11 6
56605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85 5-01	9 395-03	2 2	320.85	516.50	6.717	0.00+00	7 OF 02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06	92	809 15	1078 24	17,000	2 1E-04	0 0E+00
Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 565-06	1 50E-03	4 55E-03	111E-04	53	715 90	969 27	15,000	2 1E-04	0 0E+00
205440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 61E-05	52	655 95	905 00	13,815	0 0E+00	1 4E-01
207009 Denzo(Kjinorantnene 218010 Champan	1 Z3E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07	52	753 15	1019 70	16,000	2,1E-05	0 0E+00
309002 Alden	3 365 103	1 220 02	90-3170	1 50 E-03	3 88E-U3	9 46E-05	<b>S</b> 2	714 15	979 00	16,455	Z1E-06	0 0E+00
319846 alpha-HCH (alpha-BHC)	1 23F±03	1 42F-02	7 345-06	2 005-01	0 97 E-US	1 / UE-U4	2 5	603 01	839 37	13,000	4 9E-03	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
319857 beta-HCH (beta-BHC)	1.26F±03	1 42F-02	7.345-06	2 40E-01	3.05E-04	7 445 67	9 8	00 000	839.35	13,000	1 8E-03	0.05+0.0
542756 1.3-Dichloropropene	4.57F+01	6.26F-02	1,005-05	2 805-03	3 03E-03	7 44E-07	9 5	286 35	839 36	13,000	5 3E-04	0.05+00
606202 2,6-Dinitrototuene	6 92E+01		7 26E-06	1 82E+02	3.06F-05	7.485-07	G K	20 - 20	38/ 38	7,000	0 L	70407
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23 E-05	2 25E-06	25.	509.60	746.87	11,000	2 OH 0	200
1024573 Heptachlor epoxide	8 32E+04	1325-02	4 23E-06	2 00E-01	3 90E-04	9515-06	52	613.96	848 76	13 000	265-03	004400
7439976 Mercury (elemental)	5 20E+01	3 07 E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02	32	629 88	1750 00	14,127	000+00	3 OE-04
Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	52	657 15	873 31	14 000	3 2E-04	0 0E+00
11096825 Aroctor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	25	402 50	539 37	19 000	1 0E-04	0 0E+00
1097691 Aroctor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	52	377 50	512 27	19 000	1 0E-04	0 0E+00
126/4112 Arocor 1016 (PCB-1016)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	52	340 50	475 22	18,000	1 05-04	0 0E+00
53459219 Aracior 1242 (PCB-1242)	3 30E+04	2 146-02	5 31E-06	3 40E-01	2 13E-02	5 20E-04	22	345 50	482 20	18,000	1 0E-04	0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below) 8

		ENTER	User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm²)
		ENTER	stretum A SCS SCS soil type (used to estimate OR soil vapor permeability)
		ENTER	SCS soil type directly above water table
		ENTER	Soul stratum drectly above water table, (Enter A. B, or C)
	oethene)	ENTER I Lwī (cell D28)	Thuckness of soil stratum C. (Enter value or 0) hc (cm)
Сћетиса	Vinyl chloride (chloroethene)	NTER ENTER ENTER Totals must add up to value of LwT (cell D28)	Thickness Thickness of soil stratum B, stratum C, (Enter value or 0) (Enter value or 0) h <sub>e</sub> h <sub>c</sub> (cm) (cm) (cm)
	Vin	ENTER Totals mu	Thickness of soil stratum A, h, (cm)
		ENTER	Depth below grade to water table, Lwr (cm)
ENTER Initial groundwater conc , C <sub>W</sub> (µg/L)	1 55	ENTER Depth	below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)
ENTER Chemical CAS No (numbers only,	75014	ENTER	Average some groundwater temperature.  Ts (C)

ENTER ENTER	Stratum C Stratum C	soil water-filled soil dry soil total	porosity, bulk density, porosity,	#*	(g/cm³) (unitless)	042 027 17 043	ENTER			seam crack	height, width, rate.		(cm) (cm) (1/h)	488 01 045		Target Target hazard		
				ී්ද	Ĭ	17		Enclosed	_		width, h		(cm)	961	ENTER			frequency, carc
ENTER	Stratum A	soil water-filled	porosity,	Ψ.	(cm <sub>3</sub> /cm <sub>3</sub> )	0.2	ENTER	Enclosed	space	floor	length,	ث	(cm)	961	ENTER		Exposure	duration,
ENTER	Stratum A	soll total	porosity,	Ψ_	(unitless)	0.43	ENTER		Soil-bidg	pressure	drfferential,	ΔP	(g/cm-s²)	40	ENTER	Averaging	ume for	noncarcinogens,
ENTER	Stratum A	soil dry	bulk density,	<b>₹</b> &	(g/cm³)	1.5	ENTER	Enclosed	space	floor	thickness,	Lorse	(ciu)	15		Averaging		

윤	(unitiess)	-	ate risk-based concentration of 7
Œ	(unitless)	1 0E-06	Used to calculate risk-based groundwater concentration 1 of 7
H.	(days/yr)	350	
<b>a</b>	(yrs)	30	
ATNC	(yrs)	30	
ΑT <sub>C</sub>	(yrs)	70	
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	Reference	conc	RfC	(mg/m <sub>3</sub> )	00,100
<u>.</u>	ılsk	factor,	JRF	(md/m <sub>3</sub> )	0 15 05
Pure	water	solubility,	ဟ	(mg/L)	250 25   432 00   1 86E±01   2 75E±02   6 1E 05   0 00±000
Organic	partition	coefficient,	ጜ	(cm <sub>3</sub> /g)	1 885.01
	Critical	temperature,	ို	(°K)	432 00
Normal	polling	point,	۳	(%)	259.25
Enthalpy of vaporization at	the normal	boiling point,	ΔH,ъ	(cat/mol)	5.250
Henry's law constant	reference	temperature,	F.	(၁ <sub>၄</sub> )	25
Henry's law constant	at reference	temperature,	I	(atm-m³/mol)	1 06E-01   1 23E-06   2 71E-02
	Diffusivity	in water,	֓֞֞֞֞֞֓֓֓֓֓֓֓֓֟	(cm <sub>2</sub> /s)	1 23E-06
	Diffusivity	In air,	വ് '	(cm,/s)	1 06E-01

Floor- wall seam penmeter, Xeack	3,844	Diffusion path length, Le	2545 32	
Water-filled porosity in capillary zone, $\theta_w = \frac{\theta_w \alpha}{(cm^3/cm^3)}$	0 294	Total overall effective diffusion coefficient, $D^{eff}$ : $(cm^2/s)$	1 03E-03	
Air-filled porosity in capillary zone, $\theta_{\mathbf{k},\mathbf{c}}$	0 136	Capillary zone confective diffusion coefficient, Deff cm²/s)	7 41E-04	
Total porosity in capullary zone,	0 43	Stratum C effective diffusion coefficient, D <sup>eff</sup> c (cm <sup>2</sup> /s)	6 43E-04	Reference conc , RfC (mg/m³)
Thickness of capillary zone,	17 05	Stratum B effective diffusion coefficient, D eff (cm <sup>2</sup> /s)	1 08E-03	Unit nsk factor, URF (µg/m³) <sup>-1</sup>
Stratum A soil effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, Deff (cm²/s)	4 29E-03	Infinite source bldg conc , Chackeng (μg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub> (cm²)	0 746	Vapor viscosity at ave, soil temperature, µrs	177E-04	Infinite source indoor attenuation coefficient, a c (unitless)
Stratum A soil intrinsic permeabiity, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)	8.81E-01	Exponent of equivalent foundation Pectet number, exp(Pe <sup>§</sup> ) (unitless)
Stratum A effective total fluid saturation,  S <sub>k</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0 419	Henry's law constant at ave, groundwater temperature, H <sub>TS</sub> (atm-m³/mol)	2 09E-02	Area of crack, Acad (cm²) 384E+02
Stratum C soil arr-filled porosity, $\theta_c^c$ $(cm^3/cm^3)$	0 130	Enthalpy of vaporization at ave groundwater temperature, AH, rs (cal/mol)	4,933	Crack effective diffusion coefficient, Deact (cm²/s)
Stratum B soil aur-filled porosity, $\theta_{\bf a}^{\rm B}$ $({\rm cm}^3/{\rm cm}^3)$	0 150	Crack depth below grade, Z <sub>crack</sub>	15	Average vapor flow rate into bldg.,  Qued (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_{\bullet}^{\bullet}$ $(cm^3/cm^3)$	0 230	Crack- to-total area ratio, η	4.16E-04	Crack radius, rand (cm)
Source- building separation, L <sub>T</sub>	2545,32	Area of enclosed space below grade, Ae	9 24E+05	Source vapor conc , C <sub>source</sub> (µg/m³)
Exposure duration, r	9 46E+08	Bidg ventilation rate, Q <sub>buden</sub> (cm <sup>3</sup> /s)	5 63E+04	Convection path length, L, (cm)

#### RESULTS SHEET

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INCREMENTAL RISK CALCULATIONS,

Hazard quotient	from vapor intrusion to	Indoor alr,	noncarcinogen (unitless)	ΨZ
Incremental risk from	vapor intrusion to	ındoor air,	carcinogen (unitless)	ΑN
Final	indoor exposure	groundwater	conc., (µg/L)	7 73E+00
Pure	component water	solubility,	(hg/L)	2.76E+06
Risk-based	indoor exposure	groundwater	conc, (µg/L)	7 73E+00
Indoor	exposure groundwater	conc	noncarcinogen (µg/L)	ΑN
Indoor	exposure groundwater	conc,	carcinogen (µg/L)	7 73E+00

(DO NOT USE RESULTS IF ERRORS ARE PRESENT) ERROR SUMMARY BELOW

VLOOKUP TABLES	Soil Properties Lookup Table	1) N (unitless) M (unitless) 8, (cm³/cm³) 8, (cm³/cm³) Mean Grain Diameter (cm)	0.008 1.09 0.083 0.38 0.068 0.0092	131 0237 041 0095	156 0359 043 0078	2 28 0 561 0 41 0 057	2 68 0 627 0 43 0 045	123 0187 038 0100	0 324 0 39 0 100	137 0270 046 0034	109 0083 0.26 0.070	0 43		0 41
		K, (cm/h) a (1/cm)	0.20	0.26							0.05		0.45	

				Chemic	Chemical Properties Lookup Table	) Table						
	Organic			Pure		Henry's	Henry's			Enthatpy of		
	carpon	;	;	component		law constant	law constant	Normal		vaponzation at	Unit	
	partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	poiling	Critical	the normal	¥SL	Reference
	coefficient,	ın aır,	ın water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	boiling point,	factor	COLC
	Ϋ́,	<b>o</b> " '	<u>.</u>	σ	Ì	I	<del>ا</del> ۳	Fe.	T <sub>o</sub>	ΔH,	URF	RfC
CAS No Chemical	(cm²/g)	(cm*/s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/mol)	(၃)	(K)	( <sup>PK</sup> )	(cal/mol)	(mg/m³)	(mg/m³)
50293 DDT	2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 105-06	36	533 45	35 054	200	i c	L
50328 Benzolalbyrene	1 02F+06	4 305-02	90 300 0	10000	4 5 2 2 5 5	20 1	3 :	200	C/ 07/	חחה,רו	G(14) B	00=100
51285 2 4-Dinitoonbood	20.120.	1 200-02	00000	50-320 ·	4 02E-03	113E-06	52	715 90	969 27	15,000	2 1E-03	0 OE+00
COTOS ALTERNATION OF THE PROPERTY OF THE PROPE	20-B00	Z /3E-0Z		2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0E+00	7 0E-03
53/U3 Ulbenz(a,h)anthracene	3 805+06	2 02E-02		2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03	00000
56235 Carbon tetrachloride	1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	1.5F-05	00+00
56553 Benz(a)anthracene	3 98E+05	5 10E-02	9 OOE-06	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	15,000	20 H	20 10 0
57749 Chlordane	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13 000	3.7F.04	00.100
58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839.36	13.000	2 7E-04	00,100
60571 Dieldrin	2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1515-05	25	613.32	842.25	13,000	100	0000
65850 Benzoic Acid	6 00E-01	5 365-02	7 97E-06	3 50E+03	6 31E-05	1545-06	25	720.00	751.00	000 01	00100	100
67641 Acetone	5 75E-01	1 24E-01	1,14E-05	1 00E+06	1 59E-03	3 88E-05	22	329 20	508 10	955		26.04
67663 Chloroform	3 98E+01	104E-01	1 00E-05	7 92E+03	1 50E-01	3 66 6-03	*	334.32	536 40	900	30.00	00.50
67721 Hexachloroethane	1 78E+03	2 505-03	6 80E-06	5 00E+01	1 59E-01	3 886-03	25.	458.00	695.00	0,300	2000	0000
71363 Butanol	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 615-04	A 80F-06	35	300 88	562.05	0.00	00,10	00100
71432 Benzene	5 89E+01	8 805-02	9 80E-06	1 75E+03	2 28E-01	5.565-03	3,5	353 24	562 35	7 343	005100	20000
71556 1,1,1-Trichloroethane	1 10E+02	7 80E-02	8 30E-06	133E+03	7.055-01	1 725-02	3 %	347.24	202 10	7+0,-	00-10-0	00+100
72208 Endin	1 23E+04	125E-02	4 74E-06	2.50F-01	9 OSE-04	7.545.06	2.5	47 64	242.00	351,7	0 UE+00	1 0E+00
72435 Methoxychlor	9 77F+04	1 56E-02	4 465-06	4 500 03	2 4 GT C	90-316.4	9 8	CL 917	986 20	12,000	0 0E+00	1 15-03
72548 DDD	1 005+06	1 69E-02	4 785.08	4 305-02	1 645 04	1 201 20	<b>S</b> 1	651 02	848 49	14,000	0 0E+00	1 8E-02
72559 DDE	4 475+06	1440.00	200	3 005-02	+ 6 - 6 - 6	4 00E-06	S	639 90	863 77	14,000	6 95-05	00+300
74839 Methyl bromide	1051100	70-144-1	00000	10-202	8 0 III 0 4	2 105-05	22	636 44	860 38	13,000	9 7E-05	0 0E+00
75014 Vind chloride (chloroethene)	1 866 +04	70-07	2012	1 325+04	2 56E-01	6 24 E-03	22	276 71	467 00	5,714	0 0E+00	<b>5 0E-03</b>
75092 Mothylene chloride	194401	0001	125-00	2 /5E+U3	1 11E+00	2 716-02	25	259 25	432 00	5,250	8 4E-05	0 0E+00
75150 Carbon disuffice	104071	0 0 0	20-1/1	1 30E+04	8 98E-02	2 19E-03	52	3138	510 00	6,706	4 7E-07	3 OE+00
75252 Bromoform	0 715+01	400	CO-300 -	1 195+03	1.24E+00	3 02E-02	25	319 00	552,00	6,391	0 0E+00	7 0E-01
75374 Sprenodichlosmothers	10+31 / 0	1 495-02	CO-100 -	3 10=+03	Z 19E-0Z	5 34E-04	25	422 35	696 00	9,479	1 15-06	0 0E+00
753/3 1 1-Dichlomothono	0 30E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 8E-05	0 0E+00
76954 4 4 Dishlandhidan	105101	7 425-02	100 100	5 USE+U3	2 30E-01	5 61 E-03	25	330 55	523 00	6,895	0 0E+00	5 0E-01
19034 I. I-Didilloreurylene	2 69E+01	9 005-02		2 25E+03	1 07E+00	2 61E-02	52	304 75	576 05	6,247	5 0E-05	00+300
70440 Heptachlor	141E+06	1 12E-02		1 80E-01	4 47E-02	1 09E-03	52	603 69	846 31	13,000	1 3E-03	0.05+00
//4/4 Hexachiorocyclopentatione	Z 00E+05	161E-02	7 21E-06	1 80E+00	1 11E+00	271E-02	25	512 15	746 00	10.931	0.01	7 05.05
78591 Isophorone	4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25	488 35	715.00	10.271	2 7E-07	20,100
78875 1,2-Dichloropropane	4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 155-01	2 B0E-03	25	369 52	572.00	7 590	(A) (A)	20 40 7
79005 1,1,2-Trichtoroethane	5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	32	386 15	602.00	000,0	1 50 06	200
79016 Trichloroethylene	1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	3 K	360 36	544.20	275,0	00-10-	00+100
79345 1,1,2,2-Tetrachloroethane	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1.41E-02	3 445-04	3 K	300	25.45	CDC' /	1 7 1 4 6	0 0 0 0 0
83329 Acenaphthene	7 08E+03	4 21E-02	7 695-06	4 24F+00	8.365-03	1 555.03	3 4	2000	2 6	088.0	C) = 8 C	00=+00
		1		!	2	1 22 52	3	5	603 13	12,155	0.05+00	2 1E-01

		.,			_	00+400					7 0E+001			+00 3 5E-01			7 05-00				-02 0 0E+00			+00 2 0E-02		_	_	-06 0 0E+00	_				05 00 00 00 00 00 00 00 00 00 00 00 00 0				-04 0 0E+00			-05 0 0E+00						0E-03 0.0E+00	-03 0 0E+00			-04 0 0E+00	
	13,733 0 0E+00		13,000 0 0E+00			10,977 3 /E-06 10,206 3 2E-05	14,000 3 4E-05				8,661 0.0E+00				10,566 0 0E+00	8,501 0.0E+00			9,271 0 0E+00			00+30 0 00+30	7.930 0 0E-4				14,000 0 0E+00	15,999 4 0E-06		_			13,467 19E-04 8,000 2,4E-05	8,288 5.8E-07	14,370 0.0E+00		17.000 2.1E-04		13,815 0 0E+00		16,455 2 1E-06 13,000 4 9E-03			7,000 3,7E-05		<b>C1</b> (	~ ~	14,000 3.2E-04	· –	19,000 1 05-04	18 000 1 0F-04
	757 00	798 67	839 68	890 45	00 00	738 00	813 20	749 03	748 40	754 03	630 30 697 60	705 00	675 00	759 13	719.00	617.20	707 60	616.20	684 75	754 00	561 00	617.05	59179	632 40	694 20	629 79	942 94	806 00 862 23	825 00	873 00	725 00	708 17	814 00 678 20	620 20	936 00	544 00	1078 24	969 27	905 00	1019 70	839.37	839.36	839.36	587 38	770 00	746 87	1750 00	87331	539 37	512 27	475 22
	25 567 15			_	25 57044		25 582 15			25 560 26 25 447 60	25 41/00	25 453 57	25 447 53	25 526 15	25 48395	25 409 34	25 484 13	26 41152	25 447 21	25 503 65	25 356 65 36 356 65	25 343 43		25 404 87	25 455 02	25 451 15	25 67443	25 65/15 25 704/09	25 582 55	25 615 18	25 486 15	25 482 15	25 590 00 25 416 14	25 394 40	25 667 95	25 333 65	25 809 15		25 655 95	25 75315 25 71415	25 603.01	25 596 55	25 596 55	25 381 15	25 558 00	25 509 60	25 613 96 25 629 88	25 657 15	25 402 50	25 377 50	26 340.50
	51E-07	39E-10	26E-06	00E-06	535-03	8 15E-03	44E-08	78E-06	83E-04	90E-09	20E-03	90E-03	90E-04	34E-06	40E-05	7 88E-U3 2 76E-U3	2 10E-05	7 66E-03	2 43⊑-03	3 32E-07	9 /8E-04 5 12E-04	345-03	6 63E-03	71E-03	98E-07	80E-05	12E-05	1 02E-07 5 68E-05	32E-03	51E-05	42E-03	3 17E-06	27E-08 83F-04	84E-02	10E-05	07E-03	55E-05	11E-04	615-05	29E-07	705-04	06E-05	44E-07	77E-02	46E-07	25E-06	51E-U6 14E-02	6 00E-06	4 60E-03	2 00E-03	DOE-04
	4.5	) 6	126		ָה היני	- 80	24	7.78	4.4	4 4 2 5	2.5		390	4 3	2 40	20 / 37 C	200	7 66	2 43	333	D 4	26.7	9	37.	366	28.	11.	10.5	132	651	1 42	317	2 2 7	184	110	040	16.	111	161	82.80	3,40	. 1	7 44	17.1	7 46	225	20.6	909	4 60	200	70 0
VLOOKUP TABLES	1 85E-05	3 85E-08	5 17E-05	2 05E-04	6 26E-07	3.34E-01	1 00E-06	3 195-04	1 98E-02	1 54E-U/ 2 13E-01	4 92E-05	7 79E-02	1 60E-02	1 78E-04	9 84E-04	3 23E-01	8 20E-05	3 145-01	9 96E-02	136E-05	2 10E-02	3 01 15-01	2 72E-01	1 52E-01	1 63E-05	7 38E-04	4 595-04	2 74E-03	5 41E-02	2 67E-03	5 82E-02	1 30E-04	3 21E-02	7 54E-01	4 51E-04	1 67E-01	6 56E-05	4 55E-03	6 60E-04	3 40E-05 3 88E-03	5 97 E-03	4 35E-04	3 05E-05	7 26E-01	3 06E-05	9 23E-05	3 90E-04 4 67E-01	2 46E-04	1 892-01	8 20E-02	400.00
ΛΓ	1 08E+03	1 12E+01	2 69E+00	3.57E+01	7.48F+00	3 23E+00	1 95E+03	8 00E+02	3 105+01	1 78F+00	2 60E+04	1 56E+02	2 20E+04	1 20E+03	2 09E+03	3 10F±02	7 87E+03	1 85E+02	7 38E+01	5 305+03	8 52E+03	1 61E+02	5 26E+02	4 72E+02	8 28E+04	1 725+04	5,10E-01	2 00E-02	6 20E+00	4 34E-02	3 00E+02	4 50E+03	2 60E+03	2 OOE+02	1 35E-01	3 50E+03	2 20E-05	1 50E-03	2 06E-01	8 00E-04	1 80E-01	2 00E+00	2 40E-01	2 80E+03	1 82E+02	9 89E+03	5 62E-02	7 40E-01	8 00E-02	5 70E-02	4 20E.01
	6 35E-06	7 86E-06	4 83E-06	0,33E-05 7 88E-08	7 03F-06	6 16E-06	6 10E-06	6 25E-06	7 50E-06	4 /4E-06	8 30E-06	7 90E-06	9 46E-06	7 03E-06	8 60E-06	8005-06	8 69E-06	8 44E-06	7 90E-06	1 01E-05	90-306-6	7 80E-06	8 60E-06	8 70E-06	9 10E-06	7.53E-06	4 55E-06	3 58E-06	5 91E-06	7 74E-06	8 23E-06	8 //E-06	1 05E-05	8 20E-06	7 24E-06	1 135-05	5 66E-06	5 56E-06	6 35E-06	5 25E-06	4 86E-06	7 34E-06	7 34E-06	1 00E-05	7 26E-06	8 175-06	6 30E-06	4 34E-06	4 32E-06	5 00E-06	5 42E-06
		4 38E-02	1 74E-02	3 125-02	3 90E-02	5 61E-02	5 60E-02	3 18E-02	5 90E-02	8 70F-02	7 40E-02	6 90E-02		2 916-02	7 60E-02	7 10F-02	5 84E-02	7 69E-02	6 90E-02	4 83E-02	8.508-02		8 70E-02	7 30E-02	8 20E-02	6 92E-02	1 15E-02 3 51E-02	1 51E-02	5 42E-02	3 24E-02	3 00E-02	3 46E-02	1 96E-02	7,20E-02	2 72E-02	7.07E-02	1 90E-02	2 26E-02	3 02E-02	2 20E-U2 2 48E-U2	1 32E-02	1 42E-02	1 42E-02	6 26E-02	3 27E-02	5 45E-02	3 07E-02	1 16E-02	1 38E-02	1 56E-02	2 22E.D.2
	2 88E+02	3 39E+04	5 75E+04	1 295+03	3 39 0	5 37E+04	5 92E+02	3 81 0 + 02	2 00E+03	3.63E+02	9 12E+01	6 17E+02	3 88E+02	1 60E+03	8 46E+01	7 76E+02	2.09E+02	3 89E+02	6 17E+02	4 746+01	5 25 E+00	4 07E+02	1 82E+02	2 19E+02	2 88E+01	1 555-401	1 515+03	8 32E+07	5 50E+04	2 95E+04	1 78E+03	1 4/E+U2	6 31E+01	1 55E+02	1 05E+05	3 55E+U1	3 47E+06	1 23E+06	1 07E+05	3 985+05	2 45E+06	1 23E+03	1 26E+03	4 57E+01	6 92E+01	2 40E+01	5 20E+01	2 57E+05	2 90E+05	2 00E+05	3 30E+04
	ate	halate	primalate	len sylalling		,3-butadiene	henol	loueudo	anzidina		ol (o-cresol)	enzene	ō	ophenol			henol		enzene	16 20 20 20 20 20 20 20 20 20 20 20 20 20	2			Đ.	100	ınyı)ether	cvi)nhthalate	halate	inzene		obenzene	nerioi	omethane	hytene		iroethylene Jonnethylene	cd)pyrene	anthene	4			upha-BHC)	nta-BHC)	ropene	ener	-propyramine	nental)	•	(PCB-1260)	(PCB-1254)	(PCB-1016)
		84742 Di-n-butyi phthalate	obody Buryl benzyl primalate 86306 N-Nitrosodishoodomico			87683 Hexachloro-1,3-butadiene	87865 Pentachlorophenol	88052 2,4,6-Trichlorophenol	91203 Naprimalene 91941 3 3.Dichtorphenzidine	95476 o-Xvlene	487 2-Methylphenol (o-cresal)	95501 1,2-Dichlorobenzene	578 2-Chlorophenol	95954 2,4,5-Trichlorophenol	533 Nitrobenzene 114 Filivibenzene	425 Styrene	05679 2,4-Dimethylphenal	423 p-Xylene	167 1,4-Dichlorobenzene	478 p-Chloroantine 082 12-Dichloroethans		383 m-Xylene	383 Toluene		352 Phenoi	144 Bis(z-chloroethyl)ether 207 Endosulfan	237 Ettoosullari 317 Bis/2-ethylhexyllubthalate	340 Di-n-octyl phthalate	18741 Hexachlorobenzene	127 Anthracene	321 1,2,4-Trichlorobenzene	21142 2 4-Dictionophenol	481 Chlorodibromomethane	184 Tetrachloroethylene	29000 Pyrene	382 cis-t,z-Dichloroethylene 305 trans-1,2-Dichlomethylene	93395 Indeno(1,2,3-cd)pyrene	205992 Benzo(b)fluoranthene	206440 Fluoranthene	218019 Chrysene	309002 Aldrin	319846 alpha-HCH (alpha-BHC)	319857 beta-HCH (beta-BHC)	542756 1,3-Dichloropropene	606202 2,6-Dinitrotoluene	247 N-Nitrosodi-n-propyjamine 273 Hantachlor enoxide	7439976 Mercury (elemental)	8001352 Toxaphene	1096825 Aroctor 1280 (PCB-1260)	11097691 Aroctor 1254 (PCB-1254)	12674112 Arocior 1016 (PCB-1016)
	846	.40 20 20 20 20 20 20 20 20 20 20 20 20 20	963	86737	867	876	878	986	2 6	954	95487	955	95578	926	100414	100425	1056	106423	106467	105067	1080	108383	108883	108907	108952	115207	117817	117840	1187	120127	120821	121142	124481	127184	129000	156605	1933	2059	205440	2180	3090	3198	3198	5427	505505	1024573	74399	80013	110968	110976	

1 0E-06

Used to calculate nsk-based groundwater concentration

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below) × YES

ENTER initial groundwater conc,

ENTER

YES

	ENTER	User-defined stratum A soil vapor permeability, k, (cm²)		
	ENTER	stratum A SCS Soil type (used to estimate OR soil vapor permeability)	IS	ENTER Stratum C soul water-filled porosity, e, c, c, c, (cm.³/cm.³)
	ENTER	SCS soil type directly above	s	ENTER Stratum C soil total porosity, n <sup>c</sup> (untitiess)
	ENTER	Soil stratum directly above water table, (Enter A, B, or C)	U	ENTER Stratum C soil dry bulk density, p <sub>c</sub> p <sub>c</sub> (g/cm³)
	ENTER If Lwr (cell D28)	Thickness of soil stratum C, (Enter value or 0) hc (cm)	1280 16	ENTER Stratum B soil water-filled porosity, $\theta_n^4$ (cm <sup>2</sup> /cm <sup>2</sup> )
Chemical	NTER ENTER ENTER Totals must add up to value of L <sub>wr</sub> (cell D28)	Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub>	274 32	ENTER Stratum B soil total porosity, n n (unitless)
	ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub> (cm)	1005 84	ENTER Stratum B soil dry bulk density, P. B (g/cm³)
. —	ENTER	Depth below grade to water lable, Lwr (Cm)	2560 32	ENTER Statum A soil water-filled porosity.
groundwater conc. Cw (µg/L)	ENTER Depth	below grade to bottom of enclosed space floor, L <sub>F</sub>	15	ENTER Stratum A sod total porosity. n^A (unitless)
Chemical CAS No (Pumbers only, no dashes) 67663	ENTER	Average soll/ soll/ groundwater temperature, T <sub>s</sub>	16	ENTER Stratum A soil dry bulk density, $ ho_A^A$ ( $g/cm^3$ )

15	0.43	0.2	17	0.42	0.27	1.7	L	0 43	03
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	FNTFR			
Enclosed		Enclosed	Enclosed		i				
space	Soil-bldg	space	space	Enclosed	Floor-wall	Indoor			
floor	pressure	floor	floor	space	seam crack	air exchange			
thickness,	differential,	length,	width,	height,	width,	rate.			
Lone	٩	Ļ	W	ī	*	ER			
(cm)	(g/cm-s²)	(cm)	(cm)	(ma)	(E)	( <del>E</del> 1)			
15	40	961	961	488	0.1	0.45			
ENTER	AH L	FN	OH L	ONTER	COLEMA		ī		
Averaging	Averaging	j		Tomot	Toron house				
2	D	1	1	ימולופו	argei nazard				
TOT BITTE	time tor	Expositive	Exposure	nsk for	quotient for				
ardnogens,	noncarcinogens,	duration,	frequency,	cardinogens,	noncardnogens,				
$AT_{c}$	ATNC	<b>a</b>	띪	포	윤				
(yrs)	(yrs)	(yrs)	(days/yr)	(unitless)	(unitless)				

		Henry's	Henrys	Enthalpy of			Organic	Pure		
		law constant	law constant	vaporization at	Normat		carbon	component	Cont	
Diffusivity	Diffusivity	at reference	reference	the normal	poiling	Critical	partition	water	ŢŝŁ	Reference
mair,	in water,	temperature,	temperature,	boiling point,	point,	temperature,	coefficient,	solubility,	factor,	COUC
ជំ	្នំ	I	T,	ΔH <sub>v,b</sub>	₽	٦°	چّ	S	UR.	R.
(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(atm-m³/mol)	(၃)	(cal/mol)	<b>€</b>	Ą.	(cm <sub>3</sub> /g)	(mg/L)	(µa/m³)-†	(ma/m <sub>3</sub> )
1 04E-01	1 00E-05	3 66E-03	25	6,988	334 32	536,40	3 98E+01	7 92E+03	2 3E-05	0 DE+00
							- Writing			

### INTERMEDIATE CALCULATIONS SHEET

Floor- wall seam penmeter, Xoxek	3,844	Duffusion path length, L <sub>d</sub> (cm)	2545 32	
Water-filled porosity in capillary zone, $\theta_{w,cz}$	0 294	Total overall effective diffusion coefficient, $D^{eff}$ ; $(cm^2/s)$	1 02E-03	
Air-filled porosity in capillary zone, $\theta_{a,\alpha}$	0 136	Capillary zone effective diffusion coefficient, Do <sup>#</sup> ≃ (cm <sup>2</sup> /s)	7,36E-04	
Total porosity in capillary zone,	0.43	Stratum C c effective diffusion coefficient, D''' C (cm²'s)	6 40E-04	Reference conc , RfC (mg/m <sup>3</sup> )
Thickness of capillary zone, L <sub>α</sub>	17 05	Stratum B B effective diffusion coefficient, D E B (cm²/s)	1.07E-03	Unit nsk factor, URF (µg/m³) <sup>1</sup>
Stratum A soil effective vapor permeability, k, (cm²)	6 98E-10	Stratum A effective diffusion coefficient, D=f (cm²/s)	4 22E-03	Infinite source bldg conc , C <sub>bccmq</sub> (μg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub> (cm²)	0 746	Vapor viscosity at ave soil temperature, µrs (g/cm-s)	1 77E-04	Infinite source indoor attenuation coefficient, a (unitiess)
Stratum A soul intrinsic permeability, k	9.36E-10	Henry's law constant at ave groundwater lemperature, H'rs (unitless)	1 046-01	Exponent of equivalent foundation Pectet number, exp(Pe¹) (unitless)
Stratum A effective total fluid saturation, S. S. (cm <sup>3</sup> /cm <sup>3</sup> )	0 419	Henry's law constant at ave groundwater temperature, H <sub>Ts</sub>	2 47E-03	Area of crack, Again (cm²)
Stratum C soil air-filled porosity, e 8 <sub>c</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0 130	Enthalpy of vaporization at ave. groundwater temperature, d.H.,1s (cal/mol)	7,492	Crack effective diffusion coefficient, Dores (cm²/s)
Stratum B soil air-filled porosity, $\theta_a^B$ $(cm^3/cm^3)$	0150	Crack depth below grade, Z <sub>rack</sub> (cm)	15	Average vapor flow rate into bldg , Qua (cm <sup>3</sup> /s)
Stratum A soil air-fiilled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n	4 16E-04	Crack radius, forest (cm)
Source- building separation, L <sub>7</sub>	2545 32	Area of enclosed space below grade, Ae (cm²)	9 24E+05	Source vapor conc, C <sub>source</sub> (µg/m³)
Exposure duration, t (sec)	9 46E+08	Bidg ventilation rate, Quadra (cm <sup>3</sup> /s)	5 63E+04	Convection path length, L <sub>p</sub> (cm)

INCREMENTAL RISK CALCULATIONS	Hazard risk from quotient vapor from vapor intrusion to intrusion to indoor air, indoor air, carcinogen (unitless)
INCRE	
ULATIONS.	Final indoor exposure groundwater conc , (μg/t)
MTION CALC	Pure component water solubility, S (ug/L)
ER CONCENTR	Risk-based indoor exposure groundwater conc, (µg/L)
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS.	Indoor exposure groundwater conc , noncarcinogen
RISK-BASE	Indoor exposure groundwater conc , carcinogen (µg/L)

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

NA 2 40E+02 7 92E+06 2 40E+02

						VLOOKUP TABLES	ES					
SCS Soil Type	K, (cm/h)	a (1/cm)	Sod Properties Lookup Table N (untiless) M (untiless)	ookup Table M (untfess)	e. (cm³/cm³)	A (cm³/cm³)	Mose Grand Comment					
O	0.20	0 00	1 09	0.083	0.38	0.068	O O O					
<u>ರ</u>	0.26	0 0 19	13	0 237	0.41	0.095	35000					
· ·	<u>.</u>	0 036	1 56	0 359	0.43	0.078	0.000					
2.0	14 59	0 124	2 28	0 561	0 41	0 057	0.040					
200	29 70	0 145	2 68	0 627	0 43	0 045	0 0 0 440					
200	0 12	0 027	1 23	0 187	0 38	0 100	0 025					
100	131	0 059	148	0 324	0 39	0 100	0 028					
O.S.	0,00	0.016	137	0270	0.46	0 034	0 0046					
100	000	0.003	50.0	0.083	0.26	0.020	0 0039					
	/00	0.000	2	0 187	0 43	0 089	95000					
18	4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0.020	1.89	0.291	0 45	0 065	0 011					
						200	0000					
	ļ											
					Chemic	Chemical Properties Lookup Table	kup Table					
		Organic			Pure		Henry's	Henry's			Enthalpy of	
		carbon	;		component		law constant	law constant	Normal		vaporization at	Cont
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	polling	Critical	the normal	¥ E
		coefficient,	ਤੂ ਰਜ਼੍ਹੇ	in water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,
S C C C C C C C C C C C C C C C C C C C		8 - E	o" ?	, * - - -	s ·	Ì	<b>エ</b> .	ř	rª	ϰ	ΔH <sub>v</sub> b	-R-
Custo		(cm./g)	(cm-/s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m³/mol)	(၃)	શ	(K)	(cat/mol)	(mg/m <sub>3</sub> )
50293 DDT		2 63E+06	1 37E-02	4 95F-06	2 50F-02	3 32E-04	90 305 08	, c	7,000			
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	9 00E-06	1625-03	4 635,05	1 13 06	9 5	22.5	67073	11,000	9 7E-05
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	90-390-6	2 79E+03	1 82E-05	4 44F-07	<b>2</b> 7	805 20 805 28	/2 898 70 408	15,000	2 1E-03
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	147E-08	35.	743 24	990 41	000'61	2 40 0
		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349.90	556 60	7 127	4 TT-25
50555 Benz(a)anthracene		3 98E+05	5 105-02	9 00E-06	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	15,000	2 16-04
58849 Campa-HCH (Lindana)		1 075-03	10502	4 3/E-U6	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3 7E-04
60571 Dieldrin	_	201405	1 265 03	7.34E-Ub	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04
		6.005.01	5 36E-02	4 /4E-06	1 955-01	6 19E-04	1516-05	25	613 32	842 25	13,000	4 6E-03
67641 Acetone		5 75F-01	3 30E-02	1145.05	3 50E+03	0 315-05	1 54E-06	52	720 00	751 00	10,000	0 0E+00
		3 98€+01	1045-01	1 00 F-05	7 925+03	1 505-03	3 885-05	52 52	329 20	508 10	6,955	0 0E+00
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00F+01	1595-01	2 000 0	6 %	334 32	536 40	6,988	2 3E-05
71363 Butanol		6 92E+00		9 30E-06	7 40E+04	3 6 1 5-04	2000 S	6 K	9000	695 00	9,510	4 0E-06
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56 6 - 03	3 5	353.24	263 U2 562 16	7.346	0.0E+00
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7 136	0.05+00
72425 Motherschies		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	718 15	986 20	12,000	00+400
72548 DDD		9 //E+U4 + OOF + OA	1 561-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	52	651 02	848 49	14,000	0 0E+00
72559 DDE		4 47E±06	1 445.02	4 /0E-UB	9 000-02	1 641-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05
74839 Methyl bromide		1 05E+01	7 28E-02	1216.00	1 525-01	9 56 E 04	2 105-05	52	636 44	860 38	13,000	9 7E-05
75014 Vinyl chloride (chloroethene)	lene)	1865+01	1.06F-01	1 235-05	9 755403	1 1 1 5 2 0 0	6.24E-03	25	276 71	467 00	5,714	0 0E+00
75092 Methylene chlonde		1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 105-02	0 H	07 FC7	432 00	5,250	8 4E-05
75150 Carbon disulfide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24F+00	3.025.00	3 4	2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	00.035	6,706	4 7E-07
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 345-04	3 2	422.35	552 00 598 00	0,391	0.05+00
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	52	363 15	585.85	2,473	2 H
75343 1,1-Dichloroethane		3 16E+01		1 05E-05	5 06E+03	2 30E-01	5 61 E-03	S2 1	330 55	523 00	200, 8	2000
75354 1,1-Dichloroethylene		5 89E+01		1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6.247	505.05
7948 Heptachior		1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	38-03
78501 lenshowns	ene	Z 00E+05	1 61E-02	7.21E-06	1 80E+00	1 11E+00	2 715-02	25	512 15	746 00	10,931	0 0E+00
78875 12-Dichlomoronana		4 375+01	7 825 02	0 705-00	1 20E+04	2 /2E-04	6 63E-06	22	488 35	715 00	10,271	2 7E-07
79005 1,1,2-Trichloroethane		5 01 E+01		8 80 1 06	4 42E+03	3 74E-03	2 80E-03	52	369 52	572 00	7,590	0 0E+00
79016 Trichloroethylene		1 66E+02	7 90E-02	9 105-06	1 10E+03	4 22E-01	9 125-04	S 5	386 15	602 00	8,322	1 6E-05
79345 1,1,2,2-Tetrachloroethane	e.	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 416-02	3 445-04	3 K	419 60	56115	7,505	17E-06
83329 Acenaphthene		7 08E+03		7 69E-06	4 24E+00	6 36E-03	1 55E-04	2 2	550 54	803 15	8,996 12,155	5 85-05
						!				!	ĵ	70.0

Reference conc , RfC (mg/m³)

	1	i	i		VLOOKUP TABLES	1	;	! !				
64064 Chetrylphtnaiate	2 88E+02	2 565-02	6 355-06	1 08E+03	1 85E-05	4 5115-07	52	567 15	757 00	13,733	0 0E+00	2 8E+00
	3 39E+04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10	72 4	613 15	798 67	14,751	0 0E+00	3 5E-01
85687 Butyl benzyl phthalate	5 75E+04	1 74E-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06	22 6	<b>660 60</b>	839 68	13,000	00=+00	7 0E-01
	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 00E-06	22 6	632 28	890 45	13,000	1 4E-06	0 0E+00
86737 Fluorene	1 38E+04	3 635-02	7 88E-06	1 98E+00	2 61E-03	637E-05	22 12	570 44	870 00	12,666	0 0E+00	1 4E-01
86/48 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08		627 87	899 00	13,977	5 7E-06	0 0E+00
87885 Perfection-1,3-butadiene	537E+04	5.61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	222	486 15	738 00	10,206	2 2E-05	0 0 1 100
88062 2.4.6-Trichloraphenol	3.816+02	3 18E-02	6.25E-06	8 00E+02	3 19E-04	7 78F-06		519 15	749.03	12,000	3.4E-U5	001100
91203 Naphthalene	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04		491 14	748 40	10.373	0.05+00	1 4 F-01
91941 3,3-Dichlorobenzidine	7 24E+02	1.94E-02	6 74E-06	3 11E+00	1 64E-07	4 00E-09		560 26	754 03	13,000	1 3E-04	0 0E+00
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03		417 60	630 30	8,661	0 0E+00	7 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06		464 19	09 269	10,800	0 0E+00	1 8E-01
95501 1,2-Dichlorobenzene	6 17E+02	6 905-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03		453 57	705 00	9,700	0 0E+00	2 0E-01
955/8 Z-Unidrophenoi	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04		447 53	675.00	9,572	0 0E+00	1 8E-02
85854 Z,4,5-1 fightorophenol	1 60E+03	291€-02	7 035-06	1 20E+03	1 /8E-04	4 34E-06	52	526 15	759 13	13,000	0 05+00	3 5E-01
100414 Fibulbanzana	3 535+01	7 505.02	2 BOE-05	2 USE +U3	40 H C C C	2.405-03		463.95	00 617	10,566	0.0E+00	2 0E-03
100425 Styrana	7 76F±02	7 10F-02	8005-06	3 10F+02	1 13E-01	7 56E-03		409 34	636.00	100,0	001100	20110
105679 2 4-Dimethylphenol	2 09E+02	5 R4F-02	8695-06	7.87E+03	A 2015-05	2005-08	3 6	480.43	202 60	20,0	00400	200
106423 p-Xvlene	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 145-01	7 66E-03		411.52	616.20	8 525	0.05+00	705-07
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03		447 21	684 75	9.271	0.01+0.0	8 07.01
106478 p-Chloroaniline	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07		303 65	754 00	11,689	0 0E+00	14E-02
107062 1,2-Dichloroethane	174E+01	1046-01	9 90E-08	8 52E+03	4 01E-02	9 78E-04	25 3	356 65	561 00	7,643	2 6E-05	0 0E+00
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	25 3	345 65	519 13		0.05+00	2 0E-01
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03		412 27	617 05		0 0E+00	7 0E+00
	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03		383 78	591 79		0 0E+00	4 0E-01
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03		404.87	632 40		0 OE+00	2 0E-02
108952 Phenol	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07		455 02	694 20	10,920	0.0E+00	2 1E+00
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92E-02	7 535-06	1 72E+04	7 38E-04	1 805-05	52	451 15	629 79	6,000	3 35-04	0 0E+00
11028/ Engosulari 117817 Ris/2-othythoxylynbtbolote	4 51E±03	3 515.02	4 55E-06	2 40 5 01	4 58E-04	1 125-05		6/443	942 94	14,000	0.05+00	2 1E-02
117840 Olivioodd optibalata	1 3 1 1 4 0 7	3315-02	2 595-06	3 40 5-01	2 74E 03	1 UZE-U/ 8 695 06	9 1	55/ 75	806 GU	15,999	4 UE-06	0,0E+00
118741 Hexachlorobenzene	5 505+04	5.42E-02	5 35E-06	8 20E+00	5 4 11.00	1 325 03		704 09	77 798	000,61	00+400 10+400 10+400	/ UE-UZ
120127 Anthracana	2 95F±04	3.24F-02	7.74F-06	4 34F-02	2 57 E-02	6.41E.05		302 33 615 18	823 00 873 00	4 4 6	4000	00+00
120821 1.2.4-Trichlorobenzene	1 78E+03	3 00 5-02	8 23 E-06	3 00E+02	5 82E-02	1 47F-03		486.15	725.00	10, 12,	00+100	2010
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06		482 15	708 17	11,000	00=+00	1 1E-02
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	25	590 00	814 00	13,467	1 9E-04	0 0E+00
124481 Chtorodibromomethane	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04		416 14	678 20	8,000	2 4E-05	0 0E+00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02		394 40	620 20	8,288	5 8E-07	0 0E+00
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 10E-05		667 95	936 00	14,370	0 0E+00	1 1E-01
156592 cis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00	7,192	0 0E+00	3 5E-02
155505 trans-1,2-Dichloroethylene	5.25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03	52	320 85	516 50	6,717	0 0 0 0 0 0	7 0E-02
205000 Reprochimene	1 235105	2 265.02	3 5 5 E . O 8	4 50E-03	4 66E 03	1 4 4 5 0 4		809 13	10/8 24	000,71	2 15-04	001100
20540 Fluoranthene	1 07 F + 05	3.025-02	355-06	2 OFF-03	A 50E-04	1615.05		15.90	909 27	12,000	0.05+00	1 4 1 0 1
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5.56E-06	8 00F-04	3.40E-05	8 295-07		753 15	1019 70	16,015	215-05	0.05+00
	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05		714 15	00 626	16,455	2 1E-06	0 0 0 0 0 0
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	25 6	603 01	839 37	13,000	4 9E-03	0 0E+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		596 55	839 36	13,000	1 8E-03	0 0E+00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5 3E-04	0 0E+00
	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	587 38	7,000	3 7E-05	2 0E-02
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07	522	558 00	770 00	12,938	1 9E-04	00400
1004579 Heathorhan annual	0 201101	4 22 5 02	00-11-0	9 03E+03	8 25E-05	2 ZDE-UB		509 60	74087	000'11	205-03	0000
7439976 Mercury (elemental)	5 20F±04	3 075-02	4 43TH-00	5.00 -01	4 57E-04	9.01E-05		613.96	848 /6	13,000	Z 0E-03	2 OF 00
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6.005-08		657 15	873.31	14,12,	3.2F-04	001400
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	23	402 50	539 37	19,000	1 0E-04	0 OE+00
11097691 Aroclor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03		377 50	512 27	19,000	1 0E-04	0 0E+00
12674112 Aroctor 1016 (PCB-1016)	3.30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	52	340 50	475 22	18,000	1 0E-04	0 0E+00
53469219 Aroclor 1242 (PCB-1242)	3 30E+04	2 14E-02	5 31E-06	3 40E-01	2 135-02	5 20E-04	25 3	345 50	482 20	18,000	1 0E-04	0 0E+00

VLOOKUP TABLES

7 of 7

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1 2 September, 1998 × g YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

YES

		ENTER	User-defined stratum A soil vapor permeability,	(cm²)		
			S.		╛	
		ENTER	stratum A SCS soil type (used to estimate	permeability)	ાં	ENTER Stratum C soil water-filled porosity, $\theta_{\omega}^{c}$ $(cm^{3}/cm^{3})$
		ENTER	SCS soil type	water table	ဟ	ENTER Stratum C soil total porosity.
		ENTER	Soil stratum directly above water table.	(Enter A, B, or C)	o	ENYER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>c</sup> (g/cm³)
	ene	ENTER	Thickness Thickness of soil stratum B, stratum C, (Enter value or 0) (Enter value or 0)	(cm)	1280 16	ENTER Stratum B soil water-filled porosity, e, B (cm³/cm³)
Chemical	Trichloroethylene	NTER ENTER ENTER Totals must add up to value of L <sub>W7</sub> (cell D28)	Thickness of soil stratum B, (Enter value or 0)	(cm)	274 32	ENTER Stratum B soil total porosity. n <sup>8</sup> (unitless)
		ENTER Totals m	Thickness of soil stratum A,	(cm)	1005 84	ENTER Stratum B soll dry bulk density, p. <sup>8</sup> (g/cm²)
		ENTER	Depth below grade to water table,	(cm)	2560 32	ENTER Stratum A Soli water-filled porosity, $\theta_w^A$ $(cm^3/cm^3)$
ENTER Initial groundwater conc , Cw (µg/L)	1607 5	ENTER Depth	below grade to bottom of enclosed space floor, Le	(cm)	5	ENTER Stratum A soit total porosity, n <sup>A</sup> (unitless)
ENTER Chemical CAS no (numbers only, no dashes)	79016	ENTER	Average soul/ groundwater temperature,	(5°)	16	ENTER Stratum A soil dry bulk density, p <sub>b</sub> <sup>A</sup> (g/cm³)

		Reference	conc.	RfC	1 (mg/m³)	20.10.0
	ž	nsk	factor,	J.	(µg/m³) <sup>-1</sup>	1 75
	component	water	solubility,	Ø	(mg/L)	4 405 103
O'Barro	carbon				(cm <sub>3</sub> /g)	360 38 544 20 1 1 255.03 4 405.03 4 35 00 00 00
					( <sup>R</sup> K)	544.20
	Normal	polling	point,	۳	(k)	26.036
2 2	vaponzation at	the normal	boiling point,	ΔH,b	(cal/mol)	7 505
	law constant	reference	temperature,	ř	(၃)	75
. (	aw constant	at reference	in water, temperature,	I	(atm-m³/mol)	90E-02 9 10E-06 1 03E-02
		Diffusivity	in water,	۵	(cm <sup>2</sup> /s)	9 10E-06
					(cm <sup>2</sup> /s)	90E-02

# INTERMEDIATE CALCULATIONS SHEET

Floor-wall seam perimeter,	3,844	Diffusion path length, L <sub>d</sub> (cm)	2545 32	
Water-filled porosity in capillary zone, $\theta_{w,\alpha}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.294	Total overall effective diffusion coefficient, Doff (cm <sup>2</sup> /s)	7 71E-04	
Air-filled porosity in capillary zone, $\theta_{\rm s.cz}$ $({\rm cm}^3/{\rm cm}^3)$	0 136	Capillary zone effective diffusion coefficient, $\mathbb{D}^{\text{eff}}$ $(\operatorname{cm}^2/\underline{s})$	5.55E-04	
Total porosity in capillary zone,	0.43	Stratum C effective diffusion coefficient, D°C (cm²/s)	4 82E-04	Reference conc., RtC (mg/m³)
Thickness of capillary zone, Les	17.05	Stratum B B effective diffusion coefficient, $D^{eff}$ (cm <sup>2</sup> /s)	8 11E-04	Unit risk factor, URF (µg/m³) 1
Stratum A soil effective vapor permeability, k, (cm²)	6 98 <b>E-</b> 10	Stratum A A effective diffusion coefficient, D <sup>off</sup> (cm <sup>2</sup> /s)	3 20E-03	Infinite source bldg. conc , Couleng (µg/m²)
Stratum A soil relative air permeability, k <sub>vg</sub> (cm²)	0.746	Vapor viscosity at ave soli temperature, $\mu_{rs}$ (g/cm-s)	1,77E-04	Infinite source motoor attenuation coefficient, α (unitless)
Stratum A soil intrinsic permeability, k <sub>t</sub> (cm²)	936E-10	Henry's law constant at ave, groundwater temperature, H'rs (unifless)	2 78E-01	Exponent of equivalent foundation Pecial rumber, exp(Pe <sup>f</sup> ) (unitless)
Stratum A effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> ).	0.419	Henry's law constant at average groundwater temperature, Hrs (atm-m³/mol)	6 60E-03	Area of crack, Areack (cm²)
Stratum C soil air-filled porosity, 9,c (cm <sup>3</sup> /cm <sup>3</sup> )	0 130	Enthalpy of vaporization at ave groundwater temperature, ΔΗν.;τs (cal/mot)	8,483	Crack effective diffusion coefficient, Drawk (cm²/s)
Stratum B soil air-filled porosity, $\theta_{\mathbf{a}}^{\mathbf{g}}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zoneck (cm)	15	Average vapor flow rate into bidg , Qual (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_{\mathbf{a}}^{A}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio,  η	4 16E-04	Crack radius, r <sub>crack</sub> (cm)
Source- building separation, L <sub>T</sub>	2545 32	Area of enclosed space below grade, A <sub>e</sub> (cm²)	9 24E+05	Source vapor conc., C <sub>Kource</sub> (µg/m³)
Exposure duration, f (sec)	9 46E+08	Bidg ventilation rate, Quutang (cm <sup>3</sup> /s)	5 63E+04	Convection path length, Lp (cm)

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INCREMENTAL RISK CALCULATIONS

Hazard quotient	intrusion to Indoor air,	noncarcinogen (untless)	Ą
	intrusion to indoor air,		ΑN
Final	exposure groundwater	conc , (μg/L)	1 47E+03
Pure	water solubility,	S (µg/L)	1 10E+06
Risk-based indoor	exposure groundwater	conc , (µg/L)	1 47E+03
Indoor	groundwater conc.	noncarcinogen (µg/L)	AN
Indoor	groundwater conc ,	carcinogen (µg/L)	1 47E+03

VLOOKUP TABLES

Soit Properties Lookup Table

SCS Soil Ture	(h)(h)		~	Table	£	3, 3,	i						
occount lype	(CIIIII)				e (cm/cm)	θ, (cm²/cm²)	Mean Grain Diameter (cm)						
ა შ	20	0 008	1 09	0 083	0 38	0 068	0 0092						
<u>당</u> ,	920	0 0 19	131	0 237	0 41	0 095	0 0 16						
<u>.</u>	102	0 036	1 56	0 359	0 43	0.078	0 020						
<u>s</u>	14 59	0 124	2 28	0 561	0 41	0 057	0 040	_					
ກຸເ	29 70	0 145	2 68	0 627	0.43	0 045	0 044						
<u>ي</u> د د	0 12	0 027	1 23	0 187	0 38	0 100	0 025						
÷.	5 6	8000	148	0 324	0 39	0 100	0 029						
<u>.</u>	2 2	0016	137	0.270	0.46	0 034	0 0046						
O O	2 6	0 000	60	0.083	0.26	0.070	0 0038						
IS	2 6	000	7 - 7	20.00	0.43	6800	0 0056						
SL	4 42	0.020	1 89	0 471	0 45	0 065	0 030						
					i								
		olegon			Chemics	Chemical Properties Lookup Table	kup Table						
		Organic			Fure		Henry's	Henry's			Enthalpy of		
		carbon	Differential	3	component		law constant	law constant	Normal		vaporization at	Ę	
		parition	in 24	Circusivity		Henry s	at reference	гетегелсе	polling		the normal	risk	Reference
	,	, K		n water,	soutomy,	iaw constant	temperature,	temperature,	point,	temperature,	boiling point.	factor,	conc,
CAS No Chemical		(cm <sub>3</sub> /g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m³/mol)	နှ ပို	<u>-</u> 8	<u>د</u> ک	ΔH,b	URF	RfC (m <sub>3</sub> (m <sub>3</sub> )
									<u> </u>	,	(varinos)	1	1116111
50293 DDT		2 63E+06	137E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	72	533 15	5 720 75	11 000	9.75.05	00+110
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 13E-06	i	715 90	-	15,000	2 L	00+40
51285 2,4-Dinitrophenol		1 00E-02	2,73E-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	N	605 28			00+100	7.0F-03
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 495-03	6 03E-07	1 47E-08	25			•	2 1E-03	0 DE+00
55235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	0 556 60		1 SE-05	0 0E+00
50000 Denz(a)anin/acene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34E-06	ž		5 1004 79	_	2 1E-04	0 0E+00
Samo oneside		1 205+05	118E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	22			•	3 7E-04	0 0E+00
Social gamma-non (Lindane)		7 075+03	1 425-02	7.34E-06	6 80 = +00	5 74E-04	1 40E-05	25		839	13,000	3 7E-04	0 0E+00
SARAGO BODACO		6 14E+04	1 458-02	4 /4E-06	1 955-01	6 19E-04	1 51E-05	25				4 6E-03	00±±00
67641 Acetone		6 00E-01	20-205	7 97 11-06	3 50 1 50	631E-05	1 54E-06	25			-	0.05+00	1 4E+01
67663 Chloroform		3 98E±01	1045-01	20-34- 20-30-4	1 005+06	1 596-03	3 88E-05	25				00=+00	3 5E-01
67721 Hexachloroethane		1 78E+03	2 50F-03	6 80F-06	5 00E+03	300-01	3 001-03	529				2 38-05	0 0E+00
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3615-04	20-1100 C	7 6	9000	00 989		4 OE-06	00+300
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5.565-03	25				0 UE+00	3 5E-01
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	1 84			7.136	0 OF+00	100+100
72208 Endrin		1 23E+04	1 25E-02		2 50E-01	3 08E-04	7 51E-06	52			12,000	0 0E+00	116-03
72435 Methoxychlor		9 77E+04	1 56E-02		4 50E-02	6 48E-04	1 58E-05	22			14,000	0.00	1 8E-02
22548 000		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 645-04	4,00E-06	25			14,000	6 9E-05	0 0E+00
74839 Methyl hmmide		1 47 5 400	7 285 02	1240	1 20E-01	8 6115-04	2 10E-05	52			13,000	9 7E-05	0 0E+00
75014 Vinyl chloride (chloroethene)	(e	1.86F+01	1 06F-01	1235-06	2 25E+04	1 11 1 4 1 0 0	0.24E-03	2 1			5,714	00=+00	5 0E-03
75092 Methylene chloride	?	1 17E+01	1015-01	1 17E-05	1.30F±04	8 9RF-02	2715-02	8 2		432.00	5,250	8 4E-05	00+00
75150 Carbon disulfide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3.02E-03	3 12	3 2 2 2		90/00	70-11/4	3 UE+00
75252 Bromoform		8 715+01	1 49E-02	1 03E-05	3,10E+03	2 19E-02	5345-04	7.				1 1 0 0	00-100
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	3 50				1 H	00+100
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	25			6,895	000+00	5 OF-01
75354 1,1-Dichloroethytene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25			6.247	5 05-05	0.00
76448 Heptachior		141E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25			13,000	135-03	000
77474 Hexachlorocyclopentadiene	Ð	2 00E+05	1 61E-02		1 80E+00	111E+00	2715-02	25			10,931	0 0E+00	7 0E-05
78591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25		-	10,271	2 7E-07	0 05+00
70001 1.2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2.80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7,590	0.0E+00	4 0E-03
70046 Talking Land		5 01E+01	7 80E-02	8.80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	5 602 00	8,322	1 6E-05	0 0E+00
79345 1 1 2 2 Tetrachomothers		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 035-02	8	360 36		7,505	1 7E-06	0 0E+00
83329 Acenachthene	_	7 08 1401	7 10E-02	7 90E-06	2 97E+03	141E-02	3 445-04	52	419 60		8,996	5 8E-05	0 0E+00
		2001	4 4 1 1 1		4 245+00	6 36E-03	1 505-74	26	550 54	803 15	12,155	0 0E+00	2 16-01

6 of 7

84862 Diversal Lebels	i d				VLOOKUP TABLES							
84742 Dischipturatare	2 88E+02	2 56E-02	6355-06	1 08E+03	1 85E-05	4 51E-07	22	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 Butyl benzyl phthalate	5 75E+04	1 74F-02	4 83F-06	2 59E+01	3 85 E 108	9 39E-10	25	613 15	79867	14,751	0000	3 SE 01
86306 N-Nitrosodiphenytamine	1 29E+03	3 12E-02	6.355-06	3 515+01	2.05	1 Z0E-06	ខ្ល	550 50	839 68	13,000	000	7 0E-01
86737 Fluorene	1 38 € + 04	3 63E-02	7 88E-06	1 98E+00	2 61E-03	6.37F-05	3 5	570 44	870.00	13,000	145-06	00+400
86748 Carbazole	3 39E+03	3 905-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	25	627 87	899.00	13 977	201100 801178	004400
87865 Postoriore-1,3-butadiene	5.37E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	00+400
88052 2 4 5-Trichtoropeoul	3 84E+02	3 40E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	22	582 15	813.20	14,000	3 4E-05	0 0E+00
91203 Naphthalene	2 00E+03	5 90 5-02	7 505-05	3 10E+02	3 19E-C4	7 78E-06	S 5	519 15	749 03	12,000	3 1E-06	0 0E+00
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 11 E+00	1 64E-07	4 005-04	3 %	491 14 560 26	754.03	10,373	005+00	1 45-01
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	3 2	417.60	630.30	13,000	45 10 0	00000
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	52	464 19	697 60	10,800	000+00	185-01
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	25	453 57	705 00	9,700	0.00	2 00-01
955154 2 4 F. Trichlosophenol	3 885+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9,572	0 0E+00	1 8E-02
98953 Nitrobenzere	1 50E+03	2.915-02	7 035-06	1 20E+03	1 78E-04	4 34E-06	52	526 15	759 13	13,000	0 0E+00	3 55-01
100414 Ethylbenzene	3 635+02	7 50E-02	8 50E-06	2 09E+03	9845-04	2 40E-05	25	483 95	719 00	10,566	0 0E+00	2 0E-03
100425 Styrene	7 76E+02	7 105-02	8 00E-06	3 10 = +02	1 135-01	7 88E-03	5 % 2 %	409 34 418 34	617 20	8,501	001100	10H 10H 10H 10H 10H 10H 10H 10H 10H 10H
	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2.005-06	3 5	484 13	207 60	6,737	00+100	1 0E+00
	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	5 2 2 8	411 52	616 20	8.525	00+100	7 05+00
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 436-03	52	447 21	684 75	9.771	001100	A 0F-01
1004/8 p-Chloroaniine	6 6 t E+01	4 83E-02		5 30E+03	1 36E-05	3 32E-07	52	503 65	754 00	11,689	0000	1 4E-02
108054 Vinyl acetate	1 /4E+U1	10411-01	9 905-06	8 52E+03	4 01E-02	9 78E-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xylene	4 07F+02	2 00E-02	7 80E-06	1 615+04	2 10E-02 3 04E 04	5 12E-04		345 65	519 13	7,800	0.05+00	2 0E-01
108883 Toluene	1 82E+02	8 70E-02	8 60F-06	5 26E±02	3 VIE-UI	7.34E-03		412.27	617 05	8,523	00+400	7 0E+00
108907 Chlorobenzene	2 19E+02	7 306-02	8 70E-06	4 72E+02	1 52E-01	3 7 1 1 1 0 3	0 K	383 /8	591 79	7,930	001100	4 0E-01
108952 Phenal	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98 E-07		404 67	694 20	0.40	00+900	2 0E-02
	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 385-04	1 80E-05		451 15	659 79	25,0	3 35 04	Z 1E+00
115297 Endosulfan	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05		674 43	942 94	14,000	0.0F+00	2 15.02
117817 Bis(2-ethythexyt)phthalate	1 51E+07	3516-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07		657 15	806 00	15.999	4 OF -06	0 0F+00
11040 UHI-OCTY prinalate	8 32E+07	1515-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
11074: nexacinocoenzene 120127 Anthracene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03		582 55	825 00	14,447	4 6E-04	0 0E+00
120821 1.2.4-Trichlorobenzene	1 7.8E±03	3.24E-02	7 74E-00	4 34E-02	2 67E-03	6 516-05	52	615 18	873 00		0 0E+00	1 1E+00
	1 47E+02	3 46F-02	8 77E-06	3 00E+02 4 50E+03	3 82E-U2 1 30E 04	1,42E-03		486 15	725 00		0 OE+00	2 0E-01
121142 2,4-Duntrotoluene	9 55E+01	2 035-01	7.06F-06	2 70F±02	3 805-04	31/15-06		482 15	708 17	11,000	0 0E+00	1 15-02
124481 Chlorodibromomethane	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 215-02	3 2/ E-00 7 83E-04	6 K	390 00	814 00	13,467	는 6 2 년 2 년	0 0E+00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 546-01	1 84E-02	25	394 40	620.20	000,8 28,8	2 45-05	0.05+00
129000 Pyrene		2 72E-02	7 24E-06	135E-01	4 51E-04	1 10E-05		667 95	936 00		0.05+00	1 15-01
15559Z ds-1,Z-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00		00=400	3 SE-02
193395 Indeno(1.2.3-cd)pvrene	3.475+06	1 90E-02	7 19E-05	6 30E+03	3 85E-01	9 395-03		320 85	516 50		0 0E+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02		1.50F-03	4 55E-03	1 445 04	2 . 2 .	809 15	1078 24	17,000	2 1E-04	0 0E+00
206440 Fluoranthene	1 07E+05	3 02E-02		2 06E-01	6 605-04	161F-05		7.13.30 645.05	77 606	15,000	2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02		8 00E-04	3 40E-05	8 29E-07		753 15	1019 70	15,000	2 15.05	14501
218019 Chrysene	3 98E+05	2 48E-02		1 60E-03	3 88E-03	9 46E-05		714 15	979 00	16,455	2 15-06	0.05+00
308002 Aldrin 310816 alpha-HOH (2155)	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	55	603 01	839 37	13,000	4 9E-03	0 0E+00
319857 beta-HCH (heta-BHC)	1 255+03	1 425-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05	22	596 55	839 36	13,000	1 8E-03	00=+00
542756 1,3-Dichloropropene	4 57E+01	6.265-02	1 OOF OF	2 40E-01	3 03E-05	7 44E-07	52	596 55	839 36	13,000	5 3E-04	0 0E+00
606202 2,6-Dinitratoluene	6 92E+01	3 27E-02	7 25E-06	1 82E+02	3.06F-05	7 485-07	0, 4	381 15	587 38	2,000	3 75-05	2 0E-02
621647 N-Nitrosodi-n-propytamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 235-05	2 25E-06	3 %	509.60	746.97	12,938	1970 1970 1970	0.05+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9 51E-06	52	613 96	848 76	900	2 65-03	00490
	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02	25 6	629 88	1750 00		0 0F+00	3 OF-04
11096825 Arodor 1260 (PCB, 1260)	25/E+05	1 165-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	25 E	657 15	873 31		3 2E-04	00E+00
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	8 00E-02 5 70E-02	1 895-01 8 20E.03	4 60E-03	13 t	402 50	539 37	19,000	1 0E-04	0 0E+00
12674112 Arador 1016 (PCB-1016)	3 30E+04	2 22E-02		4 20E-01	1 195-02	2 00E-03	9 K	377 50	512 27	19,000		0 0E+00
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02		3 40E-01	2 135-02	5 20E-04	9 25	340 50 345 50	475 22 482 20	18,000	10m 24 24	00000
							, }	}	707 701	20,020		o ortool

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

ENTER Initial groundwater conc, Cw

(numbers anly,

Chemical CAS No

ENTER

YES

		ENTER	User-defined stratum A	soll vapor permeability,	₹,	(cm;)							
				R		•							
		ENTER	stratum A SCS	soll type (used to estimate	soil vapor	permeability)	SI	ENTER	Stratum C	soil water-filled	porosity,	o **	(cm <sub>3</sub> /cm <sub>3</sub> )
		ENTER	ç	soll type	directly above	water table	S	ENTER	Stratum C	soil total	porosity,	్డ	(application)
		ENTER	Sos	directly above	water table,	(Enter A, B, or C)	O	ENTER	Stratum C	soil dry	bulk density,	9	(c/cm <sub>3</sub> )
	hane	ENTER Lwr (cell 028)	Thickness of soil	(Enter value or 0)	ို	(cm)	1280 16	ENTER	Stratum B	soil water-filled	porosity,	g &	(cm <sub>3</sub> /cm <sub>3</sub> )
Chemical	1,1,2-Trichloroethane	NTER ENTER ENTER Totals must add up to vatue of Lwr (cell D28)	Thickness of soil	(Enter value or 0)	<b>.</b> .	(cm)	274 32	ENTER	Stratum B	soil total	porosity,	<b>-</b> E	(unifiese)
		ENTER Totals mus	Thickness	stratum A,	€ (	(cm)	1005 84	ENTER	Stratum B	soil dry	bulk density,	<b>.</b>	(a/cm <sup>3</sup> )
•		ENTER	Depth helps grade	to water table,	, Lw1	(cm)	2560 32	ENTER	Stratum A	soil water-filled	porosity,	Ф. **	(cm <sub>3</sub> /cm <sub>3</sub> )
(µg/L)	4 75	ENTER	below grade to bottom	space floor,	ָֿ ב	(cm)	15	ENTER	Stratum A	soil total	porosity,	<b>←</b>	(unitless)
no dashes)	]90062	ENTER	Average soil/	temperature,	<sub>ຂ</sub> 6	ĵ.	16	ENTER	Stratum A	soil dry	bulk density,	<b>√</b> 4	(a/cm <sub>2</sub> )

15	0 43	0.2	17	0 42	0.27	17	0 43	0.3
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
Enclosed		Enclosed	Enclosed					
space	Soll-bidg	space	space	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
hickness,	differential,	length,	width,	height,	width,	rate,		
, . ,	ΔР	<b>.3</b> *	WB	ቷ	*	띪		
(cm)	(g/cm-s <sup>2</sup> )	(cm)	(cm)	(cm)	(ms)	(1/h)		

0 45

ENTER Stratum C soul dry bulk density, Pb<sup>C</sup> (g/cm³)

ENTER Stratum A soil dry bulk density, pb<sup>†</sup> (g/cm³)

(cm<sub>3</sub>/cm<sub>3</sub>)

0 1	ENTER Target hazard	_		(nutless)	1	Used to calculate risk-based
488	ENTER Target	risk for carcinodens.	ኧ	(unitless)	1 0E-06	Used to calcu
961	ENTER	Exposure frequency.	H	(days/yr)	350	
961	ENTER	Exposure duration.	8	(yrs)	30	
40	ENTER Averaging	time for noncarcinogens.	AT	(yrs)	30	
13	ENTER Averaging	time for cardinogens,	ATc	(yrs)	70	

### CHEMICAL PROPERTIES SHEET

						_	
					(mg/m³)		1
	5	ТSК	factor,	URF	(µg/m³) <sup>-1</sup>		
Pure	component	water	solubility,	တ	(mg/L)		
Organic	carbon	partition	coefficient,	ጜ	(cm <sub>3</sub> /g)		1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
		Critical	temperature,	٦,	(X		0000
	Normal	poxing	point,	T <sub>B</sub>	(%)		
Enthalpy of	vaporization at	the normal	boiling point,	ΔHν	(cal/mol)		0000
Henry's	law constant	reference	temperature,	F	(၁၂)		30
Henry's	law constant	at reference	temperature,	I	(atm-m³/mol)		10 301 0
		Diffusivity	in water,	្នំ	(cm <sup>2</sup> /s)		B SOC OR
		Diffusivity	ın ar,	០ ឺ	(cm-/s)		7 80E-02 8 80E-08 0 12E-04

# INTERMEDIATE CALCULATIONS SHEET

Floor- wall seam penmeter, Xeack (cm)	Diffusion path length, L <sub>d</sub>	2545,32
Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 294  Total overall effective diffusion coefficient, Doff (cm <sup>2</sup> /s)	8 07E-04
Air-filled porosity in capillary zone, $\theta_{\rm heg}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Capillary zone effective diffusion coefficient, D™ cm²/s)	5 80E-04
Total porosity in capillary zone, n <sub>cz</sub>	Stratum C C C effective diffusion coefficient, Doff C (cm²/s)	S 10E-04  Reference conc , RfC (mg/m³)
Thickness of capillary zone, L <sub>cz</sub> (cm)	Stretum Stretum B effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	8.25E-04  Unit nsk factor, URF (µg/m³) <sup>-1</sup>
Stratum A soyl effective vapor permeability, k, (cm²)	Stratum A effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	3.17E-03 Infinite source bldg conc , C <sub>balding</sub> )
Stratum A soil relative air permeability, k <sub>ra</sub>	Vapor Vapor viscosity at ave soil temperature, µrs (q/cm-e)	Infinite source indoor attenuation coefficient, $\alpha$ (unitiess)
Stratum A soil intrinsic permeability, k,	9 36E-10  Henry's law constant at ave groundwater temperature, H'rs (untiless)	2 33E-02 Exponent of equivalent foundation Paciet number, exp(Pe <sup>1</sup> ) (unitiess)
Stratum A effective total fluid saturation, Sie (cm³/cm³)	0.419 Henry's law constant at ave groundwater temperature, H <sub>75</sub> (atm-m <sup>2</sup> /mo!)	5 53E-04  Area of crack, Areak (cm²)
Stratum C soil air-filled porosity, e.c. (cm³/cm³)	6 130 Enthalpy of vaporization at ave groundwater temperature, AH <sub>v, rs</sub> (cal/mol)	Grack effective diffusion coefficient, Detect (cm²/s)
Stratum B soil air-filled porosity, $\theta_{m{o}}^{m{e}}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Crack depth below grade, Zerack (cm)	Average vapor flow rate into bldg , Qual (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_{a}^{A}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230 Crack- to-total area ratio, n	Crack radius, fond
Source- building separation, Lr (cm)	Area of Area of enclosed space below grade, Ae (cm²)	Source vapor conc, Capara (µg/m³)
Exposure duration, r (sec)	9 46E+08 Bldg ventilation rate, Qualiting (cm <sup>3</sup> /s)	Convection path length, Lp (cm)

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS

INCREMENTAL RISK CALCULATIONS

					_
Hazard	from vapor	Indoor air,	noncarcinogen	(unitless)	Ϋ́
Incremental nsk from	vapor intrusion to	indoor air,	carcinogen	(unitless)	Y Y
Final	indoor exposure	groundwater	conc,	(нд/Г)	1 80E+03
Pure	component water	solubility,	တ	(µg/J-)	4 42E+06
Risk-based	Indoor	groundwater	conc,	(µg/L)	1 80E+03
Indoor	exposure groundwater	conc ,	noncarcinogen	(mg/L)	NA
Indoor	exposure groundwater	conc.,	carcinogen	(Jug/L)	1 80E+03

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

														•		Reference	conc.	R.C	(mg/m³)	00730	001100	7 0E-03	0 OE+00	000	00 00 0	00#400	001100	1 4 H + 5 1	3 55-01	0 0E+00	3.5F-01	0 0E+00	4 OE+00	1 18 63	0 0E+00	0 0E+00	5 0E-03	00+400	7 08.01	0 0E+00	0 0E+00	5 0E-01	000+00	0 0E+00	, o	4 OE-03	00+00	00100	0 0E+00 2 1E-01
															1	- H		URF	(µg/m³) <sup>1</sup>	0 7E-05	211.03	0 0 1 + 00	2 1E-03	1 5E-05	2 1E-04	3.75-04	4 6E-03	00=+00	0 0E+00	2 3E-05	4 0E-06 0 0E+00	8 3E-08	00+00	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6 9E-05	9 7E-05	0.01100	6 4E-U5	0.05+00	115-06	1 8E-05	0 0E+00	5 OE-05	135-03	00±400	0 0E+00	1 6E-05	1 7E-06	5 8E-05 0 0E+00
															Entirely of	the normal	boiling point,	ΔH,	(cal/mol)	11 000	15,000	15,000	16,000	7,127	15,000	500,81	13,000	10,000	6,955	6,988	9,510	7,342	7,136	12,000	14,000	13,000	5,714	5,230 205, a	6.391	9,479	7,000	6,895	6,247	13,000	10,931	7.590	8,322	7,505	8,996 12,155
																Critical	temperature,	L <sub>o</sub>	(%)	72075	969 27	827 85	990 41	556 60	1004 79	885 /3 839 36	842.25	751 00	508 10	536 40	563 05	562 16	545 00	986 20	863 77	860 38	467 00	510.00	552 00	00 969	585 85	523 00	576 05	34631	715.00	572 00	602 00	544 20	661 15 803 15
															Noma	Doiling	point	<b>.</b>	<u>چ</u>	533 15	715 90	605 28	743 24	349 90	708 15	596 55	613 32	720.00	329 20	334 32	390 88	353 24	347 24	61 817 651 02	639 90	636 44	276 71	213 00	319 00	422 35	363 15	330 55	304 75	603 69	21215 48835	369 52	386 15	360 36	419 60 550 54
														1000	law constant	reference	temperature,	<u>~</u> ;	(၃)	25	25	25	25	25	25	25	25	25	25	25	22 23	22	25	2 22	25	25	25	67 24 26	25	25	25	25	25	25	6 K	3 2	55	25	25 25
60	Mass Grain Dismater (rm)	ear Gialli Diameter (citi)	2600 0	0000	0.020	0.044	0 025	0 029	0 0048	0 0039	0 0026	0 011	o Table	S, August A	law constant	at reference	temperature,	т <sup>:</sup>	(atm-m²/mol)	8 105-06	1 13E-06	4 44E-07	1,47E-08	3 05E-02	3.341-06	1 40E-05	151E-05	1 54E-06	3 885-05	3 66E-03	3 80E-06 8 80E-06	5 56E-03	172E-02	7 51E-05	4 00E-06	2 10E-05	6 24E-03	2 195-03	3 02E-02	5 34E-04	1 60E-03	\$ 61E-03	2 61E-02	1 095-03	5 7 E-02 6 63E-06	2 805-03	9 12E-04	1 03E-02	3 44E-04 1 55E-04
VLOOKUP TABLES	θ (cm³/cm³) M	I,	0 000	0800	0.057	0.045	0 100	0 100	0 034	0 0 0 0	0 089	0.065	Chemical Properties Lookup Table	1001		Henry's	law constant	i :	(vnitless)	3 32E-04	4 63E-05	1 82E-05	6 03E-07	1 25E+00 1 37E-04	1 99 1.04	5 74E-04	6 19E-04	631E-05	1 59E-03	1 50E-01	3 61 E-04	2,28E-01	7 05E-01	6 48E-04	1 64E-04	8 615-04	2 56E-01	8 98E-02	1 24E+00	2 19E-02	6 56E-02	2 30E-01	1 0/E+00	1115+00	2 72E-04	1 15E-01	3 74E-02	4 22E-01	1 41E-02 6 36E-03
	A. (cm³/cm³)	(1112) 112) 6	8 5	- 6	2 4	0 43	0.38	0 39	0.46	0.26	0 43	0 45 1 45	Chemic	Pure	component	water	solubility,	ທີ່	(mg/L)	2 50E-02	1 62E-03	2 79E+03	2 49E-03	7 93E+02 9 40E-03	5 60F-02	6 80E+00	1 95E-01	3 50E+03	1 00E+06	/ 92E+03	7 40E+04	1 75E+03	1 33E+03	4 50E-02	9 00E-02	1 20E-01	1,52E+04 2,76E+03	1305+04	1 19E+03	3,10E+03	6 74E+03	5 05E+03	2 25E+U3	1.80F±00	1 20E+04	2 80E+03	4,42E+03	1 10€+03	2 97E+03 4 24E+00
	Table	,	0 000	0.250	0.561	0 627	0 187	0 324	0.270	0 083	0 187	0.471				Diffusivity	in water,	D.,	(cm <sup>-</sup> /s)	4 95E-06	9 00E-06	9 06E-06	5 185-06	90-100	4 37E-06	7 34E-06	4.74E-06	7 97E-06	1.14E-05	1 00E-03	9 30E-06	9 80E-06	8 80E-06	4 46E-06	4 76E-06	587E-06	1235-05	1 17E-05	1 00E-05	1 03E-05	1 06E-05	105E-05	7.69E-05	7 21E-06	6 76E-06	8 73E-06	8 80E-06	9 10E-06	7 90E-06 7 69E-06
	Soil Properties Lookup N (unitless) M (un	ı,		. t	2.28	2 68	1 23	1 48	1 37	109	123	1 89				Diffusivity	ın aır,	D.,	(cm/s)	1 37E-02	4 30E-02	2 735-02	2 02E-02	5 10F-02	1 18E-02	1 42E-02	1 25E-02	5.36E-02	1246-01	2505-03	8 00E-02	8 80E-02	7 80E-02	1 56E-02	1 69E-02	1 44E-02	7 28E-02	1016-01	1.045-01	1 49E-02	2 98E-02	7 42E-02	1 125.02	1615-02	6 23E-02	7 82E-02	7 80E-02	7 90E-02	7 10E-02 4 21E-02
	S <sub>(</sub> (1/cm)	9	9200	0.036	0 124	0 145	0 027	0 059	0.016	0 005	000	0.020		Organic	carbon	partition	coefficient,	Α α (1)	(Br up)	2 63E+06	1 02E+06	1 00E-02	3 80E+06	3.985+05	1 20E+05	1 07E+03	2 14E+04	6 00E-01	5 75E-01	1 78E+03	6 92E+00	5 89E+01	1 23F+04	9 77E+04	1 00E+06	4 47E+06	1.866+01	1 17E+01	4 57E+01	8,71E+01	5 50E+01	3 16E+01	441F+06	2 00E+05	4 68E+01	4 37E+01	5 01E+01	1 66E+02	9 33E+01 7 08E+03
	K, (cm/h)	000	2.0	104	14 59	29 70	0 12	131	0.25	0 02	007	4 42						3				į	ene ene	<b>.</b>		зпе)						ś	<b>P</b>				oethene)	Î			ane	(	D	ntadiene		<b>6</b> 0	Đ.		ethane
	SCS Soil Type						ဗ္ဗ	SCL		<u> </u>	31.5							SA SA C	Cremical	50293 DDT	50328 Benzo(a)pyrene	51285 2,4-Dinitrophenol	55235 Carbon tetrachlodde	56553 Benz(a)anthracene	57749 Chlordane	58899 gamma-HCH (Lindane)	60571 Dieldrin	65850 Benzoic Acid	67641 Acetone 67663 Chlomform	67721 Hexachloroethane	71363 Butanol	71432 Benzene 71556 1 1 1-Trichlosostano	72208 Endrin	72435 Methoxychlor	72548 DDD	72559 DUE	75014 Vinvi chloride (chloroethene)	75092 Methylene chloride	75150 Carbon disulfide	75252 Bromoform	75274 Bromodichloromethane	75354 1 1-Dichlomethane	76448 Hentachlor	77474 Hexachlorocyclopentadiene	78591 Isophorone	78875 1,2-Dichloropropane	79005 1,1,2-Trichloroethane	70345 4 4 2 2 Total	79349 1,1,2,2+1 etrachloroethane 83329 Acenaphthene

6 of 7

		4 JOE-02	0 0 0 0 0	1 12E+01	1 85E-05	4 51E-07	23 23	567 15 613 15	757 00 798 67	13 733	0 0E •00	2 8E → 00
84/42 U-n-Cutyl phthalate	3 396+04	4 38F.02	XC-131	2		- TOP: 0	22		798 67			
85687 Butyl benzyl phthalate	5 75E+04	. 74F-02	4 835 06	2 605400	5 00E-08	0:-360 6	:			14 751	0.0=+00	355-01
86306 N-Nitrosodiphenylamene	1 29E+03	3125-02	5 36F A6	3 645.00	3 1/E-03	1 26E-06	: 22		839 68	13 000	0 0E+00	7 GE 01
86737 Fluorene	1386+04	3.635.02	7 885-06	1041100	2 CSE-O4	5 00E-06	\$2		890 45	13 000	1 4E-06	C 0E+00
86748 Carbazole	3 39E +03	3 90F-02	7 035-06	7.485.00	6 36E 03	6 37E-05	52		<b>9</b> 70 00	12 666	0 0E+00	14E-0:
87683 Hexachloro-1 3-butadiene	5.37E+04	5615-02	6 165-06	3.235.00	3 346.01	80-100 C	\$ 5		835 00	13 977	5 7E-06	0 0E+00
87865 Pentachlorophenol	5 92E+02	\$ 60E-02	6 10E-06	* 95E+C3	1005-05	8 15E-03	52	486	738 00	10 206	2 2E-05	0 0E+03
88062 2 4 6-Trichlorophanol	3 81E+02	3 18E-02	6 25E-08	8 OCE +02	3.9E-04	7 78E-06	3 %	510 15	8:3.20	98	3.46-05	0 0 0
01203 Naphtralere	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	32.5		748 40	2002	2011	00000
95478 o.Xviene	7 24E +02	1 94E-02	6 74E-06	3 11E+00	1 64E 07	€ 00E-C8	52		754 03	13 000	136-04	005.00
95487 2-Wethybrepol (n. resolution)	3 638+62	8 70E-02	. 30E-05	1 78E+02	2 13E-01	5 20E-03	22	417 60	630 30	8 661	0 0E +C0	7 00 400
95501 12-Dichlorobenzene	S 17E+0	/ 40E-02	8 30E-06	2 60E +04	4 92E 05	1 20E-06	52	464 19	09 769	10 800	00E-00	1 8E-0
95578 2-Chlorophenol	3 88E+G2	5 01 F-02	46F-06	1 SeE+02	7 79E-02	1 90E-03	52	453 57	705 00	9 700	0 0E+00	2 0E 01
95954 2 4 5 Inchlorophenol	1 60E • 03	2 31 E-C2	7 035-06	1 20F+C3	1 785.04	3.90E-04	52.5	447 53	675 00	9 572	C 0E+00	· 8E-02
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9.84E.04	2 405-05	3 %	526 15	759 *3	3000	0 G 19 0	3.5E-0•
100414 Ethylbenzene	3 63€+02	7 50E-02	7 805-06	1 69E+02	3 23E-01	7 88E-03	3 %	409.34	713 00	10 566	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2 CE-03
100425 Styrene	7.76E+02	7 10E-02	8 COE-06	3 10E+02	1 13E-01	2 76E-03	2 2	41831	00 929	0 K	8	3 8
10843 s xidens	2 09E +02	5 84 E-02	8 69E-06	7 87E+03	8 2CE-05	2 00E-06	<b>%</b>	484 13	707 60	1. 329	00.00	20.00
108467 1 4-Dethlomberrane	3 89 - 02	7 69E-02	8 44E-C6	1 85E+02	3 14E 01	7 66E-03	56	411 52	616 20	8 525	000	7 OF +00
106478 p-Chlomanima	6.64E404	6 50E-02	7.90E-08	7 38E+01	9 96E-C2	2.43E-03	\$2	447 21	684 75	9 271	0 05 + 00	8 OE-O .
*07062 1.2-Dichloroethane	174F±01	10450	50-310-6	5 305 403	136E-05	3 32E-07	53	503 65	754 00	11 689	0 0E +00	145-02
108054 Vinyl acetate	5.25E+00	505.60	906-06	3 20E+03	4 U1E-U2	9 785-04	52	356 65	56100	7 643	2 6E-05	0 0E+00
108383 m-Xylene	4 07E+02	7 DOF-02	2 EUE-08	1 8 1 5 4 0 3	2 : UE UZ	5 12E-04	52	345 65	519 13	7 800	0 0E+00	2 0E-01
108883 Toluane	1 82E+02	8 70E-02	8 60 F 06	5 26E • 02	3 7 2 5 0 3	7 34E-03	52	412 27	617 05	8 523	0 0E+00	7 0E+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 725+02	1.525.01	5 635-03	<b>1</b> 2	383 78	591 79		0 0E+00	4 0E-01
108952 Phenot	2 88E+01	8 20E-02	9 105-06	8 28F+04	1.635.05	50-71-75	8 8	404 87	632 40		0 0E+00	2 0E-02
111444 Bis(2-chloroethyt)ether	1 55E+01	6 92E-02	7.53E-06	1725-04	7 385-03	3 88E-U/	8 8	455 02	694 20	10 920	C 0E+C0	2 1E+00
115297 Endosuffan	2 14E+03	1 15E-02	4 55E-08	5 10E-01	4 59E 04	127.05	0 %	57.13	659 79	000	3 3E-04	0 OE +00
1178 7 Bis(2-ethylhexyl)phthalate	151E+07	3 51E-C2	3 86E-06	3 40E-01	4 18E-08	1025-07	3 %	857.15	\$ 25 E	98	0 0E+00	2 1E-02
11/840 Ulth-Octyl prinstals	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2.74E-03	6 68E-05	2 2	704 09	862 22	88.4	95496	000000
120127 Anthropos	5 50E+04	5 42E-02	5 91E-06	8 20E+00	541E-02	1 32E-03	23	582 55	\$25.00	14 447	4 6F-04	70440
120821 1.2 4. Trichlorohennene	2.95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05	52	615 18	873.00	13 121	0.05+00	3 6
120832 2 4-Dichlamonanal	1 475403	3 WE 02	8 236-06	3 00E+02	5 82E-02	1 42E-03	52	486 '5	725 00	_	0 0E •00	2 0E-01
121142 2 4-Duratrotoking	9 555 -01	303505	8 // E	4 50E+03	1305-04	3 17E-06	52	482 15	708 17	_	0 0 0 0	1 1E-02
124481 Chlorodibromomethane	6.31E+01	- 86F-02	1 055-05	2 / UE+U2	3 3 4 5 6 5	9 27 E-08	52	290 00	814 00		· 9E-04	0 0E+00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	754F.01	40,000	2 2	41614	678 20	800	2 4E-05	0 CE - 0C
129000 Pyrane	1 05E+05	2 72E-02	7 24E-06	: 35E-01	4 51E-04	105-05	0 ×	394 40 567 08	620 20	8 288	5 8E-07	0 0E+00
156592 cas-1 2-Dichloroethytene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03	3 5	333.65	544.00	14 3/0	0.0E+00	11501
199000 usits: 1 4-Dichigroethylene	5.25E+0*	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03	32	320 85	516.50		00.00	2000
205992 Benzo(bifferenthere	24/4-00	1 90E-02	5 66 6 06	2 20E-05	6 56E-05	1 605-08	22	809 -5	1078 24	8	2 1E-04	0.05+00
206440 Fluoranthene	1 07 5 + 05	3 025 02	000000	. 50E-03	4 55E-03	1.1. 2.0.	52	715 90	969 27	15 000	2 1E-04	00+00
207089 Benzo(k)fluoranthens	1 23E+06	2 26F-02	5 56E-06		2 50E-04	1 61E-05	: <b>32</b>	655 95	905 00		0 0E+00	14E-0
218019 Chrysene	3 98E+05	2 48E-02	62.E-06	1 50F-03	3.40E-03	8 29E-07	22 2	753 15	1019 70	16 000		00.300
309002 Addin	2 45E+06	· 32E 02	4 86E-08	1 80E-01	6 97E-03	1 7/E-04	9 5	714 15	979 00	16 455		0 0E • 00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-08	2 00E+00	4 35E-04	1 06E-05	3 %	505 01	639.3/ 810.1c	13 000	4 9ff 03	0 0 0 0 0 0
319557 Beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-C7	3 2	586.55	970 JK	988	, 8E-03	00 E
SACTOR 1 STURMINGOPOPERS	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	· 77E-02		381 15	587.38	3 8	275.04	00-10-0
62:547 N-Nitrosod-n-popodamina	2 405 401	3.275-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07		558 00	770 00	12 938	8.5	0.05
	8.32F+C4	1 12 10 10	4 235 06	9 69E+U3	9 235-05	2 25E-06	52	209 60	746 87		2 0E-03	00.∃30
7439976 Mercury (elemental)	5 20E+0+	3 07E-02	8 30E-06	5.625-02	3 30E-04	95.E-06	52	613.96	848 76	_	2 6E-03	0 OE •00
8001352 Toxaphere	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2.46F-04	20-20-2 20-20-2	\$ 2		1750 00		0 0E • CO	3 CE-24
1*096825 Aroclor 1260 (PCB-;260)	2 90E+05	· 38E-02	4 32E-06	8 OCE-02	1 89E-01	4 60F-03	Q ¥	657 15	873.31	88		0 0E +CC
11097691 Arador 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	3 %		53937	000 6		0 0E+00
126/4112 Amdor 1016 (PCB-1016)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	2 %	340.50	475.22	000 00		80.00
324035 13 MODON 1542 (FOB-1542)	3 30F • 04	2 4E-02	5 31E-06	3 40E-01	2 13E-02	5 20E-04	52	345 50	482 20	18 000	2 2 3	00-30

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

×

YES

(numbers only,

Chemical CAS No

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

VERSION 1.2 September, 1998

User-defined stratum A soil vapor permeability, (cm<sup>2</sup>) stratum A SCS soil type (used to estimate OR soil vapor ENTER Stratum C soil water-filled permeability) SCS soil type directly above ENTER Stratum C soil total porosity, n<sup>C</sup> (untiless) water table ENTER (Enter A, B, or C) directly above ENTER Stratum C soil dry bulk density, P<sub>b</sub>c (g/cm³) water table, Soil stratum ENTER stratum B, stratum C, (Enter value or 0) ENTER Stratum B soil water-filled NTER ENTER ENTER
Totals must add up to value of L<sub>wr</sub> (cell D28)
Thickness Thickness of soil Ę (EE) Tetrachloroethylene Chemical ENTER Stratum B soit total porosity, (cm) Thickness of soil stratum A, ENTER Stratum B soil dry bulk density, p<sub>b</sub> (g/cm³) 1005 84 ENTER ź (E) ENTER
Stratum A
soil water-filled
porosity, bu Depth below grade to water table, ENTER Ľ (cm) below grade to bottom of enclosed space floor, ENTER Initial groundwater conc , C<sub>W</sub> ENTER Stratum A soil total porosity, n<sup>A</sup> (untless) ENTER Depth (E5) Average soil/groundwater temperature, ENTER Stratum A soil dry bulk density, p<sub>b</sub><sup>A</sup> (g/cm³) 127184 no dashes) ENTER ်

			(i					
	porosity,	porosity,	bulk density,	porosity,	porosity,	bulk density,	porosity,	porosity,
	<b>~</b> _		a <sub>d</sub> d	<sub>8</sub> C	в <sup>ж</sup> в	റ്	မ်	o ***
	(unitless)	(cm³/cm³)	(g/cm³)	(unitless)	(cm <sub>3</sub> /cm <sub>3</sub> )	(g/cm³)	(nutless)	(cm <sub>3</sub> /cm <sub>3</sub> )
							!	- 
Ц	0 43	0.2	17	0 42	0.27	17	0.43	03
	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
		Enclosed	Enclosed					
	Soilabida	97909	0000	Foodora		roopul		

							l
ENTER Enclosed	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	
space	Soil-bidg	sbace	space	Enclosed	Floor-wall	Indoor	
floor	pressure	floor	floor	space	seam crack	air exchange	
thickness,	drifferentsal,	length,	width,	height,	width,	rate,	
Losek	ΔP	Le B	W <sub>8</sub>	f	*	<b>E</b>	
(cm)	(g/cm-s²)	(cm)	(cm)	(cm)	(cm)	(1/h)	
15	40	961	961	488	0.1	0.45	
	ENTER	ENTER	ENTER	ENTER	ENTER		
	Averaging			Target	Target hazard		
time for	time for	Exposure	Exposure	risk for	quotient for		
	noncarcinogens,	duration,	frequency,	carcinogens,	noncardinogens,		
	AT <sub>NC</sub>	8	Ш	포	ğΗ		

	_	
(unitless)	1	Used to catculate risk-based groundwater concentration
(unitiess)	1 0E-06	Used to calcu groundwater
(days/yr)	350	
(yrs)	30	
(yrs)	30	
(yrs)	70	

### CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)
Unit risk factor, URF (#9/m³)*1
Pure component water solubility, S S (mg/L)
Organic carbon partition coefficient, K <sub>c</sub> (cm³/g)
Critical femperature, T <sub>C</sub> ( <sup>2</sup> K)
Normal boslung point, T <sub>B</sub>
Entha'py of vaporization at the normal boiling point, AH <sub>v.b</sub> (cal/mol)
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H (atm-m³/mol)
Diffusivity in water, D. (cm²/s)
Diffusivity in air, D. (cm²/s)

# INTERMEDIATE CALCULATIONS SHEET

Floor- wall seam permeter, X <sub>sea</sub>	3,844	Duffusion path length, L <sub>d</sub> (cm)
Water-filled porosity in capillary zone, $\theta_{w,ct}$	0.294	Total overall effective diffusion coefficient, Def (cm²/s) 7.01E-04
Air-filled porosity in capillary zone, $\theta_{\bullet,ez}$	0.136	Capillary Zone Zone diffective diffusion Coefficient, D" (cm²/s) 5 05E-04
Total porosity in capillary zone,	0.43	Stratum C effective diffusion coefficient, D*** C (cm²/s)  Reference conc , RfC (mg/m³)
Thickness of capillary zone, L≃ (cm)	17 05	Stratum B B effective diffusion coefficient, D***  Cm²/s)  7 38E-04  7 38E-04  7 38E-04  7 4 8E-07  6 8E-07
Stratum A soil soil effective vapor permeability, k, (cm²)	6.98E-10	Stratum A effective diffusion coefficient, Doff (cm²/s) 2 92E-03 Infinite source bldg conc C <sub>busing</sub> (µg/m³)
Stratum A soil relative air permeability, k <sub>q</sub> (cm²)	0 746	Vapor viscosity at ave soil temperature, temperature, thrs (g/cm-s) 1.77E-04 Infinite source indoor attenuation coefficient, a 27E-06
Stratum A soil intrinsic permeability, k <sub>1</sub>	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)  4 71E-01  Exponent of equivalent foundation Peciet number, exp(Pe <sup>5</sup> ) (unitless)
Stratum A effective total fluid saturation, S <sub>la</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0.419	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol)  1.12E-02  Area of creck, Aenex (cm²)
Stratum C soil air-filled porosity, 6,° (cm³/cm³)	0 130	Enthalpy of vaporization at ave. groundwater temperature, ΔH., τs (cal/mol) 9,492   9,492   Grack effective diffusion coefficient, Domest (cm²/s)
Stratum B soil soil air-filled porosity, $\theta_{\mathbf{a}}^{\mathbf{a}}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Z <sub>crack</sub> (cm)  15  Average vapor flow rate into bldg , Q <sub>sol</sub> (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_{\bullet}^{A}$ (cm³/cm³)	0 230	Crack- to-total area ratio, n (unitless) 4.16E-04 Crack radius, fanak (cm)
Source- building separation, L <sub>T</sub>	2545.32	Area of enclosed space below grade, Ae (cm²)  Source vapor conc., C <sub>ENSUCE</sub> 4 71E+02
Exposure duration, r	9 46E+08	Bldg ventifation rate,  Quantity (cm <sup>3/s</sup> )  S.63E+04  Convection path length,  Lp  (cm)

RESULTS SHEET

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

		Sol	Soil Properties Lookup Table	okup Table									
SCS Soil Type	-	1	N (unitless)	M (unitless)	0, (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)						
<u>ပ ဒ</u>	0.20	800 0	1 09	0 083	0 38	0 068	0 0002						
<b>.</b>	97.	9000	131	0 237	0 41	0 085	0 0 16						
<u>"</u>	4 7	0036	156	0 359	0 43	0.078	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
	20,40	0 145	077	1000	140	0.03	0 040						
SC	0 12	0 027	1 23	0 187	7 E	0 100	0.044						
SCL	131	0 0 0 5 9	148	0 324	0 39	0 100	0.029						
<u>si</u>	0.25	0.016	1 37	0.270	0 46	0 034	0 0046						
<u>ن</u> ورد ن ورد	0 02	0 002	1 09	0 083	0.26	0 0 0 0 0	6000 0						
SICL S.:	0 07	0 010	1 23	0 187	0 43	0 089	0 0056						
3,L S.L	0 45 4 42	0 020	141	0 291	0 45	0 067	0.011						
						3	000.0						
			ŀ										
-	•				Chemic	Chemical Properties Lookup Table							
	0	Organic			Pure		Henry's	Henry's			Enthalpy of		
	•				component		law constant	law constant	Normal		vaporization at	125	
	α.		Diffusivity	Diffusivity	water	Henry's	at reference	reference	poling	Critical	the normal	ķ	Reference
	8	coefficient,	in air,	In water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,	conc,
	•	۔ ۔ ۔	ວ້ ີ	້ີ	'n	Ì	Ι,	۳ ۲	<b>⊢</b> e	ှင်	۵H۷	J.F.	A S
CAS No Chemical		(cm./g)	(cm²/s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m³/mol)	(၃)	( <del>)</del>	( <b>"</b> K)		1-("m/gri)	(mg/m³)
50293 DDT		2 63E+08	1.37E.02	4 95E-06	2 505.03	2 325 04	9000	č					
50328 Benzo(a)pyrene		1.02E+06	4 30E-02	9 00E-06	1 62E-03	3 32E-04	8 10E-06	2 4	245 00	720.75	11,000	9 7E-05	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	2 70			15,000	2.1E-03	0 0E+00
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	3 6			000'61	001400	7 UE-03
56235 Carbon tetrachlonde		174E+02	7 80E-02	8 80E-06	7 93E+02	1.25E+00	3 05E-02	3 6			10,000	20-11-03	00+00
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	137E-04	3.346-06	3 6		Ī	15.77	10.00	0,01100
57749 Chlordane		1 20Ë+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	3 53		•	13,000	2 TE-04	00+400
58899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25			13,000	2 4 H	00+400
60571 Dieldrin		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	25			13.000	4 6F-03	00+100
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25			10,000	00+00	1 4E+01
6/641 Acetone		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25			6,955	00+00	3.5E-01
67534 Unioration	•	3 98E+01	1046-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25			6,988	2 3E-05	0 0E+00
71363 Butacol		1 /8E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25			9,510	4 OE-06	0 0E+00
71432 Benzene		5 89E+01	8 80E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	25			10,346	0 0E+00	3 5E-01
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1335+03	2 28E-01	5 56E-U3 1 72E-03	25	353 24		7,342	8 3E-06	00+00
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7.516-06	25.0		945 00	7,136	00+400	1 00-100
72435 Methoxychior	-	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1586-05	25.25			14,000	004	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25			14,000	6 9E-05	0.000
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44		13,000	9 7E-05	0 0E+00
75014 Vind chloride (chloroethene)		1 055+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	52			5,714	0 0E+00	5 0E-03
75092 Methylene chloride		1175+01	1048	1 175-05	2 / DE + U3	1 11E+00	2 715-02	52			5,250	8 4E-05	0 0E+00
75150 Carbon disulfide		4 57E+01	1046-01	1.00 F-05	1195+04	1 24 15 +00	2 025 02	20.50	313 00	510 00	6,706	4 7E-07	3 05+00
75252 Bromoform	_	8 71E+01	1 49E-02	1 03E-05	3 10 1 + 03	2 19E-02	5 34E-04	24 25			0,391	1 1E.06	008400
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25			2,000	4 AF-05	00+100
75343 1,1-Dichloroethane	• •	3 16E+01	. 7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	25			6895	00+00	5 0F-01
75354 1,1-Dichloraethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25			6,247	5 OE-05	0 0 0
70448 Heptachlor	•	141E+06	1 12E-02	5 695-06	1 80E-01	4 47E-02	1 09E-03	25		846 31	13,000	1 35-03	0 0E+00
78501 learhowne		2 00E+05	1 61E-02	7.21E-06	1 80E+00	1 11E+00	2 71E-02	25			10,931	0 0E+00	7 0E-05
78875 1 2-Dichlorogon	•	4 000040	0 23E-02	90-39/ 0	1 20E+04	2 /2E-04	6 63E-06	25		715 00	10.271	2 7E-07	0 0E+00
79005 1.1.2-Trichlorophane		4 3/E+01	7 80E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25		572 00	7,590	0 0E+00	4 0E-03
79016 Trichloroethylene		3 01E+03	7 90E-02	9 10E-06	4 42E+03	3 /4E-UZ 4 22E-U1	9 12E-04	52	386 15	602 00	8,322	1 6E-05	000
79345 1,1,2,2-Tetrachloroethane	٠,	9 33E+01	7 10E-02	7 90E-06	2 97F+03	1 415-02	30-25-02	C) #			505'/	1 / F	004
83329 Acenaphthene	•	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1.55F-04	2 5	550 54	661 15 803 45	4,996 12 155	3 85-03	0 UE+000
			: ! !		; ! !	1	12.700	3			14,100	ひつたばつ	1001

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84662 Diethylphthalate	2 RRE+02	2 46 E 112	ል ዓላნ ብ	1 08E+03	VLOOKUP TABLES	76	,	267 16	50 75	13 733	001	90,00
84742 Di-n-buty ohthalate	3 395+04	4 38F-02	7.86F-06	1128+01	3 85E-08	0.305.0	3 %	507 13 613 15	798 67	14.75	20140	3 55.03
85687 Butyl benzyl phthalate	5 75E+04	1 74E-02	4 83E-06	2 69E+00	5 175-05	1.265-06	3 %	660.60	/30 0/ 830 68	13,000	300	7 0 10 6
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 00E-06	25	632 28	890 45	13.000	1 4E-06	000+00
86737 Fluorene	1 38E+04	3 63E-02	7 885-06	1 98E+00	2 61E-03	6 37E-05	52	570 44	870 00	12,666	0 0E+00	1 4E-01
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08		627 87	899 00	13,977	5 7E-06	0 0E+00
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0 0E+00
99060 0 4 6 Tablistic Land	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08		582 15	813 20	14,000	3 4E-05	0 OE+00
91203 Nanhthalana	3.81E+02	3 18E-02	5 23E-05	8 00E+02	3 19E-04	7 78E-06		519 15	749 03	12,000	3.15-06	0 OF +00
91941 3.3-Dichlorobenzidine	7 24E+02	3 30E-02	6 74E-06	3 116+00	1 90E-02	4 83E-04 4 00E-09	g K	491 14 560 26	754 03	10,373	0 0E+00	1 4E-01
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03		417 60	630 30	8,661	0 0E+00	7 OE+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06		464 19	697 60	10,800	00+400	1 8E-01
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	52	453 57	705 00		0 0E+00	2 0E-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04		447 53	675 00		0 0E+00	1 8E-02
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03		4 34E-06		526 15	759 13		0 0E+00	3 5E-01
100414 Ethylpopage	0 40E+01	7 50E-02	3 50 E-06	2 09E+03	9845-04	2 40E-05		483 95	719 00	10,566	0 0 0 0 0	2 0E-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 105+02	3 23E-01 1 13E-01	7 88E-03	0 K	409 34	617.20	8,501 727	0.01100	1 01 100
105679 2,4-Dimethytphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2.00F-06	3 15	484 13	707.60	11329	00400	7 00.00
106423 p-Xylene	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	8 8	411 52	616 20	8,525	000+00	7 00+00
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	52	447 21	684 75		00+00	8 OE-01
106478 p-Chloroanitine	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07		503 65	754 00		0 0E+00	1 4E-02
	174E+01	1 04E-01	90000	8 52E+03	4 01E-02	9 78E-04		356 65	561 00	7,643	2 6E-05	0 0E+00
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04		345 65	519 13		0 0E+00	2 0E-01
108883 Toliene	4 U/E+02	7 00E-02	7 805-06	1 61E+02	3 01 E-01	7 34E-03	52	412.27	617 05		0.05+00	2 0E+00
108907 Chlombanzana	1 02E+02	7 305-02	8 705-06	3 20E+02	1 525.01	0 03E-03	0 8	383 /8	591 79	7,930	0.05+00	4 OF 01
	2 88E+01	8 20E-02	9 105-06	8 28F+04	1 635-05	3 985-07	3 %	404 07	604.20	0.400	001100	2 UE-02
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92E-02	7 53F-06	1 72F+04	7.38F-04	1 805.05	3 %	453.02	659 79		3 3E 04	2001
	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05		674 43	942 94	900.41	0 0E+00	2 16-02
117817 Bis(2-ethylhexyl)phthalate	1 51E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	25	657 15	806 00	15,999	4 0E-06	0 0E+00
117840 Dr-n-octyt phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05		704 09	862 22		0 0E+00	7 0E-02
116/41 Hexachiorobenzene	5 50E+04	5 42E-02	5.91E-06	6 20E+00	5 41E-02	1 32E-03	52	582 55	825 00	14,447	4 6E-04	0 OE+00
120821 1.2 4.Trichlorobenzene	2 95E+U4	3 245-02	/ /4E-06	4 34E-02	Z 6/E-03	6 51E-05	52	615 18	873 00	13,121	00+00	1 1E+00
	1 475 ±03	3 460.02	0 23C-00	3 00E+02	3 52E-02	1 42E-U3		486 15	725 00		0.05+00	2 0E-01
121142 2.4-Dinitrotoluene	9 55E+01	2 035-01	7.065-06	2 70F+02	3 80F-06	977.08	6 %	500.00	708.17	000,11	0 OF +00	1.15-02
124481 Chlorodibromomethane	631E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83F-04		416 14	678.20	) o o	4 4	20100
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	22	394 40	620 20	8,288	5 8F-07	001400
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 10E-05	25	667 95	936 00	14,370	0 0E+00	16.0
156592 dis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00	7,192	0 0E+00	3 5E-02
1566U5 trans-1,Z-LJIchioroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516 50	6,717	0 OE+00	7 0E-02
205992 Benzo(h)fluoranthene	1.23E+06	2 26 5.02	5 56E-06	\$ 50E-03	4 55E 03	11110		308 15	10/8 24	000'21	2 1E-04	0 0 0 0 0
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1815-05	2 5	7 13 90 655 05	77 606	000,61	2 15-04	0.05+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07		753 15	1019 70	15,000	2 15.05	00410
218019 Chrysene	3 98E+05	2 48E-02	6.21E-06	1 60E-03	3 88E-03	9 46E-05		71415	979.00	16,455	2 15-06	00+00
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 705-04	25	603 01	839 37	13,000	4 9E-03	000+000
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		596 55	839 36	13,000	1 8E-03	0 0E+00
	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5 3E-04	0.00
542/55 1,3-Dicholoppine	4 3/E+01	6 265-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	587 38	7,000	3 7E-05	2 0E-02
621647 N-Nitrosodio-omoviemos	2 40E±01	3 4/E-02	7 ZOE-UB	1 8ZE+UZ	3 06E-05	7 46E-07	52	558 00	770 00	12,938	유 :	0 0E+00
1024573 Heotachlor eboxide	8 32E+04	1 325-02	4 235-06	2.00E-01	3 90E-04	9.515.08		509 50 613 96	/45 8/ 9/8 76	000'11	2 05-03	00000
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 305-06	5 62E-02	4 67E-01	1 14E-02		629.88	750.00		2 00-03	00E+00
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06		657 15	87331		3.25-04	005+00
	2 90E+05	1 38E-02		8 00E-02	1 89E-01	4 60E-03	•	402 50	539 37	19,000	1 OE-04	00+100
11097691 Aroclor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03		377 50	512 27	19,000	1 0E-04	0 0E+00
125/4112 Arodor 1016 (PCB-1016) 53459219 Arodor 1242 (PCB-1242)	3.30E+04	2 22E-02 2 14E-02	5 31F-06	4 20E-01	1 19E-02 2 13E-03	2 90E-04 5 30E-04	52 4	340 50 345 50	475 22	18,000	1 0E-04	0.0E+00
		1	; ; ;	,	ב ומבימה			200	48£ 20	18,000	1 0E-04	00=+00

DATA ENTRY SHEET

VERSION 1.2 September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" In "YES" box and initial groundwater conc below)

	ENTER User-defined stratum A soil vapor permeability, k, (cm²)			
	ENTER Soil stratum A SCS soil type (used to estimate OR soil vapor permeability)	IS	ENTER Stratum C soil water-filled porosity, e, c (cm <sup>3</sup> /cm <sup>3</sup> )	03
	ENTER SCS soul type directly above	S	ENTER Stratum C soil total porosity, n <sup>c</sup> (unitiess)	0 43
	ENTER Soil stratum directly above water table, (Enter A, B, or C)	O	ENTER Stratum C soil dry bulk density, Pa <sup>C</sup> (g/cm <sup>3</sup> ).	ENTER Indoor air exchange rate, ER (1/h)
ethane	ENTER L <sub>WT</sub> (cell D28) Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	1280 16	ENTER Stratum B soil water-filled porosity, $\theta_w^8$ (cm³/cm³)	ENTER Floor-wall seam crack width, w (cm) (cm) 0.1 ENTER Target hazard quotient for noncarcinogens, THQ (milless)
Chemical ,1,2,2-Tetrachloroethane	NTER ENTER ENTER  Totals must add up to value of L.wr (cell D28)  Thickness of soil of soil of soil stratum B, stratum C, atum A, (Enter value or 0) (Enter value o h, h, he, he (cm)	274 32	ENTER Stratum B soil total porosity, n (unitless)	ENTER Enclosed space height, H
	ENTER Totals mu Thickness of soil stratum A, h <sub>A</sub> (cm)	1005 84	ENTER Stratum B soil dry bulk density, p. <sup>B</sup> (g/cm³)	ENTER Enclosed space floor width, We (cm).  ENTER EXPOSURE frequency, EF (days/yr)
	ENTER Depth below grade to water table, Lwr (cm)	2560 32	ENTER Stratum A soil water-filled porosity, 8,* (cm³/cm³)	ENTER Enclosed space floor length, Le (cm) 961 ENTER Exposure duration, ED (yrs)
ENTER Initial groundwater conc, Cw, (ug/L)	ENTER Depth below grade to bottom of enclosed space floor, Lr (cm)	15	ENTER Stratum A soul total porosity. n <sup>A</sup> (unidess)	ENTER Soil-bidg pressure differential, AP (g/cm-s²) 40 ENTER Averaging time for noncarchogens, AT <sub>NC</sub> (yrs)
Chemical CAS No (numbers only, no dashes).	ENTER Average Soll/ groundwater temperature, T <sub>S</sub> (°C)	16	ENTER Stratum A soil dry bulk density, Pb <sup>A</sup> (g/cm³)	ENTER Enclosed space foot thickness, Lored (cm) 15 15 ENTER Averaging time for carcinogens, ATc (yrs)

Used to calculate risk-based groundwater concentration

#### CHEMICAL PROPERTIES SHEET

								_
		Reference			(ma/m <sub>3</sub> )	1	0 0F+00	
	Š	nsk	factor.	J. P.	(uq/m³).1		5 8E-05   0 0E+0	
Pure	component	water	solubility,	Ś	(mg/L)		2 97E+03	
Organic	carbon	partition	coefficient,	፯	(cm <sub>3</sub> /g)		9 33E+01	
		Critical	temperature,	Ļ	Ş.		661 15	
	Normal	borling	point,	卢	(K)		419 60	
Enthalpy of	vaponzation et	the normal	boiling point,	ΔH <sub>v,b</sub>	(cat/mol)		966'8	
Henry's	law constant	reference	temperature,	노	(၁)		25	
Henry's	law constant	at reference	temperature,	I	(atm-m³/mol)		3 44E-04	
		Diffusivity	ın water,	្នំ	(cm²/s)		7 90E-06	
		Offusivity	ın air,	മ്	(cm²/s)		10E-02	

# INTERMEDIATE CALCULATIONS SHEET

	• -	
Floor- wall seam penmeter, X <sub>crect</sub> (cm)	3,844 Diffusion path length,	254532
Water-filled porosity in capillary zone, $\theta_{w,\alpha}$ $(cm^3/cm^3)$	Total coverall effective diffusion coefficient, D***  Coefficient, Coe	8 13E-04
Air-filled porosity in capillary zone, $\theta_a = (cm^3/cm^3)$	Capillary zone effective diffusion coefficient, Defize (cm²/s)	5 83E-04
Total porosity in capillary zone, n <sub>ca</sub>	Stratum C effective diffusion coefficient, D off c (cm²/s)	Reference conc (mg/m³)
Thickness of capillary zone, La	Stratum B effective diffusion coefficient, D*** (cm²/s)	7 95E-04 Unit risk factor, URF (µg/m³)-1
Stratum A soil soil effective vapor permeability, k, (cm²)	6 98E-10  Stratum A effective diffusion coefficient, D"A (cm²(s)	2 90E-03 Infinite source bldg conc., Cudder, (µg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub> (cm²)	Vapor viscosity at ave soif temperature, $\mu$ rs (g/cm-s)	Infinite source indoor attenuation coefficient, $\alpha$ (unitiess)
Stratum A soil intrinsic permeability, * k	9 36E-10 Henry's law constant at ave groundwater temperature, H'13 (unitless)	B 36E-03  Exponent of equivalent foundation Peciet number, exp(Pe <sup>f</sup> ) (unitiess)
Stratum A effective total fluid saturation,  S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0.419 Henry's law constant at ave groundwater temperature, Hrs (atm-m²/mol)	198E-04 Area of crack, Acred (cm²)
Stratum C soil air-filled porosity, $\theta_{\bullet}^{c}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 130 Enthalpy of vaporization at ave groundwater temperature, ΔH, τs (cal/mol)	Crack effective diffusion coefficient, Drack (cm²/s)
Stratum 8 soil aur-filed porosity, e_a^8 cm³/cm³)	Crack depth below grade, Zanak (cm)	Average vapor flow rate into bldg , Q <sub>mol</sub> (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, e <sub>n</sub> <sup>A</sup> (cm³/cm³)	0 230 Crack- to-total area ratio,  η	Grack radius, former (cm)
Source- building separation, L <sub>T</sub>	2545.32 Area of enclosed space below grade, As	924E+05 Source vapor conc., Caurae (µg/m³)
Exposure duration, t	9 46E+08  Bidg ventitation rate, Qbaldang (cm <sup>3</sup> /s)	Convection path length, L <sub>p</sub> (cm)

#### RESULTS SHEET

TIONS
ALCULA
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INCREWENTAL RISK CALCULATIONS

Hazard quotient	from vapor intrusion to	indoor air	noncarcinogen	(nutless)	AN
Incremental nsk from	vapor intrusion to	indoor air,	carcinogen	(unitless)	ΑN
Final	indoor exposure	groundwater	conc,	(µg/L)	1 38E+03
	component water			(µ3/L)	2 97E+06
Risk-based	exposure	groundwater	conc,	(µg/L)	1 38E+03
Indoor	exposure groundwater	conc.	noncarcinogen	(Hg/L)	AN
Indoor	exposure groundwater	couc.	carcinogen	(mg/L)	1 38E+03

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

		ő	Coll December   color December	Toble		VLOOKUP TABLES	ES						
SCS Soil Type	K, (cm/h)	α (1/cm)	N (unitless)	M (unitless)	θ, (cm³/cm³)	θ, (cm³/cm³)	Мвап Grain Diameter (ст.)						
O	0.20	0 008	1 09	0 083	0 38	990 0	0 0082						
ರ .	0.26	0 0 19	131	0 237	0 41	0 095	0 016						
. L.	104	0 036	1 56	0 359	0 43	0 0 78	0 050						
ე <u>"</u>	74 59 20 70	0 124	2 28	0 561	0 41	0 057	0 040						•
ပ္	0 12	0 0 2	1 23	0.027	0 40	0.045	0.044						
SCL	131	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	148	0 324	68 0 0	9 0	0 029						
55	0.25	0 0 16	137	0 270	0.46	0 034	0 0046						
SIC	0 02	0 005	1 09	0 083	0.26	0.00	0 0039						
	007	0 010	123	0 187	0.43	680 0	0 0028						
SL	0 45 4 42	0 020	141	0 291	0 45	0 065	0.011						
					Chemic	Chemical Properties Lookup Table	okup Table						
		Organic			Pure		Henry's	Henry's			Fothalny of		
		carbon			component		law constant	law constant	Norma	700	vanorization at	ţ	
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	boiling	g Critical	the normat	ž ž	Reference
	O	coefficient,	יו מונ'	in water,	solubility,	law constant	temperature,	temperature,	point,	tem	boiling point,	factor,	conc ,
CAS No		γ <sub>α</sub> α (cm <sup>3</sup> /α)	U. (cm <sup>2</sup> /s)	U.,	s (Jou	H in	H (1000)	r <u>.</u> €	<b>-</b> €			URF.	SF.
		(A) (B)	(6/ 110)	(6)	(mg/L)	(nultiess)	(atm-m/mol)	<u>(</u> )	<del>(</del> X	(X)	(cat/mol)	(ma/m <sub>3</sub> )	(mg/m³)
50293 DDT		2.63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	ž	533 15	15 720 75	11,000	9.7F-05	0.08+00
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	90-300 G	1 62E-03	4 63E-05	1 13E-06	124			15,000	2 H 2	00+
51285 2,4-Dinitrophenoi		1 00E-02	2 73E-02	9 OGE-06	2 79E+03	1 82E-05	4 44E-07	25	_		15,000	0.05+00	7 0E-03
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	73			16,000	2 1E-03	0 0E+00
56235 Carbon tetrachloride		174E+02	7 80E-02	8 805-06	7 93E+02	1 25E+00	3 05E-02	ĸ			7,127	15E-05	0 0E+00
57749 Chlordana		3 981 + 05	5 10E-02	9 00E-06	9 40E-03	1376-04	334E-06	25		•	15,000	2 1E-04	0 0E+00
58899 gamma-HCH (Lindane)		1 07 F±03	1 42F-02	4 3/E-06 7 34E-08	3.50E-02 6.80E±00	7 74 6-03	4 85E-05	N d			13,000	3.7E-04	0 0 0 0
60571 Dieldrin		2 14E+04	1.25E-02	4 74E-06	195F-01	6 19E-04	1 515-05	i č	03000		13,000	2 / L	0.01+00
65850 Benzoic Acld		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1547-08	, i		32 942 23	13,000	4 61-03	0.00+00
		5 75E-01	1 24E-01	1 14E-05	1.00E+06	1 59E-03	3 88E-05	1 2			000001		3 5 F 01
		3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	i či			886.9	2 3E-05	0 0E+00
67721 Hexachloroethane		1 78E+03	2 50E-03		5 00E+01	1 59E-01	3 88E-03	73			9,510	4 0E-06	0 0E+00
71423 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 616-04	8 80E-06	25			10,346	0 0E+00	3 5E-01
71556 1.1.1-Trichloroethane		1 105+01	8 80E-02 7 80E-02	9 BOT-06	1 /5E+03	2.28E-01	556E-03				7,342	8 35-06	0000
72208 Endrin		1 23E+04	1.25E-02	4 74E-06	2 50F-01	3 DRE-04	7 515-05			24 545 00	7,136	0 0E+00	1 05+00
72435 Methoxychlor		9 77 E+04	1565-02	4 46E-06	4 50E-02	6 485-04	1.586-05	, i	65102		12,000	000+00	1 15-03
72548 DDD		1 00E+06	1 695-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25			14,000	6 9E-05	0.00+000
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05				13,000	9 7E-05	0 0 0
74839 Methyl bromide		1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	**			5,714	0 OE+00	5 0E-03
75002 Methyland chlords (chlorosthene)	ane)	186E+01	106E-01	123E-06	2 76E+03	1116+00	271E-02			25 432 00	5,250	8 4E-05	0 0E+00
75150 Carbon disuffide		4 575+01	100	1/1-00	1 100+04	4 34E+02	2 19E-03				6,706	4 7E-07	3.05+00
75252 Bromoform		8 71E+01	1 49E-02	1,03E-05	3 10 0 + 03	2 19F-02	3 02E-02 5 34E-04		30.50	00 227 00	P8, 9	0.05+00	, UE-01
75274 Bromodichioromethane		5.50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	160E-03	3 %			6/4/6	בים בים מים מים	00+400
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5.06E+03	2 30E-01	5616-03	1 24			200,7 200,8	001400	5.00-01
75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25			6.247	5 OE-05	0 0E+00
76448 Heptachior		141E+06	1 12E-02		1 80E-01	4 47E-02	1 09E-03	25			13,000	1 3E-03	0 0E+00
77474 Hexachlorocyclopentadiene	906	2 00E+05	1 61E-02		1 80E+00	1 11E+00	2 71E-02	25			10,931	0 0E+00	7 0E-05
7007 1 Schlidtle		4 00 110	5 235-02	6 /65-06	1.205.404	2 72E-04	6 63E-06	25			10,271	2 7E-07	0 0 +00
79005 1.1.2.Tachloropane		4 3/11+01	7 825-02	8 /35-06	2 805+03	1 15E-01	2 80E-03	25			7,590	0 0E+00	4 0E-03
79016 Trichlorosthylene		3 UTE+UT	7 905-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25			8,322	16E-05	00+100
79345 1.1.2.2-Tetrachloroethane	Q.	9 33E+01	7 10F-02	2 SOF-06	2 97F±03	1 41E-02	1 USE-UZ	ς, γ,	36036	36 544.20	7,505	1 7E-06	0.05+00
83329 Acenaphthene	,	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6.36F-03	4 44 E-04	, , ,	75054		6,990	00-100	2 15-01
•							1	i	}		}	;	:- ! !

6 of 7

84662 Districtions	1	!			VLOOKUP TABLES								
84742 Di-n-butyl phthalate	3.395+04	2 38E-02	5 35E-06 7 86E-08	1 08E+03	185E-05	4 51E-07	52	567 15	757 00	13,733	0.0E+00	2 8E+00	
85687 Butyl benzyl phthalate	5 75E+04	1 74F-02	4 835-06	2 695+01	3 83E-08	9 39E-10	<b>5</b> 2	613 15	798 67	14,751	0 0E+00	3 55-01	
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6 35 E-06	3.516+01	2055-04	1.265-06	33	660 60	839 68	13,000	00+300	7 0E-01	
86737 Fluorene	1 38E+04	3 63E-02	7 88E-06	1986+00	2 615-03	97000	0 1	632.28	890 45	13,000	1 4E-06	00±300	
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6.261-07	1535.00	6 1	570 44	87000	12,666	0.05+00	14E-01	
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3.34E-01	8 15E-03	9 5	02/ 6/ 486 15	238 00	13,977	57E-06	00000	
or obside Pertachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 445-08		582 15	813.20	14 000	3.4F.05	00+400	
99092 2,4,5-1 idniorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06		519 15	749 03	12,000	3 16-06	00100	
91941 3.3-Dichlombeozidae	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04		491 14	748 40	10,373	0 OE+00	1 4E-01	
95476 o-Xviene	3 635+02	20-07-6 8 70E-02	4 7 4 1 5 6	3 115+00	1 64E-07	4 00E-09		560 26	754 03	13,000	136-04	0 0E+00	
95487 2-Methylphenol (o-cresol)	9 12F+01	2 40E-02	90505	1 /8E+U2	2 135-01	5 20E-03		417 60	630 30	8,661	0 0E+00	7 0E+00	
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90F-06	1 56F+02	7 70E-U5	1 205-06		464 19	697 60	10,800	0 0E+00	18E-01	
95578 2-Chlorophenol	3 88E+02	5 01E-02		2 20E+04	1 605-02	3 90E-03	2 8	453 57	705 00	9,700	000	2 0E-01	
95954 2,4,5-Tnchlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78F-04	3 3 4 E-04		44/ 33 Fac 45	675 00	9,572	0000	1 8E-02	
98953 Nitrobenzene	6 46E+01	7 60E-02		2 09E+03	9 84E-04	2 40F-05		320 IS	710.00	13,000	005+00	3.5E-01	
100414 Ethylbenzene	3 63E+02	7 50E-02		1 69E+02	3 23E-01	7 88E-03		409.34	617 20	0,000	00+400	2 UE-03	
100425 Styrene	7 76E+02	7 10E-02		3 10E+02	1 13E-01	2 76E-03		41831	636.00	2,50	00+00	100+00	
105073 2,4-Umemyiphenoi	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06		484 13	707 60	11,329	000+00	7 OF-02	
106467 14-Dichlemberrane	3 895+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	7 97	411 52	616 20	8.525	0 0E+00	7 0E+00	
106478 p-Chlomaniline	6 615-01	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03		447 21	684 75	9,271	0 0E+00	8 0E-01	
107062 1.2-Dichloroethans	1 745+01	4 63E-02	1 01E-05	5 30E+03	136E-05	3 32E-07	25	503 65	754 00	11,689	0 0E+00	1 4E-02	
108054 Vinyl acetate	5 25E+00	8 50E-02	9 205-00		2 10E-02	9 78E-04	22	356 65	561 00	7,643	2 6E-05	0 OE+00	
108383 m-Xylene	4 07E+02	7 00E-02	7 80F-06	1 61F+02		5 125-04		345 65	519 13	7,800	00=+00	2 0E-01	
108883 Toluene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	7.34E-U3	2 2	412.27	617 05	8,523	0 0E+00	7 0E+00	
	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1.52F-01	3 7 4 15 10 3	0 2	383 /8	591 79	7,930	005+00	4 0E-01	
	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98F-07	2 4	55.07	632.40	8,410	0 0E+00	2 0E-02	
	1 55E+01	6 92E-02		1 72E+04	7 38E-04	1 80F-05		455 UZ 451 15	650 70	10,920	0.0E+00	2 1E+00	
	2 14E+03	115E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05		74 43	942 94	9,000	40.00	0 UF+00	
117817 dis(z-ethylnexyl)phithalate	1 51E+07	3 51E-02	3 665-06	3 40E-01	4 18E-06	1 02E-07	25 6	657 15	806 00	15 999	40508	70-10-0	
118741 Havachischen	8 325+07	151E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05		704 09	862 22	15,000	005+00	7.01-02	
120127 Anthracene	2 955 +04	3 245-02	3 97E-U6	6 20E+00	5 41E-02		25 5	582 55	825 00	14,447	4 6E-04	0 OE+00	
	1 78E+03	3 00 5-02	8 237.06	4 34E-02	2 6/E-03	6 51E-05		615 18	873 00	13,121	0 0E+00	1 1E+00	
120832 2,4-Dichtorophenol	1 47E+02	3 46E-02	8 77E-06	4 50F+03	3 62E-02	1 42E-03		486 15	725 00	10,471	0 0E+00	2 0E-01	
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01	7 06E-06		3.805-06	0.715.00		482.15	708 17	11,000	0 0E+00	1 15-02	
124481 Chlorodibromomethane	631E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83F-04	0 K	590 00 416 14	814 00 678 20	13,467	19E-04	0 0E+00	
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02		394 40	620 20	000,8	2 4E-05	0.05.00	
129000 Pyrene 166603 do 1 3 Dichlero de 15-1	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 10E-05	25 6	667 95	936 00	14 370	0.05+0.0	1000	
156605 trans-1 2-Dichlomethylene	3 55E+U1	7.0355-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00	7 192	00+00	3 SE-02	
193395 Indeno(1,2,3-cd)pyrene	3.475+06	1 905-02	7 56E 06	4 30E+03	3 85E-01	9 39E-03		320 85	516 50	6,717	0 0E+00	7 0E-02	
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1.505-03	4 55E-03	1 605-06	S 10	809 15	1078 24	17,000	2 1E-04	0 0E+00	
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 50E-04	1815-04		08.017	969.27	15,000	2 11-9	0 OE+00	
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07		753.15	905 00	13,815	00=+00	1,4E-01	
218019 Chrysene	3 98E+05	2 48E-02	621E-06	1 60E-03	3 88E-03	9 46E-05		714 15	00 626	16.455	2 15 05	00+100	
209002 Alain 210848 alaba UCH (Alaba BUC)	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	52	603 01	839 37	13.000	4 PF-03	001100	
319857 beta-HCH (beta-BHC)	1 26 0 4 0 3	1 42E-02	7.34E-08	2 00E+00	4 35E-04	1 06E-05		596 55	839 36	13,000	1 8E-03	0 0E+00	
542756 1,3-Dichloropropene	4 57E+01	6 26F-02	1 00 105	2 40E-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5 3E-04	0 0E+00	
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02	7.26E-06	1 82E+03	3 065 08	1 //E-02		381 15	587 38	7,000	3.7E-05	2 0E-02	
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	7 40E-U/	8 8	00 856	770 00	12,938	1 9E-04	0 0E+00	
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	0.515-06	8 i	09 606	746 87	11,000	2 0E-03	0 0E+00	
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 305-06	5 62E-02	4 67E-01	1 145-02		01330	848 76	_	2 6E-03	0 0E+00	
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 405-01	2 46E-04	6.005-06	32	657 15	730.00		0 0E+00	3 OE-04	
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	189E-01	4 60E-03		402 50	539.37	14,000	3 2E-04	0000	
1109/691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03		377 50	512.27	000.61	10 to	00+400	
120/4112 Aredor 1016 (PCB-1016) 53469219 Aredor 1242 (PCB-1242)	3 30E+04	2 22E-02	5 425-06	4 20E-01	1 196-02	2 90E-04		340 50	475 22	18,000	1 OF-04	00=+00	
004000 1 4rat 00000 1 4rat 000000	3 300 1444	Z0-34L-7	531E-06	3 40E-01	2 135-02	5 20E-04	25 34	5 50	482 20	18,000	1 OE-04	000	
												-:	

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

8 YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

ENTER Initial groundwater

ENTER

YES

	ENTER User-defined stratum A soil vapor permeability, k, (cm²)	
	, R	L    r-
	ENTER Soil stratum A SCS Soil type (used to estimate soil vapor permeability)	ENTER Stratum C soil water-filled porosity, $\theta_{w}^{c}$ (cm <sup>3</sup> /cm <sup>3</sup> )
	ENTER SCS soil type directly above	ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)
	ENTER Sol stratum directly above water table, (Enter A, B, or C)	ENTER Stratum C soil dry bulk density, Ps <sup>c</sup> (g/cm³)
sthylene	ENTER of Lost D28) Thuckness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Stratum B soil water-filled porosity, 6,**
Chemical trans-1,2-Dichloroethylene	INTER ENTER ENTER  Totals must add up to value of L <sub>VY</sub> (cell D28)  Thickness Thickness of soil of soil stratum B, stratum C, atum A, (Enter value or 0) (Enter value or h, he he hc (cm)	ENTER Stratum B soit total porosity, n (unitless)
Ira	ENTER Totals mu Thuckness of soil stratum A, h <sub>A</sub> (cm)	ENTER Stratum B soil dry bulk density, Pa B
	ENTER Depth below grade to water table, Lwr (cm)	ENTER Stratum A soni water-filled porosity,
groundwater conc. Cw (ug/L) 23 25	ENTER Depth below grade to bottom of enclosed space floor, Lr (cm)	15 ENTER Stratum A solt total porosity. n <sup>A</sup> (unitless)
Chemical CAS No (numbers only, no dashes)	ENTER Average soil/ groundwater temperature, T <sub>S</sub> (°C)	ENTER Stratum A soil dry bulk density, p <sub>b</sub> ^ (g/cm³)

15	0.43	0.2	1.7	0 42	0.27	17	0 43	
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
space	Soil-bldg	space	space	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
thickness,	differental,	length,	width,	height,	width,	rate,		
Loreck	ΔР	Ļ	w <sub>B</sub>	f	*	띪		
(cm)	(g/cm-s²)	(cm)	(cm)	(cm)	(cm)	(1/h)		
15	40	961	961	488	0.1	0.45		
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER			
Averaging	Averaging			Target	Target hazard			
time for	time for	Exposure	Exposure	risk for	quotient for			
carcinogens,	noncarcinogens,	duration,	frequency,	carcinogens,	noncarcinogens,			
ΑTc	ATNC	8	Ш	Ŧ	된			
(ALB)	(Arre)	(2/2)	(dayehir)	(confittees)	(neitleer)			

1	Г	ľ		
(unitless)	-		Ised to calculate risk-based	groundwater concentration
(unitiess)	1 0E-06		Used to calci	groundwater
(days/yr)	350			
(yrs)	30			
(yrs)	30			
(yrs)	70			

### CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)	7 0E-02
Unit risk factor, URF (µg/m³)⁻¹	0 0E+00
Pure component water solubility, S S (mg/L)	6 30E+03
Organic carbon partitlon coefficient, $K_{c}^{c}$ (cm <sup>3</sup> /g)	5 25E+01
Critical temperature, T <sub>c</sub> (*K)	516 50
Normal boiling point, T <sub>E</sub> (°K)	320 85
Enthalpy of vaportization at the normal boiling point, AH,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	6,717
Henry's law constant reference temperature, T <sub>R</sub>	25
Henry's law constant at reference temperature, H (atm-m³/mol)	9 39E-03
Diffusmity in water, D. (cm²/s)	1 19E-05
Diffushrity in air, D_ (cm²/s)	7.07E-02

## INTERMEDIATE CALCULATIONS SHEET

Stratum A Stratum A soil soil relative air effective vapor permeability, permeability,		ve soil soil intrinsic relative air on, permeability, permeability,	son intrinsic relative air permeability, permeability,	d au-filied total fund intrinsic relative air y, porosity, saturation, permeability, permeability,	d air-filled arr-filled total fluid intrinsic relative air y, porosity, porrosity, saturation, permeability, permeability,
κ <sub>ω</sub> (cm²)	k <sub>4</sub> k <sub>49</sub> (cm²) (cm²)		S <sub>is</sub> k <sub>4</sub> (cm³/cm³) (cm²)	S <sub>is</sub> k <sub>4</sub> (cm³/cm³) (cm²)	$\theta_{\bullet}^{\bullet}$ $S_{\bullet\bullet}$ $k_{\bullet}$ (cm <sup>3</sup> ) $(cm^3)$
0 746	9.36E-10 0.746		9.365-10	0 419   9 36E-10	0130 0419 936E-10
Vapor	Henry's law Vap		Henry's law	Enthalpy of Henry's law Henry's law	Enthalpy of Henry's law Henry's law
VISCOS	constant at	constant at constant at	oursiant at constant at	constant at constant at	below ave groundwater ave groundwater ave groundwater
temperature	temperature,	temperature, temperature,	temperature, temperature,	temperature, temperature, temperature,	grade, temperature, temperature, temperature,
urs	H'rs µ		H'Ts	H <sub>TS</sub> H' <sub>TS</sub>	ΔH <sub>v,13</sub> H <sub>TS</sub> H' <sub>TS</sub>
(g/cm-s)	(unitless)		(unitless)	(atm-m³/mol) (unitless)	(cal/mol) (atm-m³/mol) (unitless)
1.77E-04	2 73E-01 1.77		2 73E-01	6 48E-03 2 73E-01	7,073 6 48E-03 2 73E-01
Infinite	Exponent of Infi		Exponent of	Exponent of	Exponent of
source				Crack	Crack
indoor	c	foundation	foundation	foundation	vapor effective foundation
attenuation			Area of Peclet	diffusion Area of Peclet	diffusion Area of Peclet
coefficient			crack, number,	coefficient, crack, number,	into bldg, coefficient, crack, number,
ಶ	exp(Pe <sup>l</sup> )	exp(Pe <sup>f</sup> )	A <sub>crack</sub> exp(Pe <sup>5</sup> )	A <sub>crack</sub> exp(Pe <sup>5</sup> )	D <sup>drack</sup> A <sub>drack</sub> exp(Pe <sup>l</sup> )
(unitless	(unitless)		(unitless)	(cm²) (unitless)	(cm²/s) (cm²) (unitless)
3 24 <b>E-</b> 06	8 80E+03 3 24	ŀ	8 80E+03	3 84E+02 8 80E+03	2 87E-03 3 84E+02 8 80E+03

ATER CONCENTRATION CALCULATIONS:
RISK-BASED GROUNDWATE

INCREMENTAL RISK CALCULATIONS.

tal Hazard quotlent from vapor intrusion to intrusion to indoor air, indoor air, indoor air, (unitiess)	NA
incremental rsk from vapor intrusion to indoor ar, carcinogen (untiless)	NA
Final indoor exposure groundwater conc., (µg/L)	8 26E+04
Pure component water solubility, S (µg/L)	6 30E+06
Risk-based Indoor exposure groundwater conc, (ug/L)	8 26E+04
Indoor exposure groundwater conc., noncarcinogen (µg/L)	8 26E+04
Indoor exposure groundwater conc , carcinogen (µg/L)	¥

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

				- -		VLOOKUP TABLES	ES					
SCS Soil Type	K, (cm/h)	α (1/cm)	N (unitless) M (unitless)	M (unitless)	θ, (cm³/cm³)	e, (cm³/cm³)	Mean Grain Diameter (cm)					
ပ	0.20	0 008		0 083	038	0 068	2600 0					
<u>ರ</u>	0.26	0 019	131	0 237	0 41	960 0	0 0 0					
<u></u>	1 04	0 036	1 56	0 359	0 43	0 0 78	0 0 0 0					
S.	14 59	0 124	2 28	0 561	0 41	0 057	0 040					
တ ဒိ	29 70	0 145	2 68	0 627	0 43	0 045	0 044					
င္သင္	0 12	0 027	1 23	0 187	0 38	0 100	0 025					
ا ا	131	0.059	148	0 324	0 39	0 100	0 029					
, ä	2 6	0.016	137	0.270	0.46	0,034	0 0046					
<u> </u>	0 00	0 000	109	0 083	0.26	0 0 0 0	0 0039					
	700	0000	123	0.187	0.43	6800	95000					
SL	4 4 5	0.020	1 89	0.471	0.40	0 065	0011					
	į				Chemic	Chemical Properties Lookup Table	kup Table					
		Organic			Pure		Henry's	Henry's			Enthalpy of	
		carbon			component		law constant	law constant	Normal		vaporization at	Ç
		partition	Diffusivity	Deffusivity	water	Henry's	at reference	reference	boiling	Critical	the normal	Asn
		coemicient, K	n air,	in water,	solubility,	iaw constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,
CAS No Chemical		(cm <sup>3</sup> /g)	(cm <sup>2</sup> /s)	(cm²/s)	(ma/L)	(unitless)	n (atm-m³/mol)	ج ق آ	. §	ှ နိ	ΔH, s	URF (o/n³).1
TOO SOONS		100										mg/m )
50328 Benzo(a)byrene		2 53E+U5	1 3/E-02 4 30E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 OFF-06	2 79F+03	1 825-05	1 35E-06 4 44E-07	27	73.90	969 27	15,000	2 1E-03
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 475-08	0 K	743.24	927.85	15,000	0 0E+00
56235 Carbon tetrachlonde		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05 10 - 02	25.0	34990	556 60	16,000	20-11-4-25 10-10-11-4-35
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	15.000	2 1F-04
57749 Chlordane		1 20E+05	1 18€-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13.000	3 7E-04
		1 07 E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-0\$	25	596 55	839 36	13,000	3 7E-04
SEBSO Destruit Acid		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	25	613 32	842 25	13,000	4 6E-03
67641 Acetore		6 UUE-01	5 365-02	7 97E-06	3 50E+03	631E-05	1 54E-06	25	720 00	751 00	10,000	0 OE+00
		3 985-01		1 145-05	1 00E+06	1 59E-03	3 88E-05	52	329 20	508 10	6,955	0 0E+00
67721 Hexachloroethane		1 78E+03		6 BDF-06	5 00F±01	1.595-01	20 00 00 00 00 00 00 00 00 00 00 00 00 0	27.	334,32	535 40	6,988	2 3E-05
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 805-06	0 16	390.88	585 UU 583 O5	9,510	4 UE-06
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56 - 03	72 22 22 22 22 22 22 22 22 22 22 22 22 2	353 24	562 16	7.342	8.3F.08
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	52	347 24	545 00	7,136	0 0E+00
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3.08E-04	7 51E-06	25	71815	986 20	12,000	0 0E+00
72548 DDD		9 //E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0 0E+00
72559 DDE		4 47E+06	1 44F-02	5.875-06	1 20E-01	8 615-04	4 OUE-US	225	639 90	863 77	14,000	6 9E-05
74839 Methyl bromide		1 05E+01	7 28E-02	1215-05	1525+04	2 56 F-04	2 :00=03 6 :34E :03	8 8	030 44	860 38	13,000	9 7E-05
75014 Vinyl chloride (chloroethene)	eue)	1 86E+01	1065-01	1 23E-06	2 76E+03	1 11E+00	271E-02	25 25	259.25	437 00	5 250	8.4F.05
75092 Methylene chloride		1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	; \$2 52	313 00	510 00	6.706	4 7E-07
75150 Carbon disulfide		4 57E+01	1045-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	25	319 00	552 00	6,391	0.0E+00
75274 Bromodichiczmethans		8 71E+03	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422 35	00 969	9,479	1 1E-06
75343 1 1-Dichlomethane		3 16 101	2 42E-02	1 000-03	6 /4E+03	6 56E-02	1 60E-03	52	363 15	585 85	2,000	1 8E-05
75354 1,1-Dichloroethylene		5 896+01	9 00F-02	1 04E-05	2 255+03	1 075+01	9 61 E-03	5 5	330 55	523 00	6,895	0 0E+00
76448 Heptachlor		1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47F-02	1.09E-03	2,5	503.60	3/0/5	6,247	20-10-4
77474 Hexachlorocyclopentadiene	9116	2 00E+05		7 21E-06	1 80E+00	1 11 1 + 00	2.716-02	25.25	512.15	746.00	10.931	00490
78591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63 € - 06	25	488 35	715.00	10.271	2 7E-07
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	672 00	7,590	00=+00
79005 1,1,2-Trichloroethane		5 01E+01		8 BOE-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8,322	1 6E-05
79016 Trichloroethylene 79345 1 1 2 2-Tetrachloroethone	,	1 66E+02	7 90E-02	9 10E-08	1 10E+03	4 22E-01	1 03E-02	25	360 36	544 20	7,505	1 7E-06
(%345 1,1,2,z-letrachloroethane	Ф	9 33 = +01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	25	419 60	661 15	966'8	5 8E-05
enternidarian agras		1 VOETUS	4 215-VZ	/ page / p	4.24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	00+1100

00E+00 00

6 of 7

0.000					VLOOKUP TABLES								
84742 Dendariy primalate	2,88E+02	2 56E-02	635E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 8€+00	
85687 Butyl benzyl phthalate	5 75F+04	1 74F-02	7 80E-00	1 12E+01	3 35 11-08	9 39E-10	52	613 15	798 67	14,751	0.00	3 5E-01	
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6.35F-06	3 515+01	20600	1.265-06	8 8	660 60	839 68	13,000	000+00	7 0E-01	
86737 Fluorene	1 38E+04	3 63E-02	7 88E-06	1 98F+00	2 67 11-03	3 00E-06	9 8	632.28	890 45	13,000	146-06	00±±00	
86748 Carbazole	3 39E+03	3 905-02	7 03E-06	7 48E+00	6 26E-07	1.535-08	3 %	527 R7	00000	12,000	200400	1 4 5 0 1	
87683 Hexachloro-1,3-butadiene	537E+04	5 61E-02	6 16E-06	3 23E+00	3.34E-01	8 15E-03	3 2	486 15	738 00	10,307	2 25-05	004100	
87852 2 4 e Trableschio	5 92E+02	5 60E-02	6 105-06	1 95E+03	1 00E-06	2 44E-08	52	582 15	813 20	14,000	3 45-05	00+00	
91203 Naphthalene	3 81 = +02	3 18E-02	6 25E-06	8 00E+02	3 195-04	7 78E-06	22	51915	749 03	12,000	3 15-06	0 0E+00	
91941 3,3-Dichlorobenzidine	7 24F+02	1 94F-02	/ 50E-06 6 74E-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	14E-01	
95476 o-Xylene	3 63E+02	8 70E-02	1 00 F-05	1 785+02	2 13E-07	4 00E-09	52 6	560 26	754 03	13,000	135-94	0 0E+00	
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 305-06	2 60E+04	4 92F-05	3 20E-03	£ 5	09 / 14	630 30	8,661	0.05+00	7 0E+00	
95501 1,2-Dichtorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 796-02	1.90F-03	3 %	404 13	705.00	70,800	0 0E+00	18501	
95578 2-Chiorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 905-04	2 22	447.53	675 00	9,572		1 85-02	
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 785-04	4 34E-06	25	526 15	759 13	13,000	000-00	3.5E-01	
100414 Ethylpersene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	22	483 95	719 00	10,566	0 0E+00	2 0E-03	
100425 Styrene	3 63E+02 7 76E+02	7 10E-02	2 80E-06	1 69E+02	3 23 5-01	7 88E-03	52	409 34	617 20	8,501	0 0E+00	1 0E+00	
105679 2,4-Dimethylphenol	2 09E+02	5 845-02		3 10E+02 7 87E+03	1 13E-01	2 76E-03	52	41831	636 00	8,737	0 OE+00	1 0E+00	
106423 p-Xylene	3 89E+02	7 69E-02		1 85E+02	3 14 F-01	2 00E-06 7 66E-03	Ç ;	484 13	707 60	11,329	00000	7 0E-02	
106467 1,4-Dichlorobenzene	6 175+02	6 90E-02		7 38E+01	9 96E-02	2 43E-03	22 52	447 21	684 75	6,525 9,771	201400	) OF +00	
106478 p-Chloroaniline	6 61E+01	4 835-02		5 30E+03	1 36E-05	3 32E-07	2 2	503 65	754 00	11.689	0.05+00	1 4F-02	
197052 1,2-Dichloroethane	1,74E+01	1 04E-01		8 52E+03	4 01E-02	9 78E-04		356 65	561 00	7,643	2 6E-05	0 0E+00	
108024 VINYI acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04		345 65	519 13	7,800	0 0E+00	2 0E-01	
10883 Tolliene	4 0/8+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03	52	412 27	617 05	8,523	0.0E+00	7 0E+00	
108907 Chlorobenzene	2 195+02	8 /UE-02 7 30E-03	8 60E-06	5 265 +02	2 72E-01	6 63E-03	52	383 78	591 79	7,930	0 0E+00	4 0E-01	
108952 Phenol	2.88E+01	8 20E-02	9 105-06	8 28E+04	1 52E-01	3 71E-03	23	404 87	632 40	8,410	0 0E+00	2 0E-02	
	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 385-04	3 98E-07	20 6	455 02	694 20	10,920	0 0E+00	2 1E+00	
115297 Endosulfan	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 595-04	1 12E-05	3 19	674.43	67.620	9,000	3.35.04	00=+00	
117817 Bis(2-ethylhexyl)phthalate	1 51E+07	3 516-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07		657 15	808.00	15 999	405-00	20-E-02	
11/840 Ul-n-octy/ phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05		704 09	862 22	15,000	0 0E+00	7 OF 02	
120127 Anthracene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03		582 55	825 00	14,447	4 65-04	0 0E+00	
120821 1.2.4-Trichlorobenzene	4 78F±03	3 245-02	7 /4E-06	4 34E-02	2 67E-03	6 51E-05		61518	873 00	13,121	0 0E+00	1 1E+00	
120832 2,4-Dichlorophenol	1 47E+02	3 465-02	8 77F-06	3 00E+02 4 50E+03	5 82E-02	1 42E-03		486 15	725 00	10,471	0 0E+00	2 0E-01	
121142 2,4-Dinitrotoluene	9 55E+01	2 035-01	7 06E-06	2 70E+02	3 801-06	0.276.00	9 5	482 15	708 17	11,000	0 0E+00	1 1E-02	
124481 Chlorodibromomethane	631E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 835-04		390 00 416 14	814 UU 678 20	13,467	196.04	00 00 0	
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02		394 40	620 20	8288	5 8F-03	000+000	
159000 Pyrana 158502 Ais-1 2-Dioplanash daga	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 10E-05		667 95	936 00	14,370	0 0E+00	1 15-01	
156605 trans-1 2-Dichlomathylene	5 255+01	7 075 03	1 35-05	3 50E+03	167E-01	4 07E-03	52	333 65	544 00	7,192	0.0E+00	3 5E-02	
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5.665-06	2 20E-03	3 83E-U1 6 56E-U5	9 395-03		320 85	516 50	6,717	0 0E+00	7 0E-02	
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1116-04		215 90	10/8 24	17,000	2 1E-04	0 0E+00	
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 61E-05		655.95	905 00	13,815	0.05+0.0	000+00	
20/089 Benzo(K)illuoranthene 218019 Chrysene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07		753 15	1019 70	16,000	2 1E-05	0 0 0 0	
309002 Aldrin	2 45F+06	1 325-02	4 865-06	1 605 01	3 88E-03	9 46E-05	52	714 15	979 00	16,455	2 1E-06	0 0E+00	
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00F+00	4 35F-04	1 / UE-04		603.01	839 37	13,000	4 9E-03	0 0E+00	
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05F-05	7.445-07		390 33 606 66	839 36	13,000	1 8E-03	0 0 0	
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02	3 %	384 15	639 35 587 38	13,000	53E0	0 0E+00	
606202 2.6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07		558 00	770 00	12 93g	2 - 10 - 1	2 UE-02	
621647 N-Mitosodi-h-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06		209 60	746 87	11,000	2 OF 03	0 OE+00	
7439976 Mercury (elemental)	5 20E±04	3 025-02	4 235-06 6 205 06	2 00E-01	3 90E-04	9 51E-06	52	613 96	848 76	13,000	2 6E-03	0 05+00	
8001352 Toxaphene	2 57E+05	1 16E-02	4 34F-06	2 02E-02	2 46E-04	1 14E-02		629 88	1750 00	14, 127	0 0E+00	3 0E-04	
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 385-02	4 32E-06	8 00E-02	1 89E-01	6 00E-06	0 %	65/ 15 462 50	87331	14,000	3.2E-04	0 00 +00	_
11097691 Arador 1254 (PCB-1254)	2 00E+05	1 56E-02	\$ 00E-06	5 70E-02	8 20E-02	2 00E-03		377 50	512.27	000 61	1 OE-04	00000	
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2 225-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	52	340 50	475 22	18,000	10E-04	00+100	
354036 13 441 (1.00) 1446 (2.00)	3 305 +04	2 145-02	531E-06	3 40E-01	2 13E-02	5 20E-04	22	345 50	482 20	18,000	1 0E-04	0 0E+00	_

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

r

YES

VERSION 1 2 September, 1998 CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

ENTER initial groundwater

ENTER

YES

		ENTER	User-defined stratum A soil vapor	κ, (cm²)					
			Č	<u>,</u>					
		ENTER	stratum A SCS soil type	soil vapor permeability)	SI	ENTER	Stratum C soil water-filled	porasity,	(cm³/cm³)
		ENTER	SCS Soil lyon	directly above water table	S	ENTER	Stratum C soil total	porosity.	(unitless)
		ENTER	Soil stratum directly above	water table, (Enter A, B, or C)	ပ		Stratum C soil dry		
	hylene	ENTER (Lwr (cell D28)	Thickness of soil stratum C, (Enter value or 0)	h <sub>c</sub> (cm)	1280 16	ENTER	Stratum B soil water-filled	porosity,	(cm³/cm³)
Chemical	cis-1,2-Dichloroethylene	NTER ENTER ENTER ENTER Totals must add up to value of L <sub>WT</sub> (cell D28)	Thickness of soil stratum B, (Enter value or 0)	h <sub>B</sub> (cm)	274 32		Stratum B soil total		
	5	ENTER Totals mu	Thickness of soil stratum A.	h <sub>A</sub> (cm)	1005 84	ENTER	Stratum B soil dry	bulk density,	(g/cm³)
_		ENTER	Depth below grade to water table,	Lw <sub>T</sub> (cm)	2560 32	ENTER	Stratum A soil water-filled	porosity,	(cm <sub>3</sub> /cm <sub>3</sub> )
groundwater conc , C <sub>W</sub> (µg/L)	88	ENTER Depth	below grade to bottom of enclosed space floor,	L <sub>F</sub> (cm)	15	ENTER	Stratum A soil total	porosity,	(unitless)
Chemical CAS No (numbers only, no dashes)	156592	ENTER	Average soil/ groundwater temperature,	٦° (٥°)	16	ENTER	Stratum A soil dry	bulk density,	(g/cm³)

ENTER         ENTER <th< th=""><th></th><th></th><th>Used to calculate risk-based</th><th>Used to catcul</th><th></th><th></th><th></th><th></th></th<>			Used to calculate risk-based	Used to catcul				
ENTER         ENTER <th< th=""><th></th><th></th><th>1</th><th>1 0E-06</th><th>350</th><th>30</th><th>30</th><th>70</th></th<>			1	1 0E-06	350	30	30	70
ENTER         ENTER <th< td=""><td></td><td></td><td>(nuitless)</td><td>(unitless)</td><td>(days/yr)</td><td>(yrs)</td><td>(yrs)</td><td>(yrs)</td></th<>			(nuitless)	(unitless)	(days/yr)	(yrs)	(yrs)	(yrs)
ENTER         ENTER <th< td=""><td></td><td></td><td>된</td><td>¥</td><td>ñ</td><td><b>a</b></td><td>AT<sub>NC</sub></td><td>ATc</td></th<>			된	¥	ñ	<b>a</b>	AT <sub>NC</sub>	ATc
ENTER         ENTER <th< td=""><td></td><td></td><td>noncardinogens,</td><td>carcinogens,</td><td>frequency,</td><td>duration,</td><td>noncarcinogens,</td><td>carcinogens,</td></th<>			noncardinogens,	carcinogens,	frequency,	duration,	noncarcinogens,	carcinogens,
ENTER         Target hazard			quotient for	risk for	Exposure	Exposure	time for	time for
ENTER         ENTER <th< td=""><td></td><td></td><td>Target hazard</td><td>Target</td><td></td><td></td><td>Averaging</td><td>Averaging</td></th<>			Target hazard	Target			Averaging	Averaging
ENTER         ENTER <th< td=""><td></td><td></td><td>ENTER</td><td>ENTER</td><td>ENTER</td><td>ENTER</td><td>ENTER</td><td>ENTER</td></th<>			ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
ENTER         ENTER <th< td=""><td></td><td>0.45</td><td>0 1</td><td>488</td><td>961</td><td>961</td><td>40</td><td>15</td></th<>		0.45	0 1	488	961	961	40	15
ENTER         ENTER <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>								
ENTER         <		(1/h)	(cm)	(cm)	(cm)	(cm)	(g/cm-s²)	(cm)
ENTER         ENTER <th< td=""><td></td><td>띪</td><td>*</td><td>ŕ</td><td>Wa</td><td>Ę</td><td>ďδ</td><td>Lorack</td></th<>		띪	*	ŕ	Wa	Ę	ďδ	Lorack
043   02   17   042   027   17   1		rate,	width,	height,	width,	length,	differential,	thickness,
643         02         17         17         17         17         17         17         17         17         18         17         18		air exchange	seam crack	space	floor	floor	pressure	floor
ENTER ENTER ENTER ENTER ENTER ENTER		Indoor	Floor≁wati	Enclosed	space	space	Soil-bldg	space
043   02   17   042   027   17					Enclosed	Enclosed		Enclosed
043 02 17 042 027 17		ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
	0 43	1.7	0.27	0 42	17	0.2	0.43	15

## CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)	3 5E-02
Unit risk factor, URF (µg/m³)*1	0 0E+00
Pura component water solubility, S S (mg/L)	3 50E+03
Organic carbon partition coefficient, K <sub>ce</sub> (cm³/g)	3 55E+01
Cnucal temperature, T <sub>c</sub>	544 00
Normal bouling point, T <sub>B</sub>	333 65
Enthalpy of vaponzation at the normal boiling point, $\Delta H_{s,a}$ (cal/mot)	7,192
Henry's law constant reference temperature, T <sub>R</sub>	25
Henry's law constant at reference temperature, H	4 07E-03
Diffusivity in water, Dw (cm²/s)	1 13E-05
Diffusivity in aur, D. D. C. (cm²/s)	7.36E-02

# INTERMEDIATE CALCULATIONS SHEET

	•	Stratum A	Stratum B	Stratum C	Stratum A	Stratum A	Stratum A	Stratum A		Totai	Air-filled	Water-filled	Floor-
Exposure	Source- building	soil air-filled	soil atr-filled	soil air-filled	effective total fluid	soil	soil relative air	soil effective vapor	Thickness of capillary	porosity in	porosity in	porosity in	wall see
duration,	separation,	porosity,	porosity,	porosity,	saturation,	permeability,	permeability,	permeability,	zone,	zone,	ZOTIB,	Zone,	permeter,
Þ	ڑ	θ <b>,</b>	в. В	ບູ້	ซื้	νZ	뿧	¥	٦	n <sub>c2</sub>	θ <sub>a α</sub>	ө 8	X
(sec)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm³/cm³)	(cm³/cm³)	(cm²)	(cm²)	(cm²)	(cm)	(cm³/cm³)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sup>3</sup> /cm <sup>3</sup> )	(E)
0 45540	0646.00	000.0	0.750	0450	0.440	0F 100 0	071.0	07 100 0	10 17	,			
00100	1 2343.32	0.530	001.0	0610	0.419	9.300-10	0 745	D 98E-10	17 03	0.43	0 136	0 294	3,844
	Area of							Stratum	Stratum	Stratum	Capillary	Total	
	enclosed	Crack-	Crack	Enthalpy of	Henry's law	Henry's law	Vapor	∢	æ	ပ	zone	overall	
Bidg	sbace	to-total	depth	vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
ventilation	helow	area	pelow	ave groundwater	ave groundwater	ave groundwater	ave soil	diffusion	diffusion	diffusion	diffusion	diffusion	path
rate,	grade,	ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient,	coefficient,	length.
Obulding	ď	두	Zornok	ΔH <sub>v TS</sub>	H <sub>TS</sub>	H.	μτs	* O	_ _ _	ت 1	<b>ا</b> ر ا	, ,	ت
(cm <sub>3</sub> /s)	(cm²)	(unitless)	(cm)	(cal/mol)	(atm-m³/mol)	(unitless)	(a-mɔ/b)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sub>2</sub> /s)	(cm)
100 1	10.200		ָ יִּ										
5 63E+04	9.24E+05	4 16E-04	15	7,674	2 72E-03	1 15E-01	1 77E-04	2 98E-03	7 60E-04	4 56E-04	5 24E-04	7.28E-04	2545 32
						Exponent of	Infinite						
			Average	Crack		equivalent	Source	Infinite					
Convection	Source		vapor	effective		foundation	indoor	source	Cpit				
path	vapor	Crack	flow rate	diffusion	Area of	Peclet	attenuation	gbld	risk	Reference			
length,	conc.	radius,	into bldg ,	coefficient,	crack,	number,	coefficient,	conc,	factor,	conc			
ٹ	Cacuros	Crack	Q	Dorack	Agack	exp(Pel)	ಶ	Coulding	URF	RfC			
(cm)	(µg/m³)	(сш)	(cm <sub>3</sub> /s)	(cm <sup>2</sup> /s)	(cm²)	(unitless)	(unitiess)	(hg/m³)	(mg/m³)	(mg/m <sub>3</sub> )			
46	4 455 100	0,0	0 CTE 04	2 000	2 647 - 00	TOTAL	20.00	100					
c	1 135+02	חוח	5-11-0	Z 98E-U3	3 84 E+02	6 13E+03	3.36E-06	3 85E-04	₹Z	3 5E-02			

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INCREMENTAL RISK CALCULATIONS

Incremental	mox xom	vapor	intrusion to	indoor ar	carcinogen	(unitless)	ΝΑ
i di		indoor	exposnre	groundwater	conc,	(ng/L)	9 48E+04
å	5		water			(µg/L)	3 48E+04 3 50E+06
Dock hose	Daced ven	ludoor	exposare	groundwater	conc.	(µg/L)	9 48E+04
Indoor	500	exposnre	groundwater	conc.,	noncarcinogen	(µg/L)	9 48E+04
lochor		exposine	groundwater	, sonc	carcinogen	(mg/L)	ΝΑ

Hazard quotuent from vapor intrusion to indoor air, noncarcinogen (unitiess)

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

		Ğ	Soil Properties Lookup Table	ookun Tabia		VLOOKUP TABLES	S						
SCS Soil Type	K, (cm/h)	a (1/cm)	N (unitless)		Ө. (ст³/ст³)	θ, (cm³/cm³) Λ	Mean Grain Diameter (cm)						
0	0.20	0 008	1 09	0 083	0 38	0 068	0 0092						
ರ .	0.26	0 0 0 19	131	0 237	0 41	0 095	0 0 16						
<u> </u>	20 2	0 036	156	0 359	0 43	0 078	0 020						
ກິທ	20 70	0 124 7 1 0	2.28	0 561	041	0 057	0 040						
SC	0 12	0 027	1 23	0 187	0.38	500	0.044						
Tos	131	0 059	1.48	0 324	600	0 100	0 029						
IS	0.25	0 0 16	1 37	0.270	0 46	0 034	0 0048						
<u> </u>	0 05	0 002	1 09	0.083	0.26	0 0 0 0	0 0039						
31.	0 0 0	0.000	1 44	196.0	0.45 0.45 0.45	0 089	0 0026						
TS.	4 42	0.020	189	0 471	0 45	0 065	0 030						
					Chemic	Chemical Properties Looking Table	n Table						- 1
		Organic			Pure		E SOLO	Hanc's			Enthalm, of		
		carbon			component		law constant	law constant	Normal		vanorization at	į	
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	pullod	Critical	the normal		ď
		coefficient,	ın aır,	ın water,	solublity,	law constant	temperature,	temperature,		temperature,	boiling point,		្រ
		×,	<b>o</b> * '	് ്	S	ī	I	ᄣ		۳		URF	
CAS No Chemical		(cm <sup>3</sup> /g)	(cm²/s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/mol)	(၁)	(%)	( <sup>0</sup> K)	_	(mg/m <sup>3</sup> ) <sup>1</sup>	ξ
50263 TOO		9013696	20 00	90 140 7	i c	r T		;					ł
50328 Benzo(a)byrene		1 02E+06	1 3/E-02 4 30E-02	90-306-06	2 50E-02	3 32E-04	8 10E-06	9 3	533 15	720 75	11,000	9 7E-05	_
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 OGE-08	2 79F±03	4 05E-03	1 13E-06	35	715 90	969 27	15,000	2 1E-03	_
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 475-08	6 K	243 24	82/85	000,67	0.00+00	
56235 Carbon tetrachloride		174E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	3 2	349 90	556 60	7 127	4 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	_
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	137E-04	3 34E-06	S2 12	708 15	1004 79	15,000	2 1E-04	_
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3 7E-04	_
58899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5,74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04	_
605/1 Dieldrin		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	52	613 32	842 25	13,000	4 6E-03	_
67841 Acelone		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	72	720 00	751 00	10,000	0 0E+00	
67663 Chloroform		3.98 = +0.1	1 04E-01	1 005-05	7 925+03	1 5086-03	3 885-05	5 6	329 20	508 10	6,955	005+00	
67721 Hexachloroethane		1 78E+03	2 50E-03	6 805-06	5 00E+01	1.59E-01	3.885-03	2 £	458 00	556 40	0,00	2 3E-05	
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	52	390 88	563 05	10.346	0.05+00	
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342	8 3E-06	_
71556 1,1,1-Trichloroethane		1 10E+02	7,80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0 0E+00	
72435 Mathematics		1 Z3E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	52	718 15	986 20	12,000	0 OE+00	
72548 DDD		9 //E+04	1 50E-02	4 46E-U6	4 50E-02	6 48E-04	1 58E-05	52	651 02	848 49	14,000	0 0E+00	
72559 DDE		4 47E+06	1 44E-02		1.20E-01	8 615-04	4 UUE-U6	0 K	636 44	863 //	14,000	6 9E-05	
74839 Methyl bromide		1 05E+01	7 28E-02	1215-05	1 52E+04	2 56E-01	6 24E-03	22	276 71	467 00	5.714	0 0E+00	
75014 Vinyl chlonde (chloroethene)	lene)	186E+01	1 06E-01	1 23E-06	2 76E+03	111E+00	271E-02	22	259 25	432 00	5,250	8 4E-05	_
75150 Cotton June 2		1170101	1015-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	52	313 00	510 00	90,706	4 7E-07	•
75252 Bromoform		4 5/E+U1	1 04E-01	1 005-05	1 195-63	1 24E+00	3 02E-02	52	319 00	552 00	6,391	0 0E+00	
75274 Bromodichtoromethane		5.50F+01	2 98E-02	1 05E-03	3 TUE+03	2 19E-02	5.34E-04	52	422 35	00 969	9,479	100	-
75343 1 1-Dichlomothene		3 16 15 01	2 98E-02	1 065-05	6 /4E+03	6 56E-02	1 60E-03	52	363 15	585 85	7,000	1 8E-05	_
75354 1.1-Dichloroethylene		5 89F+01	9 00 11-02	1 04 1 05	2 25E+03	1 075-01	5610-03	25	330 55	523 00	6,895	0.05+00	
76448 Heptachlor		141E+06	1 12E-02	5 695-06	1 80F-01	4 475-02	1 005-03	0 10	504 73	5/6 05	6,247	5 OF -05	
77474 Hexachlorocyclopentadiene	lene	2 00E+05	1 61E-02	7 21E-06	1 80E+00	1115+00	2 71E-02	52	512 15	746 00	10.931	001-00	
78591 Isophorone		4 68E+01	6 23E-02	6 765-06	1 20E+04	2 72E-04	6 635-06	72	488 35	715 00	10,271	2 7E-07	_
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 735-06	2 80E+03	1 15E-01	2,805-03	25	369 52	572 00	7,590	0.05+00	
79005 1,1,2-trichloroethane		5 01 E+01	7 80E-02	8 80E-06	4 42E+03	3,74E-02	9 12E-04	25	386 15	602 00	8,322	1 6E-05	_
79345 1 1 2 2-Tetrachloroethane	9	1 665+02	7 40E-02	9 10E-06	1 105+03	4 22E-01	1 03E-02	52	360 36	544 20	7,505	1 7E-06	
83329 Acenabithene	<b>e</b>	7 086+03	/ 10E-02 4 21E-02	7 69E-06	2 97E+03	141E-02	3 446-04	52	419 60	661 15	366,8	5 8E-05	_
		1	1,1,1	2	)   144 t	2000	1 225-04	3	55U 54	CI 200	12,155	0.05+00	

				>	VLOOKUP TABLES							
84742 Dischard Attack	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	25	567 15	757 00	13,733	0.0E+00	2 8E+00
85687 Butyl henryl optibalate	5 25E+04	4 385-02	/ 80E-06	1 125-01	3 85E-08	9 39E-10	52	613 15	798 67	14,751	0 OE+Q0	3 5E-01
86306 N-Nitrosodinhenylamine	1 29F±03	2 12E-02	4 035-06	3 646100	5 1/E-05	1 265-06	52	660 60	839 68	13,000	0 0E+00	7 0E-01
86737 Fluorene	1 38E+04	3 63 5-02	7.885-06	1986+00	2 61E-03	5 00E-06	2 2	632.28	890 45	13,000	146-06	00+300
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1.53E-08	3 %	577.87	00 00	12,000	27.50	10 H
87683 Hexachloro-1,3-butadiene	537E+04	5 61E-02	6 16E-06	3 23E+00	334E-01	8 15E-03	22	486 15	738.00	10,277	27.45	00+100
87855 Pentachlorophenol	5 92E+02	5 60E-02	6 105-06	1 95E+03	1 00E-06	2 44E-08	52	582 15	813.20	14,000	3 46-05	0 0E+00
91203 Manhhalana	3.815+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	25	51915	749 03	12,000	3 15-06	0 0E+00
91941 3 3-Dichlombenzidine	2 UVE+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	1 4E-01
95476 p-Xvlene	3 63E+02	20-04E-02	0 /4E-UD	3 T T F + 0.0	164E-07	4 00E-09	52	560 26	754 03	13,000	135-04	0 0E+00
95487 2-Methylohenol (o-cresol)	9 125+02	7.406-02	1 000 00 1 000 00 1 000 00	1 /8E+02	2 135-01	5 20E-03	52	417 60	630 30	8,661	0 0E+00	7 0E+00
	6 17E+02	6 90E-02		1 56F±02	7 705-05	1 205-06	52	464 19	697 60	10,800	00=+00	186-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 605-02	3 40F-04	<b>0</b> 4	403.57	00.00/	9,700	00+100	2 0E-01
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 346-06	9 50	526 15	759 13	13,000	00+400	185-02
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09€+03	9 845-04	2 40E-05	22	483.95	719.00	10.566	00100	2000
100414 Ethylbenzene	3 63  +02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20	8.501	000+00	1 05+00
100425 Styrene 105570 2 4 Oranothidates	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03	52	41831	636 00	8 737	0 0E+00	1 0E+00
106423 p-Xviena	2 USE+U2	5 84E-02	8 69E-06	7 87E+03	8 205-05	2 00E-06	52	484 13	707 60	11,329	0 0E+00	7 0E-02
106467 1 4. Dichlomberses	5 695402	70-26-07	8 44E-05	1 85E+02	3 14E-01	7 66E-03	<b>5</b> 8	41152	616 20	8,525	0 0E+00	7 0E+00
106478 p-Chloroaniline	6.616+01	4 83E-02	4040.00	7 38E+U1	9 96E-02	2 43E-03	52	447 21	684 75	9,271	00=+00	8 0E-01
107062 1.2-Dichloroethane	1 74F+01	1045-02	9050	9 50E+03	1 355-03	3 32E-07	52	503 65	754 00	11,689	0 0E+00	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50F-02	9 205-06	2 00F+04	2 10E-02	9 /81-04	8 8	356 65	58100	7,643	2 6E-05	0 0E+00
108383 m-Xylene	4 07E+02	7 00E-02	7.80F-06	1615+02	2 10E-02	47-17- C	8 8	345 65	519 13	7,800	0 00 00 0	2 0E-01
108883 Toluene	1,82E+02	8 70E-02	8 60E-06	5 26F+02	2 725-01	7 Sept 03	8 8	412.27	617 05	8,523	000	7 0€+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1.52F-01	3 715-03	G %	353 / 5	591 /8	7,930	90 HH 0	4 0E-01
108952 Phenol	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 985-07	3 %	454.02	604.70	0.410	0.05+00	Z 0E-02
	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	25	451 15	659 79	0,920	36.00	2 16+00
115297 Endosulfan	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	52	67443	942 94	14.000	005+00	2 1E-02
11/31/ Bis(2-ethythexyl)phthalate	1 51E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	52	657 15	806 00	15,999	4 0E-06	0.05+00
118741 Hevset-formbonness	8 32E+07	1515-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
120127 Anthracene	2 05E+04	3 24E-02	3 91E-U6	6 20E+00	5 41E-02	1 32E-03	52	582 55	825 00	14,447	4.6E-04	0 0E+00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00F-02	8 235-06	3 OUF+02	2 07 E-U3 5 82E-U3	6 51E-U5	S 12	615 18	873 00	13,121	0 0E+00	1 15+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	3 02E-02	1 42E-03 3 17E-06	Q 1	486 15	725 00	10,471	0 OE +00	2 0E-01
121142 2,4-Dinitrotoluene	9 55E+01	2 035-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08		590.00	814.00	13,467	0 0H+00	1 15-02
124481 Chlorodibromomethane	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 215-02	7 83E-04	52	416 14	678.20	96.8	2 dF-05	00+100
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02		394 40	620 20	8,288	5 8E-07	00+90
156592 de-1 2-Dichlorosthybro	1 USE+US	2 / ZE-02	7.24E-06	1 35E-01	4 51E-04	1 10E-05		667 95	936 00	14,370	0 0E+00	116-01
156605 trans-1.2-Dichlomethylene	5 25E+01	7 075 02	1 10 0 0 0 0	3 50E+03	16/E-01	4 07E-03		333 65	544 00	7,192	0 0E+00	3 5E-02
193395 Indeno(1,2,3-cd)pyrene		1 90E-02	5.66E-06	2 20F-05	3 60E-01	9 39E-03		320 85	516 50	6,717	0 0E+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02		1 50E-03	4 555-03	1115.04		715.00	1078 24	000/1	2 16-04	00=+00
206440 Fluoranthene	1 07E+05	3 02E-02		2 06E-01	6 605-04	1 615-05	22.52	655.95	905 00	12 815	40-11-0	0 0 1 + 00 7 4 1 0 2
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02		8 00E-04	3 40E-05	8 29E-07		753 15	1019 70	16,000	2 1F-05	005+00
218019 Chrysene	3 98E+05	2 48E-02		1 60E-03	3 88E-03	9 46E-05		714 15	979 00	16,455	2 1E-06	000+00
319846 alpha-HCH (alpha-BHC)	4 45E+06	1 325-02	4 86E-06	1 80E-01		1 705-04		603 01	839 37	13,000	4 9E-03	0 0E+00
319857 beta-HCH (beta-BHC)	1 26 - 103	1 42E-02	7 345 06	2 405 01	4 5311-04	1 06E-05		596.55	839 36	13,000	1 8E-03	0 0E+00
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 005-05	2 40E-01	3 03E-03	/ 44E-U/	R H	59655	839.36	13,000	5 3E-04	0 0E+00
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7.465-07		558.00	207.20	000,	3 7E-05	2 0E-02
621647 N-Ntrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06	22	209 60	746.87	11,000	200	00-100
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 235-06	2 00E-01	3 90E-04	9 51 5-06	52	613 96	848 76	13.00	2 65-03	20.00
7439976 Mercury (elemental)	5 20E+01	3 07E-02		5 62E-02	4 67E-01	1 14E-02	52	629 88	1750 00	14 127	0.05+00	20.10
8001352 loxaphene 44008936 Amder 4360 (BCB 4360)	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	52	657 15	873 31	14,000	3 2E-04	00=00
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 365-02	4 3/E-U6 5 00E-06	8 UUE-U2	1 89E-01	4 60E-03	52	402 50	539 37	19,000	1 0E-04	0 0E+00
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2 22E-02	5 42F-06	3 / 0E-02 4 20F-01	1 19E-02	2 005-03	8 8	377 50	512 27	19,000	1 0E-04	0 0E+00
53469219 Arodor 1242 (PCB-1242)		2 14E-02	,	3 40E-01	2 13E-02	5 20 5-04	0 K	345.50	475 22	18,000	10E-04	0 OE +00
				!			3	3	707	18,000	105-04	00+00

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 1.2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

		ENTER	User-defined stratum A soil vapor permeability, k, (cm²)	
			ق ا	$\exists$
		ENTER	stratum A SCS Soil type soil vapor permeability)	S
		ENTER	SCS soil type directly above water table	s
		ENTER	Soil stratum directly above water table, (Enter A. B. or C.)	O
	ane	ENTER Lyr (cell D28)	Thickness of soil stratum C. (Enter value or 0) hc (cm)	1280 16
Chemical	1,2-Dichloroethane	INTER ENTER ENTER Totals must add up to value of L <sub>wr</sub> (cell D28)	Thickness of soil of soil stratum B, stratum A, (Enter value or 0) ha (cm) (cm)	274 32
		ENTER Totals mu	Thickness of soil stratum A,	1005 84
_		ENTER	Depth below grade to water table, Lwr (cm)	2560 32
ENTER Initial groundwater conc , Cw (µg/L)	16	ENTER Depth	below grade to bottom of enclosed space floor, Lr (cm)	15
ENTER Chemical CAS No (numbers only, no dashes)	107062	ENTER	Average soil/ groundwater temperature, Ts	16

ENTER	Stratum C	soil water-filled	porosity,	ວ <b>.</b> ອ	(cm³/cm³)	03	
ENTER	Stratum C	soil total	porosity,	J <sub>C</sub>	(unitiess)	0.43	
ENTER	Stratum C	soil dry	bulk density,		(g/cm³)	1.7	ENTER
ENTER	Stratum B	soil water-filled	porosity,	8 **	(cm³/cm³)	0.27	ENTER
ENTER	Stratum B	soil total	porosity,	ย	(unitless)	0.42	ENTER
ENTER	Stratum B	soil dry	bulk density,	8 <sub>1</sub> 6	(g/cm³)	1.1	ENTER.
ENTER	Stratum A	soil water-filled	porosity,	<b>φ</b>	(cm <sub>3</sub> /cm <sub>3</sub> )	0.2	ENTER
ENTER	Stratum A	soil total	porosity,	<b>€</b> _	(unitless)	0 43	ENTER
ENTER	Stratum A	soil dry	bulk density,	<b>Փ</b> գ	(g/cm³)	1.5	ENTER

ENTER	Indoor	air exchange	rate,	8	(1/h)	0.45						
ENTER	Floor-wall	seam crack	width,	*	(cm)	0.1	ENTER	Target hazard	quotient for	noncarcinogens,	된	(nuitless)
ENTER	Enclosed	space	height,	£	(cm)	488	ENTER	Target	nsk for	carcinogens,	፳	(unitless)
ENTER Enclosed	space	floor	width,	W	(cm)	961	ENTER		Exposure	frequency,	ш	(days/vr)
ENTER Enclosed	space	floor	length,	ٿ	(cm)	961	ENTER		Exposure	duration,	<b>a</b>	(AtS)
ENTER	Soil-bidg	pressure	differential,	ďΔ	(g/cm-s²)	40	ENTER	Averaging	time for	noncarcinogens,	ATNC	(yrs)
ENTER Enclosed	space	floor	thickness,	Lenack	(cm)	15	ENTER	Averaging	time for	carcinogens,	ATc	(yrs)

Used to catculate risk-based groundwater concentration 1 0E-06

CHEMICAL PROPERTIES SHEET

ure	ponent Unit	water risk Reference	factor,	URF	(ma/L) (ua/m³) (ma/m³)	
	Ī			ጜ		
		Critical	temperature,	<b>T</b>	( <del>)</del>	-
		polling	point,	⊩	£	1000
Enthalpy of	vaponzation at	the normal	boiling point,	ΔH <sub>v,b</sub>	(cal/mol)	
Henry's	law constant	reference	temperature,	T <sub>R</sub>	(၁)	
Henry's	law constant	at reference	temperature,	I	(atm-m³/mol)	A 70 F O 4
		Diffusivity	in water,	o <sup>‡</sup>	(cm <sup>2</sup> /s)	90 1100 0
		Diffusivity	ın aır,	ď	(cm <sup>2</sup> /s)	104E.01

,		Stratum A	Stratum B	Stratum C	Stratum A	Stratum A	Stratum A	Stratum A		Total	Air-filled	Water-filled	Floor
	Source- building	soil air-filled	soil air-filled	soil air-filled	effective total fluid	soll intrinsic	soil relative air	soil effective vapor	Thickness of capillary	porosity in	porosity in	porosity in	wall
duration, se	separation,	porosity,	porosity,	porosity,	saturation,	permeability,	permeability,	permeability,	zone,	ZONB,	20ne,	ZODE	Derimeter
	ئـ	<b>∀</b> • • •	8 <b>.</b>	ູ້ຄ	ຜູ້ ທ້	¥	کد	ځد	ٿ	Ę	θ,ε	θ,	×
	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm²)	(cm²)	(cm <sup>2</sup> )	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(CE)
0 465408	2545 22	0200	0.450	0.430	0 440	07 0000	2,20	**					
+	20 6462	0.530	0010	0.130	0.419	9 306-10	0.746	6 98E-10	17 05	0.43	0.136	0 294	3,844
•	Area of							Straten	States	Stratum	Capillago	- to	
Œ	pesolane	Crack.	Crack	Enthalm of	Hood, 6,400	Lond of the	1,000	- TOP -	in c	Gratull	Capillary	10181	
j	2000	200	2 1	בוותומולא סו	Many S Idw	Tenry s law	vapor	∢ ;	œ	ပ	zone	overall	
	space	10-10181	deptn	vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
ventilation	Delow	area	woled	ave groundwater	ave groundwater	ave groundwater	ave soil	diffusion	diffusion	diffusion	diffusion	diffusion	path
	grade,	ratlo,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient	coefficient,	coefficient,	coefficient,	coefficient.	enath
Obuliding	Ą.	٤	Zorack	ΔH <sub>vTS</sub>	H st	Į,	11. 12.	۵	, D	<u>.</u> ت	, D	D off	
	(cm²)	(unitless)	(cm)	(cal/mol)	(atm-m³/mo!)	(unitless)	(g/cm-s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	P (Eg
ŀ													
5 63E+04 9	9 24E+05	4 16E-04	15	8,457	6 27E-04	2 64E-02	1 77E-04	4 22E-03	1 09E-03	6.67E-04	7 62E-04	1.06E-03	2545 32
						Exponent of	Infinite						
			Average	Crack		equivalent	source	Infinite					
Convection	Source		vapor	effective		foundation	indoor	Source	Unit				
	vapor	Crack	flow rate	diffusion	Area of	Peclet	attenuation	pldo.	i ki	Reference			
	conc.,	radius,	into bldg,	coefficient,	crack,	number,	coefficient,	COUC	factor	conc			
	Caouros	ferack	Q	Donet	Acrack	exp(Pe <sup>f</sup> )	ಶ	O	URF	Z,			
)	(ng/m³)	(cm)	(cm³/s)	(cm <sup>2</sup> /s)	(cm²)	(unitless)	(nuitless)	(md/m <sub>3</sub> )	(ma/m <sub>3</sub> ) 1	(ma/m <sub>3</sub> )			
ŀ													
2	2 64E+01	0 10	6 67E-01	4 22E-03	3 84E+02	4 75E+02	4 33E-06	1 15E-04	2 6E-05	¥			

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INCREMENTAL RISK CALCULATIONS

ll Hazard quotient						ſ	AN
Incremental risk from	vapor	Intrusion to	indoor air,	carcinogen	(nutless)		AN AN
Final	ındoor	exposure	groundwater	conc ,	(Hg/L)		8 17E+02
Pure	component	water	solubi ity	ഗ	(µg/L)		8 52E+06
Risk-based	indoor	exposure	groundwater	conc.	(ug/L)		8 17E+02
Indoor	exposure	groundwater	conc,	noncarcinogen	(μg/L)		ΑĀ
Indoor	exposnre	groundwater	conc,	carcinogen	(μg/L)		8 17E+02

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

Reference conc. RfC (mg/m³)

						VLOOKUP TABLES	LES					
SCS Soil Type	K, (cm/h)	α (1/cm)	Sou Properties Lookup Table N (unitless) M (unitless)	ookup lable M (unitless)	0, (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)					
O	0.50	0 008	1 09	0 083	0 38	990 0	0 0092					
ដ	0 26	0 0 19	131	0 237	0 41	0 095	0.016					
<u>.</u>	1 04	0 036	1 56	0 359	0 43	0 0 78	0 020					
ر د د د	14 59	0 124	2 28	0 561	0 41	0 057	0 040					
, (	0/67	0 145	7.00	0.627	0.43	0 045	0 044					
	7 5	0.059	123	781.0	860	0 100	0.025					
- S		0 000	4 40	0.324	200	0000	0.029					
i S	3 6	9000	, c	0.270	0.46	0.034	0 0046					
200	700	0000	1 23	0.003	970	0/00	55000					
18	0.45	200	141	1000	24.0	0.067	0000					
3.1	4 42	0.075	1 89	0.471	0 41	0 065	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0					
					o the d	Themsel Broadens   Johnson Table	den Takla					
		Organic				al rroperies to	okup i adi <del>d</del> Henry's	H D			1000	
		carbon			component		law constant	law constant	a who N		crimatpy or	4
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	police	Critical	the normal	E A
	U	coefficient,	ın air,	ın water,	solubility,	law constant	temperature,	temperature,	point,	temperature.	bothng point.	factor
		ኝ.	០ ។	đ°	S	Ì	· _ <b>I</b> '	اچ	<b>-</b>	۲۵	ΔH,	URF
CAS No Chemical		(cm²/g)	(cm*/s)	(cm <sub>2</sub> /s)	(mg/L)	(unilless)	(atm-m³/mol)	(၁)	(%) (X)	( <b>,</b> K)	(cat/mol)	(µg/m³) 1
50293 DDT		2 63E+06	1 37E-02	4 95E-08	2.50F-02	3 325-04	80.H01	40	A 003	37.004	44.000	1
50328 Benzo(a)pyrene		1 02F+06	4 30F-02	9 70 8 70	1 625-03	4 535.05	135.08	2 6	935	720 73	000,11	9 7E-05
51285 2.4-Dinitrophenol		1 00E-02	2 73E-02	90-300 6	2 79F±03	4 65E-03	1 13E-06 4 44E-07	25	06 303	969.27	15,000	2 1E-03
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2.49E-03	6 03E-07	1 47E-08	0. Y	743.24	827.85	000,61	001400
56235 Carbon tetrachloride		1 74E+02	7.80E-02	8 80E-06	7 93E+02	1 25E+00	3 05 6-02	25	349 90	556.60	721 7	1 50.05
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	137E-04	3 34E-06	25 2	708 15	1004 79	15,000	2 16-04
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3 7E-04
58899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04
505/1 Dieldrin		2 14E+04	1 25E-02	4 74E-06	195E-01	6 19E-04	1 51E-05	52	613 32	842 25	13,000	4 6E-03
67641 Arehan		6 00E-01	5 36E-02	7.97E-06	3 50E+03	631E-05	1 54E-06	25	720 00	751 00	10,000	0 0E+00
67663 Chloroform		3 98 11-01	1 04F-01	1 APE-05	1 00E+06 7 92E+03	1 59E-03	3 88E-05	25	329 20	508 10	6,955	0 0E+00
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1.59E-01	3 88 11.03	2,50	458 00	595 00	0,900	20 30 7
71363 Butanol		6 92E+00	8 00E-02	9 305-06	7 40E+04	3 61E-04	8 80E-06	25	390 88	563 05	10.346	0.01400
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	175E+03	2 28E-01	5 56E-03	25	353 24	562 16	7.342	8 35-06
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	133€+03	7 05E-01	1 72E-02	25	347 24	545 00	7 136	0 0E+00
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	71815	986 20	12,000	0 0E+00
72548 DDD		9 //E+04	1 565-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0 0E+00
72559 DDE		4 47E+06	1.44F-02	5 87E-06	300E-02	8 51E-04	2 10E-05	27	636 44	863 77	14,000	6 9E-05
74839 Methyl bromide		1 05E+01	7 28E-02	121E-05	1 52E+04	2.56E-01	6 24E-03	5 K	376 71	467.00	13,000	8 / E-U3
75014 Vinyl chloride (chloroethene)	aue)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 11 1 + 00	2 71E-02	25.55	259.25	432 00	5,250	8 4F-05
75092 Methylene chlonde		1 17E+01	101E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	52	313 00	510 00	6,706	4 7E-07
75150 Carbon disuffide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24 E+00	3 02E-02	25	319 00	552 00	6,391	0 0E+00
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10 = +03	2 19E-02	5 34E-04	25	422 35	00 969	9,479	1 15-06
75274 Bromodichloromethane		5,50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 8E-05
75354 1 1-Dedictoremans		3 162+01	/ 42E-02	3 055-05	5 06E+03	2 30E-01	5 61E-03	52	330 55	523 00	6,895	0 05+00
76448 Hentachlor		1 415108	4 12E-02	2 04 m-03	2 25E+03	1 0/5+00	261E-02	25	304 75	57605	6,247	5 0E-05
77474 Hexachlorocyclopentadiene	eŭ.	2 00E+05	1615-02	7.21E-06	1 AOF+00	1 115+00	1 09E-03	9 %	60369	24631	13,000	50-15
78591 Isophorone		4 68E+01	6 23 5-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	2, 2,	488 35	715 00	10,93	275.07
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	22 E	369 52	572 00	7.590	0 0E+00
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 805-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8,322	1 6E-05
79016 Trichtoroethylene		1,66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25	36036	544 20	7,505	1 7E-06
79345 1,1,2,2-Tetrachloroethane	9	9 33 E+01	7 10E-02	7 90E-06	2 97E+03	1,41E-02	3 44E-04	25	41960	661 15	8,996	5 8E-05
83329 Acenaphthene		7 08E+03	4 216-02	7 69E-06	4 24E+00	6 36E-03	1.55E-04	25	550 54	803 15	12,155	0 0E+00

378-64-0   176-25-0	3 39E+04	ron ·	25 513 15 25 613 15 25 660 60		•	355-01
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2.68E-01         3.26E-04         3.26E-04         3.26E-04         1.0E-05         2.56E-05         6.4715         6.697         0.0E-00         0.0E-00           1.55E-07         1.55E-07         1.75E-04         1.36E-04         1.0E-05         25.4115         6697         1.000         0.0E-00           2.14E-03         1.51E-07         3.61E-04         3.0E-04         3.0E-04         1.75E-04         3.0E-04         3.0E-	2 88E+01 8 20E-02 9 10E-06 8 28E+04 1 15E+01 6 92E-02 7 55E-06 172E+04 7 7 151E-02 3 56E-06 3 40E-01 4 2 151E+07 3 15E-02 3 56E-06 3 40E-01 4 2 151E+07 3 15E-02 3 56E-06 3 40E-01 4 2 151E+07 3 15E-02 3 56E-06 3 40E-01 4 2 151E+07 3 15E-02 3 56E-06 5 20E+00 5 5 50E+04 3 24E-02 5 50E+04 3 24E-02 5 50E+04 3 24E-02 178E+03 3 40E-02 178E+03 3 50E+03 3 50E+03 178E+01 1 96E-02 178E+06 1 30E+03 3 50E+03 1 50E	) en				
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178E+03   300E-02   8.22E-03   300E-02   300	1788-03   300E-02   8.7E-06   300E-02   1788-03   300E-02   8.7E-06   4.50E-02   3.7E-06   4.50E-02   3.5E-06   3.0E-02   3.5E-06   3.0E-02   3.5E-06   3.0E-02   3.5E-06   3.5E-06   3.5E-06   3.5E-06   3.5E-06   3.5E-01   4.5E-02   3.5E-02   3.5E-01   4.5E-02   3.5E-04   3.5E-01   4.5E-02   3.5E-06   3.5E-06   3.5E-01   4.5E-02   3.5E-06   3.5E-07   3.	- 4				0 0E+00
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38E+05         248E-02         621E-06         160E-03         388E-03         946E-05         25         714 15         979 00         16,455         21E-05           24E+06         132E-02         486E-06         160E-03         388E-03         170E-04         25         603 01         839 37         13,000         49E-03           123E+03         142E-02         73E-06         100E-05         240E-01         35E-04         106E-05         25         596 55         839 36         13,000         49E-03           122E+03         142E-02         72E-06         240E-01         37E-04         77E-04         25         596 55         839 36         13,000         18E-03           457E+01         626E-02         100E-05         280E-03         74E-07         25         598 55         839 36         13,000         3E-03           8 22E+01         32E-02         18E-02         36E-03         760         770 00         12,388         19E-04           9 32E-04         32E-04         36E-04	3 98E+05 2 48E-02 6 21E-06 1 60E-03 3 2 45E+06 1 32E-02 4 88E-06 1 80E-01 6 1 52E-05	. 60				2010
245E+06         13ZE-02         486E-06         180E-01         697E-03         170E-04         25         603 01         839 37         13,000         4 2E-02           123E+05         14ZE-02         73E-06         200E+00         43E-04         106E-05         25         696 55         839 36         13,000         18E-03           123E+03         14ZE-02         73E-06         200E+00         43E-04         106E-05         25         696 55         839 36         13,000         18E-03           45E+03         14ZE-02         73E-06         240E-03         74E-07         25         596 55         839 36         13,000         3E-05           6 92E+01         32F-02         72E-01         30E-05         74E-07         25         596 55         839 36         13,000         3E-05           8 92E+01         32F-02         72E-06         32E-07         25         598 00         770 00         12,938         19E-04           8 20E+01         37E-02         42E-03         39E-04         46E-01         46E-03	2 45E+06 132E-02 486E-06 180E-01 6 123E+03 142E-02 734E-06 200E+00 4 126E+03 142E-02 734E-06 200E+00 4 457E+01 626E-02 100E-05 280E+03 3 6 92E+01 327E-02 726E-06 182E+02 3 8 32E+04 132E-02 817E-06 989E+03 9 8 32E+04 132E-02 423E-06 200E-01 3 5 20E+03 30E-02 432E-06 740E-01 3 5 20E+03 18E-02 432E-06 740E-01 3 2 90E+05 136E-02 432E-06 800E-02 1 2 2 90E+05 136E-02 500E-06 570E-02 8	0				
122E+03 147E-02 734E-06 2 00E+00 4 35E-04 1 06E-05 25 596 55 839 36 13,000 1 8E-03 1 20E+03 1 42E-02 734E-06 2 40E-01 3 05E-05 1 40E-05 2 586 55 839 36 13,000 1 8E-03 1 20E-02 1 40E-02 2 40E-01 3 05E-05 2 80E-03 7 60E-05 2 80E-03 7 60E-03 8 80E-03 8 80E-0	125E+03 142E-02 734E-06 2 00E+00 4 126E+03 142E-02 734E-06 2 40E-01 3 6 95E+01 6 56E-02 1 00E-05 2 80E+03 3 6 95E+01 3 27E-02 7 56E-06 1 82E+02 3 7 8 32E+04 1 32E-02 8 17E-06 9 89E+03 9 8 32E+04 1 32E-02 4 23E-06 2 00E-01 3 5 20E+01 3 07E-02 6 30E-06 5 62E-02 4 2 2 57E+05 1 16E-02 4 34E-06 7 60E-01 2 2 90E+05 1 38E-02 4 34E-06 7 60E-01 2 2 90E+05 1 38E-02 4 34E-06 8 00E-02 1 2 2 00E+05 1 56E-02 5 00E-06 5 70E-02 8	~-				
1 26E+03         1 42E+02         7 34E+06         2 40E+01         3 05E+05         7 44E-07         25         596 55         839 36         13,000         5 3E-04           4 57E+01         6 26E+02         1 00E+05         2 80E+01         7 26E+01         7 76E-02         25         381 15         587 38         7,000         3 7E-05           6 92E+01         3 27E+02         7 26E+01         3 06E+05         7 46E-07         25         588 00         770 00         12,938         1 9E-04           8 32E+01         5 45E+02         4 06E+05         3 96E+03         9 23E-05         2 5 509 60         770 00         12,938         1 9E-04           8 32E+04         1 32E+02         4 07E+01         3 96E+04         9 51E-06         2 5 613 60         770 00         12,938         1 9E-04           5 20E+01         3 07E+02         4 07E-01         2 46E-04         4 60E-05         2 5 613 60         770 00         14,127         0 0-05           2 57E+05         1 16E-02         4 34E-06         7 40E-01         2 46E-04         4 60E-05         2 629 88         1750 00         14,107         0 0-05           2 50E+05         1 50E-05         1 50E-05         1 89E-01         2 46E-04         4 60E-03	126f+03 142E-02 734E-06 240E-01 3 457E+01 626E-02 100E-05 280E+03 7 6 92E+01 327E-02 100E-05 280E+03 7 8 32E+04 132E-02 817E-06 989E+02 3 8 32E+04 132E-02 423E-06 200E-01 3 5 20E+01 30TE-02 43E-06 50E-01 3 2 20E+05 13EE-02 43E-06 70E-01 2 2 20E+05 138E-02 43E-06 70E-01 2 2 200E+05 138E-02 500E-06 570E-02 8	_				0.150
457E+01 6 26E-02 100E-05 2 80E+03 7 26E-01 177E-02 25 38115 587 38 7 7000 3 7E-05 6 92E+01 3 27E-02 7 26E-06 182E+02 3 06E-05 7 46E-07 2 558 00 770 00 12,938 1 9E-04 13.2E-02 8 17E-05 9 89E+03 9 23E-05 2 25E-06 2 5 619 6 848 76 11,000 2 0E-03 9 50E-01 3 07E-02 6 30E-05 2 00E-01 3 07E-02 6 30E-06 7 46E-01 2 46E-04 6 00E-06 2 5 619 6 87 150 00 14,127 0 0E-03 2 57E+05 1 16E-02 4 34E-06 7 40E-01 2 46E-04 6 00E-06 2 577 15 977 19,000 1 0E-04 2 30E+05 1 36E-02 5 70E-02 8 20E-03 2 577 50 512 7 19,000 1 0E-04 3 30E+04 2 22E-06 5 340 50 512 7 18,000 1 0E-04 3 30E+04 2 12E-02 5 41E-02 5 542E-06 5 70E-02 6 70E-02 6 70E-02 6 70E-03 2 70E-03 7 70E-04 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	4 57E+01 6 26E-02 100E-05 2 80E+03 7 6 82E+01 3 27E-02 7 2EE-06 182E+02 3 3 82E+04 132E-02 4 23E-06 9 89E+03 9 9 83E+04 132E-02 4 23E-06 2 00E-01 3 7 6 2 57E+05 116E-02 4 34E-06 7 40E-02 1 2 90E+05 1 56E-02 5 00E+05 1 56E-02 5 00E+05 1 56E-02 5 00E+05 1 56E-02 5 00E-06 5 70E-02 8	7	25 596 55			200
6 92E+01 3.27E-02 7.26E-06 182E+02 3.06E-05 7.46E-07 25 558 00 770 00 12,938 1.9E-04 2.0E-05 817E-06 9.89E+03 9.33E-05 2.55E-06 25 559 00 770 00 12,938 1.9E-04 1832E+04 132E-02 2.0E-03 9.51E-06 2.0E-03 2.0E-03 2.0E-03 2.0E-04 13.0E-02 2.0E-03 2.0E-04 2.0E-03 2.0E-04 2.0E-04 2.0E-04 2.0E-05 1.0E-02 2.0E-04 2.0E-05 1.0E-04 2.0E-05 1.0E-04 2.0E-05 2.0	6 92E+01 3 27E-02 7 26E-06 182E+02 3 8 2E+02 1 3 2E-02 8 17E-06 9 89E+03 9 9 8 2E+04 1 3 2E-02 4 23E-06 2 00E-01 3 3 2E-02 1 6E-02 4 24E-06 5 7 4 0E-02 1 2 9 0 0E+05 1 5 6E-02 5 0 0E+05 5 7 0E-02 8 0 0E-02 1 5 6E-02 5 0 0E-05 5 7 0E-02 8 0 0E-02 1 5 6E-02 5 0 0E-05 5 7 0E-02 8 0 0E-05 5 0 0E-05 5 7 0E-05 8 0 0E-05 5 0 0E-05 5 0 0E-05 5 7 0E-05 8 0 0E-05 5 0 0E-05	-	25 381 15			2 0F-02
8         2 4DE+01         5 45E-02         8 17E-06         9 89E+03         9 23E-05         2 25E-06         25         609 60         746 87         11,000         2 0E-03           8 32E+04         1 32E-02         4 23E-06         2 00E-01         3 90E-04         9 51E-06         25         613 96         848 76         13,000         2 6E-03           5 20E+01         3 03E-06         2 60E-03         4 60E-01         2 629 88         1750 00         14,127         0 0E+00           2 57E+05         1 16E-02         4 34E-06         7 40E-01         2 46E-04         6 00E-03         25         657 18         873 1         14,000         3 2E-04           2 90E+05         1 38E-02         4 32E-06         8 00E-02         1 89E-01         4 60E-03         25         402 50         539 37         19,000         10E-04           2 00E+04         2 00E-03         2 50E-04         2 00E-03         25         377 50         512 27         19,000         10E-04           3 00E+04         2 22E-02         4 00E-02         1 99E-01         2 00E-03         25         377 50         512 27         19,000         10E-04           3 00E+04         2 22E-02         4 00E-02         2 0E-03         2 0E-04<	8 240E+01 545E-02 817E-06 989E+03 9 832E+04 132E-02 423E-06 200E-01 3 520E+01 307E-02 630E-06 562E-02 4 257E+05 116E-02 432E-06 800E-01 2 290E+05 138E-02 432E-06 800E-02 1 200E+05 156E-02 500E-06 570E-02 8	7	25 558 00	•		0 0E+00
8 32E+04 1 32E-02 4 23E-06 2 00E-01 3 90E-04 9 51E-06 25 613 96 848 76 13,000 2 6E-03 5 05E-04 13.000 2 0E-03 5 05E-04 13.000 2 0E-03 14.127 0.0E+00 5 05E-05 14.60C 2 630E-05 14.60C 2 630E-05 14.60C 2 630E-05 14.00C 2 0.0E+00 2 90E+05 1 38E-02 4 32E-04 8 00E-02 189E-01 4 60E-03 25 402 50 539 37 19,000 1 0E-04 2 00E+05 1 56E-02 5 00E-06 5 70E-02 8 20E-03 25 377 50 512 27 19,000 1 0E-04 3 30E+04 2 222E-05 4 22E-06 1 19E-02 2 00E-04 2 3 30E+04 2 222E-05 1 19E-02 2 00E-04 2 3 30E+04 2 222E-05 2 47E-05 2 47	8 32E+04 1 32E-02 4 23E-06 2 00E-01 3 5 20E-01 3 3 07E-02 6 30E-06 5 62E-02 4 25FE+05 1 16E-02 4 32E-06 7 40E-01 2 90E+05 1 38E-02 4 32E-06 5 70E-02 1 5 6 00E-05 5 70E-02 8	2	25 509 60			0000
3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	257E+05 116E-02 630E-06 562E-02 4 257E+06 116E-02 434E-06 740E-01 2 290E+05 138E-02 432E-06 800E-02 1 200E+05 156E-02 500E-06 570E-02 8	6	25 613 96			00+400
2 90E+05 1 10E-02 4 34E-06 7 40E-01 2 46E-04 6 00E-05 25 657 15 873 31 14,000 3 2E-04 2 90E+05 1 38E-02 4 32E-06 8 00E-02 1 89E-01 4 60E-03 25 402 50 539 37 19,000 1 0E-04 2 00E+05 1 56E-02 5 00E-05 5 70E-02 2 00E-03 25 37 50 512 7 19,000 1 0E-04 3 30E+04 2 12E-02 5 42E-05 4 20E-01 1 19E-02 2 90E-04 2 5 340 50 475 22 18,000 1 0E-04	2 90E+05 1 19E-02 4 34E-06 7 40E-01 2 2 90E+05 1 38E-02 4 32E-06 8 00E-02 1 2 00E+05 1 56E-02 5 00E-06 5 70E-02 8	•	25 629 88		_	3 0E-04
2 50E+02 136E-02 4 3ZE-06 8 00E-02 189E-01 4 60E-03 25 402 50 539 37 19,000 1 0E-04 2 00E+05 1 56E-02 5 00E-06 5 70E-02 8 20E-02 2 00E-03 25 377 50 512 27 19,000 1 0E-04 3 30E+04 2 12E-02 5 42E-06 1 19E-02 2 5 90E-04 2 5 340 50 475 22 18,000 1 0E-04	2 00E+05 1 56E-02 4 3ZE-06 8 00E-02 1		25 657 15			0 OE+00
300E-40 3.0E-40 3.0E-40 3.0E-40 2.2E-40 3.0E-40 2.2E-40 3.30E-40 3	2 00E-02 3 00E-02 8 10E-02 8	4			1	0 OE+00
3.000-04 2.425-70 4.205-01 1.95-02 2.905-04 25 340.50 475.22 18,000 1.05-04	2 20E404 2 22E 02 E 42E 08 4 20E 04	7	377		-	0 0E+00
	3.30E+04 2.2E=02 3.42E=00 4.20E=01 1	2	940		-	0 0E+00

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 12 September, 1998

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and inital groundwater conc below)

YES

		ENTER	User-defined stratum A soil vapor permeability.	, <b>*</b> ¢ (cm²)		
			č		٠٦	
		ENTER		soil vapor permeability)	SI	ENTER Stratum C soil water-titled porosity, $\theta_{w}^{c}$ $(cm^{2}/cm^{3})$
		ENTER	SCS soil type	directly above water table	S	ENTER Stratum C soll total porosity, n <sup>C</sup> (unitless)
		ENTER	Soul stratum directly above	water table, (Enter A, B, or C)	O	ENTER Stratum C soil dry bulk density, $\rho_c$ $\rho_c$
	oride	ENTER fLwr (cell D28)	Thickness of soil stratum C, (Enter value or 0)	h <sub>c</sub> (cm)	1280 16	ENTER Stratum B soit water-filled porosity, $\theta_w^B$
Chemical	Carbon tetrachi	ENTER ust add up to value o'	Thickness of soil stratum B, (Enter value or 0)	h <sub>B</sub> (cm)	274 32	ENTER Stratum B soil total porosity, n (unitless)
		ENTER Totals mu	Thickness of soil stratum A,	Р.≱ (ст)	1005 84	ENTER Stratum B soil dry bulk density, pb (g/cm³)
		ENTER	Depth below grade to water table,	Lwr (cm)	2560 32	ENTER Stratum A soil water-filled porosity,
ENTER Inital groundwater conc , Cw (µg/L)	165	ENTER Depth	below grade to bottom of enclosed space floor,	L⊭ (cm)	15	ENTER Stratum A soil total porosity, n^A (unitless)
ENTER Chemical CAS No (numbers only, no dashes)	56235	ENTER	Average solt/ groundwater temperature,	<b>ာ</b> (ဦ)	16	ENTER Stratum A soil dry bulk density, p <sub>b</sub> <sup>A</sup> (g/cm³)
	ENTER Initial groundwater conc , Cw (µg/L)	ENTER Initial groundwater conc , Cw (ug/L)	ENTER   Intral groundwater   Chemical   Chemical   Carbon tetrachloride   ENTER   ENTER   ENTER   ENTER   ENTER   ENTER   Soil	FINTER   Link   Chemical   Chemic	Fundame	Thickness   Carbon tetrachloride   Carbon tetrachloride     1 65

0.43	0.2	17	0 42	0.27	17	0 43	
	ENTER	ENTER	ENTER	ENTER	ENTER		
	Enclosed	Enctosed					
		space	Enclosed		Indoor		
_		floor	space		air exchange		
differential,		width,	height,	width,	rate,		
ΦĐ	LB	₩	Ĩ		8		
g/cm-s <sup>2</sup> )	(cm)	(cm)	(cm)	(cm)	(1/h)		
11	961	1961	488	01	0.45		
	ENTER	ENTER	ENTER	ENTER			
Averaging			Target	Target hazard			
_		Exposure	nsk for	quotient for			
ĕ	ns, duration,	frequency,	carcinogens,	noncardinogens,			
		ш	또				

Used to calculate risk-based groundwater concentration

1 0E-06 (unitless)

(days/yr)

(yrs)

(yrs)

### CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)	0 0E+00
Unit nsk factor, URF (µg/m³)*1	1 SE-05
Pure component water solubility, S S (mg/L)	7 93E+02
Organic carbon partition coefficient, K <sub>ce</sub> (cm³/g)	174E+02
Critical temperature, T <sub>C</sub> ( <sup>2</sup> K)	556 60
Normal boiling point, T <sub>B</sub>	349 90
Enthalpy of vaporization at the normal bouling point, $\Delta H_{v,b}$ (cal/mol)	7,127
Henry's law constant reference temperature, T <sub>R</sub>	25
Henry's law constant at reference temperature, H (atm-m³/mol)	3 05E-02
Diffusivity in water, Dw (cm²/s)	8 80E-06
Diffusivity in air, Da (cm²/s)	7 80E-02

# INTERMEDIATE CALCULATIONS SHEET

Floor- wall seam perimeter, Xereck (cm)	3,844	Diffusion path (ength, L <sub>d</sub> (cm)	
Water-filled porosity in capillary zone, $\theta_{w,\alpha}$ $(cm^3/cm^3)$	0 294	Total overall effective diffusion coefficient, D***.  7.59E-04	
Att-filled porosity in capillary zone, $\theta_{a,\alpha}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 136	Capillary  Zone effective diffusion coefficient, D°" (cm²/s)	
Total porosity in capillary zone, n <sub>cs</sub>	0 43	Stratum C C effective diffusion coefficient, Deff (cm²/s)	Reference conc , RfC (mg/m³)
Thickness of capillary zone, La	17.05	Stratum B affective diffusion coefficient, D*** (cm²/s)	Unit risk factor, URF (µg/m³)
Stratum A soil soil effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, D <sup>mf</sup> (cm²/s) 3 16E-03	Infinite source bldg conc. Ceutaing (µg/m³)
Stratum A soil soil relative air permeability, k <sub>rp</sub> (cm²)	0 746	Vapor viscosity at ave soil temperature, µrs (q/cm·s)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)
Stratum A soil soil intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (untiless)	Exponent of equivalent foundation Peciet number, exp(Pe <sup>f</sup> ) (unitless)
Stratum A effective total fluid saturation, Sa.	0 4 1 9	Henry's law constant at ave. groundwater temperature.  Hrs (atm-m³/mo!)	Area of crack, Assack (cm²)
Stratum C soil air-filled porosity, e,c (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, $\Delta H_{v,rs}$ (cal/mol)	Crack effective diffusion coefficient, Donak (cm²/s)
Stratum B soil air-filled porosity, $\theta_{\bullet}^{B}$	0 150	Crack depth below grade, Zonek (cm)	Average vapor flow rate into bldg , Qual (cm <sup>3</sup> /s)
Stratum A soll all-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitless)	Crack radius, rank (cm)
Source- building separation, L <sub>T</sub>	2645 32	Area of enclosed space below grade, A <sub>B</sub> (cm²)	Source vapor conc., C <sub>source</sub> (µg/m³)
Exposure duration, t	9 46E+08	Bidg ventilation rate, Qesisso (cm³/s)	Convection path iength,

### RESULTS SHEET

ALCULATIONS
ENTRATION CA
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ED GROUNDY
RISK-BASE

INCREMENTAL RISK CALCULATIONS

_	
Hazard quotlent from vapor Intrusion to indoor air, noncarcinogen (untless)	NA
Incremental nsk from vapor intrusion to indoor air, cardinogen (unitless)	Y.
Final Indoor exposure groundwater conc, (µg/L)	5 50E+01
Pure component water solubiity, S (µg/L)	7 93E+05
Risk-based indoor exposure groundwater conc, (µg/L)	5 50E+01
Indoor exposure groundwater conc, noncarcinogen (µg/L)	NA
Indoor exposure groundwater conc, cardinogen (µg/L)	5 50E+01

VLOOKUP TABLES

Soil Properties Lookup Table

SCS Soil Type	K, (cm/h)	a (1/cm)	N (unitless)	M (unitess)	θ, (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)						
ပ	0.20	0 008	1 09	0 083	0 38	0 068	0 0005						
<u>ე</u>	0 26	0 019	131	0 237	0 41	0 095	0 0 16						
	104	0 036	1 56	0 359	0.43	0.078	0.000						
ST	14 59	0 124	2.28	0.561	0.41	0.057	0.040						
S	29 70	0 145	2.68	0.627	0.43	000	0000						
SC	0 12	0 027	123	0 187	0 38	0 100	0 025						
SCL	131	0.059	1 48	0 324	0 39	0 100	0.028						
<u>S</u>	0 25	0 016	1 37	0 270	0.46	0.034	0 0046						
Sic	0 02	0 002	1 09		0.26	0.070	6800 0						
SICL	0 0 0	0100	1 23		0.43	680'0	9500 0						
110 OIL	045	0 020	14.	0 291	0 45	2900	0011						
35	74.4	0/00	88	0.471	0.41	9000	0.030						
					Chemic	Chemical Properties Lookup Table	okup Table						
		Organic			Pure		Henry's	Henry's			Enthalpy of		
		carbon			component		law constant	aw constant	Norma	=	vaporization at	Ş	-,
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	polling	Critical	the normal	Ą	Reference
		coefficient,	in air,	in water,	solubility.	law constant	temperature,	temperature,	point,	temperature	boiling point,	factor,	conc
		₹ <sub>8</sub>	<b>a</b>	å	Ø	Ì	I	ħ	۳	۳	ΔΗζ	URF.	Z,
CAS No Chemical		(cm <sub>3</sub> /g)	(cm²/s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/moi)	(၁)	(K)	(%K)	(cal/mol)	(mg/m³) 1	(mg/m³)
50293 DDT		2 63E±08	1 375-02	A 05E.08	2 505-02	10 HCC 6	90 1104	30	200		00077	100	i
		00.100	201101	00-100	70-007	50-27C C	90-301 9	67	533 15		11,000	9 7E-05	0 0E+00
54395 3 4 Distance		1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 13E-06	25			15,000	2 1E-03	0 05+00
51455 Z,4-Unitrophenol		1 00E-02	2 /35-02	9 USE-06	2 79E+03	1 82E-05	4 44E-07	25			15,000	0 0E+00	7 0E-03
F6236 C-that total additional		0011100	20-020 2 1 0 0 0 0 0 0	00-100	20-184.2	0.35-07	1 4 / E-U8	67			16,000	2 1E-03	0.00+00
Social Carbon tetrachionde		1 /4=+02	/ 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25				1 5E-05	0 0E+00
50000 Benz(a)anuniacene		3 98 0 + 05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	334E-06	25		_		2 1E-04	0 0 0
Second and Children A. Control		1 205+05	20-381 1		3 60E-02	1 99E-03	4 85E-05	25				3 7E-04	0 0 = +00
Social gamma-num (Lindane)	_	1 0/ 11/03	1 42E-02		6 80E+00	5 74E-04	1 40E-05	25			13,000	3 7E-04	0 0E+00
SUST LIBIGATION		2 14E+U4	1 256-02	4 74E-06	1955-01	6 19E-04	1 51E-05	25			13,000	4 6E-03	0 0E+00
67641 Applica		6 00E-01	5 365-02	7.975-06	3 50E+03	631E-05	1 54E-06	52			10,000	0.05+00	1 4E+01
67653 Chloroform		0 /05-01	1240	1.4E-05	1 00E+06	1 596-03	3 88E-05	25			6,955	00+400	3.5E-01
6777 Level 1		2 30 E 4	10-110-1	1 00 5	/ 92E+03	1 305-01	3 66E-03	25			886'9	2 36-05	00+1100
71363 8:4200		201100	20-H00	00-1100	3 401 50	1096-01	3 88E-03	25			9,510	4 0E-06	00+300
71432 Benzene		5 80E+00	0 00E-02		1 750-104	30-11-05	8 80E-08	57			10,346	00=+00	3 5E-01
71556 1.1.1-Trichtoroethane		1 10E+02	7 80E-02		1 335+03	7.05#-01	1 725-03	2,4	347.24	24 307 10	7.42	007100	00+00
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3.08E-04	7.515.06	3.5			000 61	20100	115.03
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1.58E-05	35 25			14 000	200	20 H
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1.64E-04	4 00E-06	3, 52			14,000	8 9F-03	10 HO
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 615-04	2 10E-05	25			13,000	97E-05	00+100
74839 Methyl bromide		1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	25			5,714	0 0E+00	5 0E-03
75014 Vinyl chloride (chloroethene)	hene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2 71 6-02	52			5,250	8 4E-05	0000
75092 Methylene chloride		1 17E+01	1 01E-01	1 17E-05	1,30E+04	8 98E-02	2 19E-03	25			902'9	4 7E-07	3 05+00
75150 Carbon disutfide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	25			6,391	0 0E+00	7 0E-01
75252 Bromaform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25			9,479	115-06	0 0E+00
75274 Bromodichloromethane	•	5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25		15 585 85	2,000	18E-05	0 0E+00
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5.61E-03	25		55 523 00	6,895	0 0E+00	5 0E-01
75354 1,1-Dichloroethylene		5 89臣+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 615-02	25		75 576 05	6,247	5 0E-05	0 0 0 0 0
76448 Heptachlor		1415+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25			13,000	1 3E-03	0 0E+00
77474 Hexachlorocyclopentadiene	liene	2 00E+05	1 61E-02	7 21E-06	1 80E+00	1 11 1 + 00	2 715-02	25			10,931	0 0E+00	7 0E-05
78591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25			10,271	2 7E-07	0 0E+00
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	52 572 00	7,590	0 0E+00	4 0E-03
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8.80E-06	4 42E+03	3 74E-02	9 125-04	25			8,322	1 6E-05	0 0E+00
79016 Trichloroethylene		1 66E+02	7 90E-02	9 105-06	1 10E+03	4 22E-01	1 03E-02	25			7,505	1 7E-06	0.000
79345 1,1,2,2-Tetrachioroethane	ane	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1.41E-02	3 44E-04	52	419 60		8,996	5 8E-05	0 OE+00
63329 Acenaphmene		7 08E+03	4.21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	34 803 15	12,155	00=+00	2 1E-01

84662 Diethyphthalate 84742 Di-n-butyl phthalate	2 88E+02 3 39E+04	2 56E-02 4 38E-02	6 35E-06 7 86E-06		VLOOKUP TABLES 1 85E-05 3 85E-08	4 51E-07 9 39E-10	25	567 15	757 00	13,733	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2 8E+00
85687 Butyl benzyl phthalate	5 75E+04	4 74E-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06	25.0	650.60	/98 5/ 839 68	13,000	0.00	2 KG
	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 00E-06	22	632 28	890 45	13,000	1 4E-06	00+00
86749 Fluorene	1 38E+04	3 63E-02	7 88E-06	1 98E+00	2 615-03	6 37E-05	25	570 44	870 00	12,666	0 0E+00	1 4E-01
	3 39E+03	3 90 = -02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	52	627 87	939 00	13,977	5 7E-06	0 0E+00
87865 Pentachloronhenol	5 92 5 104	5 61E-02	6 165-06	3 23 6 + 00	3 34 E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0 0E+00
88062 2,4,6-Trichtorophenol	3 81 5 + 02	3 185-02	6.25E-06	8 00 5 +03	3 195-04	7 70E 96	8 8	582 15	813.20	14,000	3 4E-05	00 00
	2 00E+03	5 90E-02	7 50E-06	3 10  -01	1 98F-02	7 70E-V0	8 %	319 15 494 14	749 03	12,000	3 15-06	000+00
91941 3,3-Dichlorobenzidine	7.24E+02	1 94E-02	6 74E-06	3 11 €+00	1 64E-07	4 00E-09	3 2	560 26	754 03	13,000	1 3F-04	- 44-0 - 0-14-0 - 0-14-0
	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	52	417 60	630 30	8,661	00+90	7 OE +00
95-67 2-Methyphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	52	464 19	697 60	10,800	0.00	185-01
95578 2-Chlomohenol	3 88E+02	5 01E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	52	453 57	705 00	9,700	0 0E+00	2 0E-01
	1 60E+03	2 91 5-02		1 20F+03	1 78F-04	3.90E-04	52.2	447 53 526 16	675 00	9,572	000	1 8E-02
	6.46E+01	7 60E-02	8 60E-06	2 09E+03	9 84 E-04	2 40E-05	2 5	326 13 483 95	719.00	13,000	001100	3 50.01
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	52	409 34	617.20	8,501	0 OE+00	1 OE+00
100423 Styrene 105679 2 4-Dimethyland	7,765+02	7 105-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03	52	41831	636 00		0 0E+00	1 0E+00
	2 09E+02	5 84E-02 7 69E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	8 8	484 13	707 60		0 0E+00	7 0E-02
106467 1,4-Dichlorobenzena	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	7 43F-03	9 %	411 52	616 20 694 76	8,525	0 05 +00	7 0E+00
	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	3 2	503.65	754 00		94400	4 n c
107062 1,2-Dichloroethane	1 74E+01	1 04E-01	9 90E-06	8 52E+03	4 01E-02	9 78E-04	55	356 65	561 00		2 6E-05	0 OE+00
108034 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	52	345 65	519 13		0.00+00	2 0E-01
108883 Toltiens	4 U/E+UZ	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03	52	412 27	617 05		0 0E+00	7 0E+00
108907 Chlorobenzene	2.19E+02	7.30F-02	8 70F-06	3 20E+U2 4 72E+03	2 /2E-01	6 63E-03	52	383 78	591 79		0 OE+00	4 OE-01
108952 Phenol	2 88E+01	8 20E-02	9 105-06	8 28E+04	1 63E-05	3 986-03	8 %	404.87	632 40		00+00	2 00-02
	155E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80F-05	3 %	453.02	650 70	026.0	0.0E+00	2 15 400
	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	22	674 43	942.94		0.01-00	2 15,02
11/81/ Bis(2-ethylhexyl)phthalate	1 51E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	52	657 15	806 00		4 0E-06	00=00
118741 Hexacthoropana	8 32E+07	1514-02	3.585-06	2 00E-02	2 74E-03	6 68E-05	52	704 09	862 22		0 0E+00	7 0E-02
120127 Anthracene	2 95E+04	3 24F-02	7 74F-06	6 20E+00	3 41E-02 2 67E-03	1,32E-03	52	582 55	825 00		4 6E-04	0 0E+00
	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-03	6 51E-05 1 42E-03	5 K	615 18 486 15	873 00		00+100	1 1E+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06		460 (3	708 17	10,471	0.05+00	2 05 01
	9 55E+01	2 035-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	 22 23	20 00	814 00		195-04	001400
124481 Chlorodibromomethane	631E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04		416 14	678 20			00+400
127 104 Tetrachioroginyrene	1 555+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	52	394 40	620 20			0 0E+00
156592 cs-1.2-Dichloroethylene	3.55F±01	7.365-02	113505	3 505-01	4 57E 54	1 10E-05	8 8	667 95	936 00		0.0E+00	116-01
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85 F-01	9 395-03	G K	333 53	244 00		000-00	3 55-02
	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06		•	316 30	7.00	2 16 24	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02		1 50E-03	4 55E-03	1115-04			969 27		2 15-04 16-04	00+00
205440 Fluoranthene	1 07E+05	3 02E-02		2 06E-01	6 60E-04	1615-05			905 00	_	0 0E+00	146-03
21/055 Delizo(A)lidorangiene 21/010 Chryspa	1 23E+U6 3 08E+06	2 25E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07		753 15 1	1019.70	16,000	2 1E-05	0 0E+00
309002 Aldrin	2 45E±06	1 325-02	4 865-06	1 00 0 0	3 88E-03	9.46E-05		714 15	979 00			0 0E+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02		2 00E+00	4.35F-04	1.0615-05	9 %	603 01 606 66	839 37			0 OE+00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07			830 36	000,5	20 LG	0.05+00
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02			587.38			2 05-02
606202 2,5-Dinitrotoluene	6 92E+01	3 27E-02		1 82E+02	3 06E-05	7 46E-07			770 00		196.04	0 0E+00
1024573 Hentachlor epoxide	2 40E+01	5 45E-02		9 89E+03	9 23E-05	2 25E-06	52		746 87			0 OE+00
7439976 Mercury (elemental)	5 205+01	3.075-02	4 23E-00 6 30E-06	2 UUE-U1 5 62E-03	3.90E-04	9515-06			848 76		_	0 0E+00
8001352 Toxaphene	2 57E+05	1 16E-02		7 40E-01	2.46E-04	5 OOE OB	9 %	629 88 1 667 15	1/50.00	_	0 0E+00	3 0E-04
11096825 Arador 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 605-03	25		539.37	00,4	3 ZE-04	00=+00
11097691 Arador 1254 (PCB-1254)	2 00E+05	1 56E-02	8	5 70E-02	8 20E-02	2 00E-03	22	. S	512.27	19,000		00==00
12674112 Arodor 1016 (PCB-1015) 63469219 Arodor 1242 (PCB-1242)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	52	340 50	475 22	18,000		00=+00
Catalina in seasons at about the contract of the catalina in t	SUETUS C	70-261 7	3375-06	3 40E-01	2 13E-02	5 20E-04	25	20	482 20	18,000	1 0E-04	00+30 C

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

			ENTER	User-defined stratum A soll vapor permeability, k, k, (cm²)
			ENTER	stratum A SCS SCS soil type (used to estimate OR soil vapor permeability)
			ENTER	SCS soil type directly above water table
			ENTER	Soil stratum directly above water table, (Enter A, B, or C)
			ENTER Lwt (cell D28)	Thickness of soit stratum C, (Enter value or 0) hc (cm)
	Chemical	Benzene	NTER ENTER Totals must add up to value of L <sub>w1</sub> (cell D28)	Thickness Thickness Thickness of soil of soil stratum B, stratum C, stratum B, stratum C, h <sub>k</sub> h <sub>B</sub> h <sub>c</sub> (cm) (cm) (cm) (cm) (cm) (cm) (cm) (cm)
			ENTER Totals mus	Thickness of soil stratum A, hA (cm)
		_	ENTER	Depth below grade to water table, Lwr (cm)
YES	ENTER Initial groundwater conc, Cw (µg/L)	2 525	ENTER Depth	below grade to bottom of enclosed space floor, Lr (cm)
	ENTER Chemical CAS No (numbers only, no dashes)	71432	ENTER	Average soil/ groundwater temperature, T <sub>S</sub> (°C)

ENTER	Stratum C soil water-filled	porosity,	ບ <b>,</b> ສ	(cm <sub>3</sub> /cm <sub>3</sub> )	03	
ENTER	Stratum C soll total	porosity,	°E	(unitless)	0 43	
ENTER	Stratum C soil dry	bulk density,	°.	(g/cm³)	1.7	ENTER
ENTER	Stratum B soil water-filled	porosity,	a M	(cm³/cm³)	 0.27	ENTER
ENTER	Stratum B soil total	porosity,	<b>E</b> C	(unitless)	0.42	ENTER
ENTER	Stratum B soil dry	bulk density,		(g/cm³)	17	ENTER
ENTER	Stratum A soil water-filled	porasity,	<b>∀</b> ,**0	(cm³/cm³)	0.2	ENTER
ENTER	soil totai	porosity,	<b>€</b>	(unitless)	0.43	ENTER
ENTER	soil dry	bulk density,	e, o	(g/cm³)	1.5	ENTER

Ш									
0 43									
1.7	ENTER	Indoor	air exchange	rate,	띪	(1/h)	0.45		
0.27	ENTER	Floor-wall	seam crack	width,	¥	(cm)	0.1	ENTER	Target hazard
0.42	ENTER	Enclosed	space	height,	Ŧ	(сш)	488	ENTER	Target
17	ENTER	space	floor	width,	W	(cm)	961	ENTER	į
0.2	ENTER	space	floor	length,	ı,	(cm)	981	ENTER	
0.43	ENTER	Soil-bidg	pressure	differental,	ΔD	(g/cm-s²)	40	ENTER	Averaging
15	<b>ENTER</b> Enclosed	space	floor	thickness,	Larack	(cm)	15	ENTER	Averaging

ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	10E-06 1 Jsed to calculate risk-based proundwater concentration
ENTER Target risk for carcinogens, TR (unitless)	1 0E-06 Used to calcu
ENTER Exposure frequency, EF (daysyr)	350
ENTER Exposure duration, ED (yrs)	30
ENTER Averaging time for noncardinogens, AT <sub>NC</sub> (yrs)	30
ENTER Averaging time for carcinogens, ATc (yrs)	70

## CHEMICAL PROPERTIES SHEET

Reference	conc.	(mg/m³)	00,700
Cait Isk	factor, URF	(µg/m³) <sup>-1</sup>	97.70
Pure component water			582 18   \$ 905-04   4 755-09   9 25 28 2 3 4 2 5 2 5 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
Organic carbon partition	coefficient,	(cm <sub>3</sub> /g)	£ 90E+04
Critical	temperature, T <sub>c</sub>	(K)	562 1E
Normal boiling	point,	ક	353 24
Enthalpy of vaponzation at the normal	bosung posnt,	(cal/mot)	7 349 353 24
Henry's law constant reference	temperature, T <sub>R</sub>	(၁၀)	25
Henry's law constant at reference	temperature, H	(atm-m³/mol)	5 56E-03
Diffusivity	in water, D.	(cm <sup>2</sup> /s)	9 80E-06
Diffusinty	in air, D	(cm²/s)	8 80E-02 9 80E-06

## INTERMEDIATE CALCULATIONS SHEET

#2" 20 65	Crack Enthalpy of depth vaporization at below ave groundwater grade, temperature, Z <sub>chack</sub> (cm) (cal/mol) 15 8,061	<b>J</b> H → <b>J</b> H
(atm-m³/mol) 3.64E-03	(cal/mol) 8,061 Crack	(unitiess) (cm) (cal/mol) 4.16E-04 15 8,061 Average Crack
<b>ત</b> !!		(unitiess) (cm) 4.16E-04 15 Average

	CONDIVAL	NON-BASED GROONDWATER CONCENTRATION CALCULATIONS	NOIS CALC.	210101	INCREMENTAL	INCREMENTAL RISK CALCULATIONS
Indoor exposure e groundwater gro conc, carcinogen nonc (µg/L)	Indoor exposure groundwater conc , oncarcinogen (ug/L)	Risk-based indoor exposure groundwater conc, (ug/L)	Pure component water sotubility, S S (μg/L)	Final indoor exposure groundwater conc, (iig/L)	Incremental nisk from vapor intrusion to intrusion to indoor air, carcinogen (untiless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitiess)
5.05E+02	NA	5 05E+02	1 75E+06	5 05E+02	Ą	ΑN

Reference conc , RfC (mg/m³)

		So	Soil Properties Lookup Table	okup Table								
SCS Soil Type	К, (спић) α	a (1/cm) 1	N (unitless)	M (unitless) 6	0, (cm <sup>3</sup> /cm <sup>3</sup> )	θ, (cm³/cm³)	Mean Grain Diameter (cm)					
ပ	0 20	900 0	1 09	0 083	0 38	890 0	2600 0					
<u>ರ</u>	0.26	0.019	131	0 237	0,41	0 095	0 0 0					
	104	0 036	156	0 359	0 43	0 078	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0					
<u>s</u>	14.59	0 124	2 28	0 561	0 41	0 057	0 040					
n (	29.70	0 145	7 68	0 627	0 43	0.045	0 044					
2 5	3 6	7700	2.63	/010	8 6	9 6	0.029					
100	. v	0.03	1 37	420 0	800	000	9700					
<u> </u>	0.02	0 000	60.1	0.20	2,5	0200	95000					
SICT	0 07	0 0 0 0	1 23	0 187	0,43	6800	95000					
SIL	0.45	0 020	141	0 291	0.45	790 0	0 011					
	7, 1	6/00	80	0 47		con n	0.030					
					Chemic	Chemical Properties Lookup Table	kup Table					
	0	Organic			Pure		Henry's	Henry's			Enthalpy of	
	ئ	carbon			component		law constant	law constant	Normal		vaporization at	Cuit
	ğ	partition	Diffusivity	Diffusivity		Henry's	at reference	reference	boiling	Critical	the normal	nsk R
	Š	coefficient,	تار مارز	In water,	solubility.	law constant	temperature,	temperature,	polint,	temperature,	boiling point,	factor,
CAS No	J.	νος (cm <sup>3</sup> /π)	(cm²/s)	(cm²/s)	o ()	L (sagger)	H (lom) <sub>E</sub> m-mte/	<u>ء</u> (ر	_ §	် ပ	ΔH, b	URF
		0			72,613	(2000)	(2)	6	61.7	(VI)	(California)	(Hg/III )
50293 DDT	.4	2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32€-04	8 10E-06	25	533 15	720 75	11,000	9.7E-05
50328 Benzo(a)pyrene	-	1 02E+06	4 30E-02	9 00E-08	1 62E-03	4 63E~05	1 13E-06	25	715 90	969 27	15,000	2 15-03
51285 2,4-Dinitrophenol	•	1 00 <b>E-</b> 02	2 73E-02	90-390 6	2.79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0E+00
53703 Ulbenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03
55235 Carbon tetrachloride	[	1 74E+02	7 80E-02	8 BGE-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	155-05
50000 Benzialaminiacene	., .	2 30E+U3	5 10E-02	90E-06	9 405-03	137E-04	3.34E-06	25	708 15	1004 79	15,000	2 1E-04
Appendix D. Chordense	🔻	1,20=+05	1 185-02	4 3/E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3 7E-04
60571 Dieldrin	. (1	2 145-04	1 25E-02	7.4E-06	1 056-01	3 /4E-04	400-00	C 40	290 22	839 35	13,000	3 75-04
65850 Benzoic Acid	•	6.00F-01	5.36F-02	7 976-06	3.50F±03	6 315-04	1015-00	D 40	25.510	842.43	13,000	4 65-03
67641 Acetone		5 75E-01	1 24E-01	1 14E-05	1 005+06	1 59E-03	3 88 6-05	22 22	329 20	508 10	000,01 159,8	00+100
67663 Chloroform	(7)	3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6.988	2 3E-05
67721 Hexachloroethane	-	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00	695 00	9,510	4 0E-06
71363 Butanol	יש	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	25		563 05	10,346	0 0E+00
71432 Benzene	· .	5 89E+01	8 80E-02	9 80E-06	175E+03	2 28E-01	5 56E-03	25		562 16	7,342	8 3E-06
70008 Endin	·- •	1 105+02	7 80E-02	8 80 E-06	1 33E+03	7,05E-01	1 725-02	25		545 00	7,136	0 0E+00
72435 Methoxychlor	. 0.	9776+04	1.565.02	4 /45-00	4 50E-01	3 UOE-04	7 STE-US 4 SSE-US	2 %	55105	986.20	000,21	0.05+00
72548 DDD	, -	1 00E+06	1.69E-02	4 76E-06	9 00E-02	1 64E-04	4 00F-06	2, 23		863 77	14,000	0 05+00 6 9F-05
72559 DDE	ব	4 47E+06	1,44E-02	5 87E-06	1 20E-01	8 61E-04	2 105-05	25		86038	13,000	9 7E-05
74839 Methyt bromide	1	1 05E+01	7 28E-02	1.21E-05	1 52E+04	2 56E-01	6 24E-03	25		467 00	5,714	0 OE+00
75014 Vinyl chloride (chloroethene)		1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	271E-02	25		432 00	5,250	8 4E-05
75092 Methylene chlonde	'	1 17E+01	1015-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25		510 00	90,706	4 7E-07
75752 Paradom disultide	4 6	4 57E+01	1 04E-01	1 00E-05	1,19E+03	1 24E+00	3 02E-02	52		552 00	6,391	00=+00
75274 Bennodeklomethens	~ 4	8 / 1E+01	1 495-02	1 03E-U5	3 100-103	2 195-02	5 34E-04	25		00 969	9,479	115-06
75343 4 1-Dichlorothane	., «	3 18 1401	7.425-02	1.05E-05	6 /4E+03	2 305-02	1 60E-03	25		585 85	7,000	1 8E-05
75354 1.1-Dichloroethylene	, u)	5 89E+01	9 00E-02	1.04E-05	2 25E+03	1 07F+00	50-11-00 50-11-00	5 K	30.47	578.05	6,095	00+100 80-108
76448 Heptachlor		141E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 095-03	25.	603 69	846.31	13 000	13F-03
77474 Hexachlorocyclopentadiene		2 00E+05	1615-02	7.21E-06	1 80E+00	1 11E+00	2715-02	25	512 15	746 00	10,931	000+00
78591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10,271	2 7E-07
78875 1,2-Dichloropropane	7	4.37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7,590	0.05+00
79005 1,1,2-Trichloroethane	1	5 01 E+01	7 80E-02	8 805-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8,322	1 6E-05
79016 Inchloroethylene		1 66E+02	7 90E-02	9 10 0 0 0	1 10E+03	4 22E-01	1 03E-02	25	360 36	544 20	7,505	176-06
/ 9345 T,T,Z,Z-1etrachloroethane 83329 Acenanhthene		9 33E+01 7 08E+03	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 445-04	53 E	419 60	661 15	8,996	5 8E-05
espinideipoc 2700	-	OVER TO A	70-017 4	00000	201047 4	0 30E-03	1 55E=04	C)	550 54	803 15	12,100	0.01

84662 Diethylinhthalate	COTUBBE	104 C	6 L 4		VLOOKUP TABLES							
	3 39E+04	4 38E-02	7.865-06	1 08E+03	185E-05 385E-08	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 Butyl benzyl phthalate	5.75E+04	174E-02	4 83E-06	2 69E+00	5 17 E-05	3 33E-10 1 26E-06	0 %	660.60	/986/	14,751	30.00	3 5E-01
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 00E-06	3 12	632 28	890.45	13,000	147-06	0 0E+00
86749 Carteria	1 38E+04	3 63E-02	7 88E-06	1 98E+00	2 61E-03	6 37E-05	52	570 44	870 00	12,666	0 0E+00	1 4E-01
87683 Hexachlon-1 3-bitadiene	3 39E+03	3 90E-02	7 035-06	7 48E+00	6 26E-07	1 535-08	52	627 87	899 00	13,977	57E-06	0 0E+00
87865 Pentachlorophenol	5 92 E+02	5.505.02	0 10E-00	3 235+00	3.34E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0 0E+00
88062 2,4,6-Trichlorophenol	3 81E+02	3 18 5-02	6.25E-06	8 00F+03	3 105-00	2 44E-08	8 8	582 15	813.20	14,000	3 4 05	0 0 0 0
91203 Naphthalene	2 00E+03	5 90E-02	7 505-06	3 10E+01	1 98E-02	4 R3F-04	0 K	51915	749 03	12,000	3.1E-06	90.0
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	674E-06	3 11€+00	1 64E-07	4 005-09	3 23	560 26	754 03	13,000	3 3F-00	0.06400
93476 O-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	52	417 60	630 30	8.661	0 0E+00	7 OE+00
95501.1.2-Derklomberges	9 12E+01	7 40E-02	8 305-06	2 60E+04	4 92E-05	1 20E-06	25	464 19	09 269	10,800	0 0E+00	186-01
95578 2-Chlomphagal	0 1/E+02	6 905-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	52	453 57	705 00	9,700	0.000	2 0E-01
95954 2.4.5-Trichloropenol	3 88E+02	2016-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9,572	0 0E+00	1 8E-02
98953 Nitrobenzene	6 46F+01	7 505-02	7 03E-06	1 20E+03	1 /8E-04	4 34E-06		526 15	759 13	13,000	0.00	3 5E-01
	3 635+02	7 50E-02		1 695+02	3 235-01	2 40E-05		483 95	719 00	10,566	0.00	2 0E-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 136-01	2 76E-03	6 %	409 34	636.00	8,501 727	0.05+00	100.00
105679 2,4-Dimethytphenol	2 09E+02	584E-02		7 87E+03	8 20E-05	2 00E-06		484 13	707 60	11 329	001100	1 UE+00
106423 p-Xylene	3 89E+02	7 69E-02	8 44E-06	185€+02	3 14E-01	7 66E-03		411 52	616 20	8.525	00000	7.05+00
106478 n-Chlomaniine	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	52	447 21	684 75	9,271	0 0 0 0 0	8 0E-01
107062 1.2-Dichlorethane	1745+01	4 635-02	1015-05	5 30E+03	136E-05	3 32E-07		503 65	754 00	11,689	0 0E+00	1 4E-02
108054 Vinyl acetate	5 255+00	8.50F-02		0 020403	2 105 02	9 78E-04		356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xylene	4 07E+02	7 00E-02	7 80F-06	1.615+04	2 10E-02	5 12E-04	100 E	345 65	519 13		0 OE+00	2 0E-01
108883 Taluene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72 - 01	2 34 F-US	9 8	412.27	617 05		0 05 +00	7 0E+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06		1 52E-01	3 7 1 15-03	6 4	383 /8 404 87	591 79		000+00	4 0E-01
108952 Phenol	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07		455 02	694 20	0,400	00-100	2 0E-02
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05		451 15	659 79		3.35-04	00+400
11029/ Endosuran 117817 Brs(2_ath/showd)shifteidd	2 14E+03	1 155-02		5 10E-01	4 59E-04	1 12E-05		674 43	942 94	14,000	00=00	2 1E-02
117840 Di-n-octvi obthalate	8 325+07	3 515-02	3 565-06	3 40E-01	4 18E-06	1 02E-07		657 15	806 00	15,999	4 0E-06	0 0E+00
118741 Hexachlorobenzene	5.50F+04	5.425.02		2 00E-02	2 /4E-03	6 68E-05		704 09	862 22	15,000	0 OE+00	7 0E-02
120127 Anthracene	2 95E+04	3 24F-02		4 34E-02	3 41E-02 2 67E-03	1 32E-03		582 55	825 00		4 6E-04	0 0E+00
120821 1,2,4-Trichlorobenzene		3 00E-02	8 235-06	3 00E+02	5 82F-02	1 425-03	8 8	615 18	873 00		0 0E+00	1 1E+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06		480 13	708 17		00=+00	2 0E-01
121142 2,4-Dinitrotaluene		2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08		590 00	814 00	13.467	1 05.04	1 15-02
124451 Uniorodibromomethane	6 31E+01	1.96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04		416 14	678 20		2.4E-05	001100
129000 Pyrana	1 555 +02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	25	394 40	620 20		5 8E-07	00+00
156592 cis-1,2-Dichloroethylene	3.556+04	7 365-02	1 135.05	1 35E-01	4 515-04	1 10E-05	22 6	667 95	936 00		0 0E+00	1 1E-01
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6.30F+03	3 855-01	4 U/E-03	9 2	333 65	544 00	7,192	00+300	3 5E-02
	3 47E+06	1 90E-02		2 20E-05	6 56E-05	1 60E-08		320 63 809 15	516 50 1070 24			7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03		1 115-04		715 90	969.27		2 11 5 4 11 5	0.0000
200440 Fluorantinene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 615-05		655 95	905 00			145-01
218019 Chrysene	1 23E+06	2 265-02	5 565-06	8 00E-04	3 40E-05	8 29E-07		753 15	1019 70			0 0E+00
309002 Aldrin	2 45F+06	1 32F-02		1 805-03	3 66E-U3	9 46E-05		714 15	979 00	16,455	2 1E-06	0 0E+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7.345-06	2.005+00	4 355-04	1 /0E-04	52	603 01	839 37	13,000		00=+00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02		2 40E-01	3 05 1-05	7.44E.07		390 33	839,36	13,000	1 86-03	0 0E+00
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	_	2 80E+03	7 26E-01	1 77E-02		381 15	639 36		5 3E-04	0 0E+00
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02		1 82E+02	3 06E-05	7 46E-07	25 5	558.00	770.00	20,00	200	Z 0E-02
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02		9 89E+03	9 23E-05	2 25E-06	25 5	509 60	746.87			00+100
10245/5 Heptachor epoxide	8 325+04	1 325-02		2 00E-01	3 905-04	9 515-06	25 6	613 96	848 76			001+00
2001357 Tovanhene	5 ZUE+01	3 U/E-02		5 62E-02	4 67E-01	1 14E-02	25 6	629 88	1750 00	_		3 0F-04
11096825 Arador 1260 (PCB-1260)	2 90 5 + 05	1 385 02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	25 6	657 15	873 31		3 2E-04	0 0E+00
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02	4.32E-06 5.00E-06	8 UUE-UZ 5 70E-02	1 89E-01 8 20E-02	4 60E-03	52 5	402 50	539,37			00±±00
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2.22E-02	5 42E-06	4 20E-01	1 195-02		9 6	377 50	512 27	19,000		0 0E+00
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02	(7)	3 40E-01	2 13E-02	5 20E-04	9 K9 13 K9	340 50 345 50	475 22 482 20	18,000	0E-04	0 OE +00
							ì	?	407 704	18,000		0 0E+004

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

× g

YES

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

YES

	ENTER User-defined stratum A soil vapor permeability,	I <u></u>			
	ENTER Sol Sol stratum A SCS soil type (used to estimate OR	, ()	ENTER Stratum C soil water-filed porosity.	0 3	
	SCS Soil type	directly above water table	ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)	0 43	
	ENTER Soil stratum drectly above	water table, (Enter A, B, or C) B	ENTER Stratum C soil dry bulk density, ρ <sup>6</sup> (g/cm³)	ENTER Indoor air exchange rate, ER	0 45
	ENTER L <sub>Vrt</sub> (cell D28) Thickness of soil stratum C, (Enter value or 0)	h <sub>c</sub> (cm)	ENTER Stratum B soil water-filled porosity, $\theta_w^8$ $(cm^3/cm^3)$	ENTER Floor-wall seam crack width, w (cm)	ENTER Target hazard quotient for noncarcinogens, THQ (untless)
Chloroform	NTER ENTER ENTER Totals must add up to value of L <sub>WT</sub> (cell D28) Thickness Thickness Ickness of soil of soil stratum B, stratum C, atum A, (Enter value or 0) (Enter value o	h <sub>B</sub> (cm) 1280 16	ENTER Stratum B soil total porosity, n (unifless)	ENTER Enclosed space height, H <sub>e</sub>	ENTER Target Target Tark for carcinogens, TR (unitiess)
	ENTER Totals mus Thickness of soil stratum A,	h, (cm) 762	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> 8 (g/cm³)	ENTER Enclosed space floor width, W <sub>B</sub>	ENTER Exposure frequency. EF (days/yr)
	ENTER Depth below grade to water table,	Lwr (cm) 2042 16	ENTER Stratum A soil water-filled porosity, $\theta_\omega^A$ (cm³/cm³)	ENTER Endosed space floor length, Le	enter Exposure duration, (yrs)
ENTER intual groundwater conc , Cw (µg/L)	ENTER Depth below grade to bottom of enclosed space floor,	(cm)	ENTER Stratum A soit total porosity, n (unitless)	ENTER Soil-bidg pressure differential. AP (g/cm-s²)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)
Chemical CAS No (numbers only, no dashes)	ENTER Average soil/ groundwater temperature,	7s (°C)	ENTER Stratum A soul dry bulk density, pe <sup>4</sup> (g/cm³)	ENTER Enclosed space floor thickness, Lensk (cm)	ENTER Averaging time for carcinogens, ATc (yrs)

Used to calculate risk-based groundwater concentration

## CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)	0 0E+00
Unit risk factor, URF (μg/m³)·¹	2 3E-05
Pure component water solubitity, S S (mg/L)	7 92E+03
Organic carbon partition coefficient, K (cm³/g)	536 40 3 98E+01
Critical temperature, T <sub>c</sub> (*K)	536 40
Normal bouling point, T <sub>B</sub>	334 32
Enthalpy of vaporzation at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	6,988
Henry's law constant reference temperature, T <sub>A</sub>	25
Henry's law constant at reference temperature.  H (atm-m³/mol)	3 66E-03
Diffusivity in water, D <sub>w</sub> (cm²/s)	1 00E-05
Diffusivity in air, De. (cm²/s)	1 04E-01

# INTERMEDIATE CALCULATIONS SHEET

total fluid intrinsic relative arr effective vapor material fluid intrinsic relative arr effective vapor material fluid intrinsic relative arr effective vapor material fluid fluid fluid formasbility, permasbility, permaspility, permaspility	Stratum B
Forming the participation of	air-filled air-filled
(cm²)         (cm²) <t< td=""><td>ο <b>θ</b></td></t<>	ο <b>θ</b>
936E-10   0.746   698E-10   1705   042   0126   0294	$(cm^3/cm^3)$ $(cm^3/cm^3)$ ( $(cm^3/cm^3)$
Henry's law Vapor A B C zone overall constant at viscosity at effective diffusion diffusion conficient, conficient, conc., exp(Pe <sup>1</sup> ) (cm <sup>2</sup> /s) (c	0,150 0130
Henry's law         Vapor         A         B         C         zone         overall           constant at viscosity at every groundwater ave soil temperature, ave groundwater ave soil diffusion source inflinite dequivalent source inflinite source inflinite dequivalent diffusion bidg.         (cm²/s)         (cm²/s)         (cm²/s)         (cm²/s)         (cm²/s)         (cm²/s)           Exponent of infinite foundation indoor source foundation indoor source foundation bidg.         Unit         Reference conc.         A         Counc.         A           Peciet attenuation bidg.         (ag/m³)         (ag/m³)         (ag/m³)         (ag/m³)         (ag/m³)           (unitless)         (unitless)         (ag/m³)         (ag/m³)         (ag/m³)         (ag/m³)	
constant at viscosity at effective e	Enthalpy of
ave groundwater ave soil diffusion coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, conc, exp(Pe <sup>1</sup> )         Deff. D	
H <sub>TS</sub>   H <sub>TS</sub>   D° <sup>4</sup>   D° <sup>6</sup>   D° <sup>6</sup>	ave groundwater
1.04E-01   1.77E-04   4.22E-03   (cm²/s)   (	ΔH <sub>TS</sub>
Exponent of unitiess)         1.04E-01         1.77E-04         4.22E-03         1.07E-03         0.00E+00         6.00E-04         1.46E-03           Exponent of equivalent source foundation indoor source foundation indoor source number, coefficient, conc, factor, conc, exp(Pe <sup>†</sup> )         Unit         Reference           Paciet         attenuation bldg.         factor, conc, sactor, conc, axp(Pe <sup>†</sup> )         Conc, factor, conc, gattor, conc, axp(Pe <sup>†</sup> )           (unitless)         (unitless)         (ug/m³)         (ug/m³)         (mg/m³)	(cal/mol) (atm
Exponent of Infinite equivalent source Infinite foundation indoor source Unit Peclet attenuation bidg. risk number, coefficient, conc., factor, exp(Pe <sup>1</sup> ) α C <sub>Puesto</sub> URF (unitless) (μg/m³) (μg/m³)	, 15 7,492 2 47E-03
equivalent source Infinite foundation indoor source Unit Peclet attenuation bidg. risk number, coefficient, conc , factor, exp(Pe $^l$ ) $\alpha$ C $^l$ $^l$ $^l$ $^l$ $^l$ $^l$ $^l$ $^l$	
foundation indoor source Unit Peciet attenuation bidg. risk number, coefficient, conc, factor, exp(Pe') α C <sub>butteng</sub> URF (unitiess) (μg/m³) (μg/m³)	Average Crack
Peclet attenuation bldg. risk number, coefficient, conc , factor, exp(Pe $^{\prime}$ ) $\alpha$ C $^{\rm busking}$ URF (unitiess) $(\mu g/m^3)$ $(\mu g/m^3)$	effective
number, coefficient, conc., factor, exp(Pe $^{\dagger}$ ) $\alpha$ C <sub>busting</sub> URF (unitiess) ( $\mu g/m^3$ ) ( $\mu g/m^3$ )	
$\exp(Pe^t)$ $lpha$ $C_{busing}$ URF (unitless) (unitless) ( $\mu g/m^3$ ) (	coefficient,
(unitless) $(\mu g/m^3)$ $(\mu g/m^3)$	Qual Dorack Acrack
	(cm³/s) (cm²/s) (

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS.

INCREMENTAL RISK CALCULATIONS

				_	
Hazard	from vapor	indoor air,	noncarcinogen	(untless)	NA
incremental nsk from	vapor intrusion to	indoor air,	carcinogen	(unrtless)	ΑN
Fınal	Indoor	groundwater	conc,	(µg/L)	1 72E+02
Pure	component water	solubility,	တ	(µg/L)	7 92E+06
Risk-based	indoor exposure	groundwater	, conc.	(µg/L)	1 72E+02
Indoor	exposure groundwater	COUC.,	noncarcinogen	(HG/L)	ΨN
Indoor	exposure groundwater	conc.	carcinogen	(ng/r)	1 72E+02

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

VLOOKUP TABLES

0 0 E + 00 0 0 E + 00 0 0 E + 00 0 0 E + 00 0 0 E + 00 0 0 E + 00 0 0 E + 00 0 0 E + 00

(mg/m³) conc ã

factor, ¥ŝ URF 1 4E+01 3 5E-01 0 0E+00 0 0E+00 3 5E-01 0.0E+00

1 0E+00

1 1E-03 0 0E+00  0 0E+00 0 0E+

9345 1,1,2,2-Tetrachloroethane

33329 Acenaphthene

	;		,		VLOOKUP TABLES							
84742 Dischart anticol	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0.05	2 8E+00
85687 Butta henral chthalate	5 385 404	4 385-02	7 86 406	1 12E+01	3 855-08	9 39E-10	52	613 15	798 67	14,751	0 0E+00	3 5E-01
86306 N-Nifosodinhandamina	1 205+03	3 4 2 E 0 2	4 05 11-00	2 545.00	91/11/25	1 26E-06	52	660 60	839 68	13,000	0 0E+00	7 0E-01
86737 Fluorene	385+04	3 635-02	7 88E DB	1 00 00 1	7 64 64	5 00E-06	52	632 28	890 45	13,000	1 4E-06	00+100
86748 Carbazole	3 39E+03	3 90E-02	7 035-06	7.48F+00	6 26E-03	0 3/E-45	2 2	570 44	870 00	12,666	0 0E+00	1 4E-01
87683 Hexachioro-1,3-butadiene	537E+04	5 61E-02	6 16E-06	3 23E+00	3.34E-01	8 15F-03	3 5	486 15	738.00	13,977	20,00	
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95€+03	1 00E-06	2 44E-08	25	582 15	813.20	14.000	3.4E-05	0 OE+00
88052 2,4,5-Trichlorophenol 91203 Nambhalana	3.81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	52	519 15	749 03	12,000	3 1E-06	0 0E+00
91941.3 3-Dichlombenzidine	Z 00E+03	5 90E-02	7 505-06	3 10=+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	14E-01
95478 o-Xylene	3 63E+02	8 70F-02	1.005-05	3 - 1E+00	1 04 E-U/ 2 13 E-D4	4 00E-09	52	560 26	754 03	13,000	1 3H Q4	0 0E+00
95487 2-Methytphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	3 20E-03	6 K	454 10	630.30	6,661	0.05+00	7 00-400
95501 1,2-Dichlorobenzene	6 17E+02	6 905-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	52	453 57	705.00	9,00	005+00	2000
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9.572	84.00	1 8E-02
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	22	526 15	759 13	13,000	0 OE+00	3 5E-01
100414 Ethidhaman	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	52	483 95	719 00	10,566	0.0E+00	2 0E-03
100425 Styrene	3 63E+02	7 10E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20	8,501	0 0E+00	1 0E+00
105679 2,4-Dimethylphenol	2 09E+02	5.84F-02	8 69 F-06	3 10E+02	2 30E-05	2 / 65-03	S 5	41831	636 00	8,737	00=+00	1 0E +00
106423 p-Xylene	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	2 00E-08 7 66F-03	0 £	464 13	616 20	11,329	00+400	7 0E-02
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 435-03	32	447 21	684 75	9 271	005+00	8 OF 01
	6 51E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	52	503 65	754 00	11,689	00E+00	1 4E-02
10/062 1,2-Dichloroethane	174E+01	1 046-01	90E-06	8 52E+03	4 01E-02	9 78E-04	25	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Yulese	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 106-02	5 12E-04	52	345 65	519 13		0 0E+00	2 0E-01
10883 Toliene	4 07 5 4 02	7 UUE-02	7 80E-05	161E+02	3 01 5-01	7 34E-03	52	412 27	617 05		0 OE+00	7 0E+00
108907 Chlorobenzene	2 19F+02	7.30F-02	8 70E-06	3 Z0E+0Z	2 /2E-U1	6 63E-03	52 5	383 78	591 79	7,930	0 OE+00	4 0E-01
108952 Phenol	2 88E+01	8 205-02	9 10E-06	8 28F+04	1 635-05	3 0 10-03	9 19	404 87	632.40		0 0E+00	2 0E-02
111444 Bis(2-chloroethyl)ether	155E+01	6 92E-02	7 53E-06	1 72E +04	7 38E-04	1 80F-05	3 10	453 02	659 79		0.0E+00	2 15+00
	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	22	674 43	942.55	14 000	005-00	2 15-02
117817 Bls(2-ethythexyt)phthalate	1 51E+07	3 51E-02	3,66E-06	3 40E-01	4 18E-06	1 02E-07	52	657 15	806 00	15,999	4 0E-06	00+00
11/840 Di-n-octyl pythatate 118741 Mexachiparhogan	8 32E+07	1 51E-02	3 585-06	2 00E-02	2 74E-03	6 68E-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
120127 Anthracene	2 95E±04	3 24E-02	3,91E-05	6 205 +00	5 41E-02	1 32E-03	S !	582 55	825 00		4 6E-04	0 0E+00
	1 78E+03	3 00F-02	8 23 1 - 06	3 00F+02	2 6/E-U3 5 82E-02	6 51E-05	8 8	615 18 496 45	873 00		0 0E+00	1 1E+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30F-04	3 175-08	G K	466 13	75 00		00=+00	2 GE-01
	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	2 52	590.00	814.00	13.467	1 95.04	70-10-0
	6 31 E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04	52	416 14	678 20	8.000	2.4F-05	201400
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	52	394 40	620 20	8.288	5 BE 07	00+00
1290U Pyrene 188592 28-1 2 Darkboogh 4000	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 10E-05	52	667 95	936 00		0.0E+00	1.6.01
	3 35E+01	7.075-02	1135-05	3 50E+03	1 67E-01	4 07E-03	52	333 65	544 00		0 0E+00	3 5E-02
193395 Indeno(1.2.3-cd)ovrene	3 47E+06	1 90F-02	5.66F-06	2 205-03	5 56E-05	9 395-03	8 8	320 85	516 50		0.01	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1115.04	, K	715 90	10/8 24 960 27	000 4	2750	00+900
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1615-05	8 8	655 95	905 00		40-11-0 00-11-0 00-11-0	1 45.00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07	52	753 15	1019 70		2 1F-05	005+00
218019 Chrysene	3 98E+05	2 48E-02	6.21E-06	1 605-03	3 88E-03	9 46E-05		714 15	979 00	16,455	2 1E-06	0 OE+00
2100/2 Applies	2 45E+U6	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04		603 01	839 37	13,000	4 9E-03	00±±00
319857 beta-HCH (beta-BHC)	1 26F±03	1 425-02	7.34E-05	2 UUE+UU	4 35E-04	1 06E-05		596 55	839 36	13,000	1 8E-03	0 0E+00
542756 1,3-Dichloropropene	4 57E+01	6 26F-02	1 00 1 05	2 AOF+03	7 26E-01	4445-0/	9 8	596 55 384 4 F	839 36	13,000	5 3E-04	0 0E+00
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3.06F-05	7.455-07		501 13	387.38	DO, 5	37E-05	2 OE-02
621647 N-Ntrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06	3 23	509 60	746.87		1 9E-U4	00-+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9 51E-06		613.96	848 76		267-03	001100
	5 20E+01	3 07E-02		5 62E-02	4 67E-01	1 14E-02	52	629 88	1750 00		0.0E+00	3 OF 04
8001352 Toxaphene	2 5/E+05	1 16E-02		7 40E-01	2 46E-04	6 00E-06	52	657 15	873 31		3 2E-04	0 OE+00
11096825 Arodor 1260 (PCB-1260) 11097691 Arodor 1254 (PCB-1254)	2 90E+05 2 00E+05	1 38E-02 1 56E-02	4 32E-06 5 00E-08	8 00E-02	1 89E-01	4 60E-03	52	402 50	539 37		1 0E-04	0 0E+00
12674112 Arador 1016 (PCB-1016)	3 30F+04	2 22F-02	3 00E-06	5 70E-02	8 20E-02	2 00E-03	52	377 50	512 27	19,000		0 0E+00
53469219 Arador 1242 (PCB-1242)	3 30E+04	2 14E-02	5316-06	3.40E-01	7 13E-02	2 30E-04	5 K	340 50	475 22	18,000		0 OE+00
		! !		!	4^-^^ 1	17557	3	Ac of	482 20	18,000	1 0E-04	00=+00

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below) × K

			ENTER	User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm²)	
				<b>"</b> "	_
			ENTER Sod	stratum A SCS soil type (used to estimate soil vapor permeability)	S
			ENTER	SCS soil type directly above water table	s
			ENTER	Soil stratum directly above water table, (Enter A, B, or C)	89
		ne	ENTER Lwr (cell D28)	Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	0
	Chemical	Trichloroethylene	NTER ENTER ENTER Totals must add up to value of L <sub>wT</sub> (cell D28)	Thickness Thickness Thickness of soil of soil of soil stratum B, stratum C, stratum C, [Enter value or 0] (Enter value or 0)  (cm) (cm) (cm)	1280 16
_			ENTER Totats mu	Thickness of soil stratum A,	762
	_		ENTER	Depth below grade to water table, Lwr (cm)	2042 16
3	ENTER Inutal groundwater conc , C <sub>W</sub> (µg/L)	201 65	ENTER Depth	below grade to bottom of enclosed space floor, LF (cm)	15
	ENTER Chemical CAS No (numbers only,	79016	ENTER	Average soil/ groundwater temperature, T <sub>s</sub> (°C)	16

						_	,
ENTER	Stratum C	soil water-filled	porosity,	ບ <b>.</b> ອ້	(cm <sub>3</sub> /cm <sub>3</sub> )	03	
ENTER	Stratum C	soil total	porosity,	٥	(unitless)	0.43	
ENTER	Stratum C	soil dry	bulk density,	હ	(g/cm³)	1.7	ENTER
ENTER	Stratum B	soil water-filled	porosity,	8 *6	(cm³/cm³)	0.27	ENTER
ENTER	Stratum B	sor total	parosity,	<b>"</b> c	(nutless)	0 42	ENTER
ENTER	Stratum B	soil dry	bulk density,	ల్లి	(g/cm³)	1.7	ENTER
ENTER	Stratum A	soil water-filled	porosity,	<b>φ</b> ,	(cm³/cm³)	0.2	ENTER
ENTER	Stratum A	soil total	porosity,	٠.	(unitless)	0.43	ENTER
ENTER	Stratum A	soil dry	bulk density,	*ଟ	(g/cm³)	15	ENTER

17 042 027 17	ENTER ENTER ENTER ENTER Enter	space Enclosed Floor-wall Indoor	space seam crack	height, width,	3	(cm) (cm) (cm) (1/h)	961   488   01   045
0.2	ENTER Enclosed	space	floor	length,	<b>.</b>	(cm)	961
0.43	ENTER	Soil-bidg	pressure	differential,	ФΔ	(g/cm-s²)	40
15	ENTER Enclosed	space	floor	thickness,	Lond	(cm)	15

FAIRE	Target hazard quotient for		(unitless)	1	Jsed to calculate risk-based
ENTER	Target risk for	cardinogens	(nuttless)	1 0E-06	Used to ca
ENTER	Exposure	frequency.	(days/yr)	350	
ENTER	Exposure	duration, FD	(yrs)	30	
ENTER	Averaging time for	noncardinogens,	(yrs)	30	
ENTER	Averaging time for	carcinogens, AT <sub>c</sub>	(yrs)	70	

Reference conc , RfC (mg/m³)		0.05+00
Unit risk factor, URF (μg/m³)*1		1 /E-U6
Pure component water solubility, S (mg/L)	4.400.00	1.105+03
Organic carbon partition coefficient, K <sub>oc</sub> (cm <sup>3</sup> /g)	4 667 .00	1 000-07
Critical temperature, T <sub>C</sub>	244.20	3
Normal bosling point, T <sub>B</sub>	36036	2000
Enthalpy of vaporization at the normal bouling point, AH <sub>v,b</sub> (cal/mol)	7 505	2004
nenry s law constant reference temperature, T <sub>R</sub> (°C)	36	
law constant at reference temperature, H (atm-m³/mol)	1 03E-02	
Diffusivity in water, D., (cm²/s)	9 10E-06	
Diffusivity in air, D <sub>e</sub> (cm²/s)	7.90E-02	

Floor-wall seam perimeter, Xerect (cm)	3,844	Diffusion path length, L <sub>c</sub> (cm)
Water-filled porosity in capillary zone, $\theta_{w,cz}$ $(cm^3/cm^3)$	0.294	Total overall effective diffusion coefficient, Deff (cm²/s) 111E-03
Air-filled porosity in capillary zone, $\frac{\theta_{a,cz}}{(c\pi^3/cm^3)}$	0,126	Capillary Zone effective diffusion coefficient, D' cm²/\$) 4 52E-04
Total porosity in capillary zone, n <sub>ca</sub>	0 42	Stratum C C effective diffusion coefficient, D C (cm²/s)  0 00E+00  Reference conc., RfC
Thickness of capillary zone, L <sub>cz</sub> (cm)	17 05	Stratum B effective diffusion coefficient, D** (cm²/s) 8.11E-04 Unit nsk factor, URF (µg/m³)*1
Stratum A soil effective vapor permeability, k, (cm²)	6 98 <b>E</b> -10	Stratum A effective diffusion coefficient, Det (cm²/s) 320E-03 Infinite source bldg conc, Cotalding (µg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub> (cm²)	0 746	Vapor viscosity at ave soil temperature, Prs (9/cm-s) (177E-04 linfinite source indoor attenuation coefficient, a (unitiess)
Stratum A soll intrinsic permeability, k (cm²)	9.36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)  2,78E-01  Exponent of equivalent foundation Peciet number, exp(Pe') (unitless)
Stratum A effective total fluid saturation, S <sub>b</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0.419	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mo!) 6 60E-03  Area of crack, Area of crack, (cm²)
Stratum C soil all-filled porosity, e_c (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, AH, 15 (cal/mol)  8,483  Crack effective effective diffusion coefficient, Doack (cm²/s)
Stratum B soll air-filled porosity, $\theta_{\mathbf{a}}^{\mathbf{g}}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zerak (cm)  15  Average vapor flow rate into bldg. Qual (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, e <sub>k</sub> (cm³/cm³)	0 230	Crack- to-total area ratio,  T (unitiess)  Crack Grack Fradius, Frank (cm)
Source- building separation, L <sub>T</sub>	2027 16	Area of enclosed space below grade, A <sub>6</sub> (cm²) 924E+05 Source vapor conc, C <sub>source</sub> (μg/m³)
Exposure duration, t	9 46E+08	Bldg ventitation rate, Quadres (cm³/s) (5.63E+04   length length, Lp (cm)

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INCREMENTAL RISK CALCULATION	na duotent from vapor to intrusion to rr, indoor air, en noncarcinogen (unitless)	5
INCREMEN	Incremental risk from vapor infusion to indoor arr, carcinogen (untless)	5
ULATIONS	Final indoor exposure groundwater conc , (ug/L)	22.2.
ATION CALCI	Pure component water solubility, S S (Hg/L)	
ER CONCENTR	Risk-based indoor exposure groundwater conc, (µg/L)	
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	Indoor exposure groundwater conc , noncarcingen (µg/L)	
RISK-BASE	Indoor exposure groundwater conc , carcinogen (µg/L)	

Reference conc , RfC (mg/m²)

		ò	Coll December 1	Table		VLOOKUP TABLES	LES					
SCS Soil Type	K, (cm/h)	α (1/cm)	N (unitless)	M (unitless)	θ <sub>s</sub> (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)					
O	0 20	0 008	1 09	0 083	0 38	0 068	0 0092					
ರ	0.26	0 0 19	131	0 237	0 41	0 095	0 016					
	4	0 036	1 56	0 359	0 43	0 078	0 020					
S]	14 59	0 124	2 28	0 561	0 41	0 057	0 040					
n c	5 5	0 145	2.68	0 627	0.43	0 045	0 044					
JON OF	- <del>E</del>	0 0 0 59	4.	0 324	0.39	0 100	0.029					
S.	0.25	0 0 16	1 37	0.270	0.46	0 034	0 0046					
Sic	0 02	0 005	1 09	0 083	0.26	0 0 0 0	0 003					
SICL	0 0 2	0.010	1 23	0 187	0 43	0 089	0 0028					
75 SIL	0 45 4 42	0 020	141	0 291	045	0 065	0 011					
					Chemic	Chemical Properties Lookup Table	okun Tahla					
		Organic			Pure		Henry's	Henry's			Enthains of	
		carbon			component		law constant	law constant	Normal		vaporization at	ב ב
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	polling	Crtical	the normal	ЯŠГ
		coefficient,	ın aır,	in water,	solubility,	aw constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,
		χ. 13,2	ر آسر آسر	, (2) (1)	<b>ග</b> ්	Ì.	I	⊢ é	ۇ ھ	ا م	ΔH, <sub>b</sub>	JAN.
CAS NO CUBUICAL		(du /d)	(cm-7s)	(cm/s)	(mg/L)	(nulless)	(atm-m/mol)	()	2	(7K)	(cal/mol)	(µg/m²)
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10Ë-06	25	533 15	720 75	11.000	7 P
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	90-B00 6	1 62E-03	4 63E-05	1135-06	25	715.90	22 696	15 000	4
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0E+(
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-(
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349.90	556 80	7,127	1 5E-(
55553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34 E-06	25	708 15	1004 79	15,000	2 15-0
58899 oamma-HCH (Lindane)		1 07F+03	1 18E-02 1 42E-02	7.34F-06	5 60E-02	7 24E-03	4 65E-05 1 40E-05	25	624 24 506 55	885 73	13,000	3 7E-0
60571 Dieldrin		2 14F+04	1.25F-02	4 74F-06	1 95F-01	6 195-04	1 400,000	2, 2,	613 32	843 35 843 35	13,000	מינות לי
65850 Benzolc Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6.31E-05	154F-06	2, 2,	720.00	751.00	13,000	100
67641 Acetone		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88 E-05	52	329 20	508 10	6,955	0 0 0
67663 Chlaroform		3 98E+01	1.04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6,988	2 3E-(
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	52	458 00	695 00	9,510	4 0E-(
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 615-04	8 80 5-06	25	390 88	563 05	10,346	0 00
71556 1 1-Trichloroethans		3 88E+U1	8 80E-02	9 80 = 05	1 235+03	7.28E-01	5 56E-U3	52.53	353 24	562 16	7,342	8 3E-0
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3.08E-04	7.516-06	2, 22	718 15	986.20	12,000	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
72435 Methoxychlor		9.77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-(
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	55	636 44	860 38	13,000	975
75014 Vind chloode (chlorosthere)	(aua	1 885+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24 E-03	55 F	27671	467 00	5,714	0 0E+C
75092 Methylene chloride	6	1 17E+01	101F-01	1 175-05	1.30F+04	8 98F-02	2 195-03	3 5	313 00	510 00	5,230	0 4 0 4
75150 Carbon disuffide		4 57E+01	1 04E-01	1 00E-05	1 195+03	1 24E+00	3 02E-02	22 12	319 00	552 00	6.391	0 0 0 0
75252 Bromoform		8.71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	534E-04	25	422 35	00 969	9,479	175
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 8E-(
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5615-03	25	330 55	523 00	6,895	0 0 0
78448 Hentechlor		3 89E+U1	9 00E-02	1 04E-05	2,25E+03	1 07E+00	261E-02	9 8	304 75	576 05	6,247	5 OE-0
77474 Hexachlorocyclopentadiene	900	2 00F+05	1 12E-02 1 61E-02	2 09E-06	1 80E-01	111F+00	1 09E-03	25	512 15	846 31 746 00	13 000	- A
78591 Isophorone	2	4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	8 635-06	25.25	488.35	715 00	10.271	275-0
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7,590	000
79005 1,1,2-Trichforoethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8,322	1 6E-(
79016 Trichloroethylene		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	52	360 36	544 20	7,505	1,7E-(
79345 1,1,2,2-Tetrachloroethane	96	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41Ë-02	3 44E-04	25	419 60	661 15	966'8	5 BF
83329 Acenaphthene		7 08E+03	4.21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	380

7 0E-00 0 0E+00 0 0E+0

RARES Control Asia Land	i d				VLOOKUP TABLES							•
84742 Dischard philosopa	2 355+02	2 56E-02	6 35E-06	1 08E+03	1 855-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 BE+00
85687 ButM benzyl phihalate	5 755+04	1 74E-02	7 00E-00	2 505+01	3 5 7 7 9 6	9 395-10	8 8	613 15	798 67	14,751	0 0 0 0 0	3 55-01
86306 N-Nitrosodiohenylamine	1 29F+03	3 12E-02	4 05 E-06	3 515404	3051.04	1 205-06	9 8	00000	839.68	13,000	0 0E+00	7 0E-01
86737 Fluorene	1 38E+04	3 63E-02	7 88F-06	1986+00	2 615-03	3 VUE-06	9 %	632.26	830.45	000,51	1450	0.05+00
86748 Carbazole	3 39E+03	3 905-02	7 03E-06	7 48E+00		1 53F-08	3 %	627.87	800.00	12 077	00E+00	10-11-0
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	22	486 15	738 00	10,206	2 2E-05	0.01
87855 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	52	582 15	813 20	14,000	3 4E-05	0 0E+00
91203 Narbthatene	3 81E+02	3 18E-02	6 255-06	8 00E+02	3 19E-04	7 78E-06	25	519 15	749 03	12,000	3 15-06	0 0E+00
91941 3,3-Dichlorobenzidine	7 24E+02	1 94F-02	74F-06	3.116+00	1 985-02	4 835-04	52	491 14	748 40	10,373	0000	1 4E-01
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 135-01	5 20F-03	8 %	360 ZB	7.74 03 830 30	13,000	135-04	905+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	2 2	464 19	697 60	10.800	005+00	181.01
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	22	453 57	705 00	9,700	0 0E+00	2 0E-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	22	447 53	675 00	9,572	0.0E+00	1 85-02
99994 Z.4.5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	52	526 15	759 13	13,000	0 0E+00	3 5E-01
100414 Ethylbenzene	3 635+01	7 50E-02	8 60E-06	2 09E+03	9846-04	2 40E-05	32	483 95	719 00	10,566	0 0E+00	2 0E-03
	7 76E+02	7 10E-02	8 00E-06	3 10F+02	3 23E-01	7 88E-03	ខ្ល	409 34	617 20	8,501	00-100	100+08
105679 2,4-Dimethytphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2.00F-06	3 %	436 13	207 60	11 320	00+100	7 OE+00
	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	89	411 52	616 20	8.525	001100	7 OF +00
106467 1,4-Dichlorobenzene		6 90E-02	7 90E-06		9 96E-02	2 43E-03	52	447 21	684 75	9,271	0 0E+00	8 OE-01
106478 P-Chloroantine	6.61E+01	4 83E-02	1 01E-05			3 32E-07	22	503 65	754 00	11,689	0 0E+00	1 4E-02
107002 1,z-Dichichbernane 108054 Vind acetate	1 /4E+01	1045-01	9 90E-06	8 52E+03		9 78E-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xviene	4 07E+00	7 00E-02	3 205-06	2 00E+04	2 10E-02	5 12E-04	8	345 65	519 13		0.05+00	2 0E-01
	1 82E+02	8 70E-02	8 60F-06	5 26F+02	3 01E-01	7.34E-03	2 2	412.27	617 05		00=+00	7 0E+00
	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 715-03	2 %	303 / 0 404 87	531 79	7,930	004400	4 UF-01
108952 Phenol	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	22	455 02	694.20			2 15400
	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 385-04	1 80E-05	22	451 15	628 79		335.04	0.01
115297 Endosulfan	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	52	674 43	942 94	14,000	0 OE+00	2 1E-02
11/51/ bis(Z-etnyinexyl)phrhaiate	151E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	52	657 15	806 00	15,999	4 0E-06	0 0E+00
118741 Hexachlorobenzene	8 32E+0/	1515-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
120127 Anthracene	2 95E+04	3 24E-02	7 74F-06	4 34F-02	2.67E-02	1 32E-03	52	582 55	825 00	14,447	4 6E-04	0 OE +00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23 5-06	3 00E+02	5.826-02	1 425-03	5 K	515,18 496 45	873 00	13,121	0.00	1 1E+00
120832 2,4-Dichlorophenol	147E+02	3 46E-02	8 77E-06	4 50E+03	1 305-04	3 17 E-06	3 %	460 15	708 17	11,4/1	00+400	2000
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 805-06	9 27E-08	22	590 00	814 00		1 95-04	00400
	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 215-02	7 83E-04	52	416 14	678 20	8,000	2 4E-05	00+40
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	25	394 40	620 20	8,288	5 85-07	0 OE+00
1290U0 Pyrene 456502 me.1 2-Dichlomothydone	1 05E+05	2 72E-02	7 24E-08	135E-01	4 515-04	1 10E-05	52	667 95	936 00		0.0E+00	1 1E-01
	5.255+01	7 075-02	1 135-03	3 50E+03	16/E-01	4 07E-03	52	333 65	544 00		0 0E+00	3 SE-02
193395 Indeno(1,2,3-cd)pyrene	3 47 €+06	1 90E-02	5 66E-06	2 20F-05	5.561-05	3 39E-03	2 2	320.85	516 50		00=+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1116-04		715 90	10/ 0 24 969 27	000, 41	2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	001100
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 61 5-05	22	655 95	905 00		005+00	1 4E-01
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07		753 15	1019 70		2 1E-05	0.0F+00
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 605-03	3 88E-03	9 46E-05		714 15	979 00	16,455	2 1E-06	000+000
319846 alpha.HCH (alpha.BHC)	4 45E+Ub	1 325-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04		603 01	839 37	13,000	4 9E-03	00=+00
319857 beta-HCH (beta-BHC)	1.26F+03	1 42E-02	7 34E-00	2 40E+00	4 355-04	1 06E-05		596 55	839 36	13,000	1 8E-03	0 0E+00
542756 1,3-Dichloropropena	4 57E+01	6 26E-02	1 00F-05	2 ROF +03	7 26F-01	1 775 03	Q H	596 55 584 47	839 36	13,000	5 35 04	0 0E+00
606202 2,6-Dinitrotoluene	6 92€+01	3 27E-02	7 26E-06	1 82E+02	3.06F-05	7.46E.07		381 13	38/38	2,000	3 7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06		509 60	746.87	12,938	3 2 2	0.05+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9 51E-06		613.96	848 76	96	2 05 03	0000
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 305-06	5 62E-02	4 67E-01	1 14E-02		629 88	1750 00		0.05+00	305.04
8001352 Toxaphene	2 57E+05	1 165-02		7 40E-01	2 46E-04	6 00E-06	22	657 15	873 31		325-04	000+00
11096825 Arodor 1260 (PCB-1260)	2 905+05	1 38E-02		8 00E-02	1 89E-01	4 60E-03	52		539 37	19,000	100.00	0 OE+00
11097691 Arodor 1234 (PCB-1234) 12674112 Arodor 1016 (PCB-1016)	2 00E+05	1 56E-02	5 00E-06 5 42E-06	5 70E-02	8 20E-02	2 00E-03	52 :	377 50	512 27	19,000	1 0E-04	0 0E+00
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02	5.31E-06	3 40F-01	1 19E-02 2 13E-02	2 90E-04	52 2	340 50	475 22	18,000	1 OE-04	0 0E+00
	;	! !		,	20-76	*0-307 C	Q	345 5U	482 20	18,000	1 0E-04	0 0E+00

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

		ENTER	User-defined	stratum A	permeability,	ž	(cm²)											
		ENTER	stratum A	SCS and type	(used to estimate OR	soil vapor	permeability)	SI	ENTER	Stratum C	soil water-filled	porosity,	, , ,	(cm³/cm³)	0.3			
		ENTER		SCS	soil type	directly above	water table	S	ENTER	Stratum C	soil total	porosity,		(unitless)	0.43			
		ENTER	,	Soil	directly above	water table,	(Enter A, B, or C)	В	ENTER	Stratum C	soil dry	bulk density,	່ຜູ້	(g/cm³)	17	ENTER		Indoor
	hane	ENTER Lwr (cell D28)	Thickness	of soil stratum C.	(Enter value or 0)	ည်	(cm)	0	ENTER	Stratum B	soil water-filled	porosity,	в. В.	(cm³/cm³)	0.27	ENTER		Floor-wall
Сћетиса	1,1,2-Trichloroethane	NTER ENTER ENTER Totals must add up to value of L <sub>wT</sub> (cell D28)	Thickness	of soil stratum B.	(Enter value or 0)	<b>-</b>	(cm)	1280 16	ENTER	Stratum B	soil total	porosity,	<b>9</b> _	(unitless)	0.42	ENTER		Enclosed
		ENTER Totals mu	-	I hickness of soil	stratum A,	<u>Ę</u>	(cm)	762	ENTER	Stratum B	soil dry	bulk density,	<b>.</b> 6	(g/cm³)	17	ENTER	Enclosed	space
		ENTER	i	Depth below grade	to water table,	Lwt	(cm)	2042 16	ENTER	Stratum A	soil water-filled	porosity,	<b>ф</b>	(cm³/cm³)	0.2	ENTER	Enclosed	space
ENTER Inttal groundwater conc , Cw (µg/L)	2 685	ENTER Depth	below grade	of enclosed	space floor,	ٹ	(cm)	15	ENTER	Stratum A	soil total	porosity,	<b>←</b> _	(unitless)	0.43	ENTER		Soil-bldg
ENTER Chemical CAS No (numbers only, no dashes)	79005	ENTER	Average	son/ groundwater	temperature	_ლ .	(၃)	92	ENTER	Stratum A	soil dry	bulk density,	*ત	(a/cm³)	15	ENTER	Enclosed	space

		Used to catculate risk-based groundwater concentration	Used to calcu groundwater				
		1	1 0E-08	350	30	30	70
		(unitless)	(unitless)	(days/yr)	(yrs)	(yrs)	(yrs)
		Ħ Ø	ř	Щ		AT <sub>NC</sub>	ΑTc
		noncarcinogens,	carcinogens,	frequency,	duration,	noncarcinogens,	carcinogens,
		quotient for	risk for	Exposure	Exposine	ume tor	ume ror
		Target hazard	Target		1	Averaging	Averaging
		ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
<b>,</b>	0.45	0.1	488	961	961	40	15
_							
	(1/h)	(cm)	(cm)	(cm)	(cm)	(g/cm-s <sup>2</sup> )	(cm)
	딾	*	f	*	נ	δ	Loreck
	rate,	width,	height,	width,	length,	differential,	thickness,
	air exchange	seam crack	space	floor	floor	pressure	floor
	Indoor	Floor-wall	Enclosed	sbace	space	Soil-bldg	space
				Enclosed	Enclosed		Enclosed
	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
0 43	,	0.57	7 1		4	2	
•			7	_	70	2	,

#### 2 of 7

CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)
Unit risk factor, URF (μg/m³) <sup>-1</sup>
Pure component water solubility, S (mg/L)
Organic carbon partition coefficient, $K_{cc}$ $(cm^3/g)$
Critical temperature, T <sub>C</sub> ( <sup>A</sup> K)
Normal bouling point, T <sub>B</sub>
Enthalpy of vaportzation at the normal boiling point, ΔH <sub>v,p</sub> (cal/mol)
Henry's law constant reference temperature, Te
Henry's law constant at reference temperature, H
Diffusivity in water, D., (cm <sup>2</sup> /s)
Duffusivity in air, De (cm²/s)

soil soil effective alr-filled a fotal fluid protosity, saturation, protosity, saturation, protosity, porosity, saturation, protosity, saturation, protosity, saturation, protosity, saturation, cm³/cm³, (cm³/cm³) (cm³/cm³) (cm³/cm³) (cm³/cm²) (cm²/cm²) (cm²/cm²) (cm²/cm²) (cm²/cm²/cm²) (cm²/cm²/cm²/cm²/cm²/cm²/cm²/cm²/cm²/cm²/		soil soil soil soil seriative air effective vapor permeability, permeability, k <sub>v</sub> (cm²) (cm²)	_	Thickness of	porosity in	porosity in	Dorosity in	1
porosity, porosity, saturation, θ <sub>0</sub> <sup>g</sup> θ <sub>0</sub> <sup>c</sup> S <sub>a</sub> θ <sub>0</sub> <sup>g</sup> (cm³/cm³)     (cm³/cm³)       (cm³/cm³)     (cm²/cm³)       Crack Enthalpy of depth vaporization at constant at below ave groundwater ave. groundwater grade, temperature, temperature, temperature, cm)     Hrs       Z <sub>canek</sub> Ah <sub>V,TS</sub> H <sub>Y</sub> s     Ah <sub>V</sub> s       (cm)     (cal/mol)     (atm-m³/mol)       Average     Crack vapor     553E-04       flow rate     diffusion     Area of						capillary	capillary	wall Seam
θ <sub>a</sub> <sup>b</sup> θ <sub>a</sub> <sup>c</sup> S <sub>la</sub> (cm³/cm³)         (cm³/cm³)         (cm³/cm³)           0 150         0 130         0 419           Crack         Enthalpy of depth vaportzation at constant at below ave groundwater ave, groundwater grade, temperature, temperature, temperature, temperature, cm³         AH <sub>v</sub> τs         H <sub>s</sub> Z <sub>canek</sub> ΔH <sub>v</sub> τs         H <sub>s</sub> Cal/mol)         (atm-m³/mol)           (cm)         (cal/mol)         (atm-m³/mol)         5 53E-04           Average         Crack vapor         effective         Area of           flow rate         diffusion         Area of					2006,	zone,	Zone,	perimeter,
Crack Enthalpy of Henry's law depth vaporization at constant at below ave groundwater ave, groundwater grade, temperature, temperature, 2-creek AH <sub>v</sub> rs Hrs (cm) (cal/mol) (atm-m³/mol)  Average Crack vapor effective flow rate diffusion Area of				۲	5	Ф 23	9	×
Crack Enthalpy of Henry's law depth vaportzation at constant at below ave groundwater ave, groundwater grade, temperature, temperature, 2σπελ ΔΗν τs Ην Ην (cm) (cal/mol) (atm-m³/mol)  Average Crack vapor effective flow rate diffusion Area of			(cm²)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(E)
Crack Enthalpy of Henry's law depth vaporization at constant at below ave groundwater ave, groundwater grade, temperature, temperature, 2cms AH, 7s Hrs (cal/mol) (atm-m³/mol) (atm-m³/mol) (5.53E-04 low rate diffusion Area of		-	-	17.05	c c	000		
Crack Enthalpy of Henry's law depth vaporization at constant at below ave groundwater ave, groundwater grade, temperature, temperature, 2cms			1	CD: / I	0.42	0.126	0.294	3,844
Crack Enthalpy of Henry's law depth vaporization at constant at below ave groundwater ave groundwater grade, temperature, temperature, AH, TS Hrs (cm) (atm-m³/mol)  Average Crack vapor effective flow rate diffusion Area of								
Crack Enthalpy of Henry's law depth vaporization at constant at below ave groundwater ave, groundwater grade, temperature, temperature, AH <sub>v.15</sub> H <sub>vs</sub> (cm) (cal/mol) (atm-m³/mol)  Average Crack vapor effective flow rate diffusion Area of		Stra	Stratum	Stratum	Stratum	Capillary	Total	
depth vaporization at constant at below ave groundwater ave, groundwater grade, temperature, temperature, Z <sub>canex</sub> ΔH, τs H <sub>15</sub> (cm) (atm-m³/mol)  15 (29/mol) (5.53E-04  Average Crack vapor effective flow rate diffusion Area of					U	zone	overall	
below ave groundwater grade, temperature, temperature, 2 cms         ΔHν τs         Hτs           (cm)         (cal/mol)         (atm-m³/mol)           15         9,507         5,53E.04           Average Crack vapor effective flow rate diffusion         Area of		viscosity at effe			effective	effective	offective	Diffusion
grade,         temperature,         temperature,           Z <sub>cent</sub> ΔH <sub>ν</sub> τs         H <sub>τs</sub> (cm)         (cal/mol)         (atm-m³/mol)           15         9,507         5,53E-04           Average         Crack           vapor         effective           flow rate         diffusion         Area of					diffusion	diffusion	o constitution	tec the
Z <sub>crack</sub> ΔH <sub>ν</sub> rs         H <sub>τs</sub> (cm)         (cal/mol)         (atm-m³/mol)           15         9,507         5,53E-04           Average         Crack         cffective           flow rate         diffusion         Area of	_	ø	coefficient, cor	coefficient	conflicient	coefficient.	coefficient	- Proft
(cm)         (cal/mol)         (atm-m³/mol)           15         9,507         5,53E-04           Average         Crack vapor effective flow rate diffusion         Area of		HTS D			ا ال	D.,	ا وال	
15 9,507 5,53E-04  Average Crack vapor effective flow rate diffusion Area of	_	<b>~</b>	_	_	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	P (E
Average Crack sapor effective flow rate diffusion Area of								1001
Average Crack vapor effective flow rate diffusion Area of		177E-04 317	3 17E-03 8	8 25E-04	0.00E+00	4 79E-04	1 13E-03	2027 16
Average Crack vapor effective flow rate diffusion Area of		Infinite						
vapor effective flow rate diffusion Area of			ııte					
flow rate diffusion Area of			601	Chait				
					Reference			
		coefficient, cor		factor.	conc			
Q <sub>aod</sub> D <sup>oneck</sup> A <sub>coneck</sub>			Chaile Chaile	URF	S. S.			
	~	unitless) (mg/	_	ma/m³}¹	(ma/m <sub>3</sub> )			

#### RESULTS SHEET

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INCREMENTAL RISK CALCULATIONS

Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unifiess)	Ą
Incremental nsk from vapor intrusion to indoor air, carcinogen (untiless)	Ϋ́
Final indoor exposure groundwater conc., (µg/L)	1 27E+03
Pure component water solubility, S	4.42E+06
Risk-based indoor exposure groundwater conc,	1 27E+03
Indoor exposure groundwater conc , noncarcinogen (µg/L)	NA
Indoor exposure groundwater conc., carcinogen (µg/L)	1 27E+03

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

Reference conc , RfC (mg/m²)

			Soil Properties Lookup Table	ookup Table	1								
SCS Soil Type	K, (cm/h)	α (1/cm)	N (unitless)	M (unitless)	θ, (cm²/cm²)	8, (cm²/cm²)	Mean Grain Diameter (cm)						
<u></u>	0 50	0 008	109	0 083	0 38	0 068	0 0092						
ಕ .	0.26	0 019	134	0 237	0 41	0 095	0.016						
_ <u>-</u>	5 5	0.036	96.	625.0	0 43	0.078	0 020						
വ്ഗ	70.70	0 145	0 7 7	0.567	4 6	0.057	0.040						
ပ္သ	0 12	0 027	1 23	0 187	38	0 100	2000						
SCL	131	0 059	1 48	0 324	0 39	0 100	0 028						
ī5.	0 25	0 016	1 37	0.270	0 46	0 034	0 0046						
Sic	0 05	0 002	1 09	0 083	0.26	0 0 0 0 0	60000						
SICL	0 07	0.010	1 23	0 187	0 43	680 0	0 0026						
SL.	0 45 4 42	0 020	1 41 1 89	0 291	0.45	0 065	0 011						
					Chemic	Chemical Properties Lookin Table	skin Tabla						- 1
		Organic			Pure		Henry's	Henry's			Forthathy		
		carbon			component		law constant	law constant	Normal		vanorization at		
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	boiling	Critical	the normal		æ
	•	coefficient	in air,	in water,	solubility,	law constant	temperature,	temperature,		temperature,	bailing paint,	_	O
		Y (2)	υ <u>,</u>	D.,	ທີ່	î:	I 6	<del></del> €	<b>⊢</b> ° {	<u>ب</u> ج	ΔHν <sub>δ</sub>		
CAS No		(cm²/g)	(cm-/s)	(cm-/s)	(mg/L)	(unitless)	(atm-m²/mol)	(Ç)	( <del>X</del>	(K)	(cal/mol)	(mo/m³) 1	5
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05	
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 13E-06	25	715 90	969 27	15,000	2 1E-03	
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 06E-06	2 79	1 82E-05	4 44E-07	12	605 28	827 85	15,000	0 0E+00	
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03	
56235 Carbon tetrachlonde		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	1 5E-05	
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	334E-06	52	708 15	1004 79	15,000	2 15-04	
57.49 Chiordane		1 20E+05	1 18E-02	4 37E-06	5 50E-02	1 99E-03	4 85E-05	52	624 24	885 73	13,000	3 7E-04	
60571 Dieldrin		2 14 E+03	1 25E-02	7.34E-00	1 055.01	3 /4E-04	1 40E-05	525	596,55	83936	13,000	3.7E-04	
65850 Benzoic Acid		6 DOF-01	5.365-02	7 975-06	3 50 6+03	6 21E-05	1 84 8 0 0	52	20.007	751.00	13,000	4 th C	
67641 Acetone		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25	329.20	508 10	000,01 6,955	00+100	
67663 Chloroform		3.98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	55	334 32	536 40	6,988	2 3E-05	
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00	695 00	9,510	4 0E-06	
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3,61E-04	8 80E-06	25	390 88	563 05	10,346	0 0E+00	
71556 1 1 1-Trohloroethane		1 10H+01	7 80E-02	9 80E-06	1 /5E+03	2 28E-01	5 56E-03	128	353 24	562 16	7,342	8 3E-06	
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3.086-04	7.515-06	6 K	718 15	945 00 986 20	12,000	00+100	
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	52 52	651 02	848 49	14.000	00000	
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05	
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44	86038	13,000	9 7E-05	
75014 Visid ablactor	1	1 05E+01	7 28E-02	121E-05	1 52E+04	2 56E-01	6 24E-03	25	276 71	467 00	5,714	0 0E+00	
75092 Methyleniolog (chloroemens)	die)	1175+01	10000	1 235-05	2 / bE+03	1 11E+00	2 71E-02	522	259 25	432 00	5,250	8 4E-05	
75150 Carbon disuffice		4 57F+01	1048-01	1.005-05	1.195+03	0 90E-02	2 19E-03	Q #	313 00	00 016	6,706	4 /5-0/	
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	534E-04	25 25	422.35	937.00	9.479	115-06	
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	2,000	185-05	
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	25	330 55	523 00	6,895	0 0E+00	
75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61 6-02	25	304 75	576 05	6,247	5 0E-05	
76448 Heptachlor		141E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	84631	13,000	1 3E-03	
79501 isoshomes	919	2 00E+05	1 61E-02	7.21E-06	1 805 +00	1 11E+00	2 71E-02	25	512 15	746 00	10,931	0 0E+00	
78875 1 2-Dichlomorphane		4 375+01	7 825.03	0 705-00	2 00E+04	2 / ZE-04	5 53E-U6	6 6	5000	2000	10,2/1	275-07	
79005 1.1.2-Trichloroethane		5016401	7.805-02	8 805-06	4 42F±03	3 74E-02	2 00 00 00	<b>3</b> 4	388 32	972 00	0.090 1,090	4 8E-05	
79016 Trichforoethylene		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	3 12C-04 1 03E-02	35.0	360.36	544 20	7.505	1.0E-03	
79345 1,1,2,2-Tetrachloroethane	ē	9 33E+01	7 105-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	28	419 60	661 15	966'8	5 85-05	
83329 Acenaphthene		7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	<b>32</b>	550 54	803 15	12,155	0 0E+00	

7 0E-00 0 0E+00 0 0E+0

6 of 7

84562 Distantinates	200	C C			VLOOKUP TABLES	! ! !						-
84742 Di-n-butyl ohthalate	3.395+04		2 86E-06	1 125+03	3 850 00	4 51E-07	52 5	567 15	757 00	13,733	0 OE+00	2 8E+00
85687 Butvi benzvi phthalate	5 75F+04	1 74F-02	4 R3E-06	2 605+00	5 17E.06	9 39E-10	8 8	513 TS	/98 b/	14,751	0.05+00	3 55-01
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6 35E-06	3.51E+01	2.05F-04	5.005-06	6 %	633.28	929 00	3,000	00-100	, OE-01
86737 Fluorane	1 38E+04	3 63 5-02	7 88E-06	1 98E+00	2.61E-03	6 37F-05	3 %	570 44	870.00	12,000	00.00	0.06+00
	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	22	627 87	899.00	13 977	5 7F-06	0.05+0.0
87683 Hexachioro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0.000
97.005 Pentachiorophenol 88062-24 A Trichtomanasa	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	25	582 15	813 20	14,000	3.4E-05	0 0E+00
91203 Naphthalene	2 005+03	3.18E-02	0 20E-05 7 50E-08	8 UUE+UZ	3 19E-04	7 78E-06	52	519 15	749 03	12,000	3 15-06	0 00+00
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 115+00	1 84E-07	4 83E-04	£ 52	491 14 560 26	748 40	10,373	0 0 0 0 0	146-01
95476 o-Xylane	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	3 52	417.60	630.30	2,000	901100	7 05+00
95487 2-Methylphenol (o-cresol)	9 12E+01		8 30E-06	2 60E+04	4 92E-05	1 20E-06	2 2	464 19	697 60	10,800	00+100	1 8F-01
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06		7 79E-02	1 90E-03	52	453 57	705 00	9,700	00+400	2 0E-01
955/8 Z-Chlorophenol	3 88E+02	501E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	22	447 53	675 00	9,572	0 0E+00	1 8E-02
98953 Aitmberrane	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	25	526 15	759 13	13,000	0 0E+00	3 5E-01
100414 Ethylpenzene	3 636+02	7.505-02	2 80E-06	2 09E+03	9 845-04	2 40E-05	25	483 95	719 00	10,566	0 0E+00	2 0E-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	7 88E-03	6 K	409.34	617.20	8,501	00+400	1 0E+00
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	3 2	484 13	707 60	11 329	00+100	2 OF-00
	3 89E+02	7 695-02	8 44E-06	1 85E+02	3 146-01	7 66E-03	56	411 52	616 20	8,525	0 OE+00	7 OE+00
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	25	447 21	684 75	9,271	0 OE+00	8 OE-01
107062 1 2 Duchlomothers	6 61 6 + 01	4 83E-02	1016-05		1 36E-05	3 325-07	52	503 65	754 00	11,689	0 0E+00	1 4E-02
	1 /4E+01	1045-01	905-06	8 52E+03		9 78E-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xvlene	4 075+02	2 DOE-02	3 20E-08	2 00E+04	2 10E-02	5 12E-04	52	345 65	519 13	7,800	0 0E+00	2 0E-01
108883 Toluene	1 82E+02	8 70E-02	8 60 F-06	5.26F±02	2 72E-01	/ 34E-U3	8 8	412.27	617.05	8,523	0 0E+00	7 0E+00
108907 Chlarobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52F-01	3 715-03		363 /8	591 /9	7,930	0.000	4 0E-01
	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07		455.02	694 20	0,4,0		2 UE-02
	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	52	451 15	629 79	0006	3.35-04	00F±00
11529/ Endosulfan 117917 Bis/2 Afhidhamd)ahshalais	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	52	674 43	942 94	14,000	0 0E+00	2 1E-02
117840 Di-n-octyl ohthalate	1 51E+0/ 8 32E+07	351E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	52	657 15	806.00	15,999	4 0E-06	0 0E+00
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5 91E-06	5 20E+00	5.41E-03	1 225.03	9 5	704 09	862 22	15,000	0 OE+00	7 0E-02
120127 Anthracene	2 95E+04	3 24E-02	7.74E-06	4 34E-02	2 47E-02	1 32E-U3 6 51E-U5	8 %	582 55 615 18	825 00	14,447	4 65-04	0 0E+00
	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03	2 5	486 15	725.00	10,471	00000	1 15+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06		482 15	708 17	11,000	0.05+00	1 1F-02
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08		290 00	814 00	13,467	1 9E-04	0 0 0 0
127484 Tetrachloroethylene	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04		416 14	678 20	8,000	2 4E-05	0 0E+00
129000 Pyrene	1 05E+05	2 72F-02	7 24F-06	2 00E+02	7.54E-01	1 84E-02	22	394 40	620 20	8,288	5 8E-07	0.05+00
156592 cis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 136-05	3 50E+03	1 67E-01	4 07F-03	8 %	337 65	936 00	14 370	0 0E+00	1 1E-01
156605 trans-1,2-Dichtoroethylene	5,25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516.50	6 717	00+100	3 3E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 665-06	2 20E-05	6 56E-05	1 60E-06		809 15	1078 24	17,000	2,1E-04	0 OE+00
205332 Bellzo(D):idoraniisine 206440 Flioranthene	1.035+06	2 20E-02	5 56E-06	1 50E-03	4 55E-03	1 11E-04		715 90	969 27	15,000	2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2.265-02	5.565-06	2 00E-01	3 405-04	161E-05	52 2	655 95	905 00	13,815	0 0E+00	14E-01
218019 Chrysene	3 98E+05	2 48E-02		1 60E-03	3 88E-03	9 46E-05		714 15	07 8701	000,91	2 1E-05	0 OE+00
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	22	603 01	839 37	13,000	4 9F-03	00000
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		596 55	839 36	13,000	1 85-03	00100
542756 1.3-Dichlomomone	1 20E+U3	1 42E-02	7.345-06	2 40E-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5 3E-04	0 0E+00
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3.065-05	1 //E-02 7 46E-07	8 %	381 15	587.38	7,000	3 7E-05	2 0E-02
621647 N-Nitrosodl-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06		00 acc	746.87	11,000	200	00=+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9 51E-06		613 96	848 76	13 000	2 6F-03	001100
7439976 Mercury (elemental)	5 20E+01	3 07E-02		5 62E-02	4 67E-01	1 14E-02		629 88	1750 00	14.127	00=+00	3 OF-04
8001352 Toxaphene 44005925 Amelic 4350 (500)	2 57E+05	1 16E-02		7 40E-01	2 46E-04	6 00E-06		657 15	873 31	14,000	3 2E-04	0 0E+00
11090623 Atticate (200 (PCS-1200) 11097691 Arador 1254 (PCS-1254)	2 90E+05	1 385-02	4 32E-06 5 00E-06	8 00E-02	1 89E-01	4 60E-03		402 50	539 37	19,000	1 0E-04	0 0E+00
12674112 Aroctor 1016 (PCB-1016)		2 22E-02	5 42 E-06	3 / UE-UZ 4 20E-01	8 ZUE-UZ 1 19E-02	2 005-03		377 50	512 27	19,000	1 0E-04	0 0E+00
53469219 Aroctor 1242 (PCB-1242)	3 30E+04	2 14E-02	5315-06	3 40E-01	2 13E-02	2 90E-04 5 20E-04	8 8	340 50 345 50	475 22 482 20	18,000 18,000	1 OE-04	0 0 100
									1	,	,	- - - -

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1 2 September, 1998

R YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

YES

ER ENTER ENTER Soll User-defined SCS stratum A SCS stratum A Soll type soll vapor rpe (used to estimate OR permeability, above soll vapor k, lable permeability) (cm²)	
ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	
ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	
ER S S above	S
ENTER SCS soll type directly above	s
ENTER Soll stratum drectly above water table, (Enter A, B, or C)	60
ENTER ENTER L <sub>vyr</sub> (cell D28) Thrkness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	0
Chemical  Tetrachloroethylene  NTER ENTER ENTER  Totals must add up to value of Lwr (cell D28)  Thickness Thickness Thickness of soil of soil of soil of stratum C, atum A, (Enter value or 0) (Enter value or 0)  h <sub>A</sub> h <sub>B</sub> h <sub>C</sub> (cm)	1280 16
ENTER Totals mu Thickness of soil stratum A, h <sub>A</sub>	762
ENTER Depth below grade to water table, Lwr (cm)	2042 16
ENTER initial groundwater conc , Cw (ug/L)  ENTER Depth Delow grade to bottom of enclosed space floor, Lr (cm)	15
Chemical CAS No (humbers only, no dashes) 127184 ENTER Average soil/ groundwater temperature, T <sub>S</sub> (°C)	16

	Г	]							
	0.3								
	0 43								
	1.7		ENTER		Indoor	air exchange	rate,	쫎	(4/1)
	0.27		ENTER		Floor-wall	Seam crack	width,	*	(uLV)
	0 42	1 1 1	EN THE		Enclosed	space	height,	r.	(m2)
	1.7		1 Z	Enclosed	space	floor	width,	₩	(m2)
	0.2	1	T L	Enclosed	space	floor	length,	LB	(E)
	0.43	į	7 1 1		Soil-bidg	pressure	differential,	٩V	(a/cm-s <sup>2</sup> )
	15	1	Y	Enclosed	space	floor	thickness,	Loreck	(cm)
•	_								

ENTER
Stratum C
soil water-filled
porosity,  $\theta_{\rm w}^{\rm c}$ 

ENTER Stratum C soil total porosity,

ENTER Stratum C soil dry bulk density, Pac (g/cm³)

ENTER Stratum B soil water-filled porosity,  $\theta_w^B$ 

ENTER Stratum B soil total porosity,

ENTER Stratum B soil dry bulk density, p<sub>b</sub> (g/cm³)

ENTER
Stratum A
soli water-filled s
porosity, bulk
en

ENTER Stratum A soil total porosity,

ENTER Stratum A soil dry bulk density, p<sub>b</sub><sup>A</sup> (g/cm³)

	1	1 0E-06	350	30	30	
	(unitless)	(unitless)	(days/yr)	(yrs)	(yrs)	ı
	뒫	፳	ш	입	AT <sub>NC</sub>	
	noncardnogens,	carcinogens,	frequency,	duration,	noncarcinogens,	-
	quotient for	risk for	Exposure	Exposure	time for	
	Target hazard	Target			Averaging	
	ENTER	ENTER	ENTER	ENTER	ENTER	
0 45	01	488	961	961	40	
						ł
(1/h)	(cm)	(cm)	(cm)	(cm)	(g/cm-s²)	
쯦	*	ľ	*	L	Δ	
rate,	width,	height,	width,	length,	drfferenbal,	
air excha	seam crack	space	floor	floor	pressure	

Used to calculate risk-based

## CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)
Unit nsk factor, URF (µg/m³) 1
Pure component water solubility, S S (mg/L)
Organic carbon partition coefficient, K <sub>xc</sub> (cm <sup>3</sup> /g)
Critical temperature, T <sub>c</sub>
Normal bothing point, T <sub>B</sub>
Enthalpy of vaponzation at the normal boting point, AH, b (cal/mol)
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H
Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)
Diffusivity in atr, D. (cm²/s)

Floor- wall seam perimeter, Xonex	3,844	Diffusion path length,	2027 16	
Water-filled porosity in capillary zone, $\theta_{w,cz}$	0 294	Total overall effective diffusion coefficient, $D^{off}$ $(cm^2/s)$	1 01E-03	
Air-filled porosity in capillary zone, $\theta_{\bullet,\alpha}$	0 126	Capillary zone effective diffusion coefficient, D <sup>eff</sup> cm <sup>2</sup> /s)	4 11E-04	
Total porosity in capillary zone, n <sub>ca</sub>	0.42	Stratum C effective diffusion coefficient, D"c (cm²/s)	0 00 = +00	Reference conc, RfC (mg/m³)
Thickness of capillary zone, La	17 05	Stratum B B effective diffusion coefficient, Doff (cm²/s)	7 38E-04	Unit risk factor, URF (µg/m³) <sup>-1</sup>
Stratum A soll effective vapor permeability, k	6 98E-10	Stratum A A effective diffusion coefficient, Doff (cm²/s)	2 92E-03	thfinite source bidg conc, Chadeng (µg/m³)
Stratum A soul relative air permeability, k <sub>ta</sub> (cm²)	0.746	Vapor viscosity at ave soit temperature, µrs (g/cm-s)	1 77E-04	Infinite source source indoor attenuation coefficient,    (untiless)
Stratum A soil intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)	4 71E-01	Exponent of equivalent foundation Peciat number, exp(Pe <sup>f</sup> ) (unitiess)
Stratum A effective total fluid saturation, S <sub>le</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0 419	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol)	1 12E-02	Area of crack, Avasce (cm²)
Stratum C soli air-filled porosity, $\theta_a^c$ $\langle cm^3/cm^3 \rangle$	0 130	Enthalpy of vaporization at ave groundwater temperature, $\Delta H_{\nu, TS}$ (cal/mol)	9,492	Crack effective diffusion coefficient, Dorack (cm²/s)
Stratum B soll air-filled porosity, $\theta_{\mathbf{a}}^{\mathbf{B}}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zomek (cm)	15	Average vapor flow rate into bldg , Qual (cm <sup>3</sup> /s)
Stratum A soll soll alr-filled porosity, $\theta_{\bullet}^{A}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, η (unitiess)	4 16E-04	Crack radius, radius, (cm)
Source- building separation, L <sub>T</sub>	2027 16	Area of enclosed space below grade, A <sub>B</sub>	9 24E+05	Source vapor conc, C <sub>nource</sub> (µg/m³)
Exposure duration, t	9,46E+08	Bidg ventilation rate, Qesidno (cm.³/s)	5 63E+04	Convection path length, Le (cm)

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ROUNDWATER CONCENTRATION
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INCREMENTAL RISK CALCULATIONS

			_	1	
Hazard	from vapor	indoor air,	noncarcinogen	(unitiess)	ĄZ
Incremental nsk from	vapor intrusion to	indoor air,	carcinogen	(unidess)	ΑN
Final	indoor	groundwater	conc,	(7/6d)	1 84E+03
Pure	component water	so'ubility,	S (500)	(µ8/r)	2 00E+05
Risk-based	indpor exposure	groundwater	conc.,	(HQ/L)	1 84E+03
Indoor	exposure groundwater	conc,	noncarcinogen	(1947)	NA
Indoor	exposure groundwater	conc.	carcinogen	/ (Sw.)	1 84E+03

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

0 0092 0 016 0 020 0 044 0 025 0 029 0 0039 0 0036 0 0030

0 068
0 095
0 095
0 095
0 095
0 095
0 100
0 100
0 100
0 005
0 005
0 0065

0 38 0 41 0 43 0 43 0 38 0 26 0 26 0 45

M (unitiass)
0033
0033
0037
0 359
0 561
0 627
0 187
0 224
0 220
0 083
0 187
0 291

109 131 156 228 228 228 123 123 123 123 123 141 189

0 008 0 019 0 036 0 124 0 027 0 016 0 010 0 020

0 20 1 0 26 1 0 26 1 0 25 0 0 25 0 0 25 0 0 25 0 0 25 0 0 25

Mean Grain Diameter (cm)

θ, (cm³/cm³)

θ, (cm³/cm³)

Soil Properties Lookup Table

N (unitless)

K, (cm/h)

SCS Soil Type

VLOOKUP TABLES

				Chemic	Chemical Properties Lookup Table	Table		İ				
	Organic			Pure		Heary's	Henry's			A contract of		
	carbon			component		law constant	law constant	Normal		chinalpy or	-	
	partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	poiling	Critical	the normal	<u> </u>	Doforonoo
	coefficient,	in air,	ın water,	solubility,	law constant	temperature,	temperature,	point	temperature.	poline point	factor	ימימו
	χ,	o <b>"</b> '	മ് '	Ø	'n	æ	ř	ڇر	L S	ΔH,	URF	
CAS No Chemical	(cm <sub>3</sub> /g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m³/mol)	(్రి	(%)	(%)	(cat/mol)	(µg/m³)	(mg/m³)
50293 DDT	2 63E+06	137E-02	4 95E-06	2.50E-02	3 32E-04	0 101 0	č	4,000		:		
50328 Benzo(a)pyrene	1 02E+06	4 30F-02	9 00E-06	1 62E-03	5,52E-04	6 10E-06	8 8	533 15	720 75	11,000	9 7E-05	0 0E+00
51285 2,4-Dinitrophenol	1 00E-02	2 73E-02	9 15 10 6	2 79E+03	1 825.05	97-451	8 8	06.60	969 27	15,000	2 1E-03	0 0E+00
53703 Dibenz(a.h)anthracene	3 80E+06	2012	5 18E-06	2 405 02	50-120 a	4 440-07 10 11: 4	<b>8</b> 1	605.28	827 85	15,000	0.010	7 0E-03
56235 Carbon tetrachloride	1 74E+02	7 80E-02	8 80F-06	7 935+02	1 255+00	14/E-08	52.	743 24	990 41	16,000	2 1E-03	0 0E+00
56553 Benz(a)anthracene	3 98E+05	5 10E-02	90-300 6	9 40F-03	1 37F-04	3 345 06	67	00.00	09 966	7,127	155-05	0 0 0 0
57749 Chlordane	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 995-03	4 85E-04	G H	50404	1004 /9	15,000	2 1E-04	0000
58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	C. R. C.	506 5F	5000	13,000	3 /h-04	0 0E+00
60571 Dieldrin	2 14E+04	1 25E-02	4 74E-06	195E-01	6 19E-04	1.515-05	3 2	613 23	000000	13,000	40-11-04	0.05+00
65850 Benzoic Acid	6 00E-01	5 36E-02	7 97E-06	3 50E+03	631E-05	1.54F-06	25	72007	751.00	2,000	100 to 00	00+400
67641 Acetone	5 75E-01	124E-01	1 14E-05	1 00E+06	1 59E-03	3.88E-05	25.	329 20	508.40	900'01	20+110	14E+01
67663 Chloroform	3 98E+01	1 04后-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	32 52	334.32	536.40	CC8,0	3 20 08	1 OFF
67721 Hexachloroethane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00	695.00	0,300	2000	004
71363 Butanol	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	52	390 88	563.05	10.346	0.00+00	201400
71432 Benzene	5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	52	353 24	562 16	7.342	20 TE 8	001100
71556 1,1,1-Trichloroethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	52	347 24	545 00	7 136	0.00	00+100
72208 Endrin	1.23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	52	718 15	986 20	12.000	001100	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
72435 Methoxychlor	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	22	651 02	848 49	14,000	00+00	1 8E-02
72548 DDD	1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	22	639 90	863 77	14,000	6 95-05	0 0E+00
72559 UDE	4 47E+08	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44	860 38	13,000	9 7E-05	0 0E+00
74639 Metnyl promide	1 05E+01	7 28E-02	121E-05	1 52E+04	2 56E-01	6 24E-03	25	276 71	467 00	5,714	0 0E+00	5 0E-03
75002 Mathidae (chloroethene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1,11E+00	2 71E-02	25	259 25	432 00	5,250	8 4E-05	0 0E+00
75150 Cathon duritan	174401	101E-01	1175-05	1 30E+04	8.98E-02	2 19E-03	22	313 00	510 00	6,706	4 7E-07	3 0E+00
75259 Bromoform	9,710,0	104 P	1 000	1 19E+03	1 24E+00	3 02E-02	25	319 00	552 00	6,391	0.05+00	7 0E-01
75274 Bromodichloromethane	201101	20-26-02	1 05 05	3 105+03	Z 19E-0Z	5.34E-04	52	422 35	696 00	9,479	1 15-06	0 0E+00
75343 1.1-Dichlomethane	3 16 16 101	7 425-02	1 055 05	504550	0 205-02	1 605-03	52	363 15	585 85	7,000	1 8E-05	0 0E+00
75354 1 1-Dichlomethylane	5 R0E±01	0000	200-1	20-11-1	10-306.7	5 61E-U3	<b>C7</b>	330 22	523 00	6,895	0 0E+00	5 0E-01
76448 Hentachio	1 415405	9,00E-02	00 m	2.25=+03	1 0/E+00	2 61E-02	25	304 75	576 05	6,247	5 0E-05	0 0E+00
77474 Heverthoromolopentadore	2005-06	70-37-		1 80E-U1	4 4 / E-02	1 09E-03	25	603 69	84631	13,000	1 3E-03	0 0E+00
78501 teacharana	2 00E+05	1.616-02	7.21E-06	1 801 +00	1 11E+00	2 715-02	25	512 15	746 00	10,931	0000	7 0E-05
7007 7 2 Diethermannen	4 08E+C1	50-35-05 3 551 55	6 765-06	1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10,271	2 7E-07	0 0E+00
Busdondorounders, 1 C took	4 3/E+01	/ 82E-UZ	8 /3E-06	2 80E+03	115E-01	2 80E-03	22	369 52	572 00	7,590	0 0E+00	4 0E-03
70046 Tackland the	5 01E+01	7 80E-02	8 80E-06	4 42E+03	3.74E-02	9 12E-04	52	386 15	602 00	8,322	1 6E-05	0 0E+00
70016 THE HOLD WASHINGTON	1 66 E + 02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25	360 36	544 20	7,505	17E-06	0 0E+00
	9 33E+01	7 10E-02	7 90E-06	2 97E+03	141E-02	3 445-04	25	41960	661 15	966'8	5 8E-05	0 0E+00
63329 Acenaphinene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0 0E+00	2 15-01
					:							•

84662 Districtshitslets	001	0000	90 1340 9		VLOOKUP TABLES	, ,			Ş	5	i c	20,10
84742 Overlyiphininging	2000102	70-305-7	0 20 100	1 000 +03	1 85E-U5	4 510 4/		50.00	19,00	13,733	0.05-00	2 8E+00
85687 Reput heavy antibates	2 2301104	1 745 02	4 625 06	1 125+01	3 65 5 7 5	9.39E-10		613.15	79867	14,751	0.05.00	3 25 63
86306 Navitosodinhandamina	4 201103	3 125 02	4 82 10 00	2 646+00	20-07-0	90-367		00000	973.00	200	00=+00	1000
86737 Fluorene	1 38E+04	3 635-02	7 886-06	1 98F+00	2 61F-03	3 VOE-06	6 K	570 44	870.00	13,000	00-40	1 45.01
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08		627.87	00 668	13.977	5 7E-06	0.000
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03		486 15	738 00	10,206	2 2E-05	0 0E+00
87365 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 005-06	2 44E-08		582 15	813 20	14,000	3.4E-05	0 0E+00
88062 2,4,6-Trichlorophenol		3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06		519 15	749 03	12,000	3 1E-06	0 0E+00
91203 Naphthalene 91041 3 3 Orchiombersides	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	1 4E-01
91941 3.3-Okt norobenzume 95476 p. Videne	3 635402	24E-02	0 /4E-05	3 11 E+00	1645-07	4 00E-09		560 26	754 03	13,000	1 35 0	0.00-00
95487 2-Methylphenol (o-mesol)	3 035+02 9 12F+01	5 / UE-02 7 40E-03	1 00E-03	1 /8E+02	2 13E-01 4 02E-05	5 ZUE-U3	9 4	41/60	63030	199'8	001100	7 01+00
	6 17F+02	6 90F-02	7 905-06	1 56F±02		1 205-08		404 19 453 57	997 50	0000	000	2 6 6
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 605-02	3.90 F-04		435 37	675.00	9,76	00+00	4 UE-01
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	178E-04	4 34E-06		526 15	759 13	13,000	00+100	3.5F-01
	6 46E+01	7 60E-02	8 605-06	2 09E+03	9 84E-04	2 40E-05	52	483 95	719 00	10,566	0 OE+00	2 0E-03
	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	25	409 34	617.20	8,501	0 0E+00	1 0E+00
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03	52	418 31	636 00	8,737	0 0E+00	1 OE+00
	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	22	484 13	707 60	11,329	0 0E+00	7 0E-02
106423 p-Xylene	3 89E+02	7 695-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	56	411 52	616 20	8,525	0 OE+00	7 0E+00
106478 p-Chlomanijaa	8 84E401	0 90E-02	7 90E-00	7 38E+U1	4 35C DE	2 435-03	2	447.21	584 /5		0.0E+00	ж С С С С
	1 74E+01	1045-01	9 905-06	8 52E+03	4 01E-02	9 78F-04	9 %	356 65	734 00 561 00		2 6F-05	0 0F+00
	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	22	345.65	519 13	2 800	005+00	2 OF 50
	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01 6-01	7 34E-03	52	412 27	617 05	8,523	80	7 OE+00
	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03	25	383 78	591 79		0 0E+00	4 0E-01
	2 19E+02	7 30E-02	8 70E-06	4 72E+02	152E-01	3 71E-03	25	404 87	632 40	8,410	0 0E+00	2 0E-02
	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	25 4	455 02	694 20	10,920	0 OE+00	2 1E+00
111444 Bis(2-chloroethyd)ether	1 55E+01	6 92E-02	7 535-06	1 72E+04	7 38E-04	1 80E-05	22	451 15	659 79	000'6	3 3E-04	0 0E+00
117817 Bis(2-ethylhexyl)nhthalate	1.515+07	1 13E-02	4 55E-06	3 405-01	4 395-04	1 12E-05	9 19	6/443	942.94	14,000	00E+00	2 1E-02
	8 32E+07	1516-02	3 585-06	2 00F-02	2 74E-03	6 68F-05		537 13	808 00 862 22	15,000	005-00	7 05-02
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03		582 55	825 00	14.447	4 6E-04	0 0E+00
120127 Anthracene	2 95E+04	3 24E-02	7.74E-06	4 34E-02	2 67E-03	6 51E-05	25 6	615 18	873.00	13,121	0 OE+00	1 1E+00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 235-06	3 00E+02	5 82E-02	1 42E-03		486 15	725 00		0 0E+00	2.05-01
120832 2,4-Dichlorophenol	1475+02	3 46E-02	8 77E-06	4 50E+03	130E-04	3 17E-06	22	482 15	708 17		0 0E+00	15-02
12   142 z,4-Dinacionamene 124481 Chlomothomomethere	9 33E+01	1 085-01	1 055-05	2 /UE+02	3 80E-06	9 27E-08		590 00	814 00	13,467	1984 498	0 0E+00
127184 Tetrachloroethylene	1 55E+02	7 205-02	8 205-05	2 00E+03	7.54F-01	7 03E-04	0 12	394.40	676.20	000, a	2 4E-03	00+100
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	1 35E-01	4 51E-04	1 10E-05		667 95	936 00	14.370	0 0E+00	115-01
156592 cis-1,2-Dichloroethytene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00		0 0E+00	3 5E-02
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03			516 50		0 0E+00	7 0E-02
193395 Indeno(1,2,3-cd)pyrene	3.4/E+06	1 90E-02	5 56E-06	2 20E-05	6 56E-05	1 605-06		•	1078 24	17 000	2 1E-04	0 OE+00
205932 Berzelojnorantiene 206440 Fluoranthene	1 07E+05	3.025-02	5.355-06	1 50E-03	4 55E-03 6 60E-04	1 115-04	5 K	715.90	969 27	15,000	2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 OOE-04	3 40E-05	8 29E-07		•	903.00	16,013	2 15-05	00400
218019 Chrysene	3 98E+05	2 48E-02	6.21E-06	1 60E-03	3 88E-03	9 46E-05	•		979 00	16,455	2 15-96	001100
309002 Aldnn	2 45E+06	1 32E-02	4 86E-06		6 97 E-03	1 70E-04		603 01	839 37	13,000	4 9E-03	0 OE+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 346-06	2 00E+00	4 35E-04	1 06E-05		596 55	839 36	13,000	1 8E-03	0 0E+00
31985/ beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	22	596 55	839 36	13,000	5 3E-04	0 OE+00
542/56 1,3-Dightoropena	4 5/E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	587 38	2,000	3 7E-05	2 0E-02
621547 N-Nitrosodi-n-propydamine	2 40F+01	5.45F-02	8 17E-06	1 62E+02 9 89E+03	3 USE-U3 9 23E-05	7 25E-07		558 00	770 00	12,938	196.04	00+100
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06		3 905-04	9.51F-06		613 96	84876	2 5	2 65-03	00+20
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01		22	•	750 00		005+00	3.05-04
8001352 Toxaphene	2 57E+05	1 16E-02	4 34€-06	7 40E-01	2 46E-04	6 00E-06			87331		325	0 0E+00
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	•	402 50	539 37	19,000	1 OE-04	0 OE+00
11097691 Arador 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03		377 50	512 27	19,000		0 0E+00
126/4112 Arador 1016 (PCB-1016) 63/60219 Arador 1242 (PCB-1242)	3 30E+04	2 22E-02 2 14E-02	5 42E-06	4 Z0E-01	1 19E-02 2 13E-02	2 90E-04	25	340 50	475 22	18,000		0 OE +00
23403218 AUGUST 1244 (FOUTSTAL)	5 SUETUR	70-24-1	02-11-50	3 4VE-V1	7 135-02	#G-107 c		55 5U	482 20	18,000	1 0E-04	0 0E+00



CALCULATÉ RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

8

YES

VERSION 1 2 September, 1998

User-defined stratum A soil vapor permeability, (cm<sup>2</sup>) soil type (used to estimate OR stratum A SCS permeability) soil vapor CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and mittal groundwater conc below) SCS soil type directly above water table ENTER Soil stratum directly above (Enter A, B, or C) water table, ENTER stratum B, stratum C, (Enter value or 0) INTER ENTER ENTER
Totals must add up to value of L<sub>WT</sub> (cell D28)
Thickness Thickness of soil (E) 1,1,2,2-Tetrachloroethane Chemical of soil 1280 16 (FJ) Thickness of soil stratum A, ENTER ځ Ê 762 ENTER
Stratum A
soil water-filled
porosity,  $\theta_w^A$ Depth below grade to water table, ENTER 2042 16 Lwt (cm) below grade to bottom of enclosed space floor, groundwater conc, 138 175 ENTER Initial ENTER C, (µ9/L) Depth YES (E) ٿ groundwater temperature, (numbers only, Average soll/ Chemical CAS No 79345 ENTER

ENTER Stratum C soil water-filled porosity, $\theta_w^c$ (cm³/cm³)	03	
ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)	0 43	
ENTER Stratum C soil dry bulk density, p <sub>b</sub> <sup>c</sup> (g/cm³)	1.7	ENTER Indoor aur exchange rate, ER
ENTER Stratum B soil water-filled porosity, $\theta_n^k$ ( $cm^3$ /( $cm^3$ )	0.27	ENTER Floor-wall Seam crack width, w (cm)
ENTER Stratum B soil fotal porosity, n <sup>8</sup> (unifless)	0.42	ENTER Enclosed space height, H <sub>6</sub>
ENTER Stratum B soil dry bulk density, p <sub>b</sub> (g/cm³)	17	ENTER Enclosed space floor width, We
ENTER Stratum A soil water-filled porosity, $\theta_w^A$ (cm³/cm³)	0.2	ENTER Enclosed space floor length, Le
ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	0 43	ENTER Soil-bidg. pressure differential, $\Delta P$ (g/cm-s²).
ENTER Stratum A soil dry bulk density, pa (g/cm³)	15	ENTER Enclosed space floor thickness, Lead (cm)

0.45		
0.1	ENTER Target hazard quotent for noncardinogens THQ (untiless)	1
488	ENTER Target nsk for carchogens, TR (unitless)	1 0E-06
961	ENTER Exposure frequency, EF (days/yr)	350
961	ENTER Exposure duration, ED (yrs)	30
40	ENTER Averaging time for noncarcinogens, ATivc (yrs)	30
15	ENTER Averaging time for carcinogens, ATc (yrs)	70

Used to calculate risk-based groundwater concentration

## CHEMICAL PROPERTIES SHEET

Reference	conc.	RfC	(mg/m³)
U isk	factor,	J.R.	(µg/m³) 1
Pure component water	solubility,	Ø	(mg/L)
Organic carbon partition	coefficient,	જૂ	(cm <sub>3</sub> /g)
Critical	temperature,	Ť,	( <del>,</del> K)
Normal boiling	point,	۳	ફુ ફ
Enthalpy of vaponzation at the normal	boding point,	۵Η,ν	(cal/mol)
Henry's law constant reference	temperature,	ř.	(్థి
Henry's law constant at reference	temperature,	I	(atm-m³/mol)
Diffusivity	ın water,	<u>a</u> *	(cm <sub>2</sub> /s)
Diffusivity	ın aır,	o" '	(cm <sup>2</sup> /s)

Floor- wail seam perimeter, Xoack	3,844	Diffusion path length, La (cm)
Water-filled porosity in capillary zone, $\theta_{w,cz}$	0 294	Total overall effective diffusion coefficient, Doff (cm²/s)
Aur-filled porosity in capillary zone, $\theta_{\mathbf{a},\alpha}$	0 126	Capillary Zone Sone diffusion coefficient, Def a (cm²/s)
Total porosity in capitlary zone, $\Gamma_{cz}$	0 42	Stratum C effective diffusion, Deffice (cm²/s) Reference conc. RfC (mg/m³)
Thickness of capillary zone, La (cm)	17 05	Stratum B effective diffusion coefficient, Doff s (cm²/s) 7 95E-04 7 95E-04 7 95E-04 7 95E-04 7 95E-04
Stratum A soil effective vapor permeability, k, (cm²)	6,98E-10	Stratum A effective diffusion coefficient, Deff (cm²/s) 2 90E-03 2 90E-03   Infinite source bldg conc. Causeng (ug/m³)
Stratum A soil relative air permeability, kn	0 746	Vapor viscosity at ave. soil temperature, µts (g/cm-s) (g/cm-s) (177E-04 Infinite source indoor attenuation coefficient, α (unitless) 5.02E-06
Stratum A soil intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)  8 36E-03  Exponent of equivalent foundation Peciet number, exp(Pe¹)  Vunitless) 7 88E+03
Stratum A effective total fluid saturation, S <sub>a</sub>	0 419	Henry's law constant at ave groundwater temperature,  H <sub>15</sub> (atm-m³/mol)  1 98E-04  Area of crack,  Area (cm²)  3 84E+02
Stratum C soil au-filled porosity, $\theta_a^c$ $(cm^3/cm^3)$	0 130	Enthalpy of vaporization at ave groundwater temperature, AH <sub>4</sub> ,rs (cal/mol) 10,480 Crack effective diffusion coefficient, Dozack (cm <sup>2</sup> /s) 2,90E-03
Stratum B soil air-filled porosity, $\theta_{\bf k}^{\ B}$ $({\rm cm}^3/{\rm cm}^3)$	0 150	Crack depth below grade, Zonet (cm)  Average vapor flow rate into bldg., Qual (cm³/s)
Stratum A soil air-filled porosity, $\theta_{\bullet}^{\bullet}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio,  1 (uniffess) 4 16E.04 Crack radius, fant (cm)
Source- building separation, L <sub>T</sub>	2027 16	Area of enclosed space below grade, A <sub>B</sub> (cm²) (cm²) Source vapor conc. C <sub>secret</sub> (µg/m³)
Exposure duration, t	9 46E+08	Bldg. rate, Charana (cm³/s)  Convection path length, Lp (cm)

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a copul				Incremental	Hazard
3	Risk-based	Pure	Final	nsk from	quotient
exposure	ndoor	component	Indoor	vapor	from vapor
groundwater	exposnre		exposure	intrusion to	intrusion to
	groundwater		groundwater	indoor air,	indoor air.
noncarcinogen	conc.		couc,	carcinogen	noncarcinoden
(µg/L)	(µg/L)	(µg/L)	(hg/L)	(untless)	(unitless)
ΑN	1 00E+03	1 00E+03 2 97E+06	1 OOF +03	ΦN	VV

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

1, 12, 12, 12, 12, 12, 12, 12, 12, 12,			-				VLOUNUP IABLES	ES						
2.0   CORP   1.0   CORP   CO	SCS Soil Type K, (c			serties Look (less) M			A. (cm³/cm³)	Moon Grain Dismotor (cm)						
19   10   10   10   10   10   10   10		1	٩	La	6000	I,	טיי (בוווי זימוו /	wear Grant Diarrietar (CIII)						
14   10   10   10   10   10   10   10			900	3 5	0.083	95 6	890 0	0 0092						
14   15   15   15   15   15   15   15			900	- 4	0 250	- 4 6	CEO 0	0.016						
1	•-		124	2 6	0.561	2 5	0,070	0.00						
101 0 007 1 1 0 007 1 1 0 007 0 000 0 000 0 000 0 000 0 0 0	• •		145	88	0.627	770	000	0,040						
13   0.056   1.94   0.072   0.010   0.000			027	1 23	0 187	980	0 00	4400						
0.02 0.000 109 109 0.000			029	1 48	0 324	0.39	0100	0200						
Orange   Company   Compa			016	1 37	0 270	0 46	0 034	0.0046						
Orange   Company   Compa			900	1 09	0 083	0.26	0.070	60000						
Companie   Companie			010	123	0.187	0 43	0 089	9500 0						
Chancie   Chancie   Continue			020	141	0 291	0 45	290 0	0011						
Committee   Comm			075	1 89	0 471	0 41	0 065	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
Chamical Copyrise														
Companies   Comp						Chomody	Department	Line Total						
Chamical   Configure   Confi		Organ	<u>.c</u>			Chemica	# Properies Loo	Kup Lable	-			,		
Chanical C		9	2 6		•	D .		SAUGE	Henry's			Enthalpy of		_
Chamical Charitical Confidence   Confidenc						oring or ment		law constant	taw constant	Normai		vaporization at	Chit	
Chamical (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup> )   (cm <sup>2</sup>		onuned •				water	Henry's	at reference	reference	boiling	Critical	the normal	risk	Reference
Chemical   Chemical		coefficie					aw constant	temperature,	temperature,		emperature,	boiling point.	factor	
Chamical (cin <sup>2</sup> ) y   Cin <sup>2</sup> (s)   Cin <sup>2</sup>		γ			₫	S	Ì	I	Ľ.		٠ ٢	AH.	URF.	
DDT         SEGE-06         17F-02         4 88F-06         2 60F-03         3 32E-04         1 10F-06         25 831 15         7 727 75         1 1000         9 7F-05           Denetic/preve         1 00F-02         2 9 0FE-06         4 30FE-03         2 60FE-03         4 40FE-03         2 60FE-03         1 1000         9 7F-05           Denetic/physical control branch of the control branch of th		δ <sub>/ς</sub> ш၁)	ı	١	cm²/s)	(mg/L)	(nuitless)	(atm-m³/mot)	(၁)	(°K)	, <del>S</del>		(hg/m³) 1	(mg/m³)
Acceptance   Control   C	50293 DDT	0000	•	50	i de			!						,
A. Chiletipolimania         1.00E-00         2.74-EAN Libritophrania         1.13E-06         2.65-10 tile         2.6	50328 Benzo(a)ovrena	2 0 2		20.00	4 95E-06	2 50E-02	3 32E-04	8 10E-06	52	533 15	720 75	11,000	9 7E-05	0 0E+00
Section   Sect	51285 2.4-Dinitrophenol	100			900000	1 025-03	4 63E-U5	1,135-06	55	715 90	969 27	15,000	2 1E-03	0 0E+00
Control   Cont	53703 Dibenzía hlanthracena	A P.			00 H	20120	0.0200	4 446-0	52	605 28	827 85	15,000	0 OE+00	7 0E-03
Special special	56235 Carbon tetrachlonde	200	<b>,</b> ,		00-100-0	2 49E-03	6 03E-07	1 475-08	25	743 24	990 41	16,000	2 1E-03	0 0E+00
1000-001   10000-001   10000-001   10000-001   1000-001   1000-001   1000-001   1000-001   1000-001   1000-0	56553 Benz(a)anthracene	200	- u		90000	/ 93E+UZ	1 25E+00	3 05E-02	52	349 90	556 60	7,127	1 5E-05	0 0E+00
gamma-HCH (Lurdane)         1765-03         176-04	57749 Chlordana	100.			3 00 00 00	9 40E-03	13/6-04	3 34E-06	52	708 15	1004 79	15,000	2 1E-04	00=+00
Participation   Participatio	58899 camma-HCH (Lindana)	1070	- •	70-00	4 3/E-06	3 50E-UZ	1 995-03	4 85E-05	25	624 24	885 73	13,000	3.7E-04	000+00
Second Second	60571 Dialdrin	0.75	- •	70-17	7.54E-00	6 80E+00	5 74E-04	1 40E-05	52	596 55	839 36	13,000	3.7E-04	0 0E+00
Acetan         57E-01         12E-01         12E-01         13E-02         13E-03         13E-03<	65850 Benzoic Acid	100.4	~ u	מים מי	4 /4E-05	1935-01	6 19E-04	1516-05	52	613 32	842 25	13,000	4 6E-03	0.000
Section   Sect	67641 Acetone	900	0 4	70.00	/ 9/E-06	3 50E+03	6 31E-05	1.54E-06	25	720 00	751 00	10,000	0 0E+00	1,4E+01
Particular continue	67663 Chlomform	1000	- •	٠ ١ ١	1 14E-U5	1 00E+06	1 59E-03	3 88E-05	52	329 20	508 10	6,955	0 0E+00	3.5E-01
State	67721 Hexachloroethane	100.		- 8 - 2 - 4 - 4	5 à	7 92E+03	1 50 1 -0.1	3 66E-03	52	334 32	536 40	6,988	2 3E-05	0 0E+00
Bearges         59E-101         COCCA         3 DE-201         7 DE-202         3 DE-204         7 SE 309         55 30 SE         10 346         10 SE 50	71363 Butanol	100.0		3 4	00	9 00E+0.1	1 086-01	3 88E-03	52	458.00	695 00	9,510	4 0E-06	00=+00
1.1.1-Trichlorocethane         10E-02         90E-03         1.26E-04         1.20E-04         1.20E-04 <td>71432 Benzene</td> <td>2 32. 3 89. 7</td> <td></td> <td>20-20</td> <td>7 9</td> <td>40E+04</td> <td>3 61E-04</td> <td>8 80E-06</td> <td>52</td> <td>390 88</td> <td>563 05</td> <td>10,346</td> <td>0 OE+00</td> <td>3 5E-01</td>	71432 Benzene	2 32. 3 89. 7		20-20	7 9	40E+04	3 61E-04	8 80E-06	52	390 88	563 05	10,346	0 OE+00	3 5E-01
Endfin         125E-04         126E-04         126E-04 <th< td=""><td>71556 1.1.1-Trichloroethane</td><td>100</td><td></td><td>1000</td><td>90000</td><td>1 325,03</td><td>70-202-01</td><td>ED-196 C</td><td>52</td><td>353 24</td><td>562 16</td><td>7,342</td><td>8 3E-06</td><td>0 0E+00</td></th<>	71556 1.1.1-Trichloroethane	100		1000	90000	1 325,03	70-202-01	ED-196 C	52	353 24	562 16	7,342	8 3E-06	0 0E+00
The first contract	72208 Endrin	123.1		3E-02	0 00E-00	2505.03	10-H00 v	1 /25-02	52	347 24	545 00	7,136	00+300	1 0E+00
100E+06   16E-02   16E-04   16E-04   16E-04   16E-04   16E-05   16E-04   16E-05   16E-04   16E-05   16E-04   16E-04   16E-05   16E-04	72435 Methoxychlor	9776	_	8 LO 2	4.45 E-06	4 50 5 0 5	3 000 F	7 515-06	52	718 15	986 20	12,000	0 OE+00	1 1E-03
4/TE-06         105-01         205-02         105-02         105-02         105-03	72548 DDD	100		95.02	4 765-06	9 005-02	1 640	1 58 1 55	52	651 02	848 49	14,000	0 0E+00	1 8E-02
105E+01   728E-02   728E-03   728E	72559 DDE	4 47F	•	45.02	5 875-06	1 205-02	1.040-04	4 OUE-06	52	639 90	863 77	14,000	6 9E-05	0 0E+00
ithene) 186E-01 10E-02 121E-03 128E-04 10E-05 121E-03 121E-04 11E-05 121E-04 11E-05 121E-04 11E-05 121E-04 11E-05 121E-04 11E-05 121E-04 11E-05 121E-04 11E-05 121E-04 11E-05 121E-04 121E-04 121E-05 121E-04	74839 Methyl bromide	1050		RE-03		1 525.04	+0-11-0-0	2 10E-05	S 1	636 44	86038	13,000	9 7€-05	0 0 0 0 0
177E+01   107E+01   177E+02   177E+02   177E+02   177E+03   177E+04   107E+04   177E+04   107E+05   170E+04   177E+05   170E+05   170E+04   177E+06   177E+07   177E	75014 Vinyl chlonde (chloroethene)			10.19	1 235-06	765+03	1 115400	6 24E-03	25	276 71	467 00	5,714	0 0E+00	5 0E-03
4 57E+01         1 00E-05	75092 Methylene chlonde		_	1 <u>1</u> <u>1</u> <u>1</u> <u>1</u> <u>1</u> <u>1</u> <u>1</u> <u>1</u> <u>1</u> <u>1</u>	1 17E-05	1 205 +03	00-10-0	2 / 15-02	8 8	52,657	432 00	5,250	8 4E-05	00+1100
## 50E+01 198E+02 103E+05 10E+03 219E+03 2 30E+04 25 319 00 552 00 6,391 00E+00 6,392 00E+00 6,391 00E+00 6,3	75150 Carbon disulfide	4 57 6		4 H 5	100 E-05	101101	1 245+00	2 195-03	62.5	313.00	510.00	6,706	4 7E-07	3 0 = +00
see 50E-01         3 Fee 20         10E-02         3 Fee 20         10E-03         2 Fee 20         10E-03         10E-04         10E-03         10E-04         10E-05         <	75252 Bromaform	8 715	-	50.19	1031103	3 10 110	2 105 02	3 025-02	52	319 00	552 00	6,391	0 0 = +00	7 0E-01
16E-01 7.000 18E-05	75274 Bromodichloromethane	5.50 R	۰ ،	1 2	10611-05	6 74E+03	20-191-02	3.34E-04	52	422 35	00 969	9,479	1 15-06	0 0 0 0
Signerial (12E-02 103E-02) (103E-02 107E-02 107E-02 107E-02 105E-03 107E-03 10	75343 1.1-Dichloroethane	, c		היקי	1 055 05	20+1140	0 305-02	1 601-43	52	363 15	585 85	2,000	185-05	0 0E+00
10   10   10   10   10   10   10   10	75354 1 1-Dichloroethylene	nog v		200	1 046 06	5011000	2 30E-01	5 61 5-03	52	330 22	523 00	6,895	0.0E+00	5 0E-01
Indicate         200E-05         1 0 0 E-03         1 0 0 E-03         25 603 69         846 31         13,000         13E-03           Indicate         200E-05         1 6 E-06         1 0 E-04         2 7 E-02         2 5 512 15         746 00         10,271         2 F-07           4 37E-01         6 23E-02         6 76E-06         1 20E-04         2 7 E-04         2 80E-05         2 5 80E-03         1 5 E-07         0 0 E-07           5 01E-01         7 80E-02         8 80E-06         4 4 2 E-03         3 7 4 E-04         2 80E-04         2 5 80E-03         3 60 52         6 7 20         7 5 50         0 0 E-07           5 01E-01         7 80E-02         9 10E-06         1 0 E-04         2 2 E-01         1 0 E-04         2 80E-05         1 0 E-05         1	76448 Heptachlor	7141			5 60E-06	1 805.01	1 0/E+00	2 615-02	25	304 75	576 05	6,247	5 OE-05	00=+00
4 68E-01 6 22E-02 6 76E-06 1 20E-04 2 72E-04 6 63E-06 25 512 15 746 00 10,931 0 0 E+00 1 4 7 E+01 7 82E-02 8 73E-06 2 80E-03 1 15E-01 2 80E-03 2 512 5 72 00 10,27 2 7 E-07 1 50E-02 8 80E-06 4 4 2 E+03 3 7 4 E-02 1 6 E-05 1 6 E-0	77474 Hexachlorocyclopentadiene	2005			7 215.08	1 000-01	44/6-02	1 09E-03	529	603 69	846 31	13,000	1 35-03	0 0E+00
4 37E-01 22E-02 87E-02 10.271 2 7E-07 2 80E-03 2 5 869 52 672 00 10,271 2 7E-07 2 80E-03 8 7E-07 2 80E-03 2 5 869 52 672 00 7,590 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	78591 Isophorone	4 69F	- 60		6 76 5-06	1 205+00	2 725 04	2 / 16-02	52	512 15	746 00	10,931	0 0E+00	7 0E-05
501E-01 70E-02 570E-03 7.050 0 0E+00 2.5 369.52 572.00 7.590 0 0E+00 7.50E-02 8.02 1 0E-05 (1.50E+02 7.50E-03 1.0E+03 4.2E-01 7.0E-02 7.50E-03 1.4E-03 7.50E-03 7	78875 1.2-Dichtoropropane	4 37F	^ 0		8 73E-06	2 805.403	1 155 04	6 63E-UE	52	488 35	715 00	10,271	2 7E-07	0 0E+00
166E+02 790E-02 90E-06 110E+03 422E-01 912E-04 25 360 15 602 00 8,322 16E-05 16	79005 1,1,2-Trichloroethane	501E			8 80E-06	4 42E+03	3 745-01	2 805-03	9 5	369.25	9/2 00	7,590	00=300	4 0E-03
lloroethane 9 33E+01 7 10E-02 7,90E-06 2 97E+03 141E-02 34E-04 25 419 60 66115 8,90E-05 7 0 E-06 7 0 E	79016 Trichlaroethylene	1 66		)E-02	9 10E-06	1 10F+03	4.22F-01	9 (25-04	9 8	2002	902.00	8,322	1 6E-05	0.000
7 08E+03 4 21E-02 7 69E-06 4 24E+00 6 36E-03 1 55E-04 25 5 5 E-05 7 69E-06 6 36E-03 6 36E-03 7 5 5 5 6 6 7 6 7 6 7 6 7 6 7 6 7 6 7 6	19345 1,1,2,2-Tetrachloroethane	9 33		DE-02	7.90E-06	2 97E+03	1.415.02	3.445.04	0 2	2000	02.440	906'/	ر ا ا ا	004400
	33329 Acenaphthene	7 08E	. 4	16-02	7.69E-06	4 24F+00	6 36F-03	3 44 2-04	9 8	419 50	661 15 661 15	966'8	5 8E-05	0 0E+00

A GRAND CARREST			1		VLOOKUP TABLES							•
84742 Or o but a state less	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	£	567.15	757 00	13,733	0 0E+00	2 8E+00
85687 Butte beauty attributes	3 39E+04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10	32	613 15	798 67	14,751	0 00+00	3 55-01
	1 201104	1,45-02	4 63E-06	2 695+00	5 17 E-05	1 26E-06	52	990 90	839 68	13,000	0 0E+00	7 06-01
86737 Finorene	1 295 104	3 125-02	5 35E-05	3.575+01	2 055-04	5 00E-06	52	632 28	890 45	13,000	1 4E-06	0 0E+00
86748 Carbazole	3 396+03	3 40E-02	7 035-05	7 485+00	2 51E-03	63/E-05	8 8	570 44	870 00	12,666	001100	1 4E-01
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3.34F-01	8 15E-08	6 %	627 67 486 16	238 00	13,977	ט יון ר ס יון ר	001100
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06		22	582 15	813 20	14 000	3 45-05	00+100
88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	52	519 15	749 03	12,000	3 15-06	0 0E+00
91403 Naphthalene 91941 3 3-Dichlemboording	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	1 4E-01
95476 o.Xviene	3 635+02	945-02	5 /4E-U5	311100	1 64E-07	4 00E-09	52	560 26	754 03	13,000	1 3E-04	0 00+00
95487 2-Methytohenol (o-cresol)	9 12F+01	7.405-02	8 30E-06	2 60E+04	4 92E-01	5 ZUE-03	8 8	417 60	630 30	8,561	004400	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02		1.568+02	7 795-03	1 205-06	0 K	464 19	99/69	10,800	000	185-01
95578 2-Chlorophenol	3 88E+02	5016-02	9 46E-06	2 20E+04	1 60E-02	3 905-04		455.57	675 00	9,700	00+400	1 85.03
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02		1 20E+03	1 785-04	4 34E-06		526 15	759 13	13,000	0.05+00	3 55.01
98953 Nitrobenzene	6 46E+01	7 605-02	8 605-06	2 09E+03	9 84E-04	2 40E-05		483 95	719 00	10.566	00+00	2 0E-03
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03		409 34	617 20	8,501	0 0E+00	1.0E+00
100425 Styrene	7 76E+02	7 10E-02		3 10E+02	1 13E-01	2 76E-03		41831	636 00	8,737	0 0E+00	1 0E+00
1050/3 Z,4-Uimemyipnenoi 106423 p. Xydene	2 09E+02	5 84E-02		7 87E+03	8 20E-05	2 00E-06		484 13	707 60	11,329	0 0E+00	7 0E-02
106467 1 4-Dichlombenzene	5 035 + 02	7 09E-02	3 44E-05	1 85E+02	3.14E-01	7 66E-03		411 52	616 20	8,525	0 OE+00	7 0E+00
106478 p-Chloroanitine	6 61E+01	4 83E-02		5.30E+03	38E-05	2 22E-03	S H	44 / 21 503 66	684 75	9,271	00100	8 0E-01
107062 1,2-Dichloroethane	1 74E+01	1 04E-01	9 90E-06	8 52E+03	4 01E-02	9 78E-04		356 65	561.00	7,643	0 UE+00	7 45-02
108054 Vinyl acetate	5 25E+00	8 50E-02		2 00E+04	2 10E-02	5 12E-04	8	345 65	519 13	7,800	00=+00	2 0E-01
108383 m-Xylene	4 07E+02	7 00E-02		161E+02	3 01E-01	7 34E-03		412 27	617 05	8,523	0 OE+00	7 0E+00
108883   Oluene	1.82E+02	8 70E-02		5 26E+02	2 72E-01	6 63E-03		383 78	591 79	7,930	0 0E+00	4 0E-01
10557 Chioropenzene	2 195+02	7 305-02		4 72E+02	1 52E-01	3 71E-03		404 87	632 40	8,410	0 0E+00	2 0E-02
111444 Bis/2-chlomoths@after	2 88E+01	8 20E-02	9 105-06	8 28E+04	1 635-05	3 98E-07	52	455 02	694 20	10,920	0 0E+00	2 1E+00
115297 Endosulfan	2 14E+03	6 92E-02 1 15E-02	/ 53E-06	1 72E+04	7 38E-04	1 80E-05	52 5	451 15	659,79	000'6	3 3E-04	0 0E+00
	1 51E+07	3 51 5-02		3 40 5-01	4 185-04	1 125-03	2 %	6/443	942.94	14,000	0 0E+00	2 1E-02
117840 Di-n-octyl phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05		704 09	862 22	15,999	4 UT-US	0 UE+000
	5 50E+04	5 42E-02		6 20E+00	5 416-02	1 32E-03		582.55	825 00	14,447	4 6E-04	0 OE+00
	2 95E+04	3 24E-02		4 34E-02	2 67E-03	6 51E-05	52	615 18	873 00	13,121	0 0E+00	1 1E+00
120821 1,2,4-1 nchioropenzene	1 78E+03	3 00E-02		3 00E+02	5 82E-02	1 42E-03		486 15	725 00	10,471	0 0E+00	2 0E-01
121142 2 4-Diditatelians	14/2+02	3 465-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06	22	482 15	708 17	11,000	0 0E+00	1 1E-02
124481 Chlorodiscomomethane		1 96F-02	7 UGE-06	2 /UE+02	3 805-06	9 27E-08	12	290 00	814 00	13,467	1 9E-04	0 0E+00
	1 55E+02	7 20E-02	8 20E-06	2 00E+02	3 2 1E-02 7 54F-01	1845-04	8 %	416 14	6/8 20 620 30	8,000	2 46-05	00+00
129000 Pyrene	1 05E+05	2 72E-02		135E-01	4 51E-04	1 10E-05	3 2	557 45	936.00	0,200	3 35-07	000+000
156592 cis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03	52	333 65	544 00	7.192	0 0E+00	3.5E-02
155605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516 50	6,717	0 0E+00	7 0E-02
205000 Beazo(h)ft.orgathese	3.47E+U6	1 905-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06		809 15	1078 24	17,000	2 1E-04	0.000
	1 07E+05	3 025-02	9 36E-06	1 50E-03	4 55E-03	1116-04		715 90	969 27	15,000	2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56 F-06	8 00F-04	3.405-05	8 2015-03		555 g5	905.00	13,815	00100	-1 4E-01
	3 98E+05	2 48E-02	6 21E-06	1 605-03	3 88E-03	9 46E-05	2 2	734 15	979.00	16,000	2 1F-05	00+400
309002 Aldnn	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04		603 01	839.37	13,000	4 95-03	00+100
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		596 55	839.36	13,000	1 8E-03	0.00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5 3E-04	0 OE+00
542/35 1,3-Dichloropropens	4 5/E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	587 38	7,000	3 7E-05	2 0E-02
RO1647 N-Nitrosodin-propodampe	2 405+01	5 450 02	7 20E-06	1 8ZE+0Z	3 OSE-OS	7 46E-07	32	558 00	770.00	12,938	1 9E-04	0 0E+00
1024573 Heptachlor epoxide	8 32E+04	1 325-02	4 23F-06	2 00E-01	3 005-03	2.255-406	8 8	509 60	746 87	11,000	2 0E-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 14 17-02	9 %	613.90 620.88	4750 00	13,000	2 6E-03	0.05+00
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	25.	657 15	873.31	14.00	3.25.00	, OC 104
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	25.		539.37	19,000	1010	005+00
11097691 Aroclor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	22	377 50	512 27	19,000	1000	_
12674112 Aroctor 1016 (PCB-1016)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	32	340 50	475 22	18,000	1 OE-04	
53469219 Arodor 1242 (PUB-1242)	3 30E+04	Z 14E-02	531E-06	3 40E-01	2 13E-02	5 20E-04	25	45 50	482 20	18,000	1 0E-04	0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and Initial groundwater conc below)

			ENTER	User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm²)	
				~ ~ <b> </b>	Ч
			ENTER Soil	A lumate or lity)	SI
			ENTER	SCS soil type directly above water table	S
			ENTER	Soil stratum directly above water table, (Enter A, B, or C)	8
		hylene	ENTER f Lwt (cell D28)	Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	0
	Chemical	cis-1,2-Dichloroethylene	INTER ENTER ENTER ENTER Totals must add up to value of LwT (cell D28)	Thickness Thickness Thickness of soil of soil of soil of soil stratum C, stratum A, (Enter value or 0) (Enter value or 0)  th he he hc (cm) (cm) (cm)	1280 16
		O	ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub>	762
		_	ENTER	Depth below grade to water table, Lwr (cm)	2042 16
YES	ENTER Initial groundwater conc. Cw (ug/L)	9 2 2 7 5	ENTER Depth	below grade to bottom of enclosed space floor, Lr (cm)	15
	ENTER Chemical CAS No (numbers only, no dashes)	156592	ENTER	Average soil/ groundwater temperature, T <sub>S</sub> (°C)	16

ENTER Stratum C soil water-filled porosity, e <sub>w</sub> <sup>c</sup> (cm³/cm³)	0.3		
ENTER Stratum C soil total porosity, n <sup>c</sup> (unitiess)	0 43		
ENTER Stratum C soil dry bulk density, ρ <sub>c</sub> (g/σπ³)	17	ENTER	Indoor
ENTER Stratum B soll water-filled porrosity, $\theta_w^B$	0.27	ENTER	Floor-wall
ENTER Stratum B sort total porosity, n <sup>8</sup> (untiless)	0 42	ENTER	Enclosed
ENTER Stratum B soil dry bulk density, p. <sup>8</sup> (g/cm <sup>3</sup> )	17	ENTER	space
ENTER Stratum A soil water-filled porosity. $\theta_{\omega}^{*}$ (cm³/cm³)	0.2	ENTER	Space
ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	0.43	ENTER	Soil-bidg
ENTER Statum A soil dry bulk density, P <sub>b</sub> <sup>A</sup> (g/cm³)	15	ENTER	space

Indoor	air exchange rate,	H	(1/h)	0.45						
Floor-wall	seam crack width,	*	(cm)	0.1	ENTER	Target hazard	quotient for	noncarcinogens,	완	
Enclosed	space height,	· r	(cm)	488	ENTER	Target	risk for	carcinogens,	π	
space	floor width,	W	(cm)	961	ENTER		Exposure	frequency,	#	
space	floor length,	, g	(cm)	961	ENTER		Exposure	duration,	0	
Soil-bidg	pressure differential,	٩v	(g/cm-s²)	40	ENTER	Averaging	time for	noncarcinogens,	AT <sub>NC</sub>	•
space	floor thickness,	Lorect	(cm)	15	ENTER	Averaging	time for	carcinogens,	ΑT <sub>C</sub>	,

-	e risk-based ncentration
1 0E-06	Used to calculate risk-based groundwater concentration
350	
30	
30	
70	

#### 2 of 7

CHEMICAL PROPERTIES SHEET

	Reference	conc,	RfC	(mg/m³)
Unit	risk	factor,	R.	(µg/m³):1
Pure component	water	solubility,	တ	(mg/L)
Organic carbon	partition	coefficient,	ኝ	(cm <sub>3</sub> /g)
		=	T,	- 1
Normal	poling	point,	r.	£
Enthalpy of vaponzation at	the normal	botting point,	ΔH,	(cal/mol)
Henry's law constant	reference	temperature,	Ĕ	(0)
Henry's law constant	at reference	temperature,	I	(atm-m³/mol)
	Diffusivity	In water,	០៎	(cm²/s)
	Diffusivity	in air,	<b>å</b>	(cm <sup>2</sup> /s)

# INTERMEDIATE CALCULATIONS SHEET

Floor-wall seam seam perimeter,	3,844	Diffusion path length, L <sub>d</sub> (cm)	2027 16	
Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	U 294	Total overall effective diffusion coefficient, Doff (cm. <sup>2</sup> /s)	1 04E-03	
Air-filled porosity in capillary zone, $\theta_{k,\alpha}$ {cm³/cm³}	0 126	Capillary zone effective diffusion coefficient, Doff cz (cm²/s)	4 28E-04	
Total porosity in capillary zone, $n_{cz}$	0.42	Stratum C effective diffusion coefficient, D°fc (cm²/s)	0,00E+00	Reference conc. RfC (mg/m³)
Thickness of capillary zone, La (cm)	17.05	Stratum B B effective diffusion coefficient, D " (cm²/s)	7 60E-04	Unit risk factor, URF (µg/m³)-1
Stratum A soil effective vapor permeability. k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, Deff (cm²/s)	2 98E-03	Infinite source bldg conc , Cousting (μg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub>	0 746	Vapor viscosity at ave soil temperature, Hrs (g/cm-s)	1 77E-04	Infinite source indoor attenuation coefficient, $\alpha$ (unitiess)
Stratum A soil soil intrinsic permeability, k <sub>1</sub>	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitiess)	1,15E-01	Exponent of equivalent foundation Peciat number, exp(Pe¹) (unitless)
Stratum A effective total fluid saturation, Sie (cm³/cm³)	0419	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mo!)	2 72E-03	Area of crack, Avack (cm²)
Stratum C soll an-filled porosity, $\theta_a^c$ $(cm^3/cm^3)$	0 130	Enthalpy of vaporization at ave groundwater temperature, $\Delta H_v$ rs (cal/mol)	7,674	Crack effective diffusion coefficient, Drack (cm²/s)
Stratum B soil air-filled porosity, $\theta_{m{a}}^{B}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zenek (cm)	15	Average vapor flow rate into bidg.,  Q <sub>sol</sub> (cm <sup>3</sup> /s)
Stratum A soil all-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitless)	4 16E-04	Crack radius, franct (cm)
Source- building separation, L <sub>T</sub>	2027 16	Area of enclosed space below grade, A <sub>B</sub>	9 24E+05	Source vapor conc , C <sub>source</sub> (µg/m³)
Exposure duration, t	9 46 <b>E</b> +08	Bldg ventilation rate, Q <sub>bulleno</sub> (cm <sup>3</sup> /s)	5.63E+04	Convection path length, Lp (cm)

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INCREMENTAL RISK CALCULATIONS

Hazard	from vapor	indoor air,	noncarcinogen	(nuitless)	V14	Š
Incremental risk from	vapor infrasor to	indoor air,	carcinogen	(unitiess)	V.	Ş
Final	indoor	groundwater	conc,	(µg/L)	A 485±04	101010
Pure	component	solubility,	S	(µg/L)	3 505+08	20.100.0
Risk-based	exposite	groundwater	conc,	(µg/L)	6 48E+04	1010
Indoor	exposure	conc	noncarcinogen	(μg/L)	6.48E+04	0 40E : 04
Indoor	exposure groundwater	conc,	carcinogen	(hg/L)	AM	

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

						VLOOKUP TABLES	ES						
SCS Soil Type	K (cm/h) a (1/c		_			3, 3,							
	3	(unidiess)	- 1	- 1	-1	e, (cm'/cm')	Mean Grain Diameter (cm)						
<u>ා ර</u>	0.20	9000	109	0 083	0 38	0 068	0 0092						
·		0.036	. t	0 250	140	9800	0 0 1 6						
S		0.124	200	0.553	24.5	8/00	0200						
_s		0 145	2 68	0.00	0 0	0.057	0.040						
၁၄		0 027	1 23	0 187	0 38	0 100	0.035						
SCL		0 059	1 48	0 324	030	0 100	0 029						
<u> </u>		0 016	1 37	0.270	0 46	0 034	0 0046						
2 2		0 005	8 5	0 083	0.26	0 0 0 0	0 0039						
SI.	007	0.010	123	0 187	0 43	0 089	9500'0						
		0.020	14.	0.291	0 45	0 067	0011						
		25	D -	0.47	0.47	0.065	0 030						
	Glacor	<u>.</u>			Chemica	Chermon Properties Lookup Table	up Table						1
	carbon	² c			Component		Henry's	Henry's			Enthatpy of	:	
	partition	n Diffusivity		Diffusivity	water	Henry's	at reference	reference	boiling	Cation	Vaportzation at		3
	coefficient,	=		ın water,	٠	law constant	temperature,	temperature,		temperature,	boiling point,	factor, R	įδ
CAS No Chemical	να (cm <sub>3</sub> /α)	(cm <sup>2/s)</sup>		U.w (cm²(e)	S (10m)	T i	I	r≖ é	<b>-</b> ª {	ا ۲۰			-
	Д.	l		(6) (1)	(mg/L)	(unitiess)	(atm-m'/mol)	( <u>,</u> C	Ŷ	(K)	(cal/mol)	(hg/m³)-1 (	Ξ
50293 DDT	2 63E+06		1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	52	533.15	720 75	11 000	975-05	
50328 Benzo(a)pyrene	1 02E+06		4 30E-02	90-300 6	1 62E-03	4 63E-05	1 135-06	25	715 90	969 27	15.000	2 1E-03	, .
51269 4,4-Unitrophenol	001		2 73E-02	90-E-06	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0E+00	, -
56235 Carbon tetrachlonde	3 805+06		Z 0ZE-0Z	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03	0
56553 Renz(a)anthracene	20+347		7 SUE-UZ	8 80E-06	7 93E+02	1 25E+00	3 05E-02	22	349 90	556 60	7,127	1 5E-05	U
57749 Chlordane	3 98E+05 1 20E+05		5 10E-02 1 18E-02	9 00E-06	9 40E-03	1 37E-04	3,34E-06	25	708 15	1004 79	15,000	2 1E-04	U
58899 gamma-HCH (Lindane)	1 07 1 +03		1 42E-02	4 3/E/06	2005-02	1 996-03	4 85E-05	52	624 24	885 73	13,000	3 7E-04	0
60571 Dieldrin	2 14E+04		76E-02	4 74E-06	1 955-01	3 /4E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04	Ç
65850 Benzoic Acid	6 00E-01		5 36E-02	7 97E-06	3 50E+03	6.315-05	1.545.06	S 2	525 52	842 25	13,000	4 6E-03	0
67641 Acetone	5 75E-01		1 245-01	1 14E-05	1 00E+06	1 59E-03	3,885.05	6 K	3000	00,167	10,000	00+00	- '
67663 Chloroform	3 98E+01		1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 665-03	2, 2,	334 32	536.40	0,435 000 a	200+00	
67721 Hexachloroethane	1 78E+03		2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88 5-03	<b>52</b>	458 00	695 00	0,900	2 3E-03	<b>,</b> c
71363 Butanol	6 92E+00		8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	52	390 88	563 05	10,346	0 0 0 0 0	• • •
/ 1432 Benzene 71558 1 1 1 Tricklerathone	5 89E+01	_	0E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342	8 3E-06	Ò
72208 Endrin	1 10E+02		/ 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0 OE+00	-
72435 Methoxychlor	9 77E+04		5E-02	4 46F-06	4 50E-01	3 UBE-04 8 48E-04	7 5715-06	52	718 15	986 20	12,000	0 OE +00	
72548 DDD	1 00E +06		9E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	6 %	20 00	848 49	14,000	0.05+00	
72559 DDE	4 47E+06	•	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	3 52	636 44	86038	14,000	0 4E-03	<b>-</b>
74839 Methyl bromide	_	-	7 28E-02	121E-05	1 52E+04	2 56E-01	6 24E-03	72	276 71	467 00	5.714	00#+00	, -
75002 Mothyland chicroethene)	- •		1 06E-01	1 23E-06	2 76E+03	1116+00	2 71E-02	25	259 25	432 00	5,250	8 4E-05	0
75150 Carbon disuffide	1 1/E+01		016.01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	313 00	510 00	6,706	4 7E-07	n
75252 Bromoform	8 715+01		496.02	1 00E-05	1 19E+03	1.24E+00	3 02E-02	25	319 00	552 00	6,391	0 OE+00	•-
75274 Bromodichloromethane	5 50E+01		2 98E-02	1085-05	5 74F±03	2 19E-02 8 56E-02	40-1145 C	25	422 35	696 00	9,479	1 16-06	0
75343 1,1-Dichloroethane	3 16E+01		7 42E-02	1 05E-05	5.068+03	2 305-02	1 00 E - 0.0	C y	303 75	585 85	7,000	1 8E-05	Ο,
75354 1,1-Dichloroethytene	5 89E+01		9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 615-02	0 K	304.75	523 00	6,895	0 0E+00	
76448 Heptachior			1 12E-02	5 695-06	1.80E-01	4 47E-02	1 09E-03	25	603 69	84631	13,000	1 3F-03	0 0
77474 Hexachlorocyclopentadiene			1 61E-02	7 21E-06	1 80E+00	1 11E+00	2 71E-02	25	512 15	746 00	10.931	005+00	٠,٠
70076 1 Popularia	4 68E+01		6 23E-02	6 76E-06	1 20E+04	2 72E-04	90-369 9	25	488 35	71500	10,271	2 7E-07	0
79005 1 2-Didnioroppane	4 3/E+01		7 82E-02 7 88E 98	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7,590	0 OE+00	4
79016 Trichloroethylene	3 0 E + 0 1	_ ,	7 80E-02	8 50E-06	4 42E+03	3 74E-02	9 12E-04	55	386 15	602 00	8,322	1 6E-05	0
79345 1,1,2,2-Tetrachloroethane	9 335 +0.		10E-02	7 90E-06	2 97E+03	4 22E-01	1 03E-02	25 26	360 36	544 20	7,505	17E-06	0
83329 Acenaphthene	7 08E+03	. 4	4 21E-02	7 695-06	4 24E+00	6 36E-03	3 44E-04	3 K	419 6U 550 54	661 15 803 15	8,996	5 8E-05	ο.
			ļ !	: !	) ! !	***	- ***	3	10 000	000	12,155	00 LE+00	4

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				>	VLOOKUP TABLES							•
64562 Diethylphthatate	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	157 00	13,733	00=+00	2 8E+00
85687 Butta bossed abbusines	3.396+04	4 38E-02	7 86E-06	1 12E+01	385E-08	9 39E-10		613 15	798 67	14,751	20 10 10 10 10 10 10 10 10 10 10 10 10 10	3.55.01
88305 N. Marcelland	5 /5E+04	1 /4E-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06		90 90	839 68	13,000	00+300	7 0E-01
B6727 Circus	1 29E+U3	3 125-02	6 355-06	3 515+01	2 05E-04	5 00E-08		632 28	890 45	13,000	1 4E-06	0 OE+00
A6748 Corporals	1 38E+04	3 635-02	7 88E-06	1 98E+00	2 61E-03	637E-05		570 44	870 00	12,666	00=+00	1 4E-01
8769 University of the Author	5 55E+03		7 035-06	7 48E+00	6 26E-07	1 53E-08		627 87	00 668	13,977	5 7E-06	0 0E+00
87865 Pentachiomohemol	5 03/E+04	5 50E-02	6 10E-U6	3 235+00	3.34E-01	8 15E-03	8 8	486 15	738 00	10,206	2 2E-05	00100
88062 2.4.6-Trichlorophenol	3.815+02		6.25E-06	8 00F±03	3 196-04	7 785 06		510 15	24003	000,4	100 m	
91203 Naphthalene	2 OOE +03	5 905-02	7.505-06	3 10F+01	1 985-02	A 23E-04		601 14	749.03	10.373	0.05+00	1 4 1 0 1
91941 3,3-Dichlorobenzidine	7 24E+02		6 74E-06	3 11E+00	1 64E-07	4 00E-09	3 23	560 26	754 03	13.000	13.62	0 0E+00
95476 o-Xylene	3 63 5 + 02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03		417 60	630 30	8,661	0 OE+00	7 OE+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60€+04	4 92E-05	1 20E-06		464 19	09 269	10,800	0 0E+00	1 8E-01
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03		453 57	705 00	9,700	0 0E+00	2 0E-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04		447 53	675 00	9,572	0 0E+00	1 8E-02
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	52	526 15	759 13	13,000	0 0E+00	3 55-01
98953 Ntrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05		483 95	719 00	10,566	0 0E+00	2 05-03
100414 Ethylbenzene 100425 Strang	3 63E+02	7 50E-02	7 80E-06	169E+02	3 23E-01	7 88E-03		409 34	617.20	8,501	0 0E+00	1 OF +00
105679 2 4 Dimothidahana	2005-02	7.105.02	90-109	3 10 5 10 2	1 135-01	2 /6E-U3	8 8	418 31	636 00	8,737	0.0E+00	1 0E+00
106423 p-Xylene	3 89E+02	2 64E-02 7 69E-02	8 44 11-06	1 8/E+U3	8 ZUE-U5	2 00E-06	2 2	484 13	707 60	11,329	001400	7 0E-02
106467 1.4-Dichlorobenzene	6 17E+02	6 90E-02	7 90F-06	7.38F+01	9 96 12-02	2 43E-03	2 %	411 32	684 75	0,320		מיים מ
106478 p-Chloroanitine	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07		503 65	754 00	11.689	000+00	4 4F-02
107062 1,2-Dichloroethane	174E+01	1 04E-01	9 90E-06	8 52E+03	4 01E-02	9 78E-04	2 22	356 65	561 00	7,643	2 6F-05	001-00
108054 Vinyl acetate	5 25E+00	8 505-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	22	345 65	519 13	7,800	0 0E+00	2 05-01
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03		412 27	617 05	8,523	0 0E+00	7 0E+00
108383 Toluene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03	52	383 78	591 79	7,930	0 0E+00	4 0E-01
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71 6-03	52	404 87	632 40	8,410	0.0E+00	2 0E-02
108952 Phenol	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	52	455 02	694 20	10,920	0 0E+00	2 1E+00
116297 Endosulfan	1 55E+01	6 9ZE-0Z	7 53E-06	1 72E+04	7 38E-04	1 80E-05	52 2	451 15	659 79	000'6	3 35-04	0 OE+00
117817 Bis(2-ethythexylphthalate	1516+07	3.515-02	3 66E-06	3.405-01	4 185-04	1 025.07		0/4 43	94294	500, 1	005+00	2 1E-02
117840 Di-n-octyl phthalate	8 32E+07	1516-02	3 58E-06	2 00E-02	2 74E-03	6 68F-05			862 22	15,000	4 00-00	7 00.00
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 416-02	1 32E-03	2 52	582 55	825 00	14.447	4 6E-04	000-400
120127 Anthracene	2 95E+04	3 246-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05		615 18	873 00	13,121	00+300	1 1E+00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03	7 52	486 15	725 00	10,471	0 OE+00	2 0E-01
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06	52	482 15	708 17	11,000	0 0E+00	1 1E-02
121142 Z,4-Dinidototoene 194481 Objectional transmissione	9 55E+01	2 035-01	7.065-06	2 70E+02	3 80E-06	9 27 E-08	52	590 00	814 00	13,467	98.04	0 0E+00
127184 Tetrachloroethylene	1.55F+02	7 20F-02	8 20E-06	2 005+03	3 21E-02 7 54E-01	7 83E-04	9 4	415 14	6/8/20	000	2 45-05	001100
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 515-04	1 10F-05	3 %	557 45 667 95	03 070	0,400	70400	10.00
156592 cis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50 03	1 67E-01	4 07E-03	25.	333 65	544 00	7 192	005+00	2 L
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516.50	6.717	0 0E+00	7 0E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06		809 15 1	1078.24		2 1E-04	0 OE+00
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1 11E-04		715 90	969 27	15,000	2 1E-04	00+300
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 61E-05			905 00	13,815	0 0E+00	1 4E-01
20/089 Benzo(k):iuorantnene	1 23E+U6	2 265-02	5 55E-06	8 00E-04	3 405-05	8 29E-07	25	•	1019 70	16,000	2 1E-05	0 0E+00
309002 Aldrin	2 45F+06	1 325-02	4 86E-06	1 80 1 0 1	3 00E-03	00-104 F		21 41 7 202 04	00 676	16,455	2 15-06	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
319846 aloha-HCH (aloha-BHC)	1235+03	1 425-02	7.34F-06	2 00F+00	4 35F-04	1.065-05		505 55 506 55	639 3/	000,51	4 9 4 4 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1	0 0 + 00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	25.	596 55	839.36	13,000	2 un 2 un 2 un 2 un 2 un 2 un 2 un 2 un	00000
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	177E-02		381 15	587 38	000'2	3 7E-05	2 OE-02
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07		558 00	770 00	12,938	1 95-04	0 0E+00
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06		509 60	746 87	11,000	2 0E-03	0 0E+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	951E-06	52		848 76	13,000	2 6E-03	0 OE+00
7433970 Nelculy (eletterital)	2 575.405	3 07 5-02	247100	3 62E-02	10-379	1145-02		_	1750 00	14,127	0.00	3 OE-04
11096825 Arodor 1260 (PCB-1260)		1 38F-02	4 32F-06	A 40E-01	7 46E-04	6 00E-06	9 4	65/ 15	6/3,31	000, 45	3 2E-04	00000
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	25	377.50	512.27	900	2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	00+100
12674112 Arador 1016 (PCB-1016)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04			475 22	18,000	0 0	201
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02	5 315-06	3 40E-01	2 135-02	5 20E-04	25	345 50	482 20	18,000	1 0E-04	00+90
											i	•

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

×

YES

VERSION 12 September, 1998 CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

ENTER
initial
groundwater
conc ,
Cw
(µg/L)

Chemical CAS No (numbers only, no dashes)

YES

ENTER

	Г			_					T	Т	7									
	FNTER		Lines defined	Catalina A	Stratuin A	nermeshility	F. F.	(cm²)												
	l					œ	, S		1	١	1									
	ENTER	Soll	Strating A	208	Sold for			permeability)		IS			ENTER	Stratum	soil water-filled	porosity	o d	, cm3, cm3,	(CIII /CIII )	
	ENTER				SCS	soil type	directly above	water table		S			ENTER	Stratum C	soul total	porosity	` '_		(ULIIIIASS)	67.0
	ENTER			Soil	stratum	directly above	water table,	(Enter A, B, or C)		80			ENTER	Stratum C	Soil dry	bulk density,		(alem <sup>3</sup> )	/ Block)	1.7
oride	ENTER	Lw <sub>T</sub> (cell D28)	Thickness	of soil	stratum C.	(Enter value or 0)	Ę	(cm)		0			ENTER	Stratum B	soil water-filled	porosity,	8,70	(cm <sub>3</sub> /cm <sub>3</sub> )		72.0
Carbon tetrachic	ENTER	st add up to value of	Thickness	of soil	stratum B.	(Enter value or 0)	- <b>E</b>	(cm)		1280 16			ENTER					(assittant)	2000	0.42
	ENTER	Totals mu		Thickness	of soil	stratum A,	Ę	(cm)		762			ENTER	Stratum B	solf dry	bulk density,	్డి			17
	ENTER			Depth	below grade	to water table,	LwT	(cm)		2042.16			ENTER	Stratum A	soil water-filled	porosity,	ψ <sub>3</sub>	(cm <sub>3</sub> /cm <sub>3</sub> )	,	0.2
36 825	ENTER	Depth	below grade	to bottom	of enclosed	space floor,	נ	(cm)		15				Stratum A	soil total	porosity,	<b>₹</b> _	_		0.43
56235	ENTER		Average	soll/	groundwater	temperature,	_s L	(၃)		16		1	ENTER	Stratum A	soil dry	bulk density,	€	(a/cm³)		15
	36 825	36 825 Carbon tetrachlonde ENTER ENTER ENTER	36 825 Carbon tetrachlonde  ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER EDepth Totals must add up to value of L <sub>wr</sub> (cell D28)	36 825 Carbon tetrachlonde  ENTER ENTER ENTER ENTER Soil  Depth Totals must add up to value of L <sub>w1</sub> (sell D28) below grade Thickness Thickness	36 825   Carbon tetrachloride	ENTER ENTER ENTER ENTER ENTER ENTER ENTER Soil  Depth Totals must add up to value of L <sub>wr</sub> (cell D28)  below grade Thickness Thickness to bolow grade of soil stratum B, stratum C, stratum	ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER Soil  below grade Depth Thickness of soil stratum B, stratum B, stratum A, (Enter value or 0) (Ent	ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER Soil  Depth Totals must add up to value of Lwr (cell D28)  Depth Thickness Thickness Soil stratum A Soil stratum B, stratum B, stratum C, space floor, to water table, stratum A, (Enter value or 0) (Enter va	36 825   Carbon tetrachloride	ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER Soil Stratum A Carbon tetrachloride  ENTER ENTER ENTER ENTER ENTER ENTER ENTER Soil Soil Stratum A Call D28)  Depth Thickness Thickness Soil Stratum A Call Stratum B Stratum C Call Stratum B Stratum C Call Stratum C Call Stratum C Call Call Call Call Call Call Call C	Se 825   Carbon tetrachloride	ENTER Soil Soil Stratum A Cansolion of soil stratum B, stratum C, stra	ENTER Soil Stratum A Soil Stratum A SCS soil type of enclosed below grade of soil stratum B, stratum C, stratum C, stratum C, stratum A, (Enter value or 0) (Ent	ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER Soli Stratum A Soli Soli Stratum B, stratum C, bellow grade bellow grade of soil stratum B, stratum C, cm) (cm) (cm) (cm) (cm) (cm) (cm) (cm)	ENTER ENTER Totals must add up to value of L <sub>wr</sub> (cell D28)  Depth Thuckness Thuckness Soil stratum A, card of soil stratum B, stratum C, stratum C, cm)  (cm) (cm) (cm) (cm) (cm) (cm) (cm) (cm)	ENTER ENTER	ENTER ENTER	ENTER ENTER	ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER Soil Soil Soil Stratum A (Enter value of L <sub>VIT</sub> (cell D28) Soil Stratum A (Enter value or 0) (Ente	36 825

Indoor air exchange rate, £R (1/h)

Floor-wall seam crack width,

Enclosed space height, H<sub>B</sub>

ENTER Enclosed space floor width,

Enclosed space floor length, La

> Soil-bidg pressure drifferental,

ENTER Enclosed space floor thickness,

ENTER

ENTER

ENTER

ENTER

## CHEMICAL PROPERTIES SHEET

Reference conc , RIC (mg/m³)
Unit nsk factor, URF (µg/m³) <sup>-1</sup>
Pure component water solubility, S S (mg/L)
Organic carbon partition coefficient, $K_{ce}$ $(cm^3/g)$
Critical temperature, T <sub>c</sub> (*K)
Normal boiling point, T <sub>B</sub>
Enthalpy of vaportzation at the normal boiling pount, AH,,a
Henry's law constant reference temperature, <sup>T</sup> a (°C)
Henry's law constant at reference temperature, H
Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)
Diffusivity in air, D <sub>a</sub> (cm²/s)

# INTERMEDIATE CALCULATIONS SHEET

Floor- wall seam perimeter, Xenck	3,844	Diffusion path length, L <sub>d</sub>	2027 16	
Water-filled porosity in capillary zone, $\frac{\theta_{w,cz}}{(cm^3/cm^3)}$	0 294	Total overall effective diffusion coefficient, $D^{eff}_{r}$	1 09E-03	
Air-filled porosity in capillary zone, $\theta_{a,ct}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 126	Capillary zone effective diffusion coefficient, D" (cm²/s)	4 44E-04	
Total porosity in capillary zone,	0 42	Stratum C effective diffusion coefficient, D"c (cm²/s)	0 00E+00	Reference conc , RfC (mg/m³)
Thickness of capillary zone, La (cm)	17.05	Stratum B B effective diffusion coefficient, Doff (cm <sup>2</sup> (s)	7 99E-04	Unit nsk factor, URF (µg/m³)*1
Stratum A soll effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, Def (cm²/s)	3 16E-03	Infinite source bldg. conc , Chuiding (µg/m³)
Stratum A soil relative air permeability, k <sub>re</sub> (cm²)	0 746	Vapor viscosity at ave soit temperature, µrs (g/cm-s)	1 77E-04	Infinite source indoor attenuation coefficient, a (unitiess)
Stratum A soil intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (untitless)	8 53 <b>E-</b> 01	Exponent of equivalent foundation Peclet number, exp(Pe <sup>1</sup> ) (unitless)
Stratum A effective total fluid saturation, S <sub>s</sub> .	0 419	Henry's law constant at ave, groundwater temperature, H <sub>TS</sub> (atm-m³/mol)	2 02E-02	Area of crack, Avanck (cm²)
Stratum C soil an-filled porosity, $\theta_a^c$ $(\varsigma m^3/cm^3)$	0 130	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{V,TS}$ (cal/mol)	7,798	Crack effective diffusion coefficient, Denot (cm²/s)
Stratum B soil air-filled porosity, $\theta_{\bullet}^{B}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zonak (cm)	15	Average vapor flow rate into bidg , Quest (cm <sup>3</sup> /s)
Stratum A soil soil aur-filled porosity, $\theta_{\bullet}^{\bullet}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitiess)	4.16E-04	Crack radius, reack (cm)
Source- building separation, L <sub>T</sub>	2027 16	Area of enclosed space below grade, A <sub>a</sub>	9.24E+05	Source vapor conc, C <sub>ource</sub> (ugim³)
Exposure duration, t	9 46E+08	Bidg ventilation rate, Obulding (cm <sup>3</sup> /s)	5 63E+04	Convection path length, Ly (cm)

#### RESULTS SHEET

NCREMENTAL RISK CALCULATIONS	Incremental Hazard nsk from quotient vapor from vapor intrusion to intrusion to indoor air, carcinogen noncarcinogen (untiless) (untless)	
INCREM	<b>1</b> 1	
ULATIONS	Final indoor exposure groundwater conc, (ug/L)	201 LOT
ATION CALC	Pure component water solubility, S (µg/L)	1001
ER CONCENTR	Risk-based indoor exposure groundwater conc , (µg/L)	2 785104
RISK-BASED GROUNDWATER CONCENTRATION CALCULATION:	Indoor exposure groundwater conc, noncarcinogen (µg/L)	4
RISK-BASE	Indoor exposure groundwater conc, carcinogen (µg/L)	3 76F+01

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

					VLOOKUP TABLES	SI						
SCS Soll Type	(1) c (1(cm)	Soil Properties Lookup Table	Lookup Table	£								
	.!.		(C)	o. (cm /cm )	e, (cm /cm²)	Mean Grain Diameter (cm)						
, <u>d</u>				0.38	9900	0 0092						
				140	0.095	0 016						
		200		0 43	0.078	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
				0 41	0 057	0 040						
28	0.145		0 627	0 43	0 045	0 044						
		50 1.48		200	0100	0 025						
			0.324	0.39	000	0.029						
	0.02			9 6 0	450.0	0 0046						
				0.20	0/50	9500 G						
				240	0.089	0.0036						
SL,				0 4 5	0.065	0.01						
	Č			Chemic	Chemical Properties Lookup Table	up Table						
	Organic			Pure		Henry's	Henry's			Enthalpy of		
	caroon			component		law constant	law constant	Normat		vaporization at		
	partition	_	Diffusivity		Henry's	at reference	reference	boiling	Critical	the normal		Reference
	r Soellicent	ָוֹם בּי בים כי	in water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	balling point,	ی	conc ,
CAS No Chemical	(cm <sup>3</sup> /a)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	) ( ( ) ( )	E = 0.0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ات ۋ ق	ب 19	<b>-</b>		L'R'E	2
	ò	(2)	(21,112)	(IIIB/IL)	(nulliess)	(am-m/moi)	() ()	( <del>X</del>	(K)	(cal/mol)	(μg/m³)**	(mg/m³)
50293 DDT	2 63E+06	36 1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 105-06	25	522 15	37.027	44 000	1	1
50328 Benzo(a)pyrene	1 02E+06		9 00E-06	1 62E-03	4,63E-05	1 135-06	25	715.90	969 27	000, 81	2 C	0.000
51255 2,4-Unitrophenol	1 00E-02		9 OEE-06	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15.000	0.05+00	7 05-03
56235 Carton total care	3 8011106		5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16.000	2 1E-03	00+400
56553 Benz(a)anthracene	3 09 11 10 1	7 60E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	156-05	0 0 0 + 00
57749 Chlordane	1 20F+05		3 00E-05	9 40 E 03	1 37E-U4	3 345-06	25		1004 79	15 000	2 1E-04	0 0E+00
58899 gamma-HCH (Lindane)	107E+03	•	7.34F-06	3 PUE-02	1 995-03	4 85E-05	25		885 73	13,000	3 7E-04	0 0E+00
60571 Dieldrin	2 14E+04	•	4 74 12-06	1 95 -01	8 19E-04	1 40E-05	52		839 36	13,000	3 7E-04	0 0E+00
65850 Benzoic Acid	6 00E-01	· w	7 97E-06	3 50E+03	6.315-05	1 545-06	2 5	230 002	842 25	13,000	4 6E-03	0 0 = +00
67641 Acetone	5 75E-01	_	1 14E-05	1 00E+06	1 59E-03	3 88 - 05	35		508 10	000,0T	0 OE+00	1 4E+01
	3 98E+01		1 00E-05	7 92E+03	1 505-01	3 66E-03	25	334 32	536 40	6,988 6,988	235-05	3 25-01
71353 Differentiane	1 78E+03		6 80E-06	5 00E+01	159E-01	3 88E-03	25	458 00	695 00	9,510	4 0F-06	00+100
71432 Benzana	6 92E+00	8 00E-02	9 305-06	7 40E+04	3 61E-04	8 80E-06	25	390 88	563 05	10,346	0 0E+00	3 5 6-01
71556 1.1.1-Trichloroethane	1 10E+02		90-100 8	1 225+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342	8 3E-06	0 0E+00
72208 Endrin	1,23E+04		4 74F-06	2.50E-03	3 ORE-04	1 /2E-02	25	347 24	545 00	7,136	0 0E+00	1 0E+00
72435 Methoxychlor	9 77E+04	_		4 50E-02	6 48F-04	1 585.05	27	61 817	986.20	12,000	001100	1 1E-03
72548 DDD	1 00E+06	_	4 76E-06	9 00E-02	1 64E-04	4 00E-06	22 22	639.90	863 77	14,000	0 UE+00	7 85-02
72559 DDE	4 47E+06	•	5 87E-06	1 20E-01	8 61E-04	2 10E-05	52	636 44	860 38	13,000	9.7E-05	00+400
75044 Yest chicate (chicaette	1 05E+01		1 21E-05	1 52E+04	2 56E-01	6 24E-03	25	276 71	467 00	5,714	0.000	5 0E-03
75092 Methylene chlonde	1 25 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 106E-01	1 23E-06	2 76E+03	111E+00	2.71E-02	25	259 25	432 00	5,250	8 4E-05	0 0E+00
75150 Carbon disulfide	4 57E+01		1.00 - 0.5	1 105+03	4 34E-02	2 19E-03	25	313 00	510 00	6,706	4 7E-07	3 0E+00
75252 Bromoform	8 71E+01	-	1 03E-05	3 10E+03	2 19E-02	3 025-02	7 P	319.00	552 00	6,391	00=+00	7 0E-01
75274 Bromodichloromethane	5 50E+01	2	1 06E-05	6 74E+03	6 56E-02	1 60 1-03	2,5	363.15	585 85	9,4,6 9,600	115-06	0.0000
75343 1,1-Dichloroethane	3 16E+01	7	1 05E-05	5 06E+03	2 30E-01	5616-03	25	330.55	523.00	7,000 8,805	00-100	005-00
75354 1,1-Dichloroethylene	5 89臣+01	σ.	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6.247	5 OE-05	0.05+00
7777 Locaphicon	141E+06		5 69E-06	1 805-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	1 3E-03	0.00
78591 Isonhorone	Z 00E+03	5 161E-02	7.21E-06	1 805 +00	1115+00	271E-02	52	512 15	746 00	10,931	0 0E+00	7 0E-05
78875 1.2-Dichloropropane	4 3751-01	7	9735.08	1 20E+04	2 /25-04	6 63E-06	52	488 35	715 00	10,271	2 7E-07	0 0E+00
79005 1,1,2-Trichloroethane	5 01E+01		8 80F-06	4 42F+03	3 74E-02	2 805-03	52.5	369 52	572 00	7,590	0 0E+00	4 0E-03
79016 Trichloroethylene	1 66E+02	^	9 105-06	1 10E+03	4 22E-01	3 i.ZE-04 1 03E-02	S 15	36036	544 20	8,322	1 6E-05	00+100
79345 1,1,2,2-Tetrachloroethane	9 33	7	7 90E-06	2 97E+03	141E-02	3 44E-04	25	419.60	661 15	505,7 8 998	7 RF-05	00+100
83329 Acenaphthene	7 08E+03	3 4 21 5-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	52	550 54	803 15	12.155	0.05+00	2 1F-01
										ļ.	1	

84662 Diethylphthalata 84742 Dr-n-butyl phthalata 85687 Butyl benzyl phthalate	2 88E+02 3 39E+04 5 75E+04	2 56E-02 4 38E-02 1 74E-02	6 35E-06 7 86E-06 4 83E-06	1 08E+03 1 12E+01 2 59E+00	VLOOKUP TABLES 185E-05 385E-08 517E-08	4 51E-07 9 39E-10	52 52	567 15 613 15	757 00 798 67	13,733	0.0E+00 0.0E+00	2 8E+00 3 5E-01
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02		3 51E+01	2 05E-04	1 26E-06 5 00E-06	23	660 60 632 28	839 68 890 45	13,000	0 0E+00 1 4E-06	7 0E-01
86748 Carbarda	1 38E+04	3 63 5-02	7 88E-06	1 98E+00	2 61E-03	6 37E-05	25	570 44	870 00	12,666	0 OE+00	1 4E 01
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	6 26E-07 3 34E-01	1 53E-08 8 15E-03	<b>5</b> 5 %	627 87 486 15	899 00	13,977	5 7E-06	000+00
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95€+03		2 44E-08	22	582 15	813.20	14.000	3.4E-05	00+100
91203 Nanhhalana	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	52	51915	749 03	12,000	3 1E-06	0 0E+00
91941 3,3-Drchlorobenzidine	7 24E+02	1 94E-02	7 30E-06	3 10 0 1	1 98E-02	4 83E-04	53 2	491 14	748 40	10,373	0.0E+00	14E-01
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	2 2	360 26 417 60	/54 03 630 30	13,000	1 3E-04	00000
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	123	464 19	697 60	10,800	0 0E+00	185-01
95578 2-Chlorophenol	3 88F+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	8	453 57	705 00	9,700	0 0E+00	2 0E-01
95954 2,4,5-Trichlorophenol	1 60E+03	2915-02	7 03E-06	1 20E+03	1 78E-04	3.905-04	8 %	447 53 526 15	675 00	9,572	00=+00	1 8E-02
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	52	483 95	719 00	10.566	0.05+0.0	20503
100414 Ethylbenzene 100425 Styrene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	22	409 34	617 20		0 0E+00	105+00
	2 09E+02	5.84F-02	8 69E-06	3 10E+02 7 87E+03	1 135-01	2 76E-03	52	41831	636 00	8,737	0 0E+00	1 0E+00
	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	2 00E-06 7 66E-03	8 %	484 13	707 60	11,329	0 0E+00	7 0E-02
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	25	447.21	684 75	0,56,0	00+100	) UE+00
106478 p-Chloroaniline	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	25	503 65	754 00	11.689	0.05+00	4 4F-02
107.052 1,2-Dichloroethane	1 74E+01	1 04E-01	90E-06	8 52E+03	4 01E-02	9 78E-04	25	356 65	561 00	7,643	2 6E-05	0 OE+00
108383 m-Xdena	5 25 E + 00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	52	345 65	519 13		0 0E+00	2 0E-01
108883 Toluene	1 825+02	7 00E-02	7 80E-05	1 61E+02 5 26E+02	3 01 E-01	7 34E-03	52	412 27	617 05		0 0E+00	7 0E+00
108907 Chlorobenzene	2 19E+02	7 306-02	8 70E-06		1 52E-01	9 53E-03	5 5 5 4	383 78	591 79		00=00	4 OE-01
	2 88E+01	8 20E-02	9.10E-06		1 63E-05	3 98E-07	2 2	455.02	694.20	0,410	004400	2 UE-02
	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	22	451 15	628 79		3.35.04	0.05+00
11029/ Endosultan 117817 Re(2-ath/haw/whithelate	2 145+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	22	674 43	942 94		0 0E+00	2 1E-02
117840 Di-n-octy obthalate	8 32E+07	3 5 1 5 - 0 2	3 66 1 - 06	3 40E-01	4 18E-06	1 02E-07	52	657 15	806 00		4 0E-06	0 0E+00
118741 Hexachlorobenzene	5 50E+04	5 42F-02	5.915-06	2 UUE-02 6 20E+00	2 /4E-U3 5 41E-D3	6 68E-05	25	704 09	862 22		0.0E+00	7 0E-02
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 41E-02 2 67E-03	6.51F-05	, to	38233	825.00		4 6E-04	000+000
120821 1,2,4-Trichlorobenzene	1.78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03	52	486 15	725.00	13,121	00+100	1 1E+007
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06	52	482 15	708 17		00=00	1,100
121142 z,4-Dilliuolondena 124481 Chlomdibromostana	9 55 101	2 03E-01	7.065-06	2 70E+02	3 80E-06	9 27E-08	25	290 00	814 00		1 96-04	0 0E+00
	1.55F+02	7 20E-02	1 03E-03	2 50E+03	3 21E-02	7 83E-04	52	416 14	678 20		2 4E-05	0 0E+00
	1 05E+05	2 72E-02	7 24F-06	1 35E-01	4 K1E-04	1 400 05	8 8	394 40	620 20		5 8E-07	00±00
156592 cis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 135-05	3 50E+03	167E-01	4.075-03	ð ř	333 65	936 00		00±00 00±00	1 15 03
156605 trans-1,2-Dichloroethytene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39 11-03	22	320.85	516.50	6 717	00+100	3 25-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06	22	809 15	1078 24		2 15-04	005+00
203332 Benzolojimoraninene 206440 Fluoranthene	1 Z3E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1 116-04	22	715 90	969 27		2 1E-04	0 OE+00
207089 Benzofkillworenthene	1 235+06	3 UZE-02	5 53E-U6	2 06E-01	6 60E-04	161E-05	52	655 95	905 00		0 0E+00	1 4E-01
218019 Chrysene	3.98E+05	2 48E-02	6 21E-06	1 605-03	3 885-03	0.46E-05	ខ្ម	733 15	1019 70		2 15-05	0 OE+00
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 BOE-01	6 97E-03	1 70E-04	3 12	603.01	978 979	10,455	2 15 06	00000
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 355-04	1 06E-05	22	596 55	839.36		4 SE-03	001100
31985/ Deta-HCH (Deta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	52	596 55	839 36		5 3F-04	00+400
34Z/35 1,3-Uknioropropene 808203 3 8-Distratelyses	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02	52	381 15	587 38		3 7E-05	2 0E-02
621647 N-Nitrosodi-n-cooxiamine	2 40F+01	5 45E-02	7 25E-00 8 17E-06	1 825+02	3 06E-05	7 46E-07	52	558 00	770 00		1 9E-04	0 0E+00
	8 32E+04	1 32E-02	4 235-06	2 OOF-01	3 906-04	2.255-06		509 60	746 87		2 OE-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 145-02	0 K	,	248 76 750 00		2 6E-03	0 0E+00
8001352 Toxaphene	2 57E+05	1 165-02	4 34E-06	7 40E-01	2 46E-04	6 005-06			873 31	77,41	001+00 27-03	3 0E-04
11096825 Aractor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 895-01	4 60E-03	22	402 50	539 37		3 2E-04 1 0E-04	0.011100
11097691 Aractor 1254 (PCB-1254) 12674112 Aractor 1016 (PCB-1016)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03		377 50	512 27	19,000		001100
53469219 Arador 1242 (PCB-1242)	3.30E+04	2 14E-02	5 31E-06	3 40E-01	1 195-02 2 135-02	2 90E-04 5 20E-04	35 K	340 50	475 22	18,000		0 0E+00
			!			0.60ETA	g	040 DC	482 20	18,000	1 OE-04	00+300
					!							

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

YES

VERSION 1 2 September, 1998

		ENTER	User-defined stratum A soil vapor permeability, k, (cm²)
		ENTER	stratum A SCS soil type (used to estimate OR soil vapor permeability)
		ENTER	SCS soil type directly above water table
		ENTER	Soil stratum directly above water table, (Enter A, B, or C)
		ENTER Lwr (cell D28)	Thickness of soil stratum C, (Enter value or 0) hc (cm)
Chemical	Chloroform	NTER ENTER ENTER Totals must add up to value of L <sub>w7</sub> (cell D28)	Thickness         Thickness           of soil         of soil           of soil         of soil           of soil         stratum C,           stratum A,         (Enter value or 0)           ha         he           (cm)         (cm)           853.44         304.8           1341.12
		ENTER Totals mus	Thickness of soil stratum A, h <sub>A</sub> (cm)
·	_	ENTER	Depth below grade to water table, Lwr (cm)
ENTER Initial groundwater conc , C <sub>W</sub>	6.24	ENTER Depth	below grade to bottom of enclosed space floor, LF (cm)
ENTER Chemical CAS No (numbers only,	67663	ENTER	Average soul/ groundwater temperature, Ts (°C)

0	2	70	1,	0 42	0.27	17	0 43	03
ENTER Enclosed	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
space	Soil-bidg	space	space	Enclosed	Floor-wall			
floor	pressure	floor	floor	space	seam crack	'ā	95	
hickness,	differential,	length,	width,	height,	width,		•	
Loraci	ΔP	<sup>י</sup> ר	WB	£	*	띪		
(cm)	(g/cm-s <sup>2</sup> )	(cm)	(cm)	(E3)	(cm)	(1/h)		

ENTER
Stratum C
soll water-filed
porosity,

0.0

ENTER Stratum C soil total porosity,

ENTER Stratum C soil dry bulk density, p<sub>c</sub>

ENTER
Stratum B
soil water-filled
porosity,

ENTER Stratum B soil total porosity,

ENTER Stratum B soil dry bulk density, p<sub>b</sub> (g/cm³)

ENTER Stratum A soil water-filled porosity, φ,

ENTER Stratum A soil total porosity,

ENTER Stratum A soil dry bulk density, pb<sup>A</sup> (g/cm³)

(unitless)

0.4			
0.1	ENTER Target hazard quotent for noncarcinogens, THQ (unitless)		food to coloniate the state of
488	ENTER Target risk for carcinogens, TR (untless)	1 0E-06	plea of bool t
961	ENTER Exposure frequency, EF (days/yr)	350	
961	ENTER Exposure duration, ED (yrs)	30	
40	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	30	
15	ENTER Averaging time for carcinogens, AT <sub>c</sub> (yrs)	70	

groundwater concentration

## CHEMICAL PROPERTIES SHEET

Reference conc , RfC	(1116111)
Unit risk factor, URF	(high)
Pure component water solubility.	(High L.)
Organic carbon partition coefficient, K <sub>cc</sub>	(B) (III)
Critical temperature, T <sub>c</sub>	2
Normal bolyng point, Te	
Enthalpy of vaporization at the normal boiling point, $\Delta H_{\nu,b}$	(calling)
Henry's law constant reference temperature,	
Henry's law constant at reference temperature, H	1
Diffusivity in water, D,	
Diffusivity in air,  D <sub>a</sub>	

# INTERMEDIATE CALCULATIONS SHEET

Floor- wall seam perimeter, X <sub>orsek</sub>	3,844	Diffusion path length, Le (cm)	2484 36
Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.346	Total overall effective diffusion coefficient, Deff (cm²/s)	9 14E-04
Air-filled porosity in capillary zone, $\theta_a = (cm^3/cm^3)$	0.084	Capillary zone filective diffusion coefficient, D°f (cm²/s)	1 63 E-04
Total porosity in capillary zone, $\frac{n_{c2}}{(cm^3/cm^3)}$	0.43	Stratum C effective diffusion coefficient, D <sup>eff</sup> c (cm²/s)	Reference conc., RfC (mg/m³)
Thickness of capillary zone, Lez (cm)	30 00	Stratum B B effective diffusion coefficient, D <sup>off</sup> <sub>B</sub> (cm <sup>2</sup> /s)	1 07E-03 Unit risk factor, URF (µg/m³)¹
Stratum A soil effective vapor permeability, k,	3 03E-09	Stratum A A effective diffusion coefficient, D** (cm²/s)	4 22E-03 Infinite source bidg. conc , Couc , (µg/m³)
Stratum A soil rejative air permeability.	0 778	Vapor viscosity at ave soil temperature, hrs (g/cm-s)	Infinite source indoor attenuation coefficient, a (unitless)
Stratum A soil soil intrinsic permeability, k	3 89E-09	Henry's law constant at ave groundwater temperature, H'rs (unitiess)	Exponent of equivalent foundation Peclet number, exp(Pe) (unitiess)
Stratum A effective total fluid saturation, Ste (cm³/cm³)	0.347	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mo!)	2 47E-03 Area of crack, Avask (cm²)
Stratum C soil soil air-filled porosity, $\theta_a^c$ $(cm^3/cm^3)$	0 130	Enthalpy of vaporization at ave groundwater temperature, AH, rs (cal/mol)	Crack effective diffusion coefficient, Does (cm²/s)
Stratum B soil air-filled porosity, $\theta_{\bullet}^{8}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zanck	Average vapor flow rate into bldg , Quer (cm <sup>3</sup> /s)
Stratum A soil ali-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.230	Crack- to-total area ratio, n (unitiess)	Crack Crack Tadius, Forest (cm)
Source- building separation, L <sub>T</sub>	2484,36	Area of enclosed space below grade, As	Source vapor conc. Ceours (49/m³)
Exposure duration, r	9 46E+08	1 1	S 63E+04  Convection path length, L <sub>p</sub> (cm)

### RESULTS SHEET

NCREMENTAL RISK CALCULATIONS	Hazard
INCREMENTA	locremental
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	

Hazard quotient	from vapor	indoor air,	noncarcinogen	(nutless)	AA.
Incremental nsk from	vapor Intrusion to	indoor air,	carcinogen	(unifiess)	Ą
Final	indoor	groundwater	couc,	(µg/L)	1 88E+02
Pure	component	solubility,	S	(µg/L)	7 92E+06
Risk-based	exposure	groundwater	conc,	(µg/L)	1 88E+02
Indoor	exposure groundwater	conc,	noncarcinogen	(µg/L)	NA
Indoor	exposure groundwater	conc,	carcinogen	(µg/L)	1 88E+02

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

				_	VLOOKUP TABLES							
SCR See Tiese	1		Table									
O, CO	5				- 1	Mean Grain Diameter (cm)						
) C		109	0 083	0 38	0 068	0 0092						
		131	0 237	0 41	0 095	0 0 1 6						
		156	0 359	0 43	0 078	0 0 0 0						
· 0	59 0 124	2 28	0 561	0 41	0 057	0 040						
S 29 70	70 0 145	2	0 627	0.43	0.045	0000						•
SC 012		-	0 187	0.38	0100	4000						
SCL 131		148	0.324	900	55	0000						
		137	0.270	0.00	200	0,000						
SIC 002		5	0.10	2 0	5 6	0.0049						
		3 5	0.00	070	0.00	60000						
		3 :	0.187	0.43	0.089	9500 0						
		1.41	0 291	0 45	0 067	0 0 1 1						
95	42 0 0 75	189	0 471	0 41	0.065	0000						
	ļ			Chemica	Chemical Properties Lookup Table	p Table						
	Organic			Pure		Henry's	Henry's			10.111111111111111111111111111111111111		
	carbon			component		law constant	law constant	Nome		enthalpy or	:	
	partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	Political Political	1	vaponzanon at		
	coefficient,	in air.	in water.	>	law constant	on topocone!	to deletine	S I	Culical	the normal		Reference
	¥		۵		'n	's The state of th	יפוווים מותופי		temperature,	polling point,	factor,	conc ,
CAS No Chemical	(cm <sub>3</sub> /d)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	( (ba)	(acettern)	(atm.m <sup>3</sup> /me)	<u>~</u> (	as S	ပ္ မွ်	ΔΨΔ	를 기 :	Z,
	S	)	(21.12)	4.18.11	(Gunness)	(auti-til /#ROI)	3	Ę.	(7K)	(cal/mol)	(µg/m³) 1	(mg/m³)
50293 DDT	2.63E+06	1 375.02	4 055.08	2 EOE 02	1000		;					
50328 Benzo(a)pyrene	1 02E+06	4 30F-02	90E-06	1 625-02	3 32 11-04	8 105-06	25	533 15	720 75	11,000	9 7E-05	0 0E+00
51285 2,4-Dinitrophenol	1 00E-02	2 73F-02	90-190	2 795±03	4 050-03	1 135-06	25	715 90	969 27	15,000	2 1E-03	0 OE+00
53703 Dibenzía hianthracene	3 805+06	2030.02	2000	2 401 00	075-03	4 44E-U/	52	605 28	827 85	15,000	0 0E+00	7 0E-03
58235 Carbon tetrachloride	746.00	7 000 00	00-00-0	2 485-03	10-H20 0	1 47E-08	52	743 24	990 41	16,000	2 1E-03	0 0E+00
SERVE DONAL COLOURS	1 /45+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05 E-02	25	349 90	556 60	7,127	1.5E-05	00100
67740 Objection	20+H22	5 10E-02		9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	15.000	2 1E-04	00+100
Section Colored	1 205+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13.000	3.7E-04	00+00
occes gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839.36	13,000	275-04	00100
SUS/1 Diefdrin	2 14E+04	1 25E-02	4 74E-06	195E-01	6 19E-04	1516-05	25	613.32	842.25	000,01	100	000
65850 Benzoic Acid	6 005-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1.54E-06	25	720.00	751.00	90,00	20100	001
67641 Acetone	5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88 E-05	25.	329.20	508 10	920,00	00+100	ייניין הייניין
67663 Chloroform	3 98E+01	104E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334.32	536.40	080	20,000	00.00
67721 Hexachloroethane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3.88E-03	25	458.00	605.00	0000	4 OF 06	000
71363 Butanol	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	25	390 88	563.05	10.346	0.05+00	3 55.04
/1432 Benzene	5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7 342	925.08	00100
/1556 1,1,1-Inchioroethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7 138	0.05+00	001100
72208 Endrin	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	52	718 15	986 20	12,00	001100	1,100
72435 Methoxychior	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14 000	00100	1 B F C C C
72548 DDD	1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	80-108	001
72559 DDE	4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44	860.38	13,000	1100	000
74839 Methyl bromide	1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	25	276.71	467.00	5 714	005400	20.40
/5014 Vinyl chloride (chloroethene)	1 86E+01	106E-01	1 23E-06	2 76E+03	1 11E+00	2 71E-02	52	259 25	432.00	5,750	8 4E-05	004800
75092 Methylene chlonde	1 17E+01	1 01E-01	117E-05	1 30E+04	8 98E-02	2 19E-03	25	313 00	510.00	902'0	2011	00-110-0
75150 Carbon disutfide	4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3.02E-02	35	319.00	552.00	00.0	100	201400
75252 Bromoform	8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34 0.04	25	422.35	696.00	0,53	1 15.06	00-100
75274 Bromodichloromethane	5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585.85	000.5	1 PE 05	00+30
75343 1,1-Dichloroethane	3 16€+01	7 42E-02	1 05E-05	5 06E+03	2,30E-01	5.6110.03	3 %	3305	200 000	000,5	1 011.00	00=+00
75354 1,1-Dichloroethylene	5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	3.5	304 75	578.05	0,093	00-00	יים היים
76448 Heptachlor	1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1.09E-03	3 5	000	846.31	2,500	2000	00+100
77474 Hexachlorocyclopentadiene	2 00E+05	1 61E-02	7 21E-06	1 80E+00	1 11 1 + 00	2.71E-02	35	512 15	746.00	10,000	20-110	0,00+00
78591 Isophorone	4 68E+01	6.23E-02	6 76E-06	1 20E+04	2 72E-04	6.63E-06	3 2	488 35	715.00	10,93	275.03	00.10
78875 1,2-Dichloropropane	4 37E+01	7 82E-02	8 73E-06	2 80E+03	115E-01	2 BOE-03	3,5	360 53	572.00	17701	70-27	00#400
79005 1,1,2-Trichloroethane	5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	3 5	386 15	502.00	066,7	001100	4 OHO 0
79016 Trichloroethylene	1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	55	350.36	544 20	7.505	20 H	00+400
79345 1,1,2,2-Tetrachloroethane	9.33E+01	7 105-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	52 29	419 60	66115	900	אלי הלילים הלילים	00+100
83329 Acenaphthene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0.05+00	2 15.01
								† !		) !		- - - - -

					VLOOKUP TABLES							
84742 Dear-build abitation	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0.05+00	2 8E+00
85687 But benzyl obthalate	5 755+04	4 36E-UZ	7 80E-06	1 125+01	3 85E-08	9 395-10	52	613 15	798 67	14,751	000+00	3 5E-01
86306 N-Nitrosodiphenylamine	1 29E+03	3 12F-02	4 02E-00	3 516401	2066.04	1 26E-06	8 8	660 60	839 68	13,000	0 0 - 00	7 0E-01
86737 Fluorene	1 38E+04	3 635-02	7 88E-06	1 98E+00	2.61E-03	5 00E-06	8 %	532.28	890 45	13,000	1.4E-06	0.05+00
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 535-08	3 2	627.87	899.00	13 977	5 7F-08	10-11-0
6/683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02		3 23E+00	3 34 <b>E-</b> 01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0 OE+00
88062 2 4 6-Tradiomenal	3 92E+02	5 60E-02		1 95E+03	1 00E-06	2 44E-08	52	582 15	813 20	14,000	3.4E-05	0 0E+00
91203 Naphthalene	3 0 1 E + 0.2 2 0 0 E + 0.3	3 18E-02 5 90E-02	6 25E-06 7 50E-06	8 OOE+02	3 19E-04	7 78E-06	52	519 15	749 03	12,000	3 15-06	00€+00
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74 5-06	3 116+00	1 54E-02	4 835-04	52	491 14	748 40	10,373	0 DE+00	1 4E-01
95476 o-Xylene	3 63E+02	8 70E-02		1 78E+02	2 13E-01	5 20F-03	0 K	360 26 417 60	734 U3	13,000	1 35-04	0 0E+00
95487 2-Methylphenol (o-cresol)	9 12€+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	2 22	464 19	697 60	10.800	00+100	1.05+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02		1 56E+02	7 79E-02	1 90E-03	S2	453 57	705 00	9.700	00+400	2 05-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	22	447 53	675 00	9,572	00±±00	1 8E-02
93934 Z,4,5-Inchlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	52	526 15	759 13	13,000	0 0E+00	3 5E-01
100414 Fibylbanzana	6 46E+01	7 60E-02	8 605-06	2 09E+03	9 84E-04	2 40E-05	52	483 95	719 00	10,566	0 0E+00	2 0E-03
100425 Styrene	3 03E+02	7 10F-02	7 80E-06	1 695-02	3 23E-01	7 88E-03	52	409 34	617 20	8,501	0 0E+00	1 0E+00
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 695-06	7 87E+03	8 20E-04	2 005 06	8 8	41831	636 00	8,737	0 0 0 0	1 0E+00
106423 p-Xylene	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	2 00E-05 7 66E-03	5 %	484 13	707 60	11,329	000+00	7 0E-02
106467 1,4-Dichlorobenzene	6 17 E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	3 2	447 21	684 75	0,00	00+400	00+00
106478 p-Chloroaniline	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	22	503 65	754 00	11.689	00+400	1 4F-02
10/06/2 1/Z-Dichloroethane	174E+01	104E-01		8 52E+03	4 01E-02	9 78E-04	52	356 65	561 00	7,643	2 6E-05	00+300
108283 m-Vilen	5 25 5 400	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	52	345 65	519 13	7,800	0 0E+00	2 0E-01
108883 Tolingo	1 825+02	7.005-02	7 805-06	161E+02	3 01E-01	7 34E-03	52	412 27	617 05	8,523	0 0E+00	7 0E+00
108907 Chlorobenzene	2 19F+02	7.30F-02	8 70E-06	3 25E+02	2 /2E-01	6 63 E-03	52	383 78	591 79	7,930	0 OE+00	4 0E-01
108952 Phenol	2 88E+01	8 20F-02		8 28E+04	10-369	3 / 1E-03	8 8	404 87	632 40	8,410	0 0E+00	2 0E-02
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92E-02		1 72F+04	7 385-04	/OHES	8 8	455 02	694 20	10,920	0 0E+00	2 1E+00
115297 Endosulfan	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 126-05	8 15	451 15 674 43	659 79	000,4	335-04	00000
117817 Bis(2-ethythexyl)phthalate	151E+07	351E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	2 52	657.15	806.00	14,000	20 40 0	2 15-02
117840 Di-n-octyl phthalate	8 32E+07	151E-02		2 00E-02	2 74E-03	6 68E-05	22	704 09	862 22	15,999	00400	7.05-00
118/41 Hexachlorobenzene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03	52	582 55	825 00	14.447	4 6E-04	0 0F+00
12012/ Antiracene 120921 1 2 4 Trichlossborger	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51 5-05	52	615.18	873 00	13,121	0 0E+00	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
120832 2.4-11041000benzens	1 /8E+03	3 005-02		3 00E+02	5 82E-02	1 42E-03	22	486 15	725 00	10,471	0.0E+00	2 0E-01
121142 2.4-Dinitrololuene	9 555+01	3 48E-02	7 0617 06	4 50E+03	1 305-04	3 17E-06	52	482 15	708 17	11,000	0 0E+00	1 1E-02
124481 Chlorodibromomethane		1 96E-02	1 05E-05	2 70E+02 2 50E+03	3 24E-00	927E-08	8 8	590 00	814 00	13,467	1 9E-04	0 0E+00
127184 Tetrachloroethylene		7 20E-02	8 20E-06	2 00E+02	7 546-01	1 845-02	6 x	416 14 204 40	6/8 20	9,000	246-05	00=+00
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 105-05	3 5	667 95	070 70	8,288	5 8E-0/	0.05+00
156592 as-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03	22	333 65	544 00	7,192	201400	1 5 EO
1555U5 trans-1,Z-Dichloroethylene	5 25E+01	7 07E-02		6 30E+03	3 85E-01	9 39E-03	25	320 85	516 50	6,717	00+00	7 0E-02
195595 Interno(1, z, 5-ca)pyrene 205992 Renzo(h)filmanthone	34/E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06	52	809 15	1078 24	17,000	2 1E-04	0 0E+00
	1 07F+05	2 02E-02	35E-06	2 00E-03	4 55E-03	1 11 5-04	22	715 90	969 27	15,000	2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00F-04	3.40E-05	1 01E-03	2 5	655 95	905 00	13,815	00+00	14E-01
218019 Chrysene	3 98E+05	2 48E-02		1 60E-03	3 88E-03	9.46E-05	9 %	714 15	0/ 8101	16,000	2 16-05	0 0E+00
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	32	603 01	839.37	13,000	20 10 7	00+100
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05	52	596 55	839.36	13.000	4 ac 4	00+00
319527 Deta-HCH (Deta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	22	596 55	839 36	13,000	5 3E-04	00-100
505202 2 6-Dinitrototiene	8 02E+01	9 275 93	1 00E-05	2 80E+03	7 26E-01	1 77E-02	52	381 15	587 38	7,000	3 7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamine	2.40F±01	5.455-02	7 20E-00	1 825+02	3 UBE-US	7.46E-07	<b>13</b>	558 00	770 00	12,938	1 9E-04	0 0E+00
1024573 Heptachlor epoxide	8 32E+04	1 32F-02	•	2.005-01	3 905-03	2.255-06	<b>8</b> 8	509 60	746 87	11,000	2 0E-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 145-02	9 %	613.96	848 76 4759 90	13,000	2 6E-03	0 0E+00
8001352 Toxaphene	2 57E+05	1 16E-02	(-)	7 40E-01	2 46E-04	6 00E-06	3 15	657 15	873 31	14,127	0.05+00	3 OE-04
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	52	402 50	539 37	900	2 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	00+00
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	22	377 50	512 27	19,000	1 2 2 4 4	00+100
126/4112 Arodor 1016 (PCB-1016) 53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 22E-02 2 14E-02	5 42E-06 5 31E-06	4 20E-01	1 19E-02	2 90E-04	52	340 50	475 22	18,000	1 0 H	00 0
/4: 4: 4: 4: 4: 4: 4: 4: 4: 4: 4: 4: 4: 4	ا د در	30-14: 7	າ	3 400-0	2 135-02	5 20E-04	22	345 50	482 20	18,000	1 0E-04	0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter\*X\* in "YES" box)

YES

VERSION 1.2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

YES

		ENTER	User-defined stratum A soil vapor permeability,	k, (cm²)		
			S.	•	٦	
		ENTER	stratum A SCS soil type (used to estimate	soil vapor permeability)		ENTER Stratum C soil water-filled porosity, $\theta_{\mu}^{c}$ (cm <sup>3</sup> /cm <sup>3</sup> )
		ENTER	SCS soil type	directly above water table	SC	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)
		ENTER	Soil stratum directly above	water table, (Enter A, B, or C)	O	ENTER Stratum C soll dry bulk density, P <sub>o</sub> (g/cm³)
	ene	ENTER Lwr (cell D28)	Thickness of soil stratum C, (Enter value or 0)	h <sub>с</sub> (ст)	1341 12	ENTER Stratum B soll water-filled porosity, $\theta_n^g$ (cm³/cm³)
Снетіса	Trichloroethylene	INTER ENTER ENTER Totals must add up to value of Lwr (cell D28)	Thickness of soil stratum B, (Enter value or 0)	(cm)	3048	ENTER Stratum B soil total porosity, n <sup>8</sup> (unitless)
		ENTER Totals mu	Thickness of soil stratum A,	n <sub>A</sub> (cm)	853 44	ENTER Stratum B soli duy, bulk density, p <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )
		ENTER	Depth below grade to water table,	(cm)	2499 36	ENTER Stratum A soll water-filled porosity.  0,4 (cm³)cm³)
ENTER Initial groundwater conc , Cw (µg/L)	61 41538462	ENTER Depth	below grade to bottom of enclosed space floor,	(cm)	15	ENTER Stratum A soil total porosity, n (unitless)
ENTER Chemical CAS No (numbers only,	79016	ENTER	Average soll/ groundwater temperature,	<u>s</u> (2)	16	ENTER Stratum A soil dry bulk densiry. Pa (g/cm³)

	0.43	0.2	17	0 42	0.27	17	0 43	03
INTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
Enclosed		Enclosed	Enclosed					
	Soil-bidg	space	space	Enclosed	Floor-wall	Indoor		
	pressure	floor	floor	Space	seam crack	air exchange		
thickness,	differential,	length,	width,	height,	width,	rate,		
Lorack	PΔ	ٿ	w <sub>B</sub>	f	*	ER.		
(cm)	(g/cm-s²)	(cm)	(cm)	(cm)	(cm)	(1/h)		
	40	961	961	488	01	0.45		
œ	ENTER	ENTER	ENTER	ENTER	ENTER			
Averaging	Averaging			Target	Target hazard			
⊱	time for	Exposure	Exposure	nsk for	quotient for			
913 133	noncarcinogens,	duration,	frequency,	carcinogens,	noncardinogens,			
	AT <sub>NC</sub>	۵	毌	ድ	THO.			

Used to calculate risk-based groundwater concentration 1 0E-06 (days/yr) Exposure duration, ED (yrs) ENTER
Averaging
time for
noncarcinogens,
AT<sub>NC</sub>
(yrs)

	Reference	conc.	RC	(mg/m <sub>3</sub> )		0 0E+00
ii C	пsk	factor,	J.	(nd/m <sub>3</sub> ).1		1 7F-06
component	water	solubility,	S	(mg/L)		1 10F+03
carbon		-				1 66E+02
	Critical	temperature,	ř	ફ		544 20
Normal	borling	po:nt,	ᄪ	£		360 36
vaporization at	the normal	boiling point,	ΔH, <sub>b</sub>	(cat/mol)		7.505   360 36   544 20   166E+02   110E+03   17E-06   0.0E+00
law constant	reference	temperature,	, K	(၁)		25
			r	(atm-m³/mol)		1 03E-02
	Offuswity	in water	ď	(cm <sup>2</sup> /s)		9 10E-06
	Diffusivity	in air	០ឺ	(cm <sup>2</sup> /s)		7 90E-02   9 10E-06
	law constant law constant vaportzation at Normal carbon componer	law constant law constant vaponzation at Normal carbon component Unit Offusivity at reference reference the normal boring Critical partition water risk	law constant law constant vaporization at Normal carbon component Unit Diffusivity at reference reference the normal borling Critical partition water risk in water, temperature, temperature, boiling point, temperature, coefficient, solubility, factor,	law constant law constant vaporization at Normal carbon component Unit Diffusivity at reference reference the normal boring Critical partition water risk in water, temperature, temperature, boiling point, temperature, coefficient, solubitity, factor, $D_{\rm w}$ H $T_{\rm R}$ $\Delta H_{\rm vb}$ $T_{\rm B}$ $T_{\rm C}$ $K_{\rm cc}$ S URF	law constant law constant vaporization at Normal carbon component Unit Diffusivity at reference reference the normal borting Critical partition water risk in water, temperature, temperature, boiling point, temperature, coefficient, solubitity, factor, $D_{w}$ H $T_{R}$ $\Delta H_{w}$ , $T_{B}$ $T_{C}$ $K_{cc}$ $S$ $URF$ $(cm^{3}/s)$ $(am^{3}/mol)$ $(^{9}C)$ $(calfmol)$ $(^{9}K)$ $(cm^{3}/g)$ $(mg/L)$ $(\mu g/m)^{3}$ - $(\mu g/m)^{3}$ - $(\mu g/m)^{3}$	law constant vaponzation at Normal reference the normal borling Critical partition temperature, bouling point, temperature, coefficient, Ta $AH_{\rm cb}$ $T_{\rm R}$ $T_{\rm C}$ $K_{\rm cc}$ $K_{\rm cc}$ $(^{\circ}C)$ $(^{\circ}K)$ $(^{\circ}K)$ $(^{\circ}K)$ $(^{\circ}Cn^{3}/g)$

CHEMICAL PROPERTIES SHEET

Floor- wail seam perimeter, X <sub>crack</sub>	3,844	Diffusion path length, L <sub>d</sub> (cm)	2484 36	
Water-filled porosity in capillary zone, $\theta_{w,ca}$ $(cm^3/cm^3)$	0 346	Total  overall  effective  diffusion  coefficient,  D*T  (cm²/s)	6 87E-04	
Air-filled porosity in capillary zone, $\theta_{a,ca}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.084	Capillary zone effective diffusion coefficient, Deta (cm²/s)	1 17E-04	
Total porosity in capillary zone, nez (cm <sup>3</sup> /cm <sup>3</sup> )	0.43	Stratum C effective diffusion coefficient, D <sup>eff</sup> c (cm²/s)	4 82E-04	Reference conc , RfC (mg/m³)
Thickness of capillary zone, L <sub>=</sub>	30.00	Stratum B B effective diffusion coefficient, D <sup>#</sup> <sub>B</sub> (cm <sup>2</sup> /s)	8 11E-04	Unit risk factor, URF (µg/m³)-1
Stratum A soit effective vapor permeability, k,	3 03E-09	Stratum A A effective diffusion coefficient, Deff (cm²/s)	3 20E-03	Infinite source bldg conc , Chudene (µg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub>	0 778	Vapor viscosity at ave soil temperature, H7s (g/cm-s)	1 77E-04	Infinite source indoor attenuation coefficient, a (unitiess)
Stratum A soil intrinsic permeability, k <sub>1</sub> (cm <sup>2</sup> )	3.89E-09	Henry's law constant at ave, groundwater temperature, H'rs (unitless)	2 78E-01	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitiess)
Stratum A effective total fluid saturation, $S_{a}$ (cm <sup>3</sup> )	0 347	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol).	6 60E-03	Area of crack, A <sub>carck</sub> (cm <sup>2</sup> )
Stratum C soil aur-filled porosity, e,c (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, ΔH, τs (cal/mol)	8,483	Crack effective diffusion coefficient, Dank (cm²/s)
Stratum B soil air-filled porosity, $\theta_{\mathbf{A}}^{B}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Z <sub>onek</sub>	15	Average vapor flow rate into bldg.,  Q <sub>sot</sub> (cm <sup>3</sup> /s)
Stratum A soil alr-filled porosity, $\theta_4^A$ (cm³/cm³)	0 230	Crack- to-total area ratio, n	4 16E-04	Crack radius, fonek (cm)
Source- building separation, L <sub>T</sub>	2484 36	Area of enclosed space below grade, A <sub>B</sub>	9 24E+05	Source vapor conc , C <sub>source</sub> (µg/m³)
Exposure duration,	9 46E+08	Bidg ventifation rate, Q <sub>buideng</sub> (cm <sup>3</sup> /s)	5 63E+04	Convection path length, L <sub>p</sub> (cm)

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INCREMENTAL RISK CALCULATIONS:

				_		ı	
Hazard quotient	from vapor	intrusion to	indoor air,	noncarcinoger	(unitless)		ΑN
Incremental nsk from	vapor	intrusion to	indoor air,	carcinogen	(unitless)		NA
Fınal	ndoor	exposure	groundwater	conc,	(hg/L)		1 24E+03
Pure	component	water	solubility,	S	(μg/L)		1 10E+06
Risk-based	indoor	exposnre	groundwater	conc.	(µg/L)		1 24E+03
Indoor	exposite	groundwater	conc,	noncarcinogen	(µ8/L)		NA
Indoor	exposure	groundwater	conc,	carcinogen	(µg/L)		1 24E+03

VLOOKUP TABLES

				:		VLOUKUP I ABLE	S						
SCS Soil Type	K. (cm/h) a	Soli a (1/cm)	Soil Properties Lookup N (unitless) M (un	Table	6 (cm <sup>3</sup> /cm <sup>3</sup> )	0 (cm <sup>3</sup> /cm <sup>3</sup> )							
	ı	g	ı,		( 1011 1011 )	Ī,	Mean Grain Diameter (cm)						
<u>. c</u>	920	0000	66	0.083	85.0	0.068	0 0092						
1	2 4	600	5	0.23/	0 41	0 082	0 0 1 6						
	5 6	0000	8 6	805 O	0 43	0.078	0 020						
2 0	00 100	77.0	87.7	1960	0 41	0 057	0 040						
, 6	28.0	0 143	2 68	0 627	0 43	0 045	0 044						
) <u>(</u>	Z. 0	0.027	1.23	0 187	0 38	0 100	0 025						
130	131	0.059	1 48	0 324	0 39	0 100	0 029						
5 2	0.75	0.016	137	0.270	0 46	0 034	0 0046						
200	700	0 005	109	0 083	0.26	0 0 0 0	0 0033						
מונה ו	\n 0 1 1	0010	123	0 187	0.43	0 0 0	0 0026						
18.	0.45	0 020	141	0 291	0 45	0 067	0 0 11						
35	4 42	0 075	1 89	0 471	0 41	0 065	0 030						
					•								
	•	que			Chemic	Chemical Properties Lookup Table	up Table						
	•	Organic			Pure		Henry's	Henry's			Enthaloy of		
	υ				component		law constant	law constant	Normal		vagoritzation at	<u> </u>	
	ă	partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	o line	Coffee	the normal	<u> </u>	
	Š	coefficient,	in air,	in water,	sotubility,	law constant	temperature.	temperature		ternoerature	tolling point	LISK Cale	Kererence
		<del>ہ</del> 8				i	I	i dina	Ē	reniperatue,	couling point,	ractor,	conc,
CAS No Chemical	٥	(cm <sub>3</sub> /g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(nuitless)	(atm-m³/mol)	ະ ປົ	<b>.</b> §			֡֝֞֝֜֝֞֝֓֓֓֓֞֝֟֝֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	ر آ آ
											Califically	( LLi/Onl)	(_mg/m_)
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3.32E-04	8 10E-06	25	533 15	720.75	11,000	100	1
50328 Benzo(a)pyrene	_	1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 13E-06	25	715 90	2696	000,11	ט קיי פיין קיי	004100
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	25	605 28	827.85	15,000	2011	20100
53703 Dibenz(a,h)anthracene	e.)	3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03€-07	1 47E-08	25		990 41	16,000	2 15.03	00-100
56235 Carbon tetrachloride	-	1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25		556 60	7 127	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
56553 Benz(a)anthracene	e,	3 98E+05	5 10E-02		9 40E-03	1 37E-04	3,34E-06	25		1004 79	15,000	2 2 1 2 2	
57749 Chlordane	-	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25		885 73	13,000	2 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	20 + 10 0
58899 gamma-HCH (Lindane)	•	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	71.04	
60571 Dieldrin	rv.	2 14E+04	1 25E-02	4 74E-06	195E-01	6 19E-04	1 51E-05	25		842.25	13,000	4 5 11 0 3	
62650 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25		751 00	10,000	0 OE+00	145+01
6/641 Acetone	,	5,75E-01	1 24E-01	1,14E-05	1 00E+06	1 59E-03	3 88E-05	25		508 10	6,955	0.000	35501
6753 Chloroform	e.,	3 98E+01	1 04E-01		7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	886'9	2 3E-05	0 0E+00
	- (	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1,59E-01	3 88E-03	25	458 00	695 00	9,510	4 0E-06	0 0E+00
71432 Benzene	9 4	6 92E+00	8 00E-02	9305-06	7 40E+04	3 61E-04	8 80E-06	25	390 88	563 05	10,346	0.05+00	3 5E-01
71556 1 1 1-Trichlomathens	0 4	3 09E+01	8 80E-02		175E+03	2 28E-01	5 56E-03	52	353 24	562 16	7,342	8 3E-06	0 0E+00
72208 Endin		236+04	1 255 02	8 80E-06	1 335+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0.000	1 0E+00
72435 Methoxychlor	- σ	775-04	1 565.02	4 / 4 / 4 / 4 / 4 / 4 / 4 / 4 / 4 / 4 /	7 30E-01	3 08E-04	7 51E-06	25	718 15	986 20	12,000	0 0E+00	1 1E-03
72548 DDD	, -	00F+06	1 695-02		4 30E-02	400000	1 58E-05	25	651 02	848 49	14,000	0 0E+00	1 8E-02
72559 DDE	. 4	47E+06	1 44F-02		1 205-02	9 0 4 1 - 0 4 0 4 1 - 0 4	4 00E-06	25	639 90	863 77	14,000	6 9E-05	0 0E+00
74839 Methyl bromide	•	05E+01	7 28F-02		1525-01	100000000000000000000000000000000000000	2 10E-05	8 8	636 44	860 38	13,000	9 7E-05	0 0E+00
75014 Vinyl chlonde (chloroethene)	(e)	86E+01	1 06F-01	1.23F-06	2 76E+03	1 115400	0 24E-03	8 8	27671	467 00	5,714	0 0 0 0	5 OE-03
75092 Methylene chloride		17E+01	1 01E-01	1 17E-05	1.30F+04	8 98F-03	2 / 15-02	<b>6</b> 5	27.607	432.00	5,250	8 4E-05	000
75150 Carbon disulfide	4	57E+01	1045-01	1 00E-05	1 19E+03	1 24 F+00	3 125-03	22.5	210 00	00.016	90/9	4 (H) 6	305+00
75252 Bromoform	•	8.71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	2 52	422.35	932 00 696 00	92.00	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10-10 /
75274 Bromodichloromethane	ĸ	50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585.85	2007	20 U	
75343 1,1-Dichloroethane	e	16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61 E-03	25	330.55	523 00	200	00100	00,100
75354 1,1-Dichloroethylene	5	89E+01	9 005-02		2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6.247	50-05	00+400
restaction		1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09层-03	25	603 69	846 31	13 000	1.3F-03	005+00
78601 Inchange		2 00E+05	1615-02		1 80E+00	1115+00	2 71E-02	25	512 15	746 00	10,931	0 0E+00	7 OE-05
78875 1 3-Dichlossesson	4 4	58E+01	6 23E-02		1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10,271	2 7E-07	0 0E+00
79005 1 1 2-Trichlorophone	4 4	4.3/m+01	7 82E-02		2 80E+03	1 15E-01	2 80E-03	25	369.52	572 00	7,590	0 0E+00	4 0E-03
79016 Trichloroethylene	. <del>.</del>	1 66E±02	7 90 11 02	8 80E-06	4 425+03	3 74E-02	9 12E-04	52	386 15	602 00	8,322	1 6E-05	0 0E+00
79345 1,1,2,2-Tetrachloroethane	- თ	9.33E+01	7 105-02		2 97 11 403	4 415 02	1 035-02	25	36036	544 20	7,505	1 7E-06	0 0E+00
83329 Acenaphthene		7 08E+03	4 21F-02		4 24F+00	4 1 E-02	3 445-04	52.5	09614	661 15	966'8	586-05	0 0E+00
			1		>>: 1+4 t	מיידטי ט	#0-D0C	27	550 54	803 15	12,155	0.05+00	2 1E-01

0.000			;		VLOOKUP TABLES							•
84742 C Frank Street	2 88E+02	2 56E-02	6 355-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0.05+00	2 8E+00
96607 City Duty phthalate	3 39E+04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10	22	613 15	798 67	14,751	00100	3 5E-01
52027 Butyl benzyl phthalate	5 75E+04	174E-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06	22	660 60	839 68	13,000	0.05+00	7 0E-01
	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 00E-06	25	632 28	890 45	13,000	1 4E-06	0 OE+00
86737 Fluorene	1 38E+04	3 63E-02	7 885-06	1 98E+00	2 61E-03	6 37E-05	52	570 44	870 00	12,666	0 0E+00	1 4E-01
80/48 Carbazole	3 39E+03	3 90E-02		7 48E+00	6 26E-07	1 53E-08	52	627 87	899 00	13,977	5 7E-06	0 0E+00
87865 Dentachlomohenel	5375+04	5 61E-02	6 16E-06	3 23 6 + 00	3 34E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0 0E+00
88062 2.4.6-Trichlorophenol	3 815+02	3 185-02	6 10E-06	8 00E+03	2 10E-08	7 79E 06	8 8	582 15	813.20	000,41	5 th	001100
91203 Naphthalene	2 00E+03	5 90 5-02	7 50F-06	3 10 101	1985.02	00-00 / 00-00 /	9 4	019 13	749 03	000,21	201100	7 40 04
91941 3,3-Dichlorobenzidine	7 24E+02	1946-02	6 74E-06	3 11E+00	1 64E-07	4 00E-09	22	560.26	754 03	13,000	1.3F-04	005-00
95476 o-Xylene	3 63E+02	8 70E-02		1 78E+02	2 13E-01	5 20E-03	123	417 60	630 30	8.661	0 00+00	7 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	32	464 19	697 60	10,800	00=+00	1 8E-01
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02		1 56E+02	7 79E-02	1 90E-03		453 57	705 00	9,700	0.05+00	2 0E-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9,572	0 0E+00	1 8E-02
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04			526 15	759 13	13,000	0 0E+00	3 5E-01
JOSAAA CANADANIA	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	52	483 95	719 00	10,566	0 OE+00	2 0E-03
100425 Styrene	3 53E+02 7 76E±02	7 105-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	8 8	409 34	617 20	8,501 707	000.100	100-00
105679 2.4-Dimethylopenol	2 09E+02	5 84E-02	86.700	3 10E+02	10-101	2 2005	Q	41831	636 00	, c,	001100	1 0E+00
106423 p-Xylene	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	2 00E-06	8 %	411 52	616.20	11,329 8 525	00+100	7 05+00
106467 1,4-Dichlorobenzene	6 17E+02	6 905-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03		447.21	684 75	9,72,9	20140	8 OF O.
106478 p-Chloroantine	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07		503 65	754 00	11,689	0000	1 4E-02
107062 1,2-Dichloroethane	1 74E+01	1 04E-01	9 90E-06	8 52E+03	4 01E-02	9 78E-04		356 65	561 00	7,643	2 6E-05	0 OE+00
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04		345 65	519 13	7,800	0.0E+00	2 0E-01
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01 6-01	7 34E-03		412 27	617 05	8,523	0 0E+00	7 0E+00
108883 Tolliene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03		383 78	591 79	7,930	0 OE+00	4 0E-01
10890/ Chloropenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	371E-03		404 87	632 40	8,410	0 0E+00	2 0E-02
11144 Bar 2-chiomothylother	2 88E+U3	8 205-02	9 105-06	8 285+04	1 63E-05	3 985-07	22	455 02	694 20	10,920	0 OE+00	2 1E+00
115297 Endosuffan	2 14E+03	1 15F-02	7 33E-06	1 /2E+04 5 10E-01	7 38E-04 4 59E-04	1 80E-05	£ 5	451 15 677 43	659 79	000'6	3 35-04	0000
	1 51E+07	3 51E-02	3 665-06	3 40E-01	4.18E-06	1.02F-07	3 %	657 15	BOB OO	200	00-100	70-31-7
117840 Di-n-octyt phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05	22	704 09	862 22	15,000	00+00	7 OF -02
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03	52	582 55	825 00	14,447	4 6E-04	0 0E+00
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05	52	615 18	873 00	13,121	0 0E+00	1 1E+00
120821 1,2,4-Inchlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03	52	486 15	725 00	10,471	0 0E+00	2 0E-01
12052 Z,4-Didikatonendi 121142 2 4-Digitatohiana	14/2+02	3 465-02	8 //E-06	4 50E+03	1 30E-04	3 17E-06	52	482 15	708 17	11,000	0.05+00	1 1E-02
124481 Chlorodibromomethane		1 96F-02	1 055-05	2 FOE+02	3 215-03	3 27 E-U8	8 %	590 00	814 00	13,467	1 9E-04	00=+00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7.54E-01	1 84F-02	3 %	394.40	620.20	90,00	2 4E-d3	00+400
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 10E-05		667.95	936 00	14.370	005+00	115-01
156592 cs-1,2-Dichloroethytene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00	7,192	0 0E+00	3 5E-02
156605 trans-1,2-Dichloroethylene		7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516 50	6,717	0 0E+00	7 0E-02
195595 Indeno(1,2,5-cd)pyrene	34/6+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06		809 15	1078 24	17,000	2 15-04	0 0E+00
205440 Fluoranthene	1 07F+05	3.025-02	5.35F-06	2.06E-03	4 55E-U3 6 60E-04	111504	K2 19	715 90	969 27	15,000	2 1E-04	000
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02		8 00E-04	3 40E-05	8 29 F-07		753 15	1019 70	15,013	2 15.05	1 4 E-U 1
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05		714 15	979 00	16.455	2 1E-06	00+100
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 705-04		603 01	839 37	13,000	4 9E-03	0 0E+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		596 55	839 36	13,000	185-03	0 0E+00
51969/ Detainon (Detaino) 549756 1 3-Dicklomorphone	1 505+03	1 42E-02	, 34E-06	2 405-01	3.05E-05	7 44E-07	52	596 55	839 36	13,000	5 35-04	0 0E+00
606202 2 6-Dinitroteirene	4 37 E+01	3 27E-02	1 00E-05	2 80E+03	7.26E-01	177E-02		381 15	587 38	2,000	3 7E-05	2 0E-02
621647 N-Nitrosodl-n-propylamine	2 40E+01	5 45E-02	8.17E-06	9 89E+03	9 23E-05	2.25F-06		508 60 509 60	746.87	12,938	196-0	000
1024573 Heptachlor epoxide	8 32E+04	1 32E-02		2 00E-01	3 90E-04	9515-06	32	513 96	848 76	13.00	2012	00+100
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02	52	529 88	1750 00	14.127	0 0E+00	3 DE-04
8001352 Toxaphene	2 57E+05	1 16E-02		7 40E-01	2 46E-04	6 00E-06	22	657 15	873 31	14,000	3 2E-04	0 0E+00
11096825 Aradio 1260 (PCB-1260)	2 90E+05	1 385-02		8 00E-02	189E-01	4 60E-03	52		539 37	19,000	1 OE-04	0 0E+00
11097091 AUGGO 1204 (PCB-1204)	3 305+04	2000-02	3 00E-06	3 /0E-02	8 20E-02	2 005-03	8 8	377 50	512 27	19,000	1 OE-04	0 0E+00
53469219 Arodor 1242 (PCB-1242)	330E+04	2 14E-02	5 31E-06	3 40E-01	2 135-02	2 90E-04	8 8	340 50	475 22	18,000	- 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0	00-110-0
		ļ !					3	3	N7 704	10,100		0 0 0

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

×≅

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

			ENTER	User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm²)		
			ENTER	stratum A SCS soil type (used to estimate OR soil vapor permeability)		ENTER Stratum C soil water-filled porosity, 0,c 0,c
			ENTER	SCS soil type directly above	၁	ENTER Stratum C soil total porosity,
			ENTER	Soil stratum directly above water table, (Enter A, B, or C)	Ö	ENTER Stratum C soil dry bulk density, p <sub>o</sub>
		hane	ENTER Lwr (cell D28)	Thuckness of soil stratum C, (Enter value or 0) hc (cm)	1341 12	ENTER Stratum B soil water-filled porosity,
	Chemical	1,1,2-Trichloroethane	NTER ENTER ENTER Totals must add up to value of Lwr (cell D28)	Thickness of soil stratum B, (Enter value or 0) h <sub>a</sub> (cm)	3048	ENTER Stratum B soil total porosity, n <sup>8</sup>
_			ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub>	853 44	ENTER Stratum B soll dry bulk density,
			ENTER	Depth below grade to water table, Lwr (cm)	2499 36	ENTER Stratum A soul water-filled porosity, $\theta_w^A$
YES	ENTER Initat groundwater conc , C <sub>w</sub> (µg/L)	2 373076923	ENTER Depth	below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	15	ENTER Stratum A soil total porosity, n <sup>A</sup>
	ENTER Chemical CAS No (numbers only, no dashes)	79005	ENTER	Average soll/ groundwater temperature, T <sub>s</sub>	16	ENTER Stratum A soul dry bulk density, P <sub>A</sub> (a/cm <sup>3</sup> )

ENTER ENTER Stratum C Stratum C soil total soit water-filled porosity, porosity, n <sup>c</sup> 6 <sub>w</sub> <sup>c</sup> (unitless) (cm³/cm³)	043 03						
ENTER Stratum C soil dry bulk denstry, p <sub>b</sub> (g/cm³)	17	ENTER	Indoor	air exchange rate.	Æ	(1/h)	
ENTER Stratum B soil water-filled porosity, $\theta_w^B$ (cm³/cm³)	0.27	ENTER	Floor-wall	seam crack width,	*	(cm)	
ENTER Stratum B soil total porosity, n <sup>8</sup> (unitless)	0.42	ENTER	Enclosed	space height,	ī	(cm)	
ENTER Stratum B soil dry bulk density, p <sub>b</sub> (g/cm³)	17	ENTER Enclosed	space	width,	W	(cm)	
ENTER Stratum A soil water-filled porosity, $\theta_w^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.2	ENTER	space	length,	j,	(сш)	1.50
ENTER Stratum A soil total porosity, n <sup>A</sup> (undless)	0 43	ENTER	Soil-bldg	differential,	РΔ	(g/cm-s <sup>2</sup> )	
ENTER Stratum A soul dry bulk density, Pb (g/cm³)	15	ENTER Enclosed	space	thickness,	Lond	(cm)	

0 1	ENTER Target hazard	quotient for	JH2	(unitless)	1	
488	ENTER	risk for	, F	(unitless)	1 0E-06	
961	ENTER	Exposure		(days/yr)	350	
961	ENTER	Exposure duration.	<u>.</u>	(yrs)	30	
40	ENTER	lime for noncarchogens,	ATNC	(yrs)	30	
15	ENTER	time for carcinogens,	ATc	(yrs)	70	

Used to calculate risk-based groundwater concentration

### CHEMICAL PROPERTIES SHEET

Reference	conc,	R <sub>f</sub> C	(mg/m³)
Unit nsk	factor,	J.R.	(mg/m <sub>3</sub> ).1
Pure component water	solubility,	Ø	(mg/L)
Organic carbon partition	coefficient,	፳	(cm <sub>3</sub> /g)
Ontical	temperature,	'n	( <del>K</del> )
Normat botting	point,	<b>-</b> °	ફ ફ
Enthalpy of vaponzation at the normal	boi'ing point,	ΔH,b	(cal/mol)
Henry's law constant reference	temperature,	⊢ K	(၂)
Henry's law constant at reference	temperature,	I	(atm-m³/mol)
Diffusivity	ın water,	ď	(cm <sup>2</sup> /s)
Diffusivity	n aır,	<b>់</b>	(cm <sup>2</sup> /s)

Floor-wall seam penmeter,	3,844	Diffusion path length,	2484 36	
Water-filled porosity in capillary zone, $\theta_{w,ca}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 346	Total overall effective diffusion coefficient, Deff (cm²/s)	7 35E-04	
Air-filled porosity in capillary zone, $\theta_{a,cz}$ $(cm^3/cm^3)$	0 084	Capillary  Zone effective diffusion coefficient, D <sup>eff</sup> cc (cm <sup>2</sup> /s)	1 70E-04	
Total porosity in capillary zone, $\frac{\Gamma_{c2}}{\Gamma_{c2}}$	043	Stratum C C effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> (s)	5,10E-04	Reference conc , RfC (mg/m³)
Thickness of capillary zone, La	30 00	Stratum B B effective diffusion coefficient, D (cm²/s)	8 25E-04	Unit risk factor, URF (µg/m³) <sup>-1</sup>
Stratum A soil effective vapor permeability, k, (cm²)	3 03E-09	Stratum A A effective diffusion coefficient, Doff (cm²/s)	3 17E-03	Infinite source bldg conc., Cuesting (µg/m³)
Stratum A soil relative air permeability, k <sub>19</sub>	0.778	Vapor viscosity at ave soil temperature, $\mu_{rs}$ (q/cm-s)	1 77E-04	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)
Stratum A soll intinisic permeability, k (cm²)	3 89E-09	Henry's law constant at ave groundwater temperature, H'rs (unitless)	2.33E-02	Exponent of equivalent foundation Peciet number, exp(Pe <sup>f</sup> ) (unitless)
Stratum A effective total flud saturation, S <sub>a</sub>	0.347	Henry's iaw constant at ave groundwater temperature, Hrs (atm-m³/mol)	5 53E-04	Area of crack, Area (cm²)
Stratum C sod an-filled porosity, $\theta_{c}^{c}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 130	Enthalpy of vaporization at ave groundwater temperature, $\Delta H_{v,Ts}$ (cal/mol)	9,507	Crack effective diffusion coefficient, Danse (cm²/s)
Stratum B soil air-filled porosity, $\theta_{\bullet}^{8}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Z <sub>crack</sub> (cm)	15	Average vapor flow rate into bidg , Q <sub>sol</sub> (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitless)	4 16E-04	Crack radius, frask (cm)
Source- building separation, L <sub>T</sub>	2484 36	Area of enclosed space below grade, A <sub>B</sub>	9 24E+05	Source vapor conc, C <sub>isource</sub> (ug/m³)
Exposure duration, t	9 46E+08	Bidg ventilation rate, Q <sub>bunding</sub> (cm <sup>3</sup> /s)	5 63 = +04	Convection path length, Le (cm)

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS

INCREMENTAL RISK CALCULATIONS.

Hazard quotient	from vapor	intrusion to	indoor air,	noncarcinogen	(unitless)	ĄV
Incremental risk from	vapor	intrusion to	indoor air,	carcinogen	(unitless)	AN
Final	Indoor	exposure	groundwater	conc,	(µg/L)	1 47E+03
Pure	component	water	solubility,	ഗ	(µg/L)	4 42E+06
Risk-based	ındoor	exposnre	groundwater	conc.	(μg/L.)	1 47E+03
Indoor	exposure	groundwater	conc,	noncarcinogen	(µg/L)	Ϋ́
Indoor	exposnue	groundwater	couc,	carcinogen	(mg/L)	1 47E+03

						VLOOKUP TABLES	SS						
# 0 0 0			Soil Properties Lookup Table	ookup Tabie	,								
Section 1996	K, (cm/h)	α (1/cm)	N (unitless)	M (unitless)	θ, (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)						
ා <u>ප්</u>	0 20	0 008	109	0 083	0 38	0.068	0 0005						
	9 7 6	8000	1.5.1 1.5.6	0.237	0,41	9600	0 016						
S	14.59	124	ο α - c	0.559	0.43	0.078	0 020						
S	29 70	0.145	2 2 2	0.00	0 0	0.057	0 040						
SC	0 12	0 027	1 23	0 187	2 6	600	0 0 0						
SCL	131	0 059	148	0 324	900	8 6	9700						
100	0 25	0 016	1 37	0 270	0.46	0 034	0.0046						
U 6	0 05	0 005	1 09	0 083	0.26	0.070	0 0039						
SICL	0 07	0 0 0 0	1 23	0 187	0.43	0 089	9500 0						
3. S.	0 4 0 4 0 4 0 5	0.020	1 41	0 291	0 45	790 0	0 011						
			2	ì	7	0.000	0.030						
					Chemic	Chemical Properties Lookup Table	up Table						
		Organic			Pure		Henry's	Henry's			Enthalov of		
		carbon		: : :	component		law constant	law constant	Normal		Vaporization at	TIMO	
	•	partition	Diffusivity	Orffusivity	water	Henry's	at reference	reference	poiling	Critical	the normal	ısk	Reference
		K		m water.	Southamy,	Iaw constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,	conc ,
CAS No Chemical		(6/ <sub>E</sub> m <sub>2</sub> )	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(ma/[)	(sseption)	r, (atm-m³/mot)	٣ (ر	<u> </u>	_ 2 €		CRF.	. RC
					(2.5)	(ecamin)	(authin)	3	2	(K)	(cat/mol)	(mg/m²)	(mg/m³)
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15		11 000	9.75.05	001110
51285 24 Dialement		1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 13E-06	25	715 90	969 27	15.000	2 1F-03	00+100
53703 Dihenzia hisothranena		1 00E-02	2 73E-02	90-390 6	2 79E+03	1 82E-05	4 44E-07	25	605 28		15,000	0 OE+00	7 0E-03
56235 Carbon tetrachlonde		1 745,100	7 02E-02	0 18 0 0 18 0 0 18 0	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03	0 0E+00
56553 Benz(a)anthracene		3 985+05	7 00E-02	90 200 0	/ 93E+02	1.25E+00	3 05E-02	25	349 90		7,127	1 5E-05	0 0E+00
57749 Chlordane		1 20E+05	1 18F-02	9 GUE-06 4 37E-06	9 40E-03	137E-04	334E-06	25	708 15	•	15,000	2 1E-04	0 00+00
58899 gamma-HCH (Lindane)	_	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74F-04	4 83E-US	52	624 24		13,000	3 7E-04	0 0E+00
60571 Dietdrin		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1515-05	25	613 32		13,000	3 7E-04	00=+00
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1546-06	25.0	720.02	751.00	3,000	4 of 03	00=+00
67641 Acetone		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25	329 20		0,000	00+400	2 5E 04
6753 Chloroform		3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32		56.5 88.6	2.3F-05	0.05
71363 Butanol		1 /8E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00		9,510	4 OE-06	0 0E+00
71432 Benzene		5 896+01	8 BOF-02	930E-06	7 40E+04	3 61 E-04	8 805-06	25	390 88		10,346	0 0E+00	3 5E-01
71556 1,1.1-Trichloroethane		1 10E+02	7 80E-02	8 BOE-06	1 335 +03	7.05E-01	5 56E-03	25	353 24		7,342	8 3E-06	0 0E+00
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7.515-06	25 25	718 15	545 00 986 30	7,136	0.0E+00	1 05+00
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	32 2	651 02		14,000	00+400	1 HE-U3
72569 DDC		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90		14,000	6 9E-05	0.01
74839 Methyl hmmide		4 4/E+05	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	22	636 44	86038	13,000	9 7E-05	0.00
75014 Vinyl chloride (chloroethene)	(anar	1865+01	1 065-02	1 27 E-05	1 52E+04	2 56E-01	6 24E-03	25	276 71	467 00	5,714	0.010	5 0E-03
75092 Methylene chloride	ì	1 17E+01	1015-01	1 17F-05	1305+04	8 08E-03	271E-02	25	259 25		5,250	8 4E-05	00±300
75150 Carbon disulfide		4 57E+01	104月-01	1 00E-05	1 19E+03	1 24F+00	2 19E-03	67	213.00		6.706	4 7E-07	3 0E+00
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5345-04	52	422.35	00 255	6,391	0.05+00	7 0E-01
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15		7,000	1 87.05	00+400
75354 1 * Dichtomethyleso		3 16 1401	7 42E-02	1 05E-05	5 06E+03	2 305-01	5 61E-03	25	330 55		6,895	0 0E+00	5 0E-01
76448 Hentachtor		3 88E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75		6,247	5 OE-05	0 0E+00
77474 Hexachlorocyclonentadiana	enei	2 005+05	1615.02	2 24 11 05	1 80E-01	4 47E-02	1 09E-03	25	603 69		13,000	1 35-03	0 0E+00
78591 Isophorone	,	4 68E+01	6.23E-02	6 76F-06	1 205+04	2 72E.04	2 71E-02	52	512 15	746 00	10,931	0 0E+00	7 0E-05
78875 1,2-Dichloropropane		4 37E+01	7 82E-02		2 80E+03	1 15F-01	2 805.02	S #	488 35	715 00	10,271	2 7E-07	0 OE+00
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 805-06	4 42E+03	3 74E-02	2 50E-03 9 12E-04	25.55	386 15	572 00 602 00	7,590 8,322	0 0E+00	4 0E-03
79016 Trichloroethylene		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25	360 36	544 20	7.505	1 7E-06	00+00
/9345 1,1,2,2-Tetrachloroethane	De.	9 33E+01	7 10E-02	7 90E-06	2 97E+03	141E-02	3 44E-04	72	419 60	661 15	966'8'	5 85-05	0 0 0 0 0
gaaza Acenaphurene		7 08E+03	4.21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0.05+00	2 15-01

	:		1		VLOOKUP TABLES	!	1	!	;		:	
04002 Diethylphthalate	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 515-07	52	567 15	757 00	13,733	00+00	2 BE+00
85687 Rink hearth outhalate	5 53E+04	4 35E-02	7 88E-05	1 12E+01	3 53E-06 5 17E-05	9.395-10	6 6 7	650.60	1900/	13,731	200	2000
	1 205+03	3 12E 02	6 355.06	3 516401	2056-04	202-00	3 2	632.28	900 46	200,00	4 4 1 0 0	00+10
86737 Finnana	1 385+04	3 63E-02	7 885-06	1 98 0	2 63 E-03	3 37E-05	3 %	570 44	870.00	12,666	005+00	1 4 F-03
	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1535-08	25	627.87	00 668	13.977	5 7E-06	00+300
87683 Hexachtoro-1,3-butadiene	5 37E+04	5 61 6-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	22	486 15	738 00	10,206	2 2E-05	0 0E+00
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	52	582 15	813 20	14,000	3 45-05	0 0E+00
88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 195-04	7 78E-06	52	519 15	749 03	12,000	3 1E-06	0 OE+00
9 1203 Naphulalene 9 1941 3 3-Dichlorobenzulne	2 UNE+03	5 90E-02	/ 50E-06	3 10E+01	1 985-02	4 835-04	8 8	491 14 550 28	754 03	10,373	1 35-04	0.05
95476 o-Xylene	3 635+02	8 70E-02	1 00E-05	1 78E+02	2 135-01	5 20E-03	2 2	417 60	630 30	8,661	00=+00	2 H 2 H 2 H 2 H 2 H 2 H 2 H 2 H 2 H 2 H
95487 2-Methytphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	25		09 269	10,800	0.05+00	1 8E-01
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 905-03	52	453 57	705 00	9,700	0 0E+00	2 0E-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9,572	0 0E+00	1 8E-02
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	52	526 15	759 13	13,000	0 0E+00	355-01
100414 Ethylpensene	3 635403	7 505-02	8 60E-05	2 09E+03	9 84 11-04	2 40E-05	S S	483 95	719 00	10,966	00000	2 DE-03
100425 Styrene	7 76E+02	7,10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03	25	418 31	636 00	8.737	0000	10H
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	52	484 13	707 60	11,329	0.0E+00	7 0E-02
	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	56	411 52	616 20	8,525	0 0E+00	7 0E+00
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	52	447 21	684 75	9,271	0 0E+00	8 0E-01
106478 p-Chloroaniline	6 61E+01	4 83E-02	101E-05	5 30E+03	136E-05	3 325-07	52	503 65	754 00	11,689	000-00	1 4E-02
108054 Vind acetata	5.255+00	8 50F 02	9 30 11 08	0.02E+03	2 10E-02	47 17 17 17	8 8	356 65 345 65	561 00	, 640, 5	2 65-05	0 UE+00
108383 m-Xv4epe	4 07E+02	2 OOF 02	7 80E-06	1 61E+02	3.01E-01	7 345.03	3 %	44007	517.05	000'	00100	7 0 5 400
108883 Toluene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2,72E-01	6 63E-03	52 22	383 78	591 79	7.930	000-100	4 GE-01
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03	52	404 87	632 40	8,410	0 OE+00	2 0E-02
	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	25	455 02	694 20	10,920	0 0E+00	2 1E+00
	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 805-05	52	451 15	629 79	000'6	3 35-04	0 0E+00
11529/ Endosullan 117917 Be/2 oth/hows/hophalate	2 14E+03	1 155-02	4 55E-06	5 10E-01	4 59E-04	1.12E-05	52	674 43	942 94	14,000	0 0E+00	2 1E-02
117840 Distanction optimals to		351E-02	3.58E-06	3 40E-03	4 18E-Ub	1 02E-07 6 68E-05	5 K	65 / 59	806 00 862 22	15,999	4 00.06	200100
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 415-02	1 325-03	22	582.55	825.00	14 447	4 5F-04	005-00
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05	55	615 18	873 00	13,121	0 0E+00	1 1E +00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03	25	486 15	725 00	10,471	0.05+00	2 05-01
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06	52	482 15	708 17	11,000	0.0E+00	1 1E-02
121142 Z.4-Dinitrototrene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27 E-08	52	590 00	814 00	13,467	196.0 40.0	000
124461 Calgrounding Herrigans 127184 Tetrachloroethylene	1.55F±02	7 20E-02	50-100 K	2 00E+03	3.21E-02 7.54E-01	7 63E-04 1 84E-02	5 50 24 50	416 14 304 40	678 20 630 30	000,8	2.45-05	00=+00
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	1 35E-01	4 516-04	1 10E-05	25	667 95	936 00	14.370	005+00	111-01
156592 dis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03	52	333 65	544 00	7,192	0 0E+00	3 SE-02
156605 trans-1,2-Dichloroethylene		7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03	25	320 85	516 50	6,717	0 0E+00	7 0E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 605-06	52	809 15	1078 24	17,000	2 1E-04	0 0E+00
205992 Benzo(b)ituoranthene	1 235+06	2 26E-02	5 55E-05	1 50E-03	4 55E-03	1 115-04	52	715 90	969 27	15,000	2 1E-04	00±400
205440 Floorantinene 207089 Benzo(ki@uoranthene	1 23F ±06	3 UZE-UZ		8 00F-04	3 401-05	8 29F-07	6 K	055 95 753 15	905 00	15,815	0.0E+00	1450
218019 Chrysene	3 98E+05	2 486-02	6.21E-06	1 60E-03	3 88E-03	9 46E-05	2 82	714 15	979 00	16,455	2 15-05	00000
309002 Aldnn	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	52	603 01	839 37	13,000	4 9E-03	0 0E+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05	22	596 55	839 36	13,000	1 8E-03	0 0E+00
	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	52	596 55	839 36	13,000	5 3E-04	0.05+00
542/55 1,3-Dichloropropene	4 3/E+U1	8 20E-02	1 00E-05	2 80E+03	7 26E-01	1 //E-02 7 48E-07	2 %	381 15	587 38 770 00	7,000	3.7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamine		5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06	25	209 60 509 60	746.87	11,000	2 SE-C4	00+110
1024573 Heptachlor epoxide	8 32E+04	1 32E-02			3 905-04	9 51 E-06	52	613.96	848 76	13.000	2.6E-03	00+400
7439976 Mercury (elemental)		3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02	22	629 88	1750 00	14,127	0.05+00	3 OE-04
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	25	657 15	873 31	14,000	3 2E-04	0 0E+00
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	52	402 50	539 37	19,000		0000
12674112 Arador 1016 (PCB-1016)	3.30F+04	2 22F-02		4 20F-01	1 195-02	2 905-04	3 5		475 22	9,60	4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	00+110
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02		3 40E-01	2 13E-02	5 20E-04	22	345 50	482.20	18,000	1 0 H	000+00
											!	

VERSION 1.2 September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

	ENTER User-defined stratum A soil vapor permeability, k, (cm²)			
	ENTER Soll Statum A SCS SOI ype (used to estimate OR soil vapor permeability)		ENTER Stratum C soul water-filled porosity, $\theta_w^c$ $(cm^3/cm^3)$	03
	ENTER SCS soil type directly above	SC	ENTER Stratum C soil total porosity, n <sup>c</sup> (unittess)	0 43
	ENTER Soll stratum directly above water table, (Enter A, B, or C)	U	ENTER Stratum C soil dry bulk density, pc (g/cm²)	ENTER Indoor air exchange rate, ER (1/h)
/lene	ENTER (Lyrr (cell D28) Thickness of soil stratum C, (Enter value or 0) hc (cm)	1341 12	ENTER Stratum B soil water-filled porosity, $\theta_{w}^{B}$ (cm³/cm³)	ENTER Floor-wall seam crack width, w (cm)
Chemical Tetrachloroethylene	Totals must add up to value of L <sub>vyr</sub> (cell D26) Thickness Thickness Interness of soil soil stratum B. stratum C, atum A, (Enter value or 0) (Enter value or b, h <sub>a</sub> h <sub>c</sub> (cm) (cm)	3048	ENTER Stratum B soil total porosity. n <sup>B</sup> (unlifess)	ENTER Enclosed space height, Hs (cm)
	ENTER Totals mu Thickness of soil stratum A, h <sub>A</sub> (cm)	853 44	ENTER Stratum B soil dry bulk density, p <sub>b</sub> (g/cm³)	ENTER Enclosed Space floor width, Wa
	ENTER  Depth below grade to water table,  Lwr (cm)	2499 36	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ (cm³/cm²)	ENTER Endosed space floor length, Le (cm)
ENTER initial groundwater conc. Cw (49/L)	ENTER Depth below grade to bottom of enclosed space floor, Lr (cm)	15	ENTER Stratum A soil total porosity, n^ (unitless)	ENTER Sol-bidg pressure differential, $\Delta P$ (g/cm-s²)
Chemical CAS No (numbers only, no dashes)	ENTER Average soil/ groundwater temperature, Ts (°C)	16	ENTER Stratum A soul dry bulk density, p <sub>b</sub> / (g/cm²)	ENTER Enclosed space floor thickness, Least (cm)

15	40	961	961	488	0 1	ò
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	
time for	time for	Exposure	Exposure	larger risk for	l arget hazard quotient for	
carcinogens,	noncarcinogens,	duration,	frequency,	carcinogens,	noncarcinogens,	
ت ا	AINC	8	Щ	<u>«</u>	<b>₽</b>	
(yrs)	(yrs)	(yrs)	(days/yr)	(unitless)	(unitiess)	
70	30	30	350	1.0E-08	+	
				20.10		
				Used to calcu	Jsed to calculate risk-based	
				groundwater	groundwater concentration	
					1 of 7	

## CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)
Unit risk factor, URF (µg/m³)*1
Pure component water solubility, S (mg/L)
Organic carbon partition coefficient, $K_{\infty}$ (cm <sup>3</sup> /g)
Critical temperature, T <sub>c</sub> ( <sup>2</sup> K)
Normal boiling point, T <sub>B</sub>
Enthatyy of vaponzation at the normal bouling point, AH,,,,
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H
Diffusivity in water, D <sub>w</sub> (cm²/s)
Diffusiwity in air, D. Cem <sup>2</sup> /s)

177E-04   2.92E-03   7.38E-04   4   4   4   4   4   4   4   4   4	177E-04   2.92E-03   7.38E-04   4.38E-04   6.24E-04   2 92E-03 7 38E-04 4 38E-04 1 05E-04 6 24E-04  Infinite source Unit Reference conc , factor, conc, Chadring URF RtC (449/m³) (449/m³) (449/m³) (449/m³)	
Infinite source Infinite indoor source Unit attenuation bldg risk coefficient, conc., factor, α Gouldeng URF (unitless) (μg/m³) (μg/m³) (μg/m³)	Infinite source Infinite indoor source Unit attenuation bidg risk coefficient, conc., factor, α Couding URF (unitless) (μg/m³)*	Infinite source Infinite indoor source Unit attenuation bldg risk coefficient, conc., factor, α Coustang URF (unitless) (μg/m³)*
source Infinite Indoor source Unit attenuation bldg risk coefficient, conc., factor,  α Coulding URF (unitless) (μg/m³) (μg/m³)¹	source Infinite Indoor source Unit attenuation bidg risk coefficient, conc., factor, α Chuldens (μg/m³)*	source Infinite Indoor source Unit attenuation bldg risk coefficient, conc., factor, α Coulding URF (unitless) (μg/m³)*
indoor source Unit attenuation bidg risk coefficient, conc factor, α Coulding URF (unitless) (μg/m³) (μg/m³) 1	indoor source Unit attenuation bidg risk coefficient, conc, factor, $\alpha$ Challeng URF (unitless) $(\mu g/m^3)$ $(\mu g/m^3)$	indoor source Unit attenuation bidg risk coefficient, conc., factor, α C <sub>bulding</sub> URF (unitless) (μg/m³) (μg/m³) 1
attenuation bldg risk coefficient, conc., factor, $\alpha$ $G_{buildrag}$ URF (unitless) $(\mu g/m^3)^4$	attenuation bldg rask coefficient, conc , factor, $\alpha$ $C_{\rm budens}$ $URF$ (unitless) $(\mu g/m^3)^4$	attenuation bldg risk coefficient, conc , factor, α Coulding URF (unitiess) (μg/m³) (μg/m³) t
coefficient, conc , factor, $\alpha$ $C_{\text{building}}$ URF $(\mu_1   \mu_2   m^2)^4$ $(\mu_2   m^2)^4$ $(\mu_3   m^2)^4$ $(\mu_3   m^2)^4$	coefficient, conc factor, $\alpha$ Cousing URF (unitless) ( $\mu g/m^3$ ) ( $\mu g/m^3$ ) ( $\mu g/m^3$ ) (	coefficient, conc., factor, $\alpha$ $C_{habding}$ URF $(unitless)$ $(\mu g/m^3)$ $(\mu g/m^3)$ $($
$lpha$ $G_{ m hulding}$ URF $(\mu g/m^3)^4$ $($	$lpha$ $C_{ m bulleng}$ URF $( m unitless)$ $( m \mu g/m^3)^4$ $($	$lpha$ Cousting URF (unitless) ( $\mu g/m^3$ ) ( $\mu g/m^3$ ) (
(unitless) $(\mu g/m^3)$ $(\mu g/m^3)$	(unitless) $(\mu \mu^{\prime})^{\dagger}$	(unitiess) ( $\mu g/m^3$ ) ( $\mu g/m^3$ ) (
(numess) (mg/m) (mg/m)	(_m/br) (_m/br) (ssaum_)	) (m/br) (m/br) (ssemina)

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INCREMENTAL RISK CALCULATIONS

Hazard quotlent from vapor intrusion to indoor air oncarcinogen (untiless)	¥
Incremental nsk from vapor intrusion to in introsor air, ir carcinogen non (unitiess)	NA
Final indoor exposure groundwater conc., (µg/L)	2 34E+03
Pure component water solubility, ( S S ( µg/L)	2 00E+05
Risk-based indoor exposure groundwater conc, (µg/L)	2,34E+03
Indoor exposure groundwater conc, noncarcinogen	NA
Indoor exposure groundwater conc, carcinogen (µg/L)	2 34E+03

			Soil Properties Lookup Table	гоокпр гарів			
SCS Soil Type	K, (cm/h)	a (1/cm)	N (unitless)	M (unitless)	θ <sub>e</sub> (cm³/cm³)	θ <sub>r</sub> (cm³/cm³)	Mean Grain Diameter (cm)
	0.20	0 008	1 109	0 083	0 38	0 068	0 0082
	0.26	0 0 19	131	0 237	0.41	0 095	0 0 16
	1 04	0 036	1 56	0 359	0 43	0 078	0 020
	14 59	0 124		J	0.41	0 057	0 040
	29 70	0 145			0 43	0.045	0 044
	0 12	0 027	123	0 187	0 38	. 0100	0 025
ಸ	131	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	•		0 39	0 100	0 026
	0.25	0.016	137	0 270	0.46	0 034	0 0046
υ	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 00	109		0.26	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	30000
SICL	200	000	123		0 43	680 0	9500 0
	0.45	0 0 0 0 0			0 45	0 067	0 011
	4 42	0 075	189	0 471	0.41	0 065	0 030

	,			chemic -	Chemical Properties Lookup Table	elge i di						
	Organic			Pura		Henry's	Henry's			Enthalpy of		
	carbon	:	:	component		law constant	law constant	Normal		vaporization at	5	
	partition	Diffusivity	DIFFUSIVITY	water	Henry's	at reference	reference	Bolling	Critical	the normal	risk	Reference
	coefficient,	in aır,	in water,	solubility,	aw constant	temperature,	temperature,	paint,	temperature,	boiling paint,	factor	conc,
	χ. 8	₫	۵ً	ဟ	Ì	I	<b>⊢</b> ∝	Ļ <sup>©</sup>	۲٥	۵H٬۶	ER.	Ş.
CAS No Chemical	(cm <sub>3</sub> /g)	(cm <sup>2</sup> /s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/mol)	(၂၃)	(k	( <sup>R</sup> K)·	(cat/mol)	(mg/m <sub>2</sub> ) <sup>1</sup>	(mg/m³)
50293 DDT	2 63E+06	1 37 E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	52	533 15	720 75	11,000	9 7E-05	0 0 = +00
50328 Benzo(a)pyrene	1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 135-06		715 90	969 27	15,000	2 1E-03	0 0E+00
51285 2,4-Dinitrophenol	1 00E-02	2 73E-02		2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0.00	7 0E-03
53703 Dibenz(a,h)anthracene	3 80E+06	2 02E-02		2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03	0 0E+00
56235 Carbon tetrachloride	1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	1 SE-05	0 0E+00
56553 Benz(a)anthracene	3 98E+05	5 10E-02		9 40E-03	1,37E-04	3 34E-06	25	708 15	1004 79	15,000	2 1E-04	0 0E+00
57749 Chlordane	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05		624 24	885,73	13,000	3 7E-04	0 0E+00
58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80€+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04	0 0E+00
60571 Dieldrin	2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	25	613 32	842 25	13,000	4 6E-03	0 0E+00
65850 Benzoic Acid	6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10,000	0 0E+00	1 4E+01
67641 Acetone	5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05		329 20	508 10	926'9	0 0E+00	3 5E-01
67663 Chloraform	3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6,988	2 3E-05	0 OE+00
67721 Hexachloroethane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00	695 00	9,510	4 0E-06	0 OE+00
71363 Butanol	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 805-06	25	39088	563 05	10,346	00100	3 55-01
71432 Benzene	5 89E+01	8 80E-02	9 80E-06	175E+03	2 28E-01	5 565-03	25	353 24	562 16	7,342	8 35-06	0 0E+00
71556 1,1,1-Trichtoroethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0 0E+00	1 0E+00
72208 Endrin	1 23 E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7.51E-06	25	718 15	986 20	12,000	0 0E+00	1 1E-03
72435 Methoxychior	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0 OE+00	1.8E-02
72548 DDD	1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05	0 0E+00
72559 DDE	4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44	860 38	13,000	9 7E-05	0 0E+00
74839 Methyl bromide	1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03		276 71	467 00	5,714	0 0E+00	5 0E-03
75014 Vinyl chlonde (chloroethene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2 71E-02	•	259 25	432 00	5,250	8 45-05	0 0E+00
75092 Methylene chloride	1 17E+01	101E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	313 00	510 00	90,406	4 7E-07	3 0E+00
75150 Carbon disuffide	4 57E+01	1 04E-01	1 00E-05	1 19年+03	1 24E+00	3 02E-02		319 00	552 00	6,391	0 05 +00	7 0E-01
75252 Bromoform	8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422 35	969	9,479	1 1E-06	0 0E+00
75274 Bromodichloromethane	5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03		363 15	585 85	2,000	1 8E-05	00±00
75343 1,1-Dichloroethane	3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03		330 55	523 00	6,895	0 0E+00	5 0E-01
75354 1,1-Dichloroethylene	5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61 5-02	25	304 75	576 05	6,247	5 0E-05	0 0E+00
76448 Heptachlor	1 41E+08	1 12E-02	5 69E-06	180E-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	1 3E-03	0 0E+00
77474 Hexachlorocyclopentadiene	2 00E+05	161E-02	7 21E-06	1 80E+00	1 11E+00	2 715-02	52	512,15	746 00	10,931	0 0E+00	7 0E-05
78591 tsophorone	4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63Ë-06		488 35	715 00	172,01	2 7E-07	0 0E+00
78875 1,2-Dichloropropane	4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7,590	0.0E+00	4 0E-03
79005 1,1,2-Trichloroethane	5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04		386 15	602 00	8,322	1 6E-05	0 0E+00
79016 Trichloroethylene	1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25	360 36	544 20	7,505	17E-06	0 0E+00
79345 1,1,2,2-Tetrachloroethane	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	25	41960	661 15	8,996	5 8E-05	0 0E+00
83329 Acenaphthene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0.000	2 1E-01

84683 Dooth dates also	7	i i			VLOOKUP TABLES							
84742 Discharts obtibulate	2 20E+02	2 56E-02	6 35E-06	1 08E+03	185E-05	4 51E-07	52	567 15	757 00	13,733	0.01100	2 8E+00
	5 75E+04	1 74F-02	4 83E-06	2 69F+00	3 63E-08 5 17E-08	9 39E-10	<b>13</b>	613 15 669 69	798 67	14,751	0000	3.55-01
86306 N-Nitrosodiohenvlamine	1 29F+03	3 12E-02		2 516+01	2 050 04	90-397	ខ្ល	990 90	839 68	13,000	0.0E+00	7 0E-01
86737 Fluorene	1 385+04	3635-02	7 R8F-06	1 085 +00	2615.02	3 75 06	G t	632 Z8	890.45	13,000	1 4E-06	0.05+00
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6.265-07	5.7 E-U5	C X	570 44	00 00	12,666	0.05+00	1,4E-01
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3.34E-01	8 15F-03	3 %	486 15	738.00	13,877	20,000	00+100
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00 5-06	2 44E-08	22	582 15	813.20	007,41	3.4F-05	00+100
88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	25	51915	749 03	12,000	3 15-06	0 0E+00
9 izus Naphthalene 9 iou 1-2 3 Dickbookseniden	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	1 4E-01
95476 o.Xviene	7.24E+02	1945-02	6 74E-06	3 11E+00	164E-07	4 00E-09	52	560 26	754 03	13,000	1 35-04	0 0E+00
95487 2-Methythenol (o-mesol)	3 635+02	8 /UE-UZ	1 00E-05	1 /8E+02	2 13E-01	5 20E-03		417 60	630 30	8,661	0 OE +00	7 0E+00
95501 1.2-Dichlorobenzene	6 17F+02	7 40E-02	2 30E-06 7 90E-06	2 50E+04	4 92E-US 7 70E 03	1 205-06	192	464 19	697 60	10,800	00+300	1 8E-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9.46F-06	2 20E+04	7 /9E-0Z	3 805.03	52 2	453 57	705 00	9,700	0000	2 00-01
95954 2,4,5-Trichlorophenol	1 60E+03	2 916-02	7 03E-06	1 20E+03	1 785-04	3 30E-04	G 4	447 33 526 16	560 43	2/6/6	0.05	1 8E-02
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 405-05		483.95	719.00	10.566		3 3 5 0 3
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69€+02	3 23E-01	7 88E-03		409 34	617 20	8,501	000+00	1 0E+00
100425 Styrene	7 76E+02	7 10E-02		3 10E+02	113E-01	2 76E-03		418 31	636 00	8,737	00+300	1 0E+00
105679 Z,4-Dimethylphenol	2 09E+02	5 84E-02		7 87E+03	8 20 €-05	2 00E-06	52	484 13	707 60	11,329	0 0E+00	7 0E-02
100423 p-Xylene	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03		411 52	616 20	8,525	0 05+00	7 0E+00
10040/ 1,4*DistrictionDenials	6 1/E+U2	6.905-02	7 90E-06	7 38E+01	9 96E-02	2 43 E-03		447 21	684 75	9,271	0 0E+00	8 0E-01
107062 1.2-Dichlomethans	1745+01	1 04E-01	1 UTE-US	5 30E+03	136E-05	3 32E-07		503 65	754 00	11,689	0 OE +00	1 4E-02
108054 Viny acetate	5 25E+00	8 50F-02		2 DOF+04	2 10E-02	9 /85-04		356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xvlene	4 07F+02	7 00E-02		1615+03	3 015 01	20 121 04		040 00	51.513		0 0E+00	2 0E-01
108883 Toluene	182E+02	8 70F-02	8 60F-06	5.26E+02	2 72E-01	2 4 F 4 5 5	9 2	412.27	617 05		0 0E+00	7 0E+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52F-01	3715-03		303.70	53179		00=+00	4 UF-01
108952 Phenol	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3.98F-07		455.02	694 20	0,410	00000	2 UE-UZ
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05		451 15	659.70	076,01	3.35.04	200+000
115297 Endosultan	2 14E+03	1 15E-02		5 10E-01	4 59E-04	1 12E-05		674 43	942 94	14,000	0.05+00	2 1F-02
117817 Bis(2-ethylhexyl)phthalate	151E+07	3 51E-02		3 40E-01		1 02E-07		657 15	806 00	15,999	4 0E-06	0 0E+00
11/840 Orb-octy phthalate	8 32E+07	1 51E-02		2 00E-02	2 74E-03	6 68E-05	25 7	704 09	862 22	15,000	0 0E+00	7 0E-02
120127 Anthracene	3 90E+04	3 24E-02	2 91E-06	6 205 400	5 41E-02	1 32E-03	52	582 55	825 00	14,447	4 6E-04	0 0E+00
120821 1.2,4-Trichlorobenzene	178E+03	3.00 F-02	8235-06	3.005+02	2 0/E-U3 5 87E-03	6 5 TE-U5		615 18	873 00		0000	1 1E+00
120832 2,4-Dichlorophenol	147E+02	3 46E-02		4 50E+03	1 30E-04	3 17F-06	3 5	480 ID	708 17		0.05+00	2 0E-01
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01		2 70E+02	3 805-06	9 27E-08		590.00	814 OO	13,467	1 or 50	1 15-02
124481 Chlorodibromomethane	631E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04		116 14	678.20	8,000	2 4E-05	00+400
127184 Tetrachloroethylene	1 55E+02	7 20E-02		2 00E+02	7 54E-01	1 84E-02	22	394 40	620 20	8,288	5 8E-07	0 0E+00
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 10E-05		667 95	936 00		0 OE+00	1 15-01
156592 cls-1,Z-Dichloroethylene	355E+01	7 36E-02	1 135-05	3 50E+03	167E-01	4 07E-03		333 65	544 00		0 0E+00	3 5E-02
199905 trains-1,z-Draikvoetnytene 193305 fodeso(5.2.2-d)outene	3.475+01	1 O/E-02	13850	6 30E+03	3 85E-01	9 39E-03			516 50		0 0E+00	7 0E-02
205992 Benzo(b)fluoranthene	1235+06	2 26E-02	5 56 5 06	1 505.03	0 30E-03	1 505-06	57.	809 15	1078 24	17,000	2 1E-04	0 0 0 0
206440 Fluoranthene	1 07E+05	3 02E-02	6.35E-06	2 06F-01	4 33E-03	1 1 1 1 1 1 4		15.90	969 27		2 16-04	0.00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29 E-07			1019 70		2 15 06	1401
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05		714 15	00 626	16 455	2 15-06	00=+00
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 805-01	6 97E-03	1 70E-04		03 01	839 37	13,000	4 9E-03	00+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05	25 5	96 55	839 36	13,000	1 85-03	0 0 0 0
31935/ Deta-HCH (Deta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 405-01	3 05E-05	7 44E-07	25 5	596 55	839 36	13,000	5 3E-04	0 00+00
542750 1,3-Ukalioropropene 608303 2 6 Dinitatokasa	45/E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02	25 3	381 15	587 38	7,000	3 7E-05	2 0E-02
621647 N-Nitrosodin-constante	2 40F+01	5.45E-02	/ 20E-U0	1 82E+02	3 06E-05	7.46E-07	52 t	558 00	770 00	12,938	1 9E-04	0 OE+00
1024573 Heptachlor epoxide	8 32E+04	1 32F-02		2.00E-01	3 605 04	90 27 0	9 5	509 BO	745 87	000	2 0E-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02		5 62E-02	4 67E-01		9 4	613.96 620.88	848 /5	13,000	2 65-03	0 OE+00
8001352 Toxaphene	2 57E+05	1 16E-02		7 40E-01	2 46E-04	6 00E-06	25 6	657 15	873.31		30.70	3 UE-04
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	25	402 50	539 37	19,000	10F-04	00=+00
11097691 Aroclor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	25 3	377 50	512 27	19,000	100	0 0E+00
12674112 Aroctor 1016 (PCB-1016) #2460719 Aroctor 1042 (BCB-1949)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	25 3		475 22	18,000	1 0E-04	0 0E+00
(34054.5) 1444. INDUM (1405.6)	5 300 14	70-261 7	531540	3 40E-01	2 13E-02	5 20E-04	25	345 50	482 20	18,000	1 0E-04	0 0 = +00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

×∣∺

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

YES

VERSION 1 2 September, 1998

		<del></del>
	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm²)	
	, and	닉
	ENTER Soil Soil Stratum A SCS Soil type (used to estimate soil vapor permeability)	ENTER Stratum C Soil water-filled porosity, $\theta_{w}^{c}$ (cm <sup>3</sup> /cm <sup>3</sup> )
	ENTER SCS soil type directly above	ENTER Stratum C soil total porosity, n° (untitless)
	ENTER Soll stratum directly above water table, (Enter A, B, or C)	ENTER Stratum C soul dry bulk density, p <sub>b</sub> <sup>c</sup> (g/cm <sup>3</sup> )
ethane	ENTER Twokness of soil stratum C. (Enter value or 0) hc (cm)	ENTER Stratum B soil water-filled porosity, 6,8 (cm³/cm³)
Chemical 7,2,2-Tetrachloroethane	Totals must add up to value of L <sub>wr</sub> (cell D28) Thickness Thickness of soil of soil Soil stratum B, stratum C, atum A, (Enter value or 0) (Enter value or b, h, he hc (cm)	ENTER Stratum B soil total portosity, n <sup>8</sup> (unitless)
	ENTER Totals mu Thickness of soil stratum A, h,	ENTER Stratum B soil dry bulk density, p <sub>B</sub> p <sub>B</sub> (g/cm <sup>3</sup> )
	ENTER Depth below grade to water table, Lwr (cm)	ENTER Stratum A soli water-filled morelly,  6,4,4 (cm <sup>3</sup> /cm <sup>3</sup> )
ENTER Initial groundwater conc , Cw (19/L)	ENTER Depth below grade to bottom of enclosed space floor, Lr (cm)	ENTER Stratum A sold total porosity, n A (unitless)
Chemical CAS No (numbers only, no dashes)	ENTER Average soul groundwater temperature, T <sub>s</sub> (°C)	ENTER Stratum A soil dry bulk density, p, q, (g/cm³)

	0.43	0.5	1.7	0 42	0.27	17	0 43
	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	
	Soil-bidg	space	space	Enclosed	Floor-wall	Indoor	
	pressure	floor	floor	space	seam crack	air exchange	
hickness,	differentiat,	length,	width,	height,	width,	rate,	
	ΔP	'n	WB	£	*	띪	
-	(g/cm-s²)	(cm)	(cm)	(cm)	(cm)	(1/h)	
	40	961	196	488	0.1	0 45	
	ENTER	ENTER	ENTER	ENTER	ENTER		
Averaging	Averaging			Target	Target hazard		
_	time for	Exposure	Exposure	risk for	quotient for		
as,	noncarcinogens,	duration,	frequency,	carcinogens,	noncardinogens,		
	ATNC	0	Ш	Ŧ	된		

Used to calculate risk-based groundwater concentration

carcinogens, TR (unitless)

(days/yr)

(yrs)

AT<sub>NC</sub> (yrs)

### 2 of 7

CHEMICAL PROPERTIES SHEET

						_
	Reference				,	20.00
Š	пsk	factor,	URF	(mg/m <sub>3</sub> )		10.2
Pure component	water	solubility,	ഗ	(mg/L)		9075
Organic	partition	coemcient,	پّد	(cm <sub>3</sub> /g)		410 60 SE1 15 0 325 104   307F 03   507 05
	Culical	emperaure,	Ļ	R)		EE1 15
Normal	guillog Doging	pod I	₽	(K)		410.50
Enthalpy of vaporization at	me normal	'illing brilling	ΔHΛ	(cal/mol)		8 996
Henry's law constant	temperature	i de la la la la la la la la la la la la la	Ψ,	(၁)		22
Henry's law constant	temnerature		ב `	(atm-m²/mol)		3 44E-04
C. State	In water	c	<u>.</u>	(cm <sup>2</sup> /s)		7 90E-06
Diff. iendit	in air.		֧֧֧֧֓֞֞֞֞֟֟֟ ֭֓֞֞֞֞֞֞֞֞	(cm²/s)		1 7 10E-02   7 90E-06   3 44E-04

air-filled         air-filled         total fluid         Intrinsic         relative air         effective vapor         capillary         capillary <th></th> <th>Source-</th> <th>Stratum A soil</th> <th></th> <th>Stratum C soil</th> <th>Stratum A effective</th> <th>Stratum A soil</th> <th>Stratum A soil</th> <th>Stratum A soil</th> <th>Thickness of</th> <th>Tota!</th> <th>Air-filled</th> <th>Water-filled</th> <th>Floor-</th>		Source-	Stratum A soil		Stratum C soil	Stratum A effective	Stratum A soil	Stratum A soil	Stratum A soil	Thickness of	Tota!	Air-filled	Water-filled	Floor-
αμ <sup>3</sup> (cm³/cm³)         αμ <sup>3</sup> (cm³/cm³)         S <sub>a</sub> (cm²/cm³)         (cm²/cm²)         (cm²/cm³)         (cm²/cm³)         (cm²/cm³)         (cm²/cm³)         (cm²/cm³)         (cm²/cm³)         (cm²/cm²)         (cm²/cm³)         (cm²/cm³)         (cm²/cm²)         (cm²/cm²/cm²)         (cm²/cm²)         (cm²/cm²)         (cm²/cm²)         (cm²/cm²)         (cm²/cm²/cm²)         (cm²/cm²/cm²)         (cm²/cm²/cm²)         (cm²/cm²/cm²)         (cm²/cm²/cm²)         (cm²/cm²/cm²)         (cm²/cm²/cm²/cm²/cm²/cm²/cm²/cm²/cm²/cm²/		building separation,	air-filled porosity,		air-filled porosity,	total fluid saturation,	intrinsic permeability,	relative air permeability,	effective vapor permeability,	capillary zone,	capillary zone,	capillary zone,	capillary zone,	seam permeter,
Crack	1	רי (cm)	9 <sub>ه</sub> ی (دm²/دm²)	_	θ <sub>α</sub> ς (cm³/cm³)	S <sub>te</sub> (cm³/cm³)	, γ. (cm²)	k <sub>ra</sub> (cm²)	k, (cm²)	ا (cm)	(cm³/cm³)	θ <sub>n α</sub> (cm³/cm³)	θ <sub>w.α</sub> (cm³/cm³)	X vancy
Area of enclosed Crack Enthalpy of Henry's law Henry's law Vapor A A B and Crack Crack Enthalpy of Henry's law Henry's law Vapor A A B and Crack Crack Enthalpy of Henry's law Henry's law Vapor A A B and Crack Crack Enthalpy of Henry's law Henry's law Vapor A A 1		2484 36	0 230	0 150	0 130	0 347	3 89E-09	0 778	3 03E-09	30 00	0.43	0.084	0 346	3,844
grade, control of carch         Entitiality of themy's law Henry's law Henry History constitution of the control of t		Area of		-	:	:	;		Stratum	Stratum	Stratum	Capillary	Total	
below area below area below are groundwater ave age average are average.         4 π		enclosed	Crack- to-total	Crack depth	Enthaípy of vaponzation at	Henry's law constant at	Henry's law constant at	Vapor viscosity at	A effective	B effective	C effective	zone effective	overali effective	Diffusion
Ae         η         Zerest         ΔH <sub>v</sub> ,rs         H <sub>TS</sub> H <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ <sub>TS</sub> μ		below grade,	area ratio,	below grade.	ave groundwater temperature.	ave groundwater temperature.	ave, groundwater temperature.	ave soil	diffusion	diffusion	diffusion	diffusion	diffusion	path
(cm²)         (unitless)         (cm²)         (cm²/s)         (cm²/s) <t< td=""><td></td><td>• <b>4</b></td><td>F</td><td>Zorack</td><td>ΔH<sub>v,TS</sub></td><td>H<sub>Ts</sub></td><td>H'<sub>TS</sub></td><td>μ<sub>T3</sub></td><td>D. #</td><td>D</td><td>المراجعة المراجعة الم</td><td></td><td></td><td>ing 1</td></t<>		• <b>4</b>	F	Zorack	ΔH <sub>v,TS</sub>	H <sub>Ts</sub>	H' <sub>TS</sub>	μ <sub>T3</sub>	D. #	D	المراجعة الم			ing 1
9 24E+05         4 16E-04         15         10,480         1 98E-04         8 36E-03         1 77E-04         2 90E-03         7 95E-04         5 23E-04         7 53E-04         7	1	(cm <sup>2</sup> )	(unitless)	(cm)	(cal/mol)	(atm-m³/moi)	(unitless)	(g/cm-s)	(cm <sup>2</sup> /s)	(cm²/s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm)
Source       Average vapor vapor vapor vapor vapor vapor vapor vapor vapor vapor vapor conc, radius, into bildy, coefficient, crack, number, coefficient, crack, number, coefficient, crack, number, coefficient, conc, factor, coefficient, como, factor, como, coefficient, como, factor, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient	H	9 24E+05	4 16E-04		10,480	1 98E-04	8 36E-03	1 77E-04	2 90E-03	7 95E-04	5 23E-04	2 50E-04	7 53E-04	2484 36
Average       Crack       equivalent       source       Infinite         Source       vapor       effective       foundation       indoor       source       Unit         vapor       Crack       flow rate       diffusion       Area of       Peclet       attenuation       bldg       risk         conc , radius, into bldg , coefficient, coefficient, crack, Deac       crack, number, coefficient, conc , factor, factor, cack       Avack       exp(Pe <sup>f</sup> )       α       Cpuston       URF         (μg/m³)       (cm)       (cm²/s)       (unitless)       (unitless)       (μg/m³)       (μg/m³)       (μg/m³)							Exponent of	Infinite						
Charles (cm) (cm) (cm) (cm) (cm) (cm) (cm) (cm)		Colling		Average	Crack		equivalent	source	infinite	:				
radius, into bldg, coefficient, crack, number, coefficient, conc, factor, forex $Q_{\rm act}$ $D^{\rm crack}$ $A_{\rm crack}$ $A_{\rm crack}$ $\exp({\rm Pe}^i)$ $\alpha$ $C_{\rm building}$ URF (cm) (cm <sup>3</sup> /s) (ug/m <sup>3</sup> ) (ug/m <sup>3</sup> ) (ug/m <sup>3</sup> )		vapor	Crack	flow rate	diffusion	Area of	Peclet	attenuation	source	Colf disk	Raference			
frank $\Omega_{\rm ext}$ $\Omega_{\rm cot}$		conc,	radius,	into bldg,	coefficient,	crack,	number,	coefficient,	conc	factor,	conc			
$(cm)$ $(cm^3/s)$ $(cm^2/s)$ $(cm^2)$ $(unitiess)$ $(ug/m^3)$ $(ug/m^3)$		Chourse	Cornect	Q	Danck	Aorack	exp(Pe <sup>(</sup> )	ಕ	Chuilding	URF	RfC			
		(m/6ri)	(cm)	(cm <sub>3</sub> /s)	(cm <sup>2</sup> /s)	(cm <sub>2</sub> )	(unitless)	(nutless)	(µg/m³)	(µg/m³) <sup>-1</sup>	(mg/m <sub>3</sub> )			
	-	8 36 1 +00	-	0 AQE±00	2000.03	COTUE TO C	0 155116	20 202 4	3 700 05	20 Lo 2	414			

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INCREMENTAL RISK CALCULATIONS

Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitiess)	ΥN
Incremental nsk from vapor intrusion to indoor air, carcinogen (untless)	Ą
Final indoor exposure groundwater conc , (µg/L)	1 11E+03
Pure component water solubility, S (µg/L)	2 97E+06
Risk-based indoor exposure groundwater conc, (µg/L)	1 11E+03
Indoor exposure groundwater conc , noncarcinogen (ug/L)	NA V
Indoor exposure groundwater conc, carcinogen (440 <sup>L</sup> )	1 11E+03

VLOOKUP TABLES

	1	l l	Soil Properties Lookup	ookup Table									
SCS Soil Type		- 1	N (unitless)	M (unitless)	θ <b>,</b> (cm³/cm³)	ө, (cm <sup>3</sup> /cm³)	Mean Grain Diameter (cm)						
ധ ദ്	200	0 000	60 5	0.083	0 38	0 068	0 0082						
<b>.</b>	9 6	8100	5	0.237	041	0.095	0 016						
, σ	- 4	0 030	8 6	9000	0.43	B/OO	0.020						
	2 2	0 145	2.48	0.00	670	200	2 4 6 0						
, w	0 12	0 0 27	23 5	187	7 6	0.00	4000						
SCL	1 5	0.059	148	0.324	8 6	9 5							
<u>.</u>	0 25	0.016	137	0.270	0.46	000							
SiC	0 02	0 005	109	0 083	0.26	0200	0 0030						
SICL	0 02	0 010	1 23	0 187	0 43	680 0	0 0020						
SIL	0.45	0 0 0 0 0 0	141	0 291	0.45	0 067	1100						
10	4 42	0.075	- 88	0.471	041	0 065	0 030						
:													
					Chemic	Chemical Properties Lookup Table	ookup Table						
	Ü	Organic			Pure		Henry's	Henry's			Enthalov of		
	J	carbon			component		law constant	law constant	Normal		vaporization at	j	
	•	partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	boiling	Cutical	the normal	¥	Reference
	. 8	ت.	in air,	in water,	solubility,	law constant	temperature,	temperature	point	ф	boiling point.	factor	2000
		73	៰៎	۵	Ś	ī	I	<b>+</b>	۳	F	AH,	URF.	. S
CAS No. Chemical		(cm³/g)	(cm²/s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m³/mol)	(၁)	( <del>)</del>	(°K)	(cal/mol)	(µg/m³)-1	(mg/m³)
50203 DOT		9072636	1 370	00 H	000	L C C	LOT						
50328 Benzo(a)nyrene		1.025406	4 305-02	90-1100 00-1100	2 50E-02	3 32E-04	8 10E-06	2, 5	533 15		11,000	9 7 11 05	0 0E+00
51285 2.4-Dinitrophenoi		1 00F-02	2 73F-02	900500	2 79E+03	4 65E-U3 1 82E-05	1 13E-06 4 44E-07	67 K		969.27	15,000	2 1E-03	0 0E+00
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18F-06	2.49F-03	6.03E-07	1 47E-08	3 6			15,000	001100	20.00
56235 Carbon tetrachlonde		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3.05E-02	52			7 127	4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	00+100
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	334E-06	25		-	15,000	2 1F-04	000
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05				13,000	3.7E-04	0000
58899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05				13,000	3.7E-04	00+00
60571 Dieldrin		2 14E+04	1 25E-02		1 95E-01	6 19E-04	1 51E-05				13,000	4 6E-03	0 0E+00
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25			10,000	0 0E+00	14€+01
67641 Acetone		5 75E-01	124E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	52			6,955	0 0E+00	3 5E-01
87721 Havachorottono		3 38 1 + 0.1	1 04E-01	1 005-05	/ 92E+03	1 50E-01	3 66E-03	25			6,988	2 3E-05	0 0 = +00
71363 Butanol		4 42E+03	8 00E-03		3 008 +0 1	1 39E-01	3885-03	2,2	458 00	00 695 00	9,510	4 0E-06	0 0E+00
71432 Benzane		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5.565.03	2,50			10,346	0.0E+00 8.3E-06	10-11-0 10-11-
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 726-02	25			7.136	0 OE+00	1 0 = +00
72208 Endrin		1 23E+04	1 25E-02		2 50E-01	3 08E-04	7.51E-06	25			12,000	0000	1 16-03
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	2 848 49	14,000	0 OE+00	1 8E-02
72548 DDD		1000	1 69E-02		9 00E-02	1 64E-04	4 00E-06				14,000	6 9E-05	0 0E+00
74930 Mathal beaming		4 47 E+06	1 44E-02	587E-06	1 20E-01	8 61E-04	2 10E-05				13,000	9 7E-05	0 0 = +00
75014 Vinvi chlorida (chloroethene)	<b>a</b>	1.855-101	1.065-02	1 235-06	9 76 5403	1 115+00	0.24E-03	67 6	2002	46/00	5,714	001100	9 OF 03
75092 Methylene chloride	ì	1 17E+01	1015-01	1 17E-05	1 30E+04	8 98E-02	2.115-02	3 %			5,230	2 4 T 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	00+400
75150 Carbon disulfide		4 57E+01	1046-01	1 00E-05	1 19E+03	1 24E+00	3 025-02	25			6.391	00F+00	7 OF-01
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34 E-04	25			9,479	1 1E-06	005+00
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03				7,000	1 8E-05	0.0E+00
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 615-03				6,895	0 0E+00	5 0E-01
75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25			6,247	5.0E-05	0 0 0 0
77474 Houndhousedonesiseless		100 LOO C	70-11-07	00000	1 00-01	4 47 E-UZ	1 095-03	25			13,000	35-03	0.05+00
78591 Isophorone	₽	4 68F+01	6.235-02		1 80E+00	7 72E-04	2 /1E-02 6 63E-06	25	512 15	746 00	10,931	0.06+00	7.05-05
78875 1.2-Dichloropropane		4 37E+01	7.82F-02		2 80F±03	1 15E-01	20-13CB C	2,40			7.500	) OF HO	0 0E-00
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25			8,322	1 6E-05	0 0E+00
79016 Trichloroethylene		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25			7,505	1 7E-06	0 0 0 + 00
79345 1,1,2,2-Tetrachloroethane		9 33E+01	7 10E-02	7 90E-06	2 97E+03	141E-02	3 44E-04	25			8,996	5 8E-05	0 0E+00
83329 Acenaphthene		7 08E+03	4 21E-02	7,69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54		12,155	0 0E+00	2 15-01

84662 Olemannia		L	!		VLOOKUP TABLES							
84742 Di-r-buty ohthalate	3 395+02	2 30E-02	6 35E-06 7 95C 96	1 08E+03	185E-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 Butyl benzyl phthalate	5 75E+04	1 74F-02	4 R3E-06	2 695+01	385E-08	9 39E-10	22	613 15	79867	14,751	0 0E+00	3 5E-01
86306 N-Nitrosodiphenylamine	1 29E+03	3 12 1 02	6 35E-06	3 545+00	2068 04	1 26E-06	Q ;	650 60	839 68	13,000	00+300	7 0E-01
86737 Fluorene	1 38E+04	3 63 5-02	7 881-06	1 985+00	2615.03	900000	3 3	632 28	890.45	13,000	1 4E-06	0 0E+00
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26 5-07	1 53E-03	0 %	570 44	870.00	12,556	001+00	1 4E-01
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3.34E-01	8 15E-03	, K	486 15	738.00	10,01	מין ער כ	00+100
87855 Pentachlorophenol	5 92E+02	5 60E-02		1 95E+03	1 00E-06	2 44E-08	52	582 15	813.20	14,000	3.4E-05	00+100
91203 Naphthalana	3 81E+02	3 185-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	25	519 15	749 03	12,000	3 1E-06	0 0E+00
91941 3 3-Dichlomberzidine	2 00E+03	3 30E-02	7 505-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	1 4E-01
95476 o-Xylene	3 63E+02	8 70F-02		3 11E+00	1 64 C	4 00E-09	52	560 26	754 03	13,000	1 3E-04	0 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8.30F-06	2 60E+04	2 13E-U1 4 92E-05	5 20E-03	8 8	417 60	630 30	8,661	00=+00	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02		1 56E+02	7 79E-02	1 905-03	3 K	464 19 463 57	697 60	10,800	0000	18E-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20€+04	1 60E-02	3 90F-04	2 X	455 57	705 00	9,700	00+400	2 CE-01
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	25	526 15	759 13	13,000	00+100	2 5E-02
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	52	483 95	719 00	10,566	00+00	2 OF-03
100414 Edylbenzene 100425 Styrene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20	8,501	0 0E+00	1 0E+00
105679 2 4-Dimethidahana	7 765+02	7 105-02	8 ODE-06	3 10E+02	113E-01	2 76E-03	52	41831	636 00	8,737	0 0E+00	1 0E+00
106423 p-Xviene	3.895+02	3 84E-02 7 69E-02	8 69E-06 8 44E-06	7 87E+03	8 20E-05	2 00E-06	52	484 13	707 60	11,329	0 0E+00	7 0E-02
106467 1,4-Dichlorobenzene	6 17E+02	6 90 0 2	7 905-06	7 38F+01	9 96E-03	7 00E-03	9 5	411 52	616.20	8,525	0 0E+00	7 0E+00
106478 p-Chloroanline	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 325-03	0 K	503 SE	584 75	9,271	0 0E+00	8 OE-01
107052 1,2-Dichloroethane	1 74E+01	1 04E-01	90E-06	8 52E+03	4 01E-02	9 78E-04	3 %	356.65	56156	11,089	2 65.06	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 105-02	5 12E-04		345 65	519 13	7,800	005+00	200-100
108383 Tolings	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01 6-01	7 345-03		412 27	617 05	8,523	0 0E+00	7 OE+00
108607 Chlombarzana	3 40F-02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03		383 78	591 79	7,930	0 0E+00	4 0E-01
108952 Phenol	2 195102	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03		404 87	632 40	8,410	0 0E+00	2 0E-02
111444 Bis(2-chlomethyl)ether	1556+01	0 20E-02	9 105-06	8 28E+04	1 63E-05	3 98E-07		455 02	694 20	10,920	0 0E+00	2 1E+00
115297 Endosulfan	2 14E+03	1 15E-02	4 55E-06	5 10E-01	7 38E-14 4 59E-04	1 805-05	52	451 15	659 79	9,000	3 3E-04	0 0E+00
117817 Bis(2-ethythexyl)phthalate	151E+07	351E-02		3 40E-01	4 18E-06	1 025-03		6/4 43 667 46	942.94	14,000	000-00	2 1E-02
117840 Di-n-octyl phthalate	8 32E+07	151E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05		704 09	862 22	15,939	4 CF-06	0.0E+00
118/41 Hexachiorobenzene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03		582 55	825 00	14.447	4 6F-04	005+00
12012/ Anthracene	2 95E+04	3 24E-02		4 34E-02	2 67E-03	6 51 E-05		615 18	873 00	13,121	00+300	1 1 1 1 1 00
120832 2 4. Dichlomphenol	1 /85+03	3 00E-02		3 00E+02	5 82E-02	1 42E-03		486 15	725 00	10,471	0 0E+00	2 0E-01
121142 2.4-Dinitrotoliana	0 555401	3 40E-02	47/E-06	4 50E+03	1 305-04	3 17E-06	22	482 15	708 17	11,000	0 0E+00	1 1E-02
124481 Chlorodibromomethane	631E+01	1967-02	1 05 11.05	2.605+02	3 50 11-05	9 27E-08		590 00	814 00	13,467	1 9E-04	0 0E+00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	7 03E-04	8 %	416 14	678,20 676,70	8,000	2 45-05	0 0E+00
129000 Pyrene	1 05E+05	2 72E-02		135E-01	4 51E-04	1 10F-05		567 95	936.00	27.28	) O C C	0.05+00
156592 cts-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00		001100	1 - E-01
199995 rans-1,2-Dignioroemylene	5.25E+01	7 07E-02		6 30E+03	3 85E-01	9 39E-03		320 85	516 50		00+400	7 0E-02
205992 Benzo(h)filoranthene	1 235 106	205-02	3 55 5 7 5 7	2 205-05	6 56E-05	1 60E-06		809 15	1078 24		2 1E-04	0 0E+00
	1.075+05	2 COE-02	3 25E 05	1 50E-03	4 55E-03	1 11E-04		715 90	969 27		2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5.56F-06	8 00E-04	3 40E-04	1 515-05	2 2	655 95	905 00		0 0E+00	1 4E-01
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9.46F-05	3 %	714 15	07 678	16,000	2 1E-05	0 0 0 0 0 0
309002 Aldrin	2 45E+06	1 32E-02	4 865-06	1 80E-01	6 97E-03	1 70E-04		603.01	839.37	13,455	2 L 2 L 3 L 4 L 5 L 7 L 7 L 7 L 7 L 7 L 7 L 7 L 7 L 7 L 7	00100
319846 alpha-HCH (alpha-BHC)	123E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		596 55	839 36	13.000	4 9 E C C	00+400
31955/ Deta-HUH (Deta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 445-07	55	596 55	839 36	13,000	5 35-04	001100
505202 2 F.Dimitabalisms	4 5 /E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	587 38	7,000	3 7E-05	2 0E-02
621647 N-Nitrosod-p-propagampa	2 405+01	5 2/5-02	/ 20E-06	1 82E+02	3 06E-05	7 46E-07		558 00	770 00	12,938	1 9E-04	0 0 0 0
1024573 Heptachfor epoxide	8 32F+04	1325-02	4 23 15-06	2 005-04	8 23E-03	2 25E-06	52	509 60	746 87	11,000	2 0E-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62F-02	3 90E-04 4 67E-01	9 3 IE-06	9 2	96	848 76		2 6E-03	0 0E+00
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6.00E-06	0 %	657 16	1/50/00		0 0E+00	3 0E-04
11096825 Aroclor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 895-01	4 60E-03	25 4	402.50	539.37	000.00	20.0	0.05+00
11097691 Aroctor 1254 (PCB-1254)	2 90E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03		377 50	512 27	19.00	10 H	00+000
126/4112 Arodor 1016 (PCB-1016) 53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 195-02	2 90E-04	25 3	340 50	475 22	18,000	1 OE-04	000+00
(111 )	5.1	20-24: 2	000000	3 405-03	<b>2</b> 13E-02	5 20E-04	25	345 50	482 20	18,000	1 0E-04	0.00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

YES

		ENTER	User-defined stratum A	permeability.	(cm <sub>2</sub> )				
				œ G	-				_
		ENTER Soil	stratum A SCS	(used to estimate soil vapor	permeability)	7	ENTER Stratum C soil water-filled porosity,	θ <sub>w</sub> c (cm³/cm³)	03
		ENTER	g G	soil type	water table	sc	ENTER Stratum C soil total porosity,	n (unitless)	0.43
		ENTER	Soil	directly above water table,	(Enter A, B, or C)	O	ENTER Stratum C soil dry bulk density,	ρ <sub>ο</sub> ς (g/cm³)	1,7
	ylene	ENTER Lwt (celt D28)	Thickness of soil stratum C	Ē.	-	1341 12	ENTER Stratum B soil water-filled porosity,	θ <sub>w</sub> β (cm³/cm³)	0.27
Chemical	cis-1,2-Dichloroethylene	NTER ENTER ENTER Totals must add up to value of L <sub>wT</sub> (cell D28)	Thickness of soit stratum B	(Enter value or 0)	(cm)	3048	ENTER Stratum B soil total porosity,	n (unitless)	0.42
	ő	ENTER Totals mus	Thickness	stratum A,		853 44	₩ # # <b>#</b>	ρ <sub>в</sub> <sup>в</sup> (g/cm³)	17
		ENTER	Depth below grade	to water table,	(cm)	2499 36	ENTER Stratum A Soil water-filled porosity, bu	6,*^A (cm³/cm³)	0.2
ENTER Initial groundwater conc , Cw (µg/L)	15 1225	ENTER Depth	below grade to bottom of enclosed	space floor,	(cm)	15	ENTER Stratum A soil total porosity,	n <sup>A</sup> (unitless)	0.43
ENTER Chemical CAS No (numbers only, no dashes)	156592	ENTER	Average soit/ oroundwater	temperature, T <sub>s</sub>	(၁,)	16	ENTER Stratum A soil dry bulk density,	ρ <sub>b</sub> <sup>A</sup> (g/cm³)	15

C	04	301	301	400		
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	
Averaging	Averaging			Target	Target hazard	
tme for		Exposure	Exposure	nsk for		
carcinogens,	ē	duration,	frequency,	carcinogens,	_	
ΑT <sub>C</sub>	ATNC	0	Ш	포		
(yrs)	(yrs)	(yrs)	(days/yr)	(unitless)	(unitless)	
,						
70	30	30	350	1 0E-06	1	
				Used to calc	Jsed to calculate risk-based	
				groundwate	groundwater concentration	

indoor air exchange rate, ER (1/h)

Floor-wall seam crack width,

Enclosed space height, H<sub>B</sub> (cm)

Enclosed space floor width,

Enclosed space floor length, Le

Soit-bldg pressure differentiat, AP (g/cm-s²)

ENTER

ENTER

ENTER

ENTER

ENTER Enclosed space floor thickness,

## CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)
Unit nsk factor, URF (µg/m³) ¹
Pure component water solubility, S (mg/L)
Organic carbon partition coefficient, $K_{\infty}$
Critical temperature, T <sub>c</sub> (%)
Normal bolimg point, T <sub>B</sub>
Entha'py of vaponzation at the normal bouling point, AH,,a (cal/moi)
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H
Diffusnity in water, D,, (cm²/s)
Diffusivity in air, D.

Floor- wall seam perimeter, X <sub>xex</sub>	3,844	Diffusion path length, Le	2484 36	
Water-filled porosity in capillary zone. $\theta_w = (cm^3/cm^3)$	0.346	Total overall effective diffusion coefficient, D**r (cm²/s)	6 52E-04	
Air-filled porosity in capillary zone, $\theta_{acc}$	0.084	Capitlary zone effective diffusion coefficient, Doff (cm²/s)	1 20E-04	
Total porosity in capillary zone, n <sub>ca</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0.43	Stratum C C effective diffusion coefficient, D <sup>off</sup> (cm <sup>2</sup> /s)	4 56E-04	Reference conc., RfC (mg/m³)
Thickness of capillary zone, Let (cm)	30 00	Stratum B B effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	7 60E-04	Unit nsk factor, URF (µg/m³) ¹
Stratum A soil effective vapor permeability, k, (cm²)	3 03E-09	Stratum A A effective diffusion coefficient, Def (cm²/s).	2 98E-03	Infinite source bidg conc , Coueding (µg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub>	0 778	Vapor viscosity at ave soil temperature, $\mu_{TS}$ ( $g/cm-s$ )	1 77E-04	Infinite source indoor attenuation coefficient, at (unitless)
Stratum A soll intrinsic permeability, k	3 89E-09	Henry's iaw constant at ave groundwater temperature, H'rs (unitiess)	1 15E-01	Exponent of equivalent foundation Peciet number, exp(Pe') (unitiess)
Stratum A effective total fluid saturation,  Sie (cm³/cm³)	0 347	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol)	2 72 <b>E-</b> 03	Area of crack, Availate (cm <sup>2</sup> )
Stratum C sod aur-filled porosity, $\theta_a^c$	0.130	Enthalpy of vaporization at ave groundwater temperature, $\Delta H_{\nu, TS}$ (cal/mol)	7,674	Crack effective diffusion coefficient, Done (cm²/s)
Stratum B soil air-filled porosity, $\theta_{\mathbf{n}}^{B}$ $(\mathrm{cm}^{3}/\mathrm{cm}^{3})$	0 150	Crack depth below grade, Zonek (cm)	15	Average vapor flow rate into bldg ,  Q <sub>sol</sub> (cm <sup>3</sup> /s)
Stratum A soil alr-filled porosity, $\theta_{\bullet}^{\bullet}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n	4 16E-04	Crack radius, frank (cm)
Source- building separation, L <sub>T</sub>	2484.36	Area of enclosed space below grade, A <sub>B</sub>	9 24E+05	Source vapor conc , Chourse (µg/m³)
Exposure duration, t	9 46E+08	Bldg ventilation rate, Q <sub>buldeng</sub> (cm <sup>3</sup> /s)	5 63E+04	Convection path length, L.p. (cm)

INCREMENTAL RISK CALCULATIONS.

Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitiess)	42
Incremental nsk from vapor intrusion to indoor air, carcinogen (unttless)	ĄZ
Final indoor exposure groundwater conc , (ug/L).	8 02E+04
Pure component water solubility, S S (µg/L)	3 50E+06
Risk-based indoor exposure groundwater conc, (ug/L)	8 02E+04
Indoor exposure groundwater conc., noncarcinogen (µg/L)	8 02E+04
Indoor exposure groundwater conc , carcinogen (µg/L)	Ą

VLOOKUP TABLES

						10010						
Z S S S I Trues	(mm/h)	So (1/61)	Ţ.		£3							
co con 1 ypa	N. (Critica)	ŀ	- 1	- 1	oe (cm /cm )	- [	Mean Grain Diameter (cm)					
<u>ن</u> د	0 50	0 008	1 09	0 083	0 38	0 068	0 0092					
<u>.</u>	0.26	0 019	131	0 237	0 41	0 095	0 0 16					
	2	0 036	156	0 359	0 43	0 0 78	0 020					
<u>S1</u>	14 59	0 124	2 28	0 561	0 41	0 057	0.040					
<u>s</u>	29.70	0 145	2 68	0 627	0.43	0.045	0 044					
SC	0 12	0 027	1 23	0 187	0.38	0 100	0 00	_				
SCL	131	0.059	1 48	0.324	900	200	0000					
<u>88</u>	0.25	0.016	137	0.220	0.00	0.034	0.0046					
Sic	0.02	0000	5 5	0.20	96.0	0000	00000					
Dis	700			0 000	070		01000					
= 5	0 0	200	7 -	200	2 4	0000	9000					
18	4 4 2 5	0.020	- +	0.23	0.40	7900	100					
			60	1	<b>,</b>	con n	0.030					
					0,000	alon I controvered In	- Jan. H. v.					
		41.00			Cremic	Chemical Properties Lookup Table	up lable					
		Organic -			<b>e</b>		Henry's	Henry's			Enthalpy of	
		carpon	:	:	component	:	law constant	law constant	Norma		vaponzation at	Ž.
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	poling	Critical	the normal	rısk
	Ç	coefficient,	in air,	in water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,
		χ,	ם" '	֓֞֞֜֞֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֡֓֓֓֡	s)	ī	I	۳	⊢e°	ပိ	۵H٬۶	URF
CAS No Chemical		(cm <sub>3</sub> /g)	(cm <sub>2</sub> /s)	(cm²/s)	(mg/t.)	(unitless)	(atm-m³/mol)	(၁)	(k)	( <sup>2</sup> K)	(cal/mol)	(mg/m³) 1
+00 0000		1	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4			1						
50293 001		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05
20328 Benzo(a)pyrene		1 025+06	4 30E-02	90-E-06	1 62E-03	4 63E-05	1 13E-06	25			15,000	2 1E-03
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	25		827 85	15,000	0 0E+00
53703 Dibenz(a,h)anthracene		3,80€+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25		990 41	16,000	2 1E-03
56235 Carbon tetrachloride		174E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25			7 127	155.05
56553 Benz(a)anthracene		3 98E+05	5 10E-02	90°E-06	9 40E-03	137E-04	3.34E-06			•	15,000	
57749 Chlordane		1 20E+05	1 18E-02	4 37F-06	5 BOF-02	1 99 1.03	4 RSE-05	20.00			900,61	10-11-0
58899 camma-HCH (I Indana)		1075+03	1 425.02	7 345 08	001100 S	20-100-	4 405 05	2 .			13,000	5 /E-04
60571 Dielden		20112	1 250 02	745	00000	9 740-04	1,40E-CD	9 1	0000		13,000	3 /E-04
		40+104 o	70-367	4 /45-00	1 505-01	6 19E-04	151E-05	52			13,000	4 6E-03
6565U Benzoic Acid		6 00E-01	5 36E-02	7.97E-06	3 50E+03	6 31E-05	1 54E-06	52			10,000	0 0E+00
6/641 Acetone		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25		508 10	6,955	0 0E+00
67663 Chloroform		3 98E+01	104501	1 00E-05	7 92E+03	150E-01	3 66E-03	25	334 32	536 40	6,988	2 3E-05
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25			9,510	4 0E-06
71363 Butanol		6 92€+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	25			10.346	0 0E+00
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25			7.342	8 35-06
71556 1,1,1-Trichtoroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25			7.136	0 OE+00
72208 Endrin		123E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25		986 20	12.000	0.05+00
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25			14.000	0.00
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25			14,000	6.98-05
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1.20E-01	8 61E-04	2 10E-05	25			13,000	9 7E-05
74839 Methyl bromide		1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	25		467 00	5.714	0 0E+00
75014 Vinyt chloride (chloroethene)	ле)	186E+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2 71E-02	25			5,250	8 4E-05
75092 Methylene chloride		1 17E+01	1 01E-01	117E-05	1 30E+04	8 98E-02	2 19E-03	25			6,706	4 7E-07
75150 Carbon disulfide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	25			6.391	0.00
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422 35		9,479	1.1E-06
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15		7.000	1.8E-05
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	25	330 55		6,895	0 0E+00
75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6,247	5 0E-05
76448 Heptachlor		141E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 095-03	25			13,000	1 3E-03
77474 Hexachlorocyclopentadiene	92	2 00E+05		7.21E-06	1 80E+00	1 11E+00	2 715-02	25			10,931	0 0E+00
78591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25		715 00	10,271	2 7E-07
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25			7,590	00E+00
79005 1,1,2-Trichloroethane		5 01 E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	388 15		8,322	1 6E-05
/ you'd inchloroethylene		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03Ё-02	25	360 36	544 20	7,505	1 7E-06
/ 9345 1,1,2,2-1 etrachloroethane	•	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	25	419 60	661 15	966'8	5 8E-05
acced Acenaphunene		7.08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0 0E+00

Adres Printed Library			;		VLOOKUP TABLES							
84742 Olevandranare	2 885+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	22	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 Butyl benzyl phthalate	5 75E+04	5 74F-02	4 83E-06	2 695+01	3 855-08	9 39E-10	<b>12</b>	613 15	798 67	14,751	0 05+00	3 5E-01
	1 29E+03	3 12E-02	6.355-06	3.516+01	2 055-03	1 28E-06	ខ្ម	660 60	839 68	13,000	00+ii0	7 0E-01
86737 Fluorene	1 38E+04	3 63E-02	7 88E-06	1 985+00	2615-03	3 705-08	Q H	632.28	890.45	3,000	1.4E-06	00=+00
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1.53E-08	3 %	627.87	00 008	12,000	0.05+00	1 45-01
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3.34E-01	8 15E-03	25	486 15	738.00	10.06	2 75 05	00400
87855 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	25	582 15	813.20	14,000	3.4E-05	0.0E+00
90002 Z,4,5-1 nchlorophenol 91203 Nanhthalana	3 816+02	3 18E-02	6 255-06	8 00E+02	3 19E-04	7 78E-06	25	519 15	749 03	12,000	3 15-06	0 0E+00
91941 3.3-Dichlorobenzidina	7 24F±02	1 94 E-02	/ 50E-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	1 4E-01
95476 o-Xylene	3 63E+02	8 70E-02	1 005-05	1 78F+02	2 13 17-07	4 000-09	52	560 26	754 03	13,000	1 3E 04	0 0 0 0
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	3.20E-03	8 K	464 10	630 30	8,661	0 0 0 0 0	7 GE+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02		1 56E+02	7 79E-02	1 905-03	2 5	453 57	705 00	002.6	0.05+00	- C
95578 2-Chlorophenol	3 88E+02	501E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	23	447 53	675 00	9.572	00+00	1 86-02
93934 Z.4.5-Frichlorophenol	1 60E+03	2 91E-02		1 20E+03	1 78E-04	4 34E-06	52	526 15	759 13	13,000	0 0E+00	3 5E-01
100414 Ethylborasos	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	25	483 95	719 00	10,566	0 0E+00	2 05-03
100425 Styrene	3 63E+02	7 10E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20	8,501	0 0E+00	1 0E+00
105679 2,4-Dimethylphenol	2 09E+02	5845-02		7 875403	10550	2 /6E-03	52	41831	636 00	8,737	0 0E+00	1 0E+00
106423 p-Xylene	3 89E+02	7 69E-02		1 85F+02	3 145-01	2.00E-06 7.66E.03	52	484 13	707 60	11,329	0.00	7 0E-02
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96 E-02	2 43E-03	8 %	4132	07 919	8,525	004	7 0E+00
106478 p-Chloroaniline	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	3 52	503.65	754 00	11.680	00+100	8 UE-01
107062 1,2-Dichloroethane	1 74E+01	1 04E-01	9 90E-06	8 52E+03	4 01E-02	9 78 5-04	22	356 65	561 00	7.643	2 6F-05	001100
106034 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04		345 65	519 13	7.800	000+00	2 0E-01
108883 Tobione	4 07E+02	7 005-02	7 805-06	1 61E+02	3015-01	7 34E-03		412 27	617 05	8,523	0 0E+00	7 0E+00
108907 Chlombanzana	2 105102	8 70E-02	8 50F-06	5 26E+02	2 72E-01	6 63E-03		383 78	591 79	7,930	0 0E+00	4 0E-01
108952 Phenol	2.13C+02	8 20E-02	9 105-06	4 / ZE+UZ 8 28E+O4	1 525-01	3 71E-03		404 87	632 40	8,410	0.0E+00	2 0E-02
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92F-02	7.535-06	1 725+04	7 305 04	3 985-07		455 02	694 20	10,920	0 0E+00	2 1E+00
115297 Endosulfan	2 14E+03	115E-02	4 55E-06	5 10E-01	4 595-04	1 125-05	9 %	451 15	659 79	000'6	3 36 4	0 0E+00
117817 Bis(2-ethythexyl)phthalate	151E+07	351E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	3 15	657.15	806.00	000,41	001100	2.15-02
117840 Di-n-octyl phthalate	8 32E+07	151E-02	3 58E-06	2 00E-02	2 74E-03	6 685-05		704 09	862.22	15,000	00100	7.05.02
120127 Approved		5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03	52	582 55	825 00	14,447	4 6E-04	00+300
120127 Andulacelle 120821 1.2 4-Trichlorobenzene	2 90E+04	3 24 E-02	7.45-06	4 34E-02	2 67E-03	6 51E-05	52	615 18	873 00	13,121	0 OE+00	1 1E+00
120832 2.4-Dichlorophenol	1.47F±02	3 46E-02	8 77E-06	3 00E+02	5 82E-02	1 42E-03		486 15	725 00	10,471	0 0E+00	2 0E-01
121142 2,4-Duntrotoluene	9 55E+01	2 03F-01		2 70E±03	3 BOE AG	31/15-46		482 15	708 17	11,000	0 0E+00	1 1E-02
124481 Chlorodibromomethane	631E+01	1 96E-02	1 05E-05	2 50E+03	3 215-02	2 Z T T - OS		590 00	814 00	13,467	1 9E-04	0 0E+00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	3 53	394 40	62020	000,8	2 4E-05	00 00
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 515-04	1 10E-05		667 95	936 00	14.370	00400	1 1 1 0 1
135392 dis-1,2-Dichloroethylene 156605 trans-1,2-Dichloroethylone	3 55 101	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00	7,192	0 0 0 0 0	3 5E-02
193395 Indeno(1.2.3-cd)pvrene	3 475+06	1 90 11 02	7 560 06	5 30E+03	385E-01	9 39E-03	52	320 85	516 50	6,717	0 0E+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2.26E-02		1.50E-03	4 55E-03	1 50 5-06		809 15	1078 24	17,000	2 1E-04	0 0E+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1615.04	9 %	15.90	969 27	15,000	2 1E-04	0 0 0 0
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 405-05	8 29E-07		753 15	905 00 1019 70	13,815	0.05+00	1 4E-01
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05		714 15	00 626	16 455	2 TE-05	00+900
310846 alpha-HCH (alpha-DLC)	2.45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	25	603 01	839 37	13,000	4 9E-03	00 00
319857 beta-HCH (beta-BHC)	1 26F±03	1 42E-02	7.34E-06	2 00E+00	4 35E-04	1 06E-05	52	596 55	839 36	13,000	1 8E-03	0 00+00
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00 = 05	2 AUE-01	3 UDE-US 7 26F-01	7 44E-07	52	596.55	839 36	13,000	5 3E-04	0 0E+00
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3.06E-05	7.46E-07	6 % 	381 15 558 00	587 38	000,	3 7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06	3 5	509 60	746.97	12,936	1 9H 0	0 00-400
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9 51E-06	25	613.96	848 76	13,000	2 65.03	00000
7439975 Mercury (elemental)	5 20E+01	3 07E-02		5 62E-02	4 67E-01	1 145-02	25	629 88	1750 00		0.0F+00	3.05-04
8001332 Foxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	25 6	657 15	873 31		3.2E.04	100F400
11090825 Alocadi 1200 (PCB-1200) 11097691 Aroctor 1254 (PCB-1254)	2 00E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	25	402 50	539 37	19 000	1 OE-04	
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2 22E-02	5 42E-06	3 70E-02 4 20F-03	0 205-02 1 195-02	2 00E-03	52	377 50	512.27	19,000	1 0E-04	
53469219 Aroclor 1242 (PCB-1242)	3 30€+04	2 14E-02	. 6,	3 40E-01	2 13E-02	5 20F-04	8 K	340 50	475 22	18,000	1 0E-04	00±00
				!	!		3	22	482.20	18,000	1 0E-04	

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 1 2 September, 1998

YES X

OR
CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

		ENTER	User-defined stratum A soil vapor permeability.	(cm²)	
			8		
		ENTER	stratum A SCS soil type (used to estimate soil vapor	permeability)	ENTER Stratum C soil water-filled posity, e.c. (cm³/cm³)
		ENTER	SCS soil type directly above	water table SC	ENTER Stratum C soil total porosity, n (unitless)
		ENTER	Soil stratum directly above water table,	(Enter A, B, or C) C	ENTER Stratum C soil dry bulk density, P <sub>c</sub> (g/cm³)
	oride	ENTER Lwr (cell D28)	Thickness of soil stratum C, (Enter value or 0)	(cm) 1341 12	ENTER Stratum B soil water-filled porosity, ew (cm³/cm³)
Chemical	Carbon tetrachloride	NTER ENTER ENTER Totals must add up to value of LwT (cell D28)	Thickness of soil stratum B, (Enter value or 0)	(cm) 304 8	ENTER Stratum B soil total porosity, nB (unitless)
		ENTER Totals mu	Thickness of soil stratum A,	(cm) 853 44	ENTER Stratum B soil dry bulk density, p <sub>b</sub> <sup>B</sup> (g/cm³)
		ENTER	Depth below grade to water table, Lwr	(cm) 2499 36	ENTER Stratum A soil water-filled porosity,
ENTER inital groundwater conc , Cw (µg/L)	6 136923077	ENTER Depth	below grade to bottom of enclosed space floor, Lr	(cm) 15	ENTER Stratum A soli total porosity, n (unitless)
ENTER Chemical CAS No (numbers only,	56235	ENTER	Average soll/ groundwater temperature, Ts	් 1	ENTER Stratum A sodi dry bulk density, p <sub>b</sub> <sup>A</sup> (g/cm³)

		Used to calcutate risk-based	Used to calcu				
		1	1 0E-06	350	30	30	70
		(unitless)	(unitless)	(days/yr)	(yrs)	(yrs)	(yrs)
			¥	핖	<b>a</b>	ATMC	AT <sub>C</sub>
		noncardnogens,	carcinogens,	frequency,	duration,	noncarcinogens,	carcinogens,
		quotient for	risk for	Exposure	Exposure	time for	time for
		Target hazard	Target			Averaging	Averaging
		ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
	0.45	1 01	488	961	961	40	15
	(1/h)	(cm)	(cm)	(cm)	(cm)	(9/cm-s <sup>2</sup> )	(cm)
	<b>£</b>	*	ť	×	ٿ	ďΔ	Loreck
	rate,	width,	height,	width,	length,	differential,	thickness,
	air exchange	seam crack	space	floor	floor	pressure	floor
	Indoor	Floor-wall	Enclosed	space	space	Soil-bidg	sbace
				Enclosed	Enclosed		Enclosed
	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
0.4	17	0.27	0 42	17	0.2	0.43	15

### 2 of 7

CHEMICAL PROPERTIES SHEET

Reference conc , RfC /ms/m <sup>3</sup> )	, manual
nsk factor, URF	7
Pure component water solubility, S	(3)(3)(1)
Organic carbon partition coefficient, K <sub>oe</sub> (cm <sup>3</sup> /o)	(S)
Critical temperature, control To	(ייישריי) (בייביי) (בייביי) (בייביי) (בייביי) (בייביי)
Normal boting point, te T <sub>e</sub>	
Enthalpy of vaponzation at the normal boiling point, AH <sub>v,b</sub>	
Henry's law constant reference temperature, T <sub>R</sub>	25
Henry's law constant at reference temperature, H (atm-m³/mol)	7 80F-02   8 80F-06   3 05F-02
Diffusivity in water, D., (cm²/s)	8 80F-06
Diffuswity in air,  D. (cm²/s)	7 80F-02

Stratum A soli	A Stratum B	Stratum C soil	Stratum A effective	Stratum A soil	Stratum A soil	Stratum A soul	Thickness of	Total porosity in	Air-filled	Water-filled	Floor-
b m		air-filled porosity,	total fluid saturation,	intrinsic permeability,	relative air permeability,	effective vapor permeability,	capillary zone,	capillary zone,	capillary	capillary zone,	seam perimeter,
θ <sub>a</sub> <sup>A</sup> θ <sub>a</sub> <sup>B</sup> (cm³/cm³) (cm³/cm³)		θ <sub>α</sub> c (cm³/cm³)	S <sub>te</sub> (cm³/cm³)	k, (cm²)	k <sub>o</sub> (cm²)	κ, (cm²)	(cm)	n <sub>cz</sub> (cm³/cm³)	θ <sub>a,cz</sub> (cm³/cm³)	θ <sub>w.α</sub> (cm³/cm³)	X (cm)
0230 0150		0 130	0.347	3.89E-09	0 778	3 03E-09	30 00	0 43	0 084	0.346	3,844
						Stratum	Stratum	Stratum	Capillary	Total	
Crack- Crack		Enthalpy of	Henry's law	Henry's law	Vapor	4	മ	ပ	zone	overall	
depth		vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
area betow ratio, grade.		ave groundwater temperature.	ave groundwater temperature.	ave groundwater temperature.	ave soil	coefficient	coefficient	coefficient	diffusion	diffusion	path
		ΔH, τs	H	II.	LTS.	, # <u></u>	٥٩٩	ا الا	,		,
(unitless) (cm)	1	(cal/mol)	(atm-m³/mot)	(unitless)	(g/cm-s)	(cm²/s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm)
4 16E-04   15	, ,	862'2	2 02E-02	8 53E-01	1 77E-04	3 16E-03	7 99E-04	4 74E-04	1 12E-04	6 75E-04	2484 36
				Exponent of	Infinite						
Average		Crack		equivalent	sonice	Infinite					
				foundation	indoor	source	Cust				
flow rate	-		Area of	Pectet	attenuation	pjqg	ısk	Reference			
radius, into bldg	:	٥	crack,	number,	coefficient,	conc.,	factor,	conc			
ranck Q <sub>soll</sub>		χους Ω	Acrack	exp(Pe¹)	ಶ	Choliding	URF	RC			
(cm³/s)		(cm <sup>2</sup> /s)	(cm²)	(unitless)	(unitless)	(mg/m³)	(µg/m³) ¹	(mg/m³)			
0,10 2 89E+00		3 16E-03	3 84E+02	3 32E+15	4 10E-06	3 50E-03	1 5E-05	AN			

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RISK-BASE	RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	ER CONCENTR	ATION CALC	ULATIONS	INCREMENTAL	NCREMENTAL RISK CALCULATIONS.
1	-		(	ı	Incremental	Hazard
Indoor	Indoor	Kisk-based	Pud	Final	risk from	quotient
exposition	exposnue	indoor	component	Indoor	vapor	from vapor
groundwater	groundwater	exposure	water	exposure	intrusion to	intrusion to
conc	conc,	groundwater	solubility,	groundwater	indoor air,	indoor air,
carcinogen	noncarcinogen	conc.	ഗ	conc,	carcinogen	noncarcinoden
(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/J-)	(unitless)	(unitless)
4 64E+01	AN	4 64E+01	4 64E+01 7 93E+05	4 64E+01	ΨN	ΨN

Reference conc , RfC (mg/m³)

						VLUCKUP I ABLES	E3					
	2	Ø	ی		, si	r						
Such solir Lype	K, (cm/h)	- 4	- 1		θ, (cm²/cm²)	θ <sub>r</sub> (cm³/cm²)	Mean Grain Diameter (cm)					
<u> </u>	0 50	0 008	109	0 083	0 38	0 068	0 0092					
, _	9 7	800		0.237	0.41	0,095	0 016					
<u>.</u>	- ;	9600	156	0 359	0 43	0 0 78	0 020					
ט ני	4 5 5 5 5 5 6	0 124	228	0 561	041	0 057	0 040					
2	28.0	0, 145	7 23	0 627	O 0	0.045	0 044					
108	7 5	200	0 00	0 0 0	0 0	9 6	0.025					
S	0 25	0.03	1 37	0.270	0.45	0000	0.029					
SiC	0 02	0 000	1 09	0.083	0.26	0200	0 0013					
SICL	0 07	0 0 0 0	1 23	0 187	0.43	6800	0 0058					
SIL	0.45	0 050	141	0 291	0.45	290 0	0011					
રા	4 42	0 075	189	0 471	0 41	0 065	0 030					
					Chemica	Chemical Properties Lookup Table	kup Table					
		Organic			Pure		Henry's	Henry's			Enthainy of	
		carbon		-	component		law constant	law constant	Normal		vaporization at	į
		partition	Diffusivity	Diffusivity		Henry's	al reference	reference	poiling	Critical	the normal	. ASE
	~	coefficient,	ın aır,	ın water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,
CAS No Chemical		(cm <sup>3</sup> /a)	O. (cm <sup>2</sup> /s)	D <sub>w</sub>	S ("cu.)	T.	H (Jean)(mate)	ہے ﴿	<b>-</b> €	⊢ ပိ	ΔH,ν	URF.
		/6; (a)	(2)	(8) (13)	(1119/12)	(numess)	(auri-rit /iriol)	<u>(</u> )	2	(¥	(cal/mot)	(ˈm/m²)
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9.7E-05
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	90E-06	1 62E-03	4 63E-05	1 13€-06	25	715 90	969 27	15,000	2 15-03
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	90-390 6	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0.00+00
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1,25E+00	3 05E-02	25	349 90	556 60	7,127	1 SE-05
55240 Chizzan		3 98E+05	5 10E-02	90-300.6	9 40E-03	137E-04	3 34E-06	25	708 15	•	15,000	2 1E-04
Cathor C HOH of the Constant		1 205+05	1 185-02	43/11-06	5 60E-02	1 99E-03	4 85E-05	25	624 24		13,000	3 7E-04
60571 Dialdrin		2 14 11 403	1 4ZE-UZ	7.34E-05	6 80E+00	5 74E-04	1 40E-05	25	596 55		13,000	3 7E-04
65850 Benzolo Acid		6 DOE-01	1 23E-02	7 076 08	1 35E-01	6 19E-04	151E-05	25	613 32		13,000	4 6E-03
67641 Acetone		5.755-01	1 24E-01	1.97.11.00	3 30H+03	6 31E-03	1 54E-06	25	720 00		10,000	0 0 1 + 00
67663 Chloroform		3 98E+01	104E-01	1.00F-05	7 925+03	1505-03	3 86E-U3	220	329.20	508 10	6,955	0 0E+00
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1595-01	20-1189 C	0.46	354 32 45 00	535 40	5 988 6 9	2 3 4 43
71363 Butanol		6 92E+00	8 00E-02	9 305-06	7 40E+04	3615-04	80-100 c	3 6	2000		9,010	4 UT-U5
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25	353.24		7.342	8 3F-06
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0 0E+00
7228 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	718 15	986 20	12,000	0 0E+00
72548 DDD		9 //E+04	1 565-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	52	651 02		14,000	0 0E+00
72559 DDE		4 47F+06	1 445-02	80-301 #	9 00E-02	1 04E-U4	4 00E-06	52 5	639 90		14,000	6 9E-05
74839 Methyl bromide		1 05E+01	7 28E-02	121F-05	1.52F±04	2.56F-01	2 10E-03	0 Y	020 44	860 38	3,000	9 /E-U5
75014 Vinyl chlonde (chloroethene)	ene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2 71E-02	3, 52	259.25	432 00	5,714	2 4E-05
75092 Methytene chlonde		1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 195-03	52	313 00		6.706	4 7E-07
75150 Carbon disulfide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02€-02	25	319 00		6,391	00+300
/5252 Bramofarm		8 71E+01	1 49E-02	1 03E-05	3 10 =+03	2 19E-02	5 34E-04	25	422 35		9 479	1 1E-06
75343 # 1-Dichlorosthane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15		2,000	1 8E-05
75354 1.1-Dichloroethylene		5 89F±01	0 00E-02	1 045 05	3 05E+U3	2 30E-01	5 61E-03	52	330 55		6,895	0 0E+00
76448 Heptachlor		1 41E+06		5.695-06	1 805-01	4 47E-02	2 0 E-02	67 2	504 C	3/6 05	6,247	က ရှင် ရှင်
77474 Hexachlorocyclopentadiene	9119	2 00E+05	1 61E-02	7 21E-06	1 80E+00	111E+00	27167 C	2 2	513 15	748.00	13,000	2010
78591 Isophorone		4,68E+01	6 23E-02	6.76E-06	1 20E+04	2 72E-04	663=08	3, 2,	488.35	715.00	172.01	275.07
78875 1,2-Dichloropropane		4.37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	52 52	369 52	572 00	7.590	0.00+00
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 805-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8,322	1 6E-05
79016 Trichloroethylene 79345 4 1 2 2 Tetrachloroethan	!	1 66E+02	7 90E-02	9.10E-06	1 10E+03	4 22E-01	1 03E-02	52	36036	544 20	7,505	1 7E-06
83320 Acenschitch	ø	9 33E+01	7 10E-02	7 90E-06	2 97E+03	141E-02	3 445-04	25	419 60	661 15	966'8	5 8E-05
Social Average in a la		COETOS /	4 415-04	90-369 /	4 24E+00	6 36E-03	1 55E-04	<b>5</b> 2	550 54	803 15	12,155	0.050

March   Marc	84662 Diethytphthalate 84742 Drn-buty phthalate 85687 Buty benzyl phthalate	2 88E+02 3 39E+04 5 75E+04	2 56E-02 4 38E-02 1 74E-02	6 35E-06 7 86E-06 4 83E-06		VLOOKUP TABLES 1 85E-05 3 85E-08 5 17E-05	4 51E-07 9 39E-10 1 26E-06	25 25 25	567 15 613 15 660 60	757 00 798 67 839 68	13,733 14,751 13.000	0 0E+00 0 0E+00 0 0E+00	0.00
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,		1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	90-300 s	2 22	632 28	890 45	13,000	> -	1 4E-06
9. 5.257-0.         5.057-0.	86748 Carbazole	3 39E+03	3 90E-02	7 035-06	1 98E+00 7 48E+00	2 61E-03	6 37E-05 1 53E-08	23 7 7	570 44 627 87	870 00	12,666	۰ "	8+HS
8782-1242         356-02         10 10 10-03         10 10 10-04	87683 Hexachloro-1,3-butadiene	5 37 E+04	561E-02		3 23E+00	3 34E-01	8 15E-03	2 22	486 15	738 00	10,206	0 2	2E-05
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0	88062 2 4 & Tacklosses	5 92E+02	5 60E-02		1 95E+03	1 00E-06	2 44E-08	52	582 15	813 20	14,000	m	4E-05
7.585-72   7.585-72	91203 Naphthalene	2 00E+03	5 90F-02		3 10F+01	3 19E-04 1 98E-02	7 78E-06	25	519 15	749 03	12,000	ຕີ	1E-06
0.12E-01   7.04E-02   1.0E-05   1.0E-05   1.0E-05   2.1E-01   2.0E-05   2.	91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 11E+00	1 64E-07	4 00E-09	3 2	560 26	754 03	10,373	5 5	2 4
91 Time 10         10 Time	95476 o-Xytene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	22	417 60	630 30	8,661	9	9
10.0000-10.         5.0000	95467 Z-Methylphenol (o-cresol) 95501 1 2-Dichlomberzere	9 12E+01 6 17E+03	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 205-06	52	464 19	697 60	10,800	0 OE	ş
166E-01 760E-02 291E-02 3 80E-02 3 10E-02 1 31E-04 2 80E-02 5 2515 7 7910 1 13000 1 300000 1 300000 1 300000 1 300000 1 300000 1 300000 1 300000 1 300000 1 300000 1 300000 1 300000 1	95578 2-Chlorophenol	3 88E+02	5 01E-02	9.46F-06	1 50E+02 2 20F+04	7 79E-02 1 60E-02	190E-03	<b>52</b>	453 57	705 00	9,700	<u>й</u> (	용 :
4.46E-0.7         7.00E-0.2         8.00E-0.4         9.18E-0.4         7.40E-0.5         2.40E-0.4         9.18E-0.4         7.00E-0.2         7.00E-0.2         9.18E-0.4         7.00E-0.2         7.00E-0.2         9.18E-0.4         7.00E-0.2         7.00E-0.2         9.18E-0.2         7.00E-0.2         7.00E-0.2         9.18E-0.2         7.00E-0.2         7.00E-0.2 <t< td=""><th>95954 2,4,5-Trichlorophenol</th><td>1 60E+03</td><td>2916-02</td><td>7 03E-06</td><td>1 20E+03</td><td>1785-04</td><td>4 34E-06</td><td>3 5</td><td>526 15</td><td>759 13</td><td>9,5/2</td><td></td><td>3 8</td></t<>	95954 2,4,5-Trichlorophenol	1 60E+03	2916-02	7 03E-06	1 20E+03	1785-04	4 34E-06	3 5	526 15	759 13	9,5/2		3 8
STREATOR         TORGENO         <	98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	22	483 95	719 00	10,566	i di O	3 8
2 00EC 10         6 0EC 20         7 0EC 20         7 0EC 20         2 0EC 20	100414 Ethylbenzene 100425 Styrene	3 63E+02	7 505-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20	8,501	0 0E+	8
9 86E-02         7 86E-03         3 44E-06         1 8EE-02         2 44E-13         7 70E-04         1 1,239           9 10E-02         6 0EE-01         6 0EE-01         7 0EE-02         2 44E-13         2 44E-13         2 44E-13         7 10 10 10 10 10 10 10 10 10 10 10 10 10	105679 2.4-Dimethylohenol	2 09E+02	5.845-02	8 69E-08	3 10E+02 7 87E+03	1,13E-01	2 76E-03	8 8	41831	636 00	8,737	₩	웅 :
6 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	106423 p-Xylene	3 89E+02	7 695-02	8 44E-06	1 85E+02	3 14E-01	2 00E-08 7 66E-03	8 %	484 13	616 20	11,329	0 0 0	8 8
6 Fib-10   482E-04         3 DBE-04         3 DBE-04 <th>106467 1,4-Dichlorobenzene</th> <td>6 17E+02</td> <td>6 90E-02</td> <td>7 90E-06</td> <td>7 38E+01</td> <td>9 96E-02</td> <td>2 43E-03</td> <td>22 52</td> <td>447 21</td> <td>684 75</td> <td>6,323 9,771</td> <td></td> <td>3 8</td>	106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	22 52	447 21	684 75	6,323 9,771		3 8
7.85E+01   10.8E+02   2.80E+03   2.0E+03   2.0E+04   2	106478 p-Chloroaniline	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	52	503 65	754 00	11,689	90	8
4 OFFICE OF STREAM         5 STREAM <th>10/06/2 1,2-Dichloroethane</th> <th>1 74E+01</th> <th>104E-01</th> <th></th> <th>8 52E+03</th> <th>4 01E-02</th> <th>9 78E-04</th> <th>52</th> <th>356 65</th> <th>561 00</th> <th>7,643</th> <th>2 6</th> <th>33</th>	10/06/2 1,2-Dichloroethane	1 74E+01	104E-01		8 52E+03	4 01E-02	9 78E-04	52	356 65	561 00	7,643	2 6	33
1925-0.0   1905-0.2   2005-0.0   1915-0.0   2756-0.0	108383 m-Xviene	0.75400	8 30E-02		2 00E+04	2 10E-02	5 12E-04	52	345 65	519 13	7,800	0 0 €	8
2 19E+01         7 30E-02         7 30E-02         8 70E-03         1 52E-04         1 50E-03         2 19E-07	108883 Toluane	1 82F±02	8 70F-02		1 61E+UZ	3 01E-01	7 34E-03	52 5	412.27	617 05	8,523	0 0E+	8
2 MB Fig. 10         2 DEC 20         10 EG 40         2 DEC 40         1 DEC 40         2 DEC 40         1 DEC 40         2 DEC 40         1 DEC 40         2 DEC 40         1 DEC 40         2 DEC 40         1 DEC 40         2 DEC 40         1 DEC 40         2 DEC 40         1 DEC 40         2 DEC 40         2 DEC 40         2 DEC 40         2 DEC 40         3 DEC 40	108907 Chlorobenzene	2 19E+02	7 30E-02		4 72E+02	1 52E-01	3 715-03	6 K	303 / B	591 /9	7,930	# E	8 8
1565-01   1582-02   7585-04   7585	108952 Phenol	2 88E+01	8 20E-02		8 28E+04	1 63E-05	3 98E-07	2 2	455 02	694 20	10.920	F 4	3 5
4   120         1   120         4   120         4   120         4   120         4   120         4   120         4   120         4   120         4   120         4   120         4   120         4   120         4   120         4   120         4   120         4   120         4   120         4   120         4   120         5   120         5   120         5   120         5   120         5   120         5   120         5   120         5   120         5   120         5   120         5   120         5   120         5   120         5   120         5   120         5   120         6   120         6   120         6   120         6   120         6   120         6   120         6   120         7   120 <t< th=""><th></th><th>1 55E+01</th><th>6 92E-02</th><th></th><th>1 72E+04</th><th>7 38E-04</th><th>1 80E-05</th><th></th><th>451 15</th><th>629 79</th><th>000'6</th><th>337</th><th>8</th></t<>		1 55E+01	6 92E-02		1 72E+04	7 38E-04	1 80E-05		451 15	629 79	000'6	337	8
9 32E+07         151E-02         3 58E-06         2 00E-04         2 58E-06         2 00E-04         2 58E-06         2 00E-04         2 58E-06         2 00E-04         2 58E-06         2 00E-04         3 58E-06         2 00E-04         3 58E-06         2 00E-04         3 58E-06         3 00E-04         3 58E-06         3 00E-04         3 58E-06         3 00E-04         3 58E-06         3 00E-04         3 58E-06         3 00E-04         3 58E-06         3 00E-04         3 58E-06         3 00E-04         3 58E-06         3 00E-04         3 58E-06         3 00E-04		1516+07	3 5 1 1-02		3 40E-01	4 59E-04	1 12E-05		674 43	942 94	14,000	0 OE+	2
5 50E+04         5 42E-02         5 91E-06         6 20E+04         5 42E-02         5 91E-06         6 20E+04         5 42E-02         5 91E-06         2 50E+04         3 24E-02         5 91E-06         2 50E-04         3 24E-02         5 91E-06         2 5 5 615 8         8 25 00         14,447           1 78E+03         3 00E+02         8 77E-06         8 00E+02         8 77E-06         8 00E+02         1 00E+02         2 00E+02         1 00E+02         2 00E+02         1 00E+02         2 00E+02         1 00E+02         2 00E+02         1 00E+02         2	117840 DH-octyl phthalate		1516-02		2 00E-02		6.68F-05	0 K	55/ 15	806 00	15,999	4 0E-0	φ (
29/EF-04         3.24E-02         7.74E-06         3.44E-02         2.67E-03         6.51E-05         2.6 61E-05         3.7 61E-05	118741 Hexachlorobenzene	5 50E+04	5 42E-02		6 20E+00		1 32E-03	2 2	582 55	825 00	15,000	4 6 4	<b>⊃</b> 4
1785-473   3106-474   3106-475	120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05		615 18	873 00	13,121	0 0 0	
155E+02   3 10E-04   3 17E-06   2 0 0 E+03   3 10E-04   3 17E-06   2 5 482 15   708 17   10.000     155E+02   2 10EE-02   2 0 0 E+03   3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	120821 1,2,4-1 manoropenzene 120832 2 4-Dicklopskenet	1 /8E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03		486 15	725 00	10,471	0 0E+0(	_
Size-01   196E-02   105E-03   2 10E-04   3 21E-04   196E-04   196E-05   2 10E-05   3 21E-04   196E-05   3 21E-04   196E-05   2 10E-05   3 10E-03   3 10E-03   3 10E-04   2 10E-05   3 10E-03   3	121142 2.4-Dinitrotoliene	9 555+01	3 405-02		4 50E+03	1 30E-04	3 17E-06		482 15	708 17	11,000	0 0E+0	0
155E+02   720E+02   820E+02   720E+02   750E+02   750E	124481 Chlorodibromomethane	6.31E+01	1 96E-02	1 05E-05	2 / UE+U2 2 60F+03	3 24E-05	9 2/E-08		590 00	814 00	13,467	95-0	** 1
10E+05   27ZE-02   72E-02		1 55E+02	7 20E-02		2 00E+02	7 54E-01	1 84E-02	8 %	394 40	62020	000,0	2450	ю r
35E+01         7.36E-02         11E-05         3.56E+01         7.36E-02         11E-05         3.56E+01         7.36E-02         7.19E-03         5.56E-03         5.56E-03         1.56E-03         1.56E-03         2.56E-03         5.56E-03         1.56E-03         1.56E-03         1.56E-03         1.56E-03         1.16E-04         2.56E-03         5.56E-03         1.56E-03         1.16E-04         2.56E-03         5.56E-03         1.56E-03         1.16E-04         2.56E-03         5.56E-03         1.56E-03         1.16E-04         2.56E-03         1.56E-03         1.56E-03         1.16E-04         2.56E-03         2	129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	1 35E-01	4 51E-04	1 105-05	22	567.95	936 00	14.370	0.05+0.0	_
1	156592 cts-1,2-Dichloroethylene	3 55E+01	7,36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03	52	333 65	544 00	7,192	0.000	
1 23E+06         1,50E-02         5 56E-06         1 50E-05         6 56E-06         1 50E-05         1 11E-04         25         7 15         90         1 7,000         1 7,000           1 07E+05         3 02E-02         5 56E-06         8 00E-04         3 40E-05         1 11E-04         25         73 15         1019 70         15,000           1 23E+06         2 56E-06         8 00E-04         3 40E-05         2 56E-07         2 5 734 15         905 00         13,010           3 86E+05         2 48E-02         6 51E-06         1 60E-03         3 8E-03         9 46E-05         2 714 15         979 00         16,455           2 46E+03         1 42E-02         7 34E-06         2 00E+00         4 51E-04         1 06E-05         7 74E-02         2 5 65 58         839 37         1 300           1 26E+03         1 42E-02         7 34E-06         2 40E-01         3 05E-05         7 76E-04         7 76E-05	103305 holeso(1.23.cd)stans	3 23E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516 50	6,717	0 0E+00	_
1	205992 Benzo(b)fluoranthene	1235+06	7.26E-02	3 55E-05	2 20E-05	6 56E-05	1 60E-06		809 15	1078 24	17,000	2 1E-04	
123E+06         2 28E-02         5 56E-06         8 00E-04         3 46E-05         8 20E-05         2 533 55         9 93 90         13,815           3 88E+05         2 48E-02         6 21E-06         1 60E-03         3 88E-03         9 46E-05         25         774 15         979 00         16,455           2 45E-06         1 22E-02         4 8EE-06         1 80E-01         6 97E-03         1 70E-04         25         506 55         893 37         13,000           1 23E-02         1 42E-02         7 34E-06         2 40E-01         3 55E-03         1 40E-05         2 50E 56         893 36         13,000           4 57E-03         1 42E-02         7 34E-06         2 40E-01         3 55E-03         7 44E-07         2 56 58         893 36         13,000           4 57E-03         1 42E-02         7 34E-06         2 40E-01         3 55E-03         7 44E-07         2 58 58         893 36         13,000           6 92E+01         3 77E-02         7 26E-06         1 82E+02         3 56E-05         7 44E-07         2 58 59         7 70 00         12,938           8 22E+04         1 32E-02         4 55E-02         3 88E-03         7 26E-01         7 44E-07         2 58 59         87 87         1,000	206440 Fluoranthene	1 07E+05	3 02E-02	6.35E-06	2.06 = -0.1	6 60F-04	1 115-04		715.90	969 27	15,000	2 1E-04	
3 98E+05         2 48E+02         6 21E-06         1 60E-03         3 88E-03         9 46E-05         25         744 15         979 00         14,645           2 45E+06         1 32E-02         4 8EE-06         1 80E-01         6 97E-03         1 70E-04         25         503 01         839 37         13,000           1 25E+03         1 42E-02         7 34E-06         2 00E+00         4 3EE-04         1 06E-05         25         596 55         839 36         13,000           4 57E+01         1 42E-02         7 34E-06         2 40E-01         3 05E-05         7 44E-07         25         596 55         839 36         13,000           4 57E+01         1 42E-02         7 34E-06         2 40E-01         1 32E-02         7 44E-07         25         596 55         839 36         13,000           6 92E+01         3 77E-02         7 26E-06         1 82E+02         3 06E-05         7 44E-07         25         598 50         7 700         12,388           8 32E+04         1 32E-02         4 55E-02         3 06E-05         7 46E-07         2 56 50         7 700         12,388           8 32E+04         1 32E-02         4 56E-03         3 06E-05         2 06E-05         7 46E-07         2 56 50         7 700         <	207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07		753 15	1019 70	13,815	2 45 26	_
45E+06         13E-02         4 86E-06         1 80E-01         6 97E-03         1 70E-04         25         603 01         839 37         13,000           123E+03         142E-02         7 34E-06         2 00E+00         4 35E-04         1 06E-05         25         596 55         839 36         13,000           4 57E+01         142E-02         7 34E-06         2 00E+01         3 05E-05         7 44E-07         25         596 55         839 36         13,000           4 57E+01         3 27E-02         7 26E-06         1 06E-05         7 46E-07         2 5         586 55         839 36         13,000           6 92E+01         3 27E-02         7 26E-06         1 82E+02         3 06E-05         7 46E-07         2 5         580 50         7 700         12,938           8 22E+04         1 32E-02         4 75E-06         2 06E-05         3 96E-06         2 25E-06         2 56 50         7 46 87         11,000           5 20E+04         1 32E-02         4 32E-06         2 06E-01         3 90E-06         2 56E-06         2 56 50         7 70 00         12,388           5 20E+04         1 32E-02         4 45E-01         1 46E-02         2 629 88         1750 00         14,100           5 20E+04 <t< th=""><th>218019 Chrysene</th><th>3 98E+05</th><th>2 48E-02</th><th>6 21E-06</th><th>1 60E-03</th><th>3 88E-03</th><th>9 46E-05</th><th></th><th>714 15</th><th>00 626</th><th>16 455</th><th>7 1 7 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5</th><th></th></t<>	218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05		714 15	00 626	16 455	7 1 7 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	
123E+03         142E-02         734E-06         2 00E+00         4 3E-04         1 06E-05         25         596 55         839 36         13,000           4 72E+03         142E-02         7 34E-06         2 40E-01         3 0EE-05         7 44E-07         25         596 55         839 36         13,000           4 72E+03         142E-02         7 26E-01         3 0EE-05         7 46E-07         2 5         381 15         587 38         7,000           6 92E+01         3 26E-02         1 00E-01         3 0EE-05         7 46E-07         2 5         58 00         7 70 00         12,938           2 40E+01         5 45E-02         8 17E-06         9 89E+03         9 23E-05         2 25E-06         2 5         510 60         14,100           5 20E+01         3 0E-06         2 00E-01         3 90E-04         9 51E-06         2 5         613 96         848 76         13,000           5 20E+04         13E-02         4 67E-01         1 14E-02         2 629 88         1750 00         14,100           2 50E+05         1 38E-02         4 60E-04         2 00E-06         2 06E-04         4 60E-04         2 06E-06	309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97 E-03	1 70E-04		303 01	839 37	13,000	4 9E-0	. ~
1,72E+03 14ZE+02 73E+06 240E+03 726E+05 74E+07 25 596 55 839 36 13,000 13,000 14,72E+01 62E-02 100E+03 726E+01 177E+02 25 38115 587 38 7,000 12,90E+04 17,000  319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		396 55	839 36	13,000	1 8E-0	. ~	
4 37E+01         6 26E-02         1 00E-03         2 80E+03         7 26E-01         1 77E-02         25         381 15         587 38         7,000           8 3E+01         3 27E-02         7 26E-06         3 06E-05         7 46E-07         2 5         580 0         7 70 00         12,938           9 4 2 4E-01         3 3ZE+04         1 3ZE-02         4 6ZE-02         2 6ZE-05         2 5         509 60         7 70 00         12,938           5 20E+04         1 3ZE-02         4 6ZE-02         4 6ZE-01         3 9GE-04         9 5ZE-05         25         509 60         7 46 87         11,000           5 20E+04         1 3ZE-02         4 6ZE-02         4 6ZE-03         4 6ZE-03         2 6ZE-03	51965/ Deta-non (beta-only)	1 285+03	1 42E-02	/ 34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5 3E-0	_
8 22E+01         3 2F=02         7 2E=00         7 2 0E=00         7 00         12,938           8 0 24E+01         3 4 2E=02         8 1 7E=06         9 89E+03         3 2 2 6E=06         2 5 58 00         7 70 00         12,938           8 2 2 4 0 4         1 5 4 5 0 2 0 2 0 2 0 0 2 0 0 0 0 0 0 0 0 0 0	542/55 1,3-Digitopropene	4 5/E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	587 38	7,000	3 7E-0	
2 20E-04         3 20E-04         3 90E-04         9 51E-06         25 619 60         746 87         11,000           8 32E+04         1 32E-02         4 23E-06         2 00E-01         3 90E-04         9 51E-06         25 613 96         848 76         13,000           5 20E+04         1 37E-02         4 57E-01         4 67E-01         1 14E-02         25 628 88         1750 00         14,127         13,000           2 57E+05         1 6E-02         4 34E-01         2 46E-04         6 00E-06         2 657 15         873 31         14,000           2 90E+05         1 38E-02         4 32E-06         8 00E-02         1 88E-01         4 60E-03         25 657 15         873 31         14,000           2 00E+05         1 56E-02         5 00E-06         5 70E-02         1 9E-02         2 00E-03         25 375 50         512 27         19,000           3 30E+04         2 22E-02         5 42E-06         4 20E-01         1 18E-02         2 90E-04         25 30E-04         25 30E-04         2 345 50         482 20         18,000	621647 N-Mitrosodia-propose	9 92E+U1	3 2/E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07		558 00	770 00	12,938	1 9E-04	
5 ONE-01         5 ONE-04         5 SUE-04         9 51E-05         25 613 96         848 76         13,000           5 ONE-05         6 30E-06         6 50E-02         4 67E-01         1 14E-02         25 629 88         1750 00         14,127           2 57E-16         1 16E-02         4 32E-06         7 40E-01         2 46E-04         6 00E-05         25 657 15         873 31         14,000           2 90E+05         1 38E-02         4 32E-06         8 00E-02         1 88E-01         4 60E-03         25 657 15         873 31         14,000           2 00E+05         1 56E-02         5 00E-06         5 70E-02         8 20E-02         2 00E-03         25 377 50         512.27         19,000           3 30E+04         2 22E-02         5 42E-06         4 20E-01         1 18E-02         2 90E-04         25 30 50         475.22         18,000           3 30E+04         2 14E-02         5 31E-06         3 40E-01         2 13E-02         5 20E-04         25 345 50         482.20         18,000	1024573 Hentachler epoxide	8 32E+04	1 326.02	•	9 89E+U3	9.23E-05	2 25E-06		09 60	746 87	11,000	2 0E-03	_
2 57E+05 116E-02 434E-06 740E-01 2460-04 600E-06 53 657 15 873 31 14,000 14,127 0 2 90E+05 138E-02 432E-06 8 00E-02 189E-01 460E-03 25 657 15 873 31 14,000 3 2 90E+05 156E-02 5 00E+05 156E-02 5 00E+05 156E-02 5 00E-03 25 377 50 512 27 19,000 1 3 30E+04 2 222E-02 5 42E-06 4 20E-01 119E-02 2 90E-04 25 345 50 482 20 18,000 1 3 30E+04 2 14E-02 5 31E-06 3 40E-01 2 13E-02 5 50E-04 25 345 50 482 20 18,000 1	7439976 Mercury (elemental)	5 20E+01	3 07E-02	6.30F-06	5 625.02	3 90E-04 4 67E-01			313.96	848 76	13,000	2 6E-03	_
2 90E+05 138E-02 432E-06 8 00E-02 189E-01 4,000 3 25 65/15 8/331 14,000 3 2 05/15 138E-02 432E-06 8 00E-02 189E-01 2 00E-03 25 402 50 539 37 19,000 1 2 00E+05 156E-02 5 00E+06 5 70E-02 8 20E-02 2 00E-04 25 377 50 512 27 19,000 1 3 30E+04 2 222E-02 5 42E-06 4 20E-01 119E-02 2 90E-04 25 345 50 482 20 18,000 1 3 30E+04 2 14E-02 5 31E-06 3 40E-01 2 13E-02 5 50E-04 25 345 50 482 20 18,000 1	8001352 Toxaphene	2 57E+05	1 16F-02	4 34F-06	7 40E-01	2 46E-04	14E-02		22.888	1750 00	14, 127	0 OE +0	0
2 00E+05 1 56E-02 5 00E+06 5 70E-02 8 20E-02 2 00E-03 25 377 19,000 1 330E+04 2 22E-02 5 342E-06 4 20E-01 1 19E-02 2 90E-04 25 345 50 482 20 18,000 1 330E+04 2 14E-02 5 31E-06 3 40E-01 2 13E-02 5 50E-04 25 345 50 482 20 18,000 1	11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89F-01	6 00E-06		57 JS	873 31	14,000	326	8
330E+04 222E-02 542E-06 420E-01 119E-02 290E-04 25 340 50 475.22 18,000 1 330E+04 214E-02 531E-06 340E-01 213E-02 520E-04 25 345 50 482 20 18,000 1	11097691 Aroclor 1254 (PCB-1254)	2 00E+05	1 56E-02	···	5 70E-02	8 20E-02	2 00E-03	3 %	27.50	539.37	19,000	H 1	<b>4</b> :
330E+04 214E-02 531E-06 340E-01 213E-02 520E-04 25 34550 482 20 18,000 1	12674112 Arador 1016 (PCB-1016)	3 30E+04	2 22E-02	স	4 20E-01	1 19E-02	2 90E-04		40 50	475.22	18,000	2 6	
	53469219 Arador 1242 (PCB-1242)	3 30E+04	2 14E-02	"	3 40E-01	2 13E-02	5 20E-04			482 20	18.000	2 2 4 4 4	

VERSION 12 September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

S S

YES

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

	ENTER	User-defined	۵	, k	,			
			ate OR	-	1	Г		
	ENTER	Soul stratum A	soil type (used to estimate	soil vapor		٦	ENTER Stratum C soil water-filled porosity, $\theta_a^c$ $(cm^3/cm^3)$	
	ENTER	-	SCS soil type	directly above		SC	ENTER Stratum C sol total porosity. n <sup>C</sup> (unitless)	
_	ENTER	ō	stratum directly above	water table, (Enter A. B. or C)		ပ	ENTER Stratum C soil dry bulk density, pc (g/cm³)  17  17  ENTER Indoor air exchange rate, ER ((1/h)	11111
	ENTER	Thickness	stratum C, (Enter value or 0)	ր <sub></sub> (cm)		1341 12	ENTER Stratum B solt water-filled porosity, $\theta_w^8$ $(cm^3/cm^3)$ ENTER Floor-wall seam crack width, w	7
Chemical	ENTER	Totals must add up to value of Lwr (celi U.26) Thickness Thickness of soil of soil	stratum B, (Enter value or 0)	h <sub>B</sub> (cm)		3048	ENTER Stratum B soul total porosity.  n B (unitless)  0.42  ENTER Enclosed space height, He (cm)	,,,,,,
	ENTER	Thickness	of soil stratum A,	r ĝ		853 44	ENTER Stratum B soil dry bulk density, p <sub>B</sub> (g/cm³)  17  17  ENTER Enclosed space floor width, W (cm)	
	ENTER	Death	below grade to water table,	Lwt (cm)		2499 36	ENTER Stratum soil water-filled porosity, $\theta_w^A$ $(cm^3/cm^3)$ $(cm^3/cm^3)$ ENTER Enclosed space floor length, La	
ENTER Initial groundwater conc , Cw (µg/L)	ENTER	Depth below grade to bottom	of enclosed space floor,	(m <sub>5</sub> )		15	ENTER Stratum A soli total porosity, n^A (unitless) 043 ENTER Soli-bidg pressure differential, A A (g/cm-s²)	
Chemical CAS No (numbers only, no dashes)	ENTER	Average soll/	groundwater temperature,	ړ° (څ		16	ENTER Stratum A soil dry bulk density, Pa (g/cm³)  15 ENTER Enclosed space floor thickness, Level (cm)	

88			
ENTER	ENTER ENT		ENTER ENTER
2		Exposure	Exposure
carci	×		duration, frequency,
ቿ	ш	ш	ш
(unitless)	(days/yr) (ur		(days/yr) (
1 0E-06	350 1		
1			

## CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)
Unit nsk factor, URF (µg/m³)**
Pure component water solubility, S S (mg/L)
Organic carbon partution coefficient, K <sub>ee</sub> (cm <sup>3</sup> /g)
Cntical temperature, T <sub>c</sub> (*K)
Normal boiling point, T <sub>B</sub>
Enthalpy of vaponzation at the normal boiling point, $\Delta H_{vb}$ (cal/mol)
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H
Diffusivity in water, D., (cm²/s)
Diffusivity in air, D. (cm <sup>2</sup> /s)

# INTERMEDIATE CALCULATIONS SHEET

Exposure duration,	Source- building separation, Lt	Stratum A soil air-filled porosity,	Stratum B soil air-filled porosity,	Stratum C soll air-filled porosity,	Stratum A effective total fluid saturation,	Stratum A sort intrinsic permeability,	Stratum A soil relative air permeability,	Stratum A soil effective vapor permeability,	Thickness of capillary zone,	Total porosity in capillary zone,		Water-filled porosity in capillary zone,	Floor- wall seam perimeter,
(sec)	(cm)	(cm³/cm³)		(cm <sup>3</sup> /cm <sup>3</sup> )	(cm <sup>3</sup> /cm <sup>3</sup> )	(cm²)	cm²)	(cm²)	եզ (cm)	n <sub>ez</sub> (cm³/cm³)	(cm³/cm³)	ew cz (cm³/cm³)	Xomey (cm)
9,46E+08	2484 36	0 230	0 150	0.130	0 347	3 89E-09	0 778	3 03E-09	30,00	0.43	0 084	0 346	3,844
	Area of							Stratum	Stratum	Stratum	Capillary	Total	
Bidg	space	Crack- to-total	Crack depth	Enthalpy of vaporization at	Henry's law constant at	Henry's law	Vapor viscostty at	A	B offective	C	Zone	overall	*
ventilation	pelow	area	petow	ave groundwater	ave, groundwater	ave groundwater	ave soil	diffusion	diffusion	diffusion	diffusion	diffusion	path
rate,	grade,	ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient,	coefficient,	length,
O <sub>building</sub>	å,	౯	Zorack	ΔH <sub>v,TS</sub>	H E	H' <sub>Ts</sub>	μтѕ	ا ا	# 0	ື້	, , ,	ם יי	ت
(cm³/s)	(cm²)	(nutless)	(cm)	(cal/mol)	(atm-m³/mol)	(anitless)	(g/cm-s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm)
5.63E+04	9 24E+05	4 16E-04	15	8,061	3 64E-03	1 53E-01	1 77E-04	3 57E-03	9 05E-04	5 40E-04	1 35E-04	7 71E-04	2484 36
						Exponent of	Infinite						
2000	G		Average	Crack		equivalent	source	Infinite	:				
path	vapor	Crack	flow rate	diffusion	Area of	Peclet	Indoor	source	C Dic	Reference			
length,	conc.,	radius,	into bldg ,	coefficient,	crack,	number,	coefficient,	conc.,	factor,	COLIC.			
Ĵ.	Caparos	Crack	Q.	Donck	Agrack	exp(Pe <sup>f</sup> )	ಕ	Coulding	URF	R.C.			
(cm)	(mg/m³)	(cm)	(cm <sup>3</sup> /s)	(cm <sup>2</sup> /s)	(cm²)	(unitless)	(unitless)	(m/6ri)	(µg/m³) <sup>-1</sup>	(mg/m <sub>3</sub> )			
ļ	20,102	9, 3											
- -	1.53F+02	-	2 ROHADO	2 575 03	2 BARLOS	F 050-140	00 Deg 8	10000	00 100				

### RESULTS SHEET

INCREMENTAL RISK CALCULATIONS.	Hazard quotient from vapor intrusion to indoor alr, noncarcinogen (unitiess)	Ş
INCREMENTAL	Incremental nsk from vapor intrusion to indoor ar, carcinogen (unitless)	
JLATIONS	Final indoor exposure groundwater conc., (µg/L)	
ATION CALCI	Pure component water solubility, S S (µg/L)	
R CONCENTR	Risk-based indoor exposure groundwater conc, (µg/L)	
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	Indoor exposure groundwater conc., noncarcinogen (ug/L)	
RISK-BASE	Indoor exposure groundwater conc, carcinogen (µg/L)	

NA	
4 13E+UZ   1 (3E+UB   4.13E+UZ	(DO NOT USE RESULTS IF ERRORS ARE PRESENT)
4 13E 402 1 NA	ERROR SUMMARY BELOW.

VLOOKUP TABLES

		Ø.	Soil Properties	artiae Lookun Takia								
SCS Soil Type K	K, (cm/h)	α (1/cm)	N (unitless)	M (unitiess)	θ. (cm³/cm³)	e. (cm <sup>3</sup> /cm <sup>3</sup> ) N	Mean Grain Diameter (cm)					
S	0.20	0.008	00.	0.083	0.38	١.	Can Crain Clairiese (ciri)					
บ	0.26	0.019	133	0.037	250	0 000	0 0092					
<del>-1</del>	9	0.036	1.56	0.359	0 43	8200	000					
LS LS	14.59	0 124	2.28	0.561	5 5	2000	0.020					
S	29 70	0 145	89 6	0.627	7 7	200	2000					
SC	0 12	0.027	1 23	0 187	800	0 150	2000					
SCL	131	0 059	1 48	0 324	0 39	0 100	0200					
<u></u>	0 25	0 016	1 37	0 270	0.46	0 034	0 0046					
000	0 03	0 005	1 09	0 083	0.26	0 0 0 0	0 0039					
STOL	0 0 1	0 0 10	1 23	0 187	0.43	0 089	0 0056					
100	0.45	0 020	141	0 291	0 45	0 007	0 0 11					
ar.	4 47	0.075	189	0 471	0 41	0 065	0:030					
		1			Chemic	Chemical Properties Lookup Table	p Table					
		Organic			Fure		Henry's	Henry's			Enthalpy of	
		carbon		2	component		law constant	law constant	Normal		vaporization at	ž Š
	•	partition	Untusivity	Unfusivity		Henry's	at reference	reference	politing	Critical	the normal	rısk
		coemcient, K	בו בי כ	in water,	solubility.	law constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,
CAS No Chemical		(cm³/g)	(cm <sup>2</sup> /s)	(cm²/s)	(mg/L)	(unitless)	n (atm-m³/mol)	<u>د</u> ق	_e §	င္ မွ	ΔH <sub>vb</sub>	URF (m <sup>3</sup> , t
										(4.1)		(    /8m)
50238 Dozas (2)2022		2 63 = +06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05
51285 2 4-Dio(ttophono)		1025+06	4 305-02	9 OOE-06	1 62E-03	4 63E-05	1 13E-06	25	715 90	969 27	15,000	2 1E-03
53703 Dihanz/a hlanthracene		1 00E-02	2 / 3E-02	9.06E-06	2 /9E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0E+00
56235 Carbon tetrachlonde		3 SUE 100	7 905 00	00-100 100-0	2 48E-03	6 U3E-U/	1 47E-08	25	743 24	990 41	16,000	2 1E-03
56553 Renz(a)anthracene		3 095 +05	70-07	8 80E-00	/ 93E+02	1.25E+00	3 05E-02	52	349 90	929 60	7,127	1 5E-05
57749 Chlordane		1 200-105	3 10HOZ	9 UUE-UG	9 40E-U3	137E-04	3 34E-06	25	708 15	1004 79	15,000	2 1E-04
58899 camman PCH.		1 075-103	1 425 02	4 3/11/06	20-309 0	20-11-6-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	4 85E-05	52	624 24	885 73	13,000	3 7E-04
		27,07	1 425-02	7.34E-U6	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04
		A 14E-104	70-367	4 7 4 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	1 505-01	6 19E-04	1 516-05	25	613 32	842 25	13,000	4 6E-03
67641 Acatons		6 76 E 04	3 30E-02	000	3 505+03	6 375-05	1 54E-06	25	720 00	751 00	10,000	0 0E+00
67663 Chloryform		3 085401	1040-01	140.00	1 005+00	1 59E-03	3 88E-05	52	329 20	508 10	6,955	0 0E+00
67721 Hexachlorothene		1 100 100	1040	00 LOG C	7 925+03	1 50 1 -01	3 66E-03	52	334 32	536 40	6,988	2 3E-05
71363 Butanol		9 9 2 4 00	2 30E-03	90-106	3 400:04	1 585-01	3 88E-03	25	458 00	00 969	9,510	4 0E-06
71432 Benzene		5 895+01	8 80E-02	90-U06-6	1 755.104	40-11-0-c	90-H08 8	25	390 88	563 05	10,346	0 0E+00
71556 1.1.1-Trichloroethane		1 10F+02	7 80F-02	8 80E-06	1 335+03	2 20E-U	5 55E-U3	25	353 24	562 16	7,342	8 3E-06
72208 Endrin		1.23E+04	1 25E-02	4 745-06	2 50E-01	7 03E-0	7 615 06	9 8	347.24	545 00	7,136	005+00
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48F-04	1 585.05	67 6	654.03	200 20	12,000	0.01100
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	3 5	839 90	863.77	26,4	0.05+00
72559 DDE		4 47E+06	1 44E-02	5.87E-06	1 20E-01	8 61E-04	2 10E-05	52 52	636 44	860 38	000,51	9 75-05
74839 Methyl bromide		1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	52	276 71	467 00	5,714	0.05+00
75014 Vinyl chloride (chloroethene)	ле. Э	1 86E+01	1 06E-01	1 23E-06	2 76E+03	111E+00	2 71E-02	25	259 25	432 00	5,250	8 4E-05
75092 Methylene chlonde		1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	313 00	510 00	6,706	4 7E-07
75252 Brandle		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	25	319 00	552 00	6,391	0 0E+00
7527 Bromodoblom		8 715+01	1 49E-02	1 035-05	3 10E+03	2 19E-02	5 34E-04	52	422 35	00 969	9,479	1 1E-06
75343 1 1-Dichloroethans		3 46 1 101	2 385-02	1 065-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	2,000	1 8E-05
75354 1 1-Dichlomethylene		3 (0E+01	7 425-02	1 055-05	5 U6E+U3	2.30E-01	5 61E-03	25	330 55	523 00	6,895	0 0E+00
76448 Hentschlor		1445406	4 125 02	CD-1140 -	2 20E+U3	10/8+00	2 61E-02	52	304 75	576 05	6,247	5 05-05
77474 Hexachlorocyclopentadiane	4	2005+05	1 615.02	7 215.08	1 905-01	4476-02	1 09E-03	52	603 69	84631	13,000	1 3E-03
78591 Isophorone	2	4 68F+01	6 23E-02	6 76E-06	1 205+04	2 725.04	2 / 15-02	3 5	51215	746 00	10,931	0 0E+00
78875 1.2-Dichloropropana		4 37E+01	7 82F-02	8 73 -06	2 80F+03	1155.04	0.05-00	2 2	400 cc	00 617	10,271	2 7E-07
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3.74E-02	2 00E-03	5 K	386 15	5/2 00	065,7	00E+00
79016 Trichloroethytene		1 66E+02	7 905-02	9 10E-06	1,106+03	4 22E-01	1 035-02	3, 23	36036	544 20	8,322	1 0 17 1 20 17 10 10 10 10 10 10 10 10 10 10 10 10 10
79345 1,1,2,2-Tetrachloroethane		9 33E+01	7 10E-02	7 90E-06	2 97E+03	141E-02	3 445-04	3 %	419.60	661 15	> 600 K	7 8E.05
83329 Acenaphthene		7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	52 52	550 54	803,15	12.155	0 0E+00
									1		<b>!</b>	1

0 0E+00 0 0E+00

84669 C. Abrah Abrah C. B.					VLOOKUP TABLES								
84742 Olouhand ophhalata	2 88E+02	2 56E-02	635E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 8E+00	
85687 Butyl benzyl phthalate	5 755+04	4 745 02	/ 86E-U6	1 125+01	3 85E-08	9 39E-10	8	613 15	798 67	14,751	0 0E+00	3 5E-01	
86306 N-Nitrosodinhenviarrine	1 200-103	420.02	4 83E-UB	2 59E+00	5 17E-05	1 26E-06	52	09 099	839 68	13,000	0 0E+00	7 0E-01	
86737 Fluorene	1.38F+04	3 635-02	7 885.06	1 0011100	2 05E-04	5 00E-06	8	632 28	890 45	13,000	1 4E-06	0 0E+00	
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26F-03	6 3/E-05 4 63E-08	52 2	570 44	870 00	12,666	000+00	146-01	
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02		3 23E+00	3345-01	8 15E-03	3 %	486.15	738.00	13,977	ָ קַ קַּ	00+100	
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	52	582 15	813.20	14,000	3.46-05	00+100	
91203 Nachthalene	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	55	519 15	749 03	12,000	3 15-06	0 0E+00	
91941 3,3-Dichlorobenzidine	7 24E+02	1 94F-02	6 74 F.06	3 110=+01	1 98E-UZ	4 83E-04	33	491 14	748 40	10,373	0.0E+00	1 4E-01	
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	4 WE-09	8 8	560 26	754 03	13,000	136-04	0 0E+00	
95487 2-Methylphenol (o-cresol)	9 125-101	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 205-05	3 %	464 19	697 60	8,661	00=+00	7 0E+00	
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03		453 57	705 00	000,00	00=+00	2 5	
955/8 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9.572	000+00	1 8 7 - 0 2	
93834 Z.4.5-Inchlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34 <b>E</b> -06	52	526 15	759 13	13,000	000+00	3 55-01	
100414 Ethylhanzana	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	22	483 95	719 00	10,566	0 0E+00	2 0E-03	
100425 Styrene	3 535 ±02	7 10E-02	7 805-06	1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20	8,501	0 0E+00	1 0E+00	
105679 2.4-Dimethylphenol	2 09F+02	5 84E-02	8 50 0 0	3 TUE+U2	1 13E-01	2 76E-03		418 31	636 00	8,737	0 0E+00	1 0E+00	
106423 p-Xytene	3 89E+02	7 69F-02	8 445-06	7 07 E+U3	3 14E-03	2 00E-06		484 13	707 60	11,329	0.05+00	7 0E-02	
	6 17E+02		7 905-06	7.38F+01	9 965-03	7 56 5 43		41152	616 20	8,525	0 0 0 0	7 0E+00	
106478 p-Chloroanline	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1.36E-05	3 325.03	Q Y	44 / 21 502 65	584 75	9,271	0 0E+00	8 OE-01	
107062 1,2-Dichloroethane	1745+01	1 04E-01	90E-06	8 52E+03	4 01E-02	3 32E-07		303 65 356 66	754 00	11,689	0 0 0 0 0	1 4E-02	
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12 F-04		345.65	540 43	,643	2 6E-05	0 0E+00	
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03		412.27	515 13 617 05	008,	0.05+00	2 0E-01	
108883 Toluene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63 E-03	2 52	383 78	59179	7,930	00+100	/ UE+00	
10890/ Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	152E-01	3 71E-03		404 87	632.40	6.410	0.05+00	0 10 0	
100952 Phenoi	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07		455 02	694 20	10.920	0 05+00	2 1F+00	
115207 Endoeiden	155E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05		451 15	629 79	000'6	3.3E-04	0 0E+00	
		1 105-02	4 55H -06	5.10E-01	4 59E-04	1 12E-05		674 43	942 94	14,000	0 0E+00	2 1E-02	
	8 32F±07	1516-02	2 400 5	3 40F-U1	4,18E-06	1 02E-07		657 15	806 00	15,999	4 0E-06	0 0E+00	
118741 Hexachlorobenzene	5 50E+04	5425-02	5.91E-06	5 20E+00	Z /4E-U3	6 68E-05		704 09	862 22	15,000	0.0E+00	7 0E-02	
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4.34F-02	2 675-03	- 32E-03		582 55	825 00	14,447	4 6E-04	0 0E+00	
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23 F-06	3 OOF +02	5.825-03	4 4 7 6 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6		615 18	873 00	13,121	0 0E+00	1 1€+00	
120832 2,4-Dichlorophenol	147E+02	3 46E-02		4 50F+03	1305-02	50-374 6	2 2	486 15	725 00	10,471	0 0E+00	2 0E-01	
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3.805-06	3 17E-00		482 15	708 17	11,000	0 0E+00	1 15-02	
	6315+01	1 96E-02	1 05E-05	2 60E+03	3 21 5-02	7.83E-04		390 00	814 00	13,467	1 9E-04	0 0E+00	
127184 Tetrachioroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1845-02		304 40	620 20	000,8	2 4E-05	0.000	
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 515-04	1 10E-05	22	667.95	936.00	0,200	70-100	00+00	
156592 cis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00	7 192	000	2000	
100000 trans-1,2-Utchloroethylene	5 25E+01	7 07E-02	₩.	6 30E+03	3 85E-01	9 39E-03		320 85	516 50	6.717	0 0F+00	7 OF 40 2	
205050 Henro(1,2,0-d)pyrene 205000 Benzo(h)/homenthese	4 225.00	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06		809 15	1078 24	17,000	2 1E-04	0 0 0 0	
	1 075+05	2 20E-02	5 56E-06	1 50E-03	4 55E-03	116-04		715 90	969 27	15,000	2 1E-04	0 0E+00	
	1 23E+06	2265.02	5 56 1.08	10-100 a	2 401 06	1 6115-05	52	655 95	905 00	13,815	0 0E+00	1 4E-01	
218019 Chrysene	3 98E+05	2 48E-02	6.21E-06	1 60E-03	3.88E-03	0.29E-U/ 0.48E-05	2 4	753 15	1019 70	16,000	2 1E-05	0 OE+00	
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04		603.01	979 00	15,455	2 15-06	0 0E+00	
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		596 55	839.36	13,000	12 to 12 to	00+100	
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	22	596 55	839 36	13,000	535-04	000+000	
5427.30 1,3-Dictinolopiopera 606202 2 6-Dinitrolopisopa	6 07E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	587 38	7,000	3 7E-05	2 0E-02	
621647 N-Nitrosodi-n-propylamine	2 40F±01	5.455.02	7 20E-00	1 82E+02	3 06E-05	7 46E-07		558 00	770 00	12,938	195-04	0 0E+00	
	8 32E+04	132F-02	4 235-06	2 00E-03	9 23E-U5	2 25E-06	52	209 60	746 87	11,000	2 0E-03	0 0E+00	•
7439976 Mercury (elemental)	\$ 20E+01	3 07 E-02	6 30E-06	5 62F-02	3 30E-04 4 67E-01	9 57 11-06		613.96	848 76		2 6E-03	0 0E+00	U
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46F-04	6 00E-08		92.629	90.06/1		0 0E+00	3 0E-04	4
11096825 Aroclor 1260 (PCB-1260)	2 90E+05	138E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03		402.50	530 37	000,41	3.2E-04	0 0E+00	1
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03			512.27	19,000	2 H	0.00+00	U
126/4112 Arodor 1016 (PCB-1016) 53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 905-04		340 50	475 22	18,000	- 1- - 1- - 1- - 1- - 1- - 1- - 1- - 1-	2 C	1
17471-00-1747	3 300+04	2 14E-02	5 31E-06	3 40E-01	2 13E-02	5 20E-04	52	45 50	482 20	18,000	1 0 0 0 4	00 00 00	T
					1900							•	

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

ENTER

ENTER

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below) YES

		<del> </del>				_						
	ENTER	User-defined stratum A	soil vapor permeability,	, K	(da)							
	i		S R		• -							
	ENTER	stratum A SCS	soil type (used to estimate	soil vapor	parneadiny	S)	ENTER	Stratum C	soil water-filled	porosity,	o_*e	(cm³/cm³)
	ENTER			directly above	water table	2	ENTER	Stratum C	soil total	porosity,	్డ	(unitless)
	ENTER	Solf	stratum directly above	water table,	(Cilial A, B, ul V)	3	ENTER	Stratum C	soil dry	bulk density,	ာရီ	(g/cm³)
eue	ENTER (Lwr (cell D28)	Thackness of soil	(Enter value or 0)	h <sub>c</sub>	024.00	214 32	ENTER	Stratum B	soil water-filled	porosity,	<b>8</b> ,*	(cm³/cm³)
Trichloroethyle	ENTER st add up to value of	Thickness of soil	(Enter value or 0)	با 19	(510)	348 04	ENTER	Stratum B	soil totai	porosity,	<b>"</b> c	(unitless)
	ENTER Totats mus	Thickness	stratum A,	h,	64064	240 04	ENTER	Stratum B	soil dry	bulk density,	<b>.</b>	(g/cm³)
	ENTER	Depth	to water table,	Lwr (cm)	1971 6	0 - /2-	ENTER	Stratum A	soil water-filled	porosity,	<b>4</b> <sup>34</sup> θ	(cm³/cm³)
6 890769231	ENTER	below grade to bottom	space floor,	<u>}</u> ٹ	16	2					<del>د</del>	(vnitless)
79016	ENTER	Average soil/	temperature,	ာ <u>(</u>	18	2	ENTER	Stratum A	soil dry	bulk density,	գ <sub>զ</sub>	(g/cm³)
	6 890769231	6 890769231  ENTER ENTER ENTER ENTER ENTER  Depth Totals must add up to value of LwT (cell D28)	6 890769231   Trichloroethylene   ENTER ENTER ENTER ENTER Soil	ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER Soil Stratum A below grade to bottom Depth Thickness of soil stratum B, stratum C, space floor, to water table, stratum A, (Enter value or 0) (Enter value o	ENTER ENTER ENTER ENTER ENTER ENTER Soil  Below grade  to bottom  Depth  Depth  Thickness  to bottom  Depth  Thickness  Thickness  to bottom  Depth  Thickness  Thickness  To fast must add up to value of L <sub>vir</sub> (cell D28)  Soil  Soil  Soil  Soil  ScS  Soil  ScS  Soil type  stratum A  Enter thickness  Soil  ScS  Soil type  In L <sub>vir</sub> L <sub>vir</sub> L <sub>vir</sub> L <sub>vir</sub> L <sub>vir</sub> L <sub>vir</sub> L <sub>vir</sub> L <sub>vir</sub> L <sub>vir</sub> L <sub>vir</sub> L <sub>vir</sub> L <sub>vir</sub> L <sub>vir</sub> L <sub>vir</sub> L <sub>vir</sub> L 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cm) (cm) (cm) (cm) (cm) (cm) (cm) (cm)</td><td>ENTER ENTER  Depth Totals must add up to value of L<sub>MT</sub> (cell D28)  Depth Totals must add up to value of L<sub>MT</sub> (cell D28)  Depth Thickness Thickness Soli stratum A stratum B, stratum B, stratum C, stratum B, stratum C, to water table, stratum A, (Enter value or 0) (Enter value or 0</td><td>ENTER ENTER Soil below grade to bottom Depth Thickness of soil of soil enclosed below grade of soil a stratum B, stratum C, space floor, to water table, stratum B, stratum C, space floor, to water table, stratum B, stratum C, cm) (cm) (cm) (cm) (cm) (cm) (cm) (cm)</td></th<>	6 890769231         ENTER         ENTER	ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER Sod Statum A Stratum A Stratum B Stratum B Stratum B Stratum B Stratum B Stratum B Stratum B Stratum B Stratum B Stratum C Stratum C Stratum C Stratum C Stratum C Stratum C Stratum C Stratum C Stratum SCS Soil type C Stratum C Strat	ENTER ENTER Thickness Thickness Soli stratum A cm) (cm) (cm) (cm) (cm) (cm) (cm) (cm)	ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER ENTER  Depth Totals must add up to value of L <sub>MT</sub> (cell D28)  Depth Totals must add up to value of L <sub>MT</sub> (cell D28)  Depth Thickness Thickness Soli stratum A stratum B, stratum B, stratum C, stratum B, stratum C, to water table, stratum A, (Enter value or 0) (Enter value or 0	ENTER Soil below grade to bottom Depth Thickness of soil of soil enclosed below grade of soil a stratum B, stratum C, space floor, to water table, stratum B, stratum C, space floor, to water table, stratum B, stratum C, cm) (cm) (cm) (cm) (cm) (cm) (cm) (cm)

ENTER	Stratum C	soil water-filled	porosity,	o_**6	(cm³/cm³)		0.3			
ENTER	Stratum C	soil total	porosity,	ຶ	(unitless)		0.43			
ENTER	Stratum C	soil dry	bulk density,	9 <b>9</b> 6	(g/cm³)		17	ENTER		Indoor
ENTER	Stratum B	soi water-filled	porosity,	8 ** <del>0</del>	(cm³/cm³)		0.27	ENTER		Floor-wall
ENTER	Stratum B	soil total	porosity,	<b>=</b> c	(unitless)		0 42	ENTER		Enclosed
ENTER	Stratum B	soil dry	bulk density,	<sub>8</sub> 9	(g/cm³)		1.7	ENTER	Enclosed	space
ENTER	Stratum A	soil water-filled	porosity,	<b>∜</b> }	(cm³/cm³)		0.2	ENTER	Enclosed	space
ENTER	Stratum A	soil total	porosity.	<b>₹</b>	(unitless)	3	0.43	ENTER		Soil-bidg
ENTER	Stratum A	soil dry	bulk density,	<b>,</b> dq	(g/cm³)		1.5	ENTER	Enclosed	space

ENTER	Indoor	rate,	品	(1/h)	0.45
ENTER	Floor-wall	width,	*	(cm)	0.1
ENT ENT ENT ENT ENT ENT ENT ENT ENT ENT	Enclosed	helght,	Ŧ	(cm)	488
ENTER	space	width,	Ws	(cm)	961
ENTER Enclosed	space	length,	ٿ	(cm)	961
ENTENTE R	Soil-bldg	differential,	ΔP	(g/cm-s <sup>2</sup> )	40
ENTER Enclosed	space	thickness,	Lorack	(cm)	15

 Jsed to calculate risk-based groundwater concentration	Used to calcu				
	1 0E-06	350	30	30	70
(vnitless)	(nuitless)	(days/yr)	(yrs)	(yrs)	(yrs)
托	T.	ü	a	AT <sub>NC</sub>	ΑΤ <sub>c</sub>
noncardinogens,	carcinogens,	frequency,	duration,	noncarcinogens,	carcinogens,
quotient for	nsk for	Exposure	Exposure	time for	time for
Target hazard	Target			Averaging	Averaging
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER

## CHEMICAL PROPERTIES SHEET

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100-105

## INTERMEDIATE CALCULATIONS SHEET

		Stratum A	Stratum B	Stratum C	Stratum A	Stratum A	Stratum A	Stratum A		Total	Air-filled	Water-filled	Floor
	Source-	soul		soil	effective	sorl	soil	soil	Thickness of	porosity in	porosity in	porosity in	wall
Exposure	building	ar-filled	air-filled	arr-filled	total fluid	intrinsic	relative air	effective vapor	capillary	capillary	capillary	capillary	seam
duration,	separation,	porosity,	porosity,	porosity,	saturation,	permeability,	permeability,	permeability,	zone,	zone,	zone,	zone,	perimeter,
۲	נ	<b>∀</b> •	в <b>.</b>	ບູ້ອ	ซื	¥	ያ	¥	٦	n <sub>cz</sub>	9	θ. Ω	X
(sec)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm²)	(cm²)	(cm²)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm <sup>3</sup> /cm <sup>3</sup> )	(cm)
9 46E+08	1356.6	0 230	0 150	0 130	0.419	9.36E-10	0 746	6 98E-10	17 05	0.43	0 136	0.294	3,844
	Ages							Stratus	Stratim	Stration	Celling	Total	
	enclosed	Crack-	Crack	Enthalpy of	Henry's law	Henry's law	Vapor	∢	æ	O	Zone	overall	
Bldg.		to-total	depth	vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
ventilation	below	area	below	ave groundwater	ave groundwater	ave groundwater	ave soil	diffusion	diffusion	diffusion	diffusion	diffusion	path
rate,		ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient,	coefficient,	length,
Obulting	Å.	٤	Zorack	ΔH <sub>v,TS</sub>	H St	Ţ	MTS	آ ص	 D	۵	O	D#1	ت
(cm³/s)	(cm²)	(unitless)	(cm)	(cal/mol)	(atm-m³/mol)	(unitless)	(a/cm-s)	(cm²/s)	(cm²/s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm)
5 63E+04	9.24E+05	4.16E-04	15	8,483	6 60E-03	2 78E-01	1 77E-04	3 20E-03	8 11E-04	4 82E-04	5.55E-04	9 63E-04	1356 6
						Exponent of	Infinite						
			Average	Crack		equivalent	Source	Infinite					
Convection	Source		vapor	effective		foundation	indoor	source	ă ș				
path	vapor	Crack	flow rate	diffusion	Area of	Peclet	attenuation	pldg	пsk	Reference			
length,	conc.	radius,	into bldg,	coefficient,	crack,	number,	coefficient,	conc,	factor,	conc.,			
ٹر	Course	Forest	Q	Denck	Acreck	exp(Pe <sup>(</sup> )	ಶ	Coulding	URF	RfC			
(cm)	(mg/m³)	(cm)	(cm <sub>3</sub> /s)	(cm <sup>2</sup> /s)	(cm²)	(nuitless)	(unitless)	(µg/m³)	(µg/m³)	(mg/m³)			
<u> </u>	796-00	9	0.075.04	20 200 0	2 845 - 62	50+30c c	07 27 00	1 625 02	4 75 06	VI			
2	2 /8E+UZ		00/11/0	3 205-03	3845+02	20+122	3 8/E-US	50-E-03	- CE-06	ď.			

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INCREMENTAL RISK CALCULATIONS

Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitiess)	δN
Incremental risk from vapor Intrusion to indoor air, carcinogen (unitless)	AN
Final indoor exposure groundwater conc, (µg/L)	8 77E+02
Pure component water solublity, S	1 10E+06
Risk-based indoor exposure groundwater conc , (µg/L)	8 77E+02
Indoor exposure groundwater conc , noncarcinogen (µg/L)	NA
Indoor exposure groundwater conc , carcinogen (µg/L)	8 77E+02

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

		1	17	okup Table									
CS Soil Type	ı	α (1/cm) P	N (unitless)	M (unitless)	θ, (cm³/cm³)	θ <sub>r</sub> (cm³/cm³)	Mean Grain Diameter (cm)						
U	0.20	0 008	1 09	0 083	0 38	0 068	0 0092	12					
<u>ಕ</u>	0.26	0 0 19	131	0 237	0 41	0 095		9					
	1 04	0 036	1 56	0 359	0 43	0.078	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0					
<u>\$1</u>	14 59	0 124	2 28	0 561	0 41	0 057		0					
S	29 70	0 145	2 68	0 627	0.43	0 045		4					
<u>SC</u>	0 12	0 027	1 23	0 187	0 38	0 100	0 025	· 10					
SCL	131	0 059	1 48	0 324	0 39	0 100		Ø,					
<u>S</u>	0 25	0.016	1 37	0 270	0.46	0 034	•	Ó					
Sic	0 02	0 005	1 09	0 083	0.26	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		6					
SICL	0 07	0 0 10	1 23	0 187	0.43	0 089		9					
TIS:	0 45	0 0 0 0	141	0 291	0 45	290'0		_					
J.C.	4 42	0.075	189	0.471	0.41	0 065	0 030	គ្នា					
					Chemic	Chemical Properties Lookup Table	ookup Table						
		Organic			Pure		Henry's	Henry's			Enthainy of		
		carbon			component		iaw constant	law constant	Norma		vanorization at	÷.	
			Officervity	Diffusivity	water	Henry's	at reference	reference		leatha	the normal	<u> </u>	0.40.00.00
	O	نہ	in air.	in water.	solubility -	law constant	temperature	fermoratura		termoeratura	ine nominal	ASII 4	Reiterence
	ı	Υ. S	۵	۵	S	i	Ī	T	<u></u>	T, T	YII Dogu:	E E	, Colle
CAS No Chemical		(cm <sub>3</sub> /g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(nuttless)	(atm-m³/mol)	် ပို	E	÷ ₹	_	(ua/m³) 1	(ma/m)
											l		
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	•	55	533 15		11,000	9 7E-05	0 0 0 0 0
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	9 005-06	1 62E-03	4 63E-05		_	5 71590		15,000	2 1E-03	0 0E+00
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	90- <b>3</b> 90 6	2 79E+03	1 82E-05	4 44E-07	7 25	5 605 28	827 85	15,000	0 0E+00	7 0E-03
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07					16,000	2 1E-03	0 0E+00
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 255 +00				556 60	7,127	1 5E-05	0 0E+00
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40 1-03	1 37E-04				1004 79	15,000	2 1E-04	0 0E+00
57749 Chlordane		1,20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4	5 25			13,000	3 7E-04	0 0E+00
58899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05		5 596 55		13,000	3 7E-04	0 0E+00
60571 Dieldrin		2 14E+04	1 25E-02	4 74E-06	195E-01	6 19E-04	-				13,000	4 6E-03	0 0E+00
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50 0 +03	6 31E-05	1 54E-06				10,000	0 0E+00	1 4E+01
67641 Acetone		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03					6,955	0 0E+00	3 5E-01
67663 Chloroform		3,98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01					6,988	2 3E-05	0 0E+00
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03				9,510	4 0E-06	0 0E+00
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04		16 25			10,346	0 0E+00	3 5E-01
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	-				7,342	8 3E-06	0 0 0 0
7 1000 T.1.1*Inchiorograms		1 105+02	/ 80E-02	8 805-06	1 33E+03	7 05E-01	- 1				7,136	0 OE+00	10€+00
72435 Methosophor		0 775 04	1 255-02	4 74E-U6	2505-01	3 USE-04					12,000	0 0E+00	1 16-03
72548 DDD		1005106	1 505-02	4 405-00	4 50E-02	45,000	1 585-05				14,000	0 0E+00	1 8E-02
325 255		475+06	1445.02	00-00-4 00-00-00-00-00-00-00-00-00-00-00-00-00-	9 UCE-02	40-146-0					14,000	6 9E-05	0 0E+00
74839 Methyl homide		1056+01	7 285 02	3 87 5-00	1 525+04	90100	Z 10E-03		030 44	860 38	000,61	9 / 11-05	00=+00
75014 Vinvi chlonda (chloroathana)	(0)	1 86 1 101	106501	4 23E AB	2 78 1403	1 115+00					41 / 'C	0.05+00	3 UE-03
75092 Methylene chloride	<u> </u>	1 17F+01	1015-01	1 17F-05	1.30 = +04	8 9.8E.03					02,230	4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0000
75150 Carbon disulfide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00					6.391	004400	7 OF 01
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02		25			9,479	1 1E-06	0.000
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02		_			2,000	1 8E-05	000+00
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03				6,895	0 0E+00	5 0E-01
75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1,07E+00	2 61E-02	25 25			6,247	S 0E-05	0 0E+00
76448 Heptachtor		1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03				13,000	1 35-03	0 0E+00
77474 Hexachlorocyclopentadiene	ᡓ	2 00E+05		7 21E-06	1 80E+00	1 11E+00					10,931	0 0E+00	7 0E-05
78591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04					10,271	2 7E-07	0 0E+00
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1,15E-01			369		7,590	0 00+00	4 0E-03
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74€-02	<b>63</b>	25			8,322	1 65-05	0 0E+00
79016 Inchloroethylene		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01					7,505	1 7E-06	0 0E+00
83320 Acadachthana	_	4 33E+01	7 105-02	7 905-06	2.97E+03	141E-02	en •		41960	661 15	966'8	5 8E-05	0 0E+00
erenindende passe		Cordon /	1 6 1 6 4 6	02-040	4 64F	0 2000	1 55E-U4				12,155	0.01100	Z 1E-01

84562 Diethychtholete	i i				VLOOKUP TABLES							
84742 Directify optigate	2 88E+UZ	2 56E-02	6 355-06	1 08E+03	185E-05	4 51E-07	25	567 15	757 00	13,733	0.0E+00	2 8E+00
85687 Butvi benzvi nhthalate	5 255 +04	4 385-02	/ 86E-06	1 125-101	3 85E-08	9 39E-10	25		798 67	14,751	0 0E+00	3 5E-01
86306 N-Nitrosodushandania	4071104	1 /4E-02	4 83E-06	2 69E+00	517E-05	1 265-06	25		839 68	13,000	0 0E+00	7 0F-01
86727 Chimmed Alphien yianine	1.29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 00E-06	52		890.45	13 000	1 4F-06	0.00
86748 Corporate	1 38E+04	3 63E-02	7 88E-06	1 985+00	261E-03	6 37E-05	25	570 44	870.00	12 666	0.05+00	145.01
A7802 Localifornia 4 2 to 1	3.395+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	25		00 668	13 977	5 7F-06	00-100
87865 Destablished Land	5 37E+04		6 16E-06	3 23€+00	3 34E-01	8 15E-03	25	486	738 00	10,206	2.2E-05	00+400
88062 2.4 A. Trichlomohanal	3 925+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	25		813 20	14.000	3 45-05	00+100
91203 Nachthalene	3 815+02	3 18E-02	6 255-06	8 00E+02	3 19E-04	7 78E-06	52	519 15	749 03	12,000	3 1E-06	0 0 0
91941 3,3-Dichlorobenzidme	7 24F+02		7 50E-05	3 10 - +01	1 98E-02	4 83E-04	25	491 14	748 40	10,373	0 0E+00	14E-01
95476 o-Xylene	3 635+02	8 70E-02	1.00 F-05	3    E+00	- 04E-6/	4 005-09	S2 1	560 26	754 03	13,000	1 36-04	0 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60F+04	4 925-01	5 20E-03	52	417 60	630 30	8,661	0 0E+00	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79F-02	1 205-00	9 8	5 5 5	697 60	10,800	0 0 = +00	186-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90 -03	0 H	453.57	705.00	9,700	00± 100 100 100 100 100 100 100 100 100	2 0E-01
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	3 30E-04 4 34E-06	8 %	44/ 53 F76 4F	6/5 00	9,572	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 8E-02
98953 Nitrobenzene	6 46E+01	7 60E-02	8 605-06	2 09E+03	9 84 5-04	2.40F-05	3 %	326 13	710.00	000,51	0 0 0 0	3 56-01
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	3 %	403.83	7.19.00 817.20	20,20	00+400	2 0E-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2.76E-03	25.55	41831	636.00	0,00	00400	00110
106423 - Video	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	25	484 13	707 60	11.329	00+100	7 05-02
106467 1 4-Dichlombenzene	3 695+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	56	411 52	616 20	8,525	000+00	7 0E+00
	0 175-02	905-02	/ 90E-06	7 38E+01	9 96E-02	2 43E-03	52	447 21	684 75	9.271	00+300	8 OF-01
107062 1 2-Dichlomethane	1 7/15-01	4 83E-02	101E-05	5 30E+03	1 36E-05	3 32E-07	52	503 65	754 00	11,689	000+00	1 4E-02
108054 Vind acetate	1.4E+01	1045-01	990E-06	8 52E+03	4 01E-02	9 78E-04	22	356 65	561 00	7.643	2 6E-05	0 0E+00
108383 m-Xvlene	3.255400	9 30E-02	9.20E-06	2 00E+04	2 10E-02	5 12E-04	52	345 65	519 13	7,800	0.05+00	2 0E-01
108883 Toluene	1 825+02	705-02	80E-06	161E+02	3 016-01	7 34E-03	52	412 27	617 05	8,523	0 0E+00	7 OE+00
108907 Chlorobenzene	2 195+02	7 305 02	000000	5 20E+02	2 /2E-01	6 63 E-03	52	383 78	591 79	7,930	0.0E+00	4 0E-01
108952 Phenol	2 BBE+01	8 20E-02	0 105-06	4 /2E+02	1 52E-01	371E-03	22	404 87	632 40	8,410	0 0E+00	2 0E-02
111444 Bis(2-chloroethyl)ether	1 55E+01	6 005 00		0 285+04	1 631-05	3 98E-07	22	455 02	694 20	10,920	0.05+00	2 1E+00
115297 Endosultan	2 14 E+03	1 15E-02	4 555-06	5 10E-04	7 38E-04	180E-05	52	451 15	626 26	9,000	3 35-04	0 0E+00
117817 Bis(2-ethythexyl)phthalate	1516+07	3515-02		3 40E-01	4 190 06	1 12E-05	52	674 43	942 94	14,000	0 0E+00	2 1E-02
117840 Di-n-octyl phthalate	8 32E+07	151E-02		2 00F-02	2 74E-03	1025-07	82	557 15	806 00	15,999	4 0E-06	0 0E+00
118741 Hexachlorobenzene	5 50E+04	5 42E-02	591E-06	6 205+00	5.41E-02	1 325 03	ខ្ល	704 09	862 22	15,000	0 0E+00	7 0E-02
120127 Anthracene	2 95E+04	3 24E-02		4 34E-02	2 67F-03	- 32E-03	8 %	382 35	825 00	14,447	4 6E-04	0 0 0 0
120821 1.2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 425-03	0 K	01018	8/3 00	13,121	0 OE+00	1 1E+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1300-04	3 17E-06	3 %	480 13	709 72	10,471	00=+00	2 0E-01
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27 E-08	3 %	5000	00 17 014 00	11,000	0.05+00	1 1E-02
124481 Chlorodibromomethane	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04	3 5	41614	678.20	) 40 00 00 00 00 00 00 00 00 00 00 00 00 0	- 40 P	00+400
12000 Guranioroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	25	394 40	620 20	288	2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	00+100
156592 cis.1 2.Dichlomothylene	1 USE+US	2 /2E-02	7 24E-06	135E-01	4 51E-04	1 105-05	52	667 95	936 00		000+00	115.0
156605 trans-1.2-Dichloroethylene	5 356+01	7 075 02	1 13 11-05	3 50E+03	1 67E-01	4 07E-03	52	333 65	544 00		0 0E+00	3 5E-02
193395 Indeno(1.2.3-cd)ovrene	3 475+05	1 00 0 02	50-181 - 50-181 -	5 30E+03	3 85E-01	9 39 5-03	25	320 85	516 50		0 0E+00	7 0E-02
205992 Benzo(b)fluoranthene		2 26F-02	5.56 - 06	1 505-03	5 55E-05	1 605-06	52	809 15	1078 24		2 1Ë-04	0 0E+00
206440 Fluoranthena	1 07E+05	3 02E-02	6 35E-06	2 06F-01	# 50E-03	1 647 06	S S	715 90	969 27	15,000	2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02		8 00E-04	3.405-05	CO-30C 4	នូវ	655 95	905 00	13,815	0 0E+00	1 4E-01
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46 E-05	<b>6</b> 4	71415	1019 70	16,000	2 1E-05	0 0E+00
309002 Aldnn	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	3 %	603.01	979 00	16,455	2 1E-06	0 0E+00
319646 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05	22	596.55	92936	3,000	2 to 1	0.05+00
51363/ Deta-HCH (Deta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	52	596.55	839.36	2,000	200	00:00
542/55 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02	22	381 15	587.38	2,56	3 3F-U4	00=+00
621647 N.Nitrosodin.commudamino	8 92E+01	3 27E-02		1 82E+02	3 06E-05	7 46E-07	25	558 00	770 00	12,938	19E-03	2 DE-02
1024573 Hentachlor enoxide	8 32F+04	1 225 02	0 1/10	9 89E+03	9 Z3E-05	2 25E-06	22	209 60	746 87	11,000	2 0E-03	0.05+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	4 23E-06	Z 00E-01	3 90E-04	9 515-06	22	613 96	848 76	13,000	2 6E-03	0.00
8001352 Toxaphene	2 57E+05	1 16E-02	4 34F-06	7.40E-01	10-E/0 *	1 14E-02	52	629 88	1750 00	14,127	0 OE+00	3 0E-04
11096825 Arador 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 895-01	9 00E-06	8 8	657 15	873 31	14,000	3 2E-04	0 0E+00
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00 5-03	3 5	977 50	539 37	19,000	1 0E-04	0 0E+00
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	8 49	340.50	512.27	19,000	유 5 년	0 0E+00
53469219 Aroclor 1242 (PCB-1242)	3 30E+04	2 14E-02	5 31E-06	3 40E-01	2 135-02	5 20 6 04	3 5	345.50	482 20	900,81	1 0E-04	00100
							i	•	74 44	250,0	\$ 5 5	

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

YES

		ENTER	User-defined stratum A soil vapor permeability, k <sub>v</sub>
		İ	% 
		ENTER	stratum A SCS soil type (used to estimate soil vapor permeability)
		ENTER	SCS solt type drectly above water table
		ENTER	Soil stratum directly above water fable, (Enter A, B, or C)
	lene	ENTER Lwr (cell D28)	Thickness of soil stratum C, (Enter value or 0) hc (cm)
Chemical	Tetrachloroethylene	NTER ENTER ENTER Totals must add up to value of L wt (cell D28)	Thickness   Thickness   Thickness   Color     of soil   stratum B,   stratum C,     stratum A,   (Enter value or 0)   (Enter value or 0)     h <sub>A</sub> h <sub>B</sub> h <sub>C</sub> h <sub>C</sub>     (cm)   (cm)   (cm)     548 64   548 64   274 32
		ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub> (cm)
·		ENTER	Depth below grade to water table, Lwr (cm)
ENTER Initial groundwater conc, C <sub>W</sub> (µg/L)	1 720769231	ENTER Depth	below grade to bottom of enclosed space floor, Lr (cm)
ENTER Chemical CAS No (numbers only, no dashes)	127184	ENTER	Average soil groundwater temperature, T <sub>S</sub> (°C)

ENTER	Stratum C	soil water-filled	porosity,	o ** 0	(ст <sub>3</sub> /ст <sub>3</sub> )	0 3							
ENTER	Stratum C	soil total	porosity,	ပိုင	(unitless)	0 43							
ENTER	Stratum C	soil dry	bulk density,	Š	(g/cm³)	1.7	ENTER		Indoor	air exchange	rate,	<b>E</b>	(1/h)
ENTER	Stratum B	soil water-filled	porosity,	в. Ж	(cm <sub>3</sub> /cm <sub>3</sub> )	0 27	ENTER		Floor-wall	seam crack	width,	*	(cm)
ENTER	Stratum B	soil total	porosity,	<b>e</b> L	(vnitless)	0 42	ENTER		Enclosed	space	height,	ᇁ	(cm)
ENTER	Stratum B	soil dry	bulk density,	<b>8</b> 40	(g/cm³)	17	ENTER	Enclosed	space	floor	width,	š	(mo)
ENTER	Stratum A	soil water-filled	porosity,	6**	(cm³/cm³)	0.2	ENTER	Enclosed	space	floor	length,	ت	(cm)
ENTER	Stratum A	soil total	porosity,	<b>←</b>	(unitless)	0 43	ENTER		Soil-bidg.	pressure	differential,	ΔP	(g/cm-s <sup>2</sup> )
ENTER	Stratum A	soil dry	bulk density,	₹₫	(a/cm³)	15	ENTER	Enclosed	space	floor	thickness,	Lone	(cm)

0.45

	15	4	40	961	961	488	0.1	1
	ENTER		ENTER	ENTER	ENTER	ENTER	ENTER	
	Averaging time for		Averaging time for	Exposure	Exposure	Target risk for	Target hazard quotient for	
	carcinogens,	Ī	noncarcinogens,	duration,		carcinogens,		
	ATc		AT		Ш	Œ	ЪŦ	
	(yrs)		(yrs)	(yrs)	(days/yr)	(unitless)	(uniffess)	
1								
ш	70	Ц	30	30	350	1 0E-06	1	
l						:		
						Used to calco	Jsed to calculate risk-based	
						groundwater	proundwater concentration	
					•			

#### 2 of 7

CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)
Unit risk factor, URF (µg/m³)·1
Pure component water solubitly, S S (mg/L)
Organic carbon partution coefficient, K <sub>x</sub> (cm <sup>3</sup> /g)
Cntical temperature, T <sub>C</sub> (%)
Normal bouling pount, T <sub>B</sub>
Enthalpy of vaporization at the normal boiling point, ΔH <sub>vb</sub> (cal/mol)
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H
Diffusivity In water, D <sub>*</sub> (cm <sup>2</sup> /s)
Diffusivity in air, D. (cm²/s)

# INTERMEDIATE CALCULATIONS SHEET

Stratum A Total Au-filed Water-filled Floorsoll Thickness of porosity in porosity in porosity in wall factive vapor capillary capillary capillary capillary seam emeability. Zone, Zone, Zone, Zone, perimeter, $k_{\nu}$ $k_{\nu$	17 05 0 43 0.136 0.294	Stratum Stratum Capillary Total B C zone overall effective effective effective Dif diffusion diffusion diffusion is coefficient, coefficient, coefficient, le	$(cm^2/s)$ $(cm^2/s)$ $(cm^2/s)$	E-03 7 38E-04 4 38E-04 5 05E-04 8 77E-04 1356 6	iite		Cont Tisk	Ont risk R factor,	Unit risk factor, URF	Unit risk factor, URF
soil effective vapor , permeability, k, (cm²)	6.98E-10	Stratum A effective diffusion coefficient	(cm²/s)	2 92E-03	Infinite					
Stratum A soul relative air permeablity, k <sub>rq</sub> (cm²)	0 746	Vapor viscosity at ave soil temperature,	(g/cm-s)	1 77E-04	Infinite	indoor	altenuation	coefficient,	attenuation coefficient, α	attenuation coefficient, α
Stratum A soil intrinsic permeability, k,	9 36E-10	Henry's law constant at sve groundwater temperature,	(unitless)	4 71 <b>E-</b> 01	Exponent of equivalent	foundation		number,	number, exp(Pe <sup>f</sup> )	number, exp(Pe <sup>f</sup> )
Stratum A effective total fluid saturation, Sa (cm <sup>3</sup> /cm <sup>3</sup> )	0 419	Henry's law constant at ave groundwater temperature,	(atm-m³/mol)	1 12E-02		Area of		crack,	crack,	crack,
Stratum C soll air-filled porosity, 9 <sub>a</sub> c (cm <sup>3</sup> /cm <sup>3</sup> )	0 130	Enthalpy of vaporization at ave groundwater temperature,	(cal/mol)	9,492	Crack	effective diffusion		coefficient,	coefficient, D <sup>onick</sup>	coefficient, D <sup>omek</sup>
Stratum B soil air-filled porosity, e, e (cm³/cm³)	0 150	Crack depth below grade,	(cm)	15	Average	vapor flow rate		into bldg,	Into bidg,	Into bidg ,
Stratum A soll alr-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio,	(nuitless)	4 16E-04		Crack		radius,	radius, Fanck	radius, Fersck
Source- bullding separation, L <sub>T</sub>	1356 6	Area of enclosed space below grade,	(cm <sup>2</sup> )	9 24E+05	,	Source		couc,	conc,	Caouros
Exposure duration, t	9 46E+08	Bidg ventilation rate,	(cm <sup>3</sup> /s)	5 63E+04	:	Convection path		length,	ength, ابا	length,

incremental RISK CALCULATIONS incremental Hazard risk from quotient vapor from vapor intrusion to intrusion to indoor air, indoor air, carcinogen noncarcinogen (unitless) (unitless)	NA
Final indoor exposure conc , (µg/L)	1 59E+03
Pure component water solubility, S (19/L)	2 00E+05
Risk-based indoor exposure groundwater conc (4g/L)	1 59E+03
Indoor indoor Risk-based Pure Final exposure exposure exposure water exposure conc. groundwater solubility, groundwater conc. (49/L) (49/L) (49/L) (49/L) (49/L)	AA
Indoor exposure groundwater conc., carcinogen (µg/L)	1 59E+03

				,					1	٠, ر		Γ	_		uce		f2	Γ	00E+00	7 05-03	00+100	0 0E+00	0 OE +00	00+100	00+400	1 4 E+01	3 5E-01	0 0E+00	0 0E+00	00E+00	1 0E+00	1 16-03	1 8E-02	00 W	5 0E-03	0 0 = +00	3 0E+00	0 OE+00	00+00	5 0E-01	0 0E+00	0 0E+00	7 0E-05	0 CH +00	00.00	00+900	0 0E+00
															Reference	Sono	Cme/m <sup>3</sup> )	1										_	-																Ŭ		
														Cuit	risk	factor,	(uo/m³).1		9.7E-05	001100	2 1E-03	1 5E-05	2 1E-04	37504	4 6F-03	0 OE+00	0 0E+00	2 3E-05	4 0E-06	8 3E-06	0 0E+00	0 OE+00	0 0E+00	9 7E-05	0 0E+00	8 4E-05	4 75-07	1 15-06	1 8E-05	0 OE+00	5 0E-05	135-03	0 OE+00	2 7E-07	1 65-05	1 7E-06	5 8E-05
													Enthalpy of	vaporization at	the normal	boiling paint,	ΔH, b (cal/moi)		11,000	15,000	16,000	7,127	15,000	13,000	13,000	10,000	6,955	6,988	9,510	7,342	7,136	12,000	14,000	13,000	5,714	5,250	6,706	9.479	7,000	6,895	6,247	13,000	10,931	10,271	8.322	7,505	966'8
															Critical	temperature,	. გ		720 75	827.85	990 41	556 60	1004 79	885 73	842.25	75100	508 10	536 40	695 00	562 16	545 00	986 20	848 49	86038	467 00	432 00	510 00	932 00	585 85			84631	746 00	715 00	972 00 602 00	544 20	661 15
														Normai	polling	point,	<b>්</b> දි		533 15	605 28	743 24	349 90	708 15	624 24	613.32	720 00	329 20	334 32	458 00	353 24	347 24	718 15	651 02	636 44	276 71	259 25	313 00	422 35	363 15	330 55	304 75	603.69	512 15	360 52	386 15	360 38	419 60
													Henry's	law constant	reference	temperature, T	≖ු වි	1	25	25.55	52 52	25	25	35. 25.	52 22 22 24	25	25	22	25	22	25	25	3 23	22 2	52	52	25	25.	25	25	25	25	25	25	22 22	: S2	52
53		Mean Grain Diameter (cm)	0 0092	0.00	0 040	0 044	0 025	0.029	6600 0	0 0056	0 030	cup Table	Henry's	law constant	at reference	temperature,	n (atm-m³/mol)		8 10E-06	4 44E-07	1 47E-08	3 05E-02	3 345-06	4 85E-05	1.516-05	1.54E-06	3 88E-05	3 66E-03	3 88E-03 9 80E-06	5 56E-03	1 72E-02	7.51E-06	1 58E-05 4 00F-06	2 10E-05	6 24E-03	2 716-02	2 19E-03	5 34E-04	1 60E-03	5 61E-03	2 615-02	1 09E-03	271E-02	6 63E-06	2 80E-03 9 12E-04	1 03E-02	3 44E-04
VLOOKUP TABLES		- 1	0 068	0.078	0 057	0 045	0,100	0 100	0 0 0 0	680 0	0.065	Chemical Properties Lookup Table			Henry's	law constant	(unitless)		3 32E-04	1 82E-05	6 03E-07	1 25E+00	1 37E-04	1 99E-03	6 19E-04	6.31E-05	1 59E-03	1 50E-01	1 59E-01 3 61E-04	2,285-01	7 05E-01	3 08 E-04	6 48E-04	8 61E-04	2 56E-01	1 11E+00	8 98E-02	2 19E-02	6 56E-02	2 30E-01	1 07E+00	4 47E-02	1 11E+00	2 72E-04	3 74E-02	4 22E-01	1 41E-02
	ئم ئے د	θ, (cm'/cm')	038	0 43	0.41	0 43	0 38	0.46	0.26	0 43	041	Chemic	Pure	component	water	solubility,	S (mg/L)		2 50E-02	2 79E+03	2 49E-03	7 93E+02	9 40E-03	5 60E-02	1 95E-01	3 50E+03	1 00E+06	7 92E+03	5 00E+01	1 75E+03	1 33E+03	2 505-01	4 50E-02 9 00E-02	1 205-01	1 52E+04	2 76E+03	1 30E+04	3 10 1 + 03	6,74E+03	5 06E+03	2 25E+03	1 80E-01	1 800+00	1 20E+04 2 80E+03	4 42E+03	1 100-03	2 97E+03
	ookup Table	M (unitless)	0 083	0 359	0.561	0 627	0 187	0 324	0 083	0 187	0.291				Diffusivity	in water,	(cm²/s)		4 95E-06	90-300 e	5 18E-06	8 80E-06	9 00E-06	4 3/E-06 7 3/E-06	4 746-06	7 97E-06	1 14E-05	1 00E-05	6 80E-06	9 80E-06	8 80E-06	4 74E-06	4 46E-06 4 76E-06	5 87E-06	1 21E-05	1 23E-06	1 17E-05	1 03E-05	1 06E-05	1 05E-05	1 04E-05	5 695-06	7 21E-06	0 /0E-C0	8 80E-06	9 105-06	7 90E-06
		- 4	90 -	156	2 28	2 68	123	137	109	123	141				Diffusivity	ž c	(cm²/s)		1 37E-02	2 73E-02	2 02E-02	7 80E-02	5 105-02	1 18E-02	1 25E-02	5 36E-02	1 24E-01	1 04E-01	2 50E-03	8 BOE-02	7 80E-02	1 25E-02	1 55E-02 1 69E-02	1 44E-02	7 285-02	1 06E-01	1 016-01	1 49E-02	2 98E-02	7 42E-02	9 00E-02	1 12E-02	1 61E-02	6 23E-02 7 82E-03	7 80E-02	7 90E-02	7 10E-02
		α (1/cm)	0 008	0 036	0 124	0 145	0 027	0 0 0 0 0 16	0 002	0010	0.020		Organic	carbon	partition	coefficient,	cm³/g)		2 63E+06	1 00E-02	3 80E+06	1 74E+02	3 98E+05	1 20E+05	2 14 E+04	6 00E-01	5 75E-01	3 98E+01	1 78E+03	5 89E+01	1 10E+02	1 23E+04	9 //E+04 1 00E+06	4 47E+06	1 05E+01	186E+01	1 1/E+01	8 71E+01	5 50E+01	3 16 €+01	5 89E+01	141E+06	2 00E+05	4 68E+01	5 01 11 40 1	1 66E+02	9 33E+01
		K, (cm/n)	9 50	10.	14 59	29 70	0 12	0.25	0 02	007	4 42						ical				Icene	ide	<b>p</b>	dane)	(alla)				<b>c</b> o		ane					loroethene)	<u>o</u>		thane	ø	ene	:	oentadiene	ç	ane	i	roethane
	•	ed/v															lo Chemical		50293 DDT 50328 Benzo(a)myrene	51285 2,4-Dinitrophenol	53703 Dibenz(a,h)anthracene	56235 Carbon tetrachloride	56553 Benz(a)anthracene	5/749 Chlordane 58899 damma.HCH (lindane)	60571 Dieldrin	65850 Benzoic Acid	67641 Acetone	67663 Chloroform	67721 Hexachloroethane 71363 Butanot	71432 Benzene	71556 1,1,1-Trichloroethane	72208 Endrin	72548 DDD	72559 DDE	74839 Methyl bromide	75014 Vinyl chloride (chloroethene)	75092 Methylene chloride 75150 Carbon disulfide	75252 Bromoform	75274 Bromodichloromethane	75343 1,1-Dichloroethane	75354 1,1-Dichtoroethylene	76448 Heptachfor	77474 Hexachlorocyclopentadiene	78875 1 2-Dichloropropage	79005 1,1.2-Trichloroethane	79016 Trichloroethylene	79345 1,1,2,2-Tetrachloroethane
		SCS SOIL YPB	ပ ပ	أ	รา	တ	ខ្លួ	- - - - - - - - - - - - - - - - - - -	SIC	SICT SICT	7 20 10						CAS No												-																	٠	

84662 District of the Control of the	1				VLOOKUP TABLES							
84742 Die Amphibiate	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 Buty benzyl phthalate	7.750+04	4 385-02	7 861-06	1 12E+01	3 85E-08	9 39E-10	52	613 15	798 67	14,751	0 0E+00	3 5E-01
	1 205404	1,45,02	4 6 5 T C C C C C C C C C C C C C C C C C C	2 69E+00	5 17E-05	1 26E-06	52	09 099	839 68	13,000	0 0E+00	7 0E-01
86737 Fluorene	1385+04	3 625.02	0 33E-00	3516+01	2 05E-04	5 00E-06	52	632 28	890 45	13,000	1 4E-06	0 0E+00
86748 Carbazole	3 39 03	3 905-02	7 035 08	1 98E+00	2 61E-03	6 37E-05	52	570 44	870 00	12,666	0 0E+00	1 4E-01
87683 Hexachloro-1,3-butadiene	537E+04	5.615-02	6 15E-06	3 235+00	3 345 04	1 535-08	52	627 87	899 00	13,977	5 7E-06	0 0E+00
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	0 10E-03	S &	486 15	738 00	10,206	2 2E-05	00 H
88062 2,4,6-Trichlorophenol	3.81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7.78E-06	3 52	519 15	749.03	12,000	3.41.45 41.45 41.45	00+400
91941 3 3 Dichlomboomidies	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	22	491 14	748 40	10.373	004400	1 4 F-01
95476 0-Xvleps	7 24E+02	1945-02	6 74E-06	3 115 +00	1 64E-07	4 00E-09	52	560 26	754 03	13,000	136-04	0 0E+00
95487 2-Methydobenol (o-cresol)	9 12E+02	7 40E-02	1 00E-05	1 78E+02	2 135-01	5 20E-03	25	417 60	630 30	8 661	0 0E+00	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 905-02	7 90F-06	2 50E+04	4 92E-05	1 20E-06	52	464 19	697 60	10,800	0.05+00	1 8E-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20F+04	1 60E-02	1905-03	52	453 57	705 00	9,700	0 0E+00	2 0E-01
95954 2,4,5-Trichlorophenol	1 60E+03	291E-02	7 03E-06	1 20€+03	1 785-04	3.90E-54 4.34E-06	0 H	447 53 536 46	675 00	9,572	0 0 0 0 0	1 8E-02
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 845-04	2 40F-05	3 %	320 13 483 95	7 10 00	13,000	00000	355-01
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	22	409 34	617.20	000,01	001100	2 UE-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03	25	418 31	636 00	737	00+00	00+00
106423 p. Xviene	2 095 +02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	22	484 13	707 60	11,329	0 0E+00	7 OF 402
	5 035+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	56	411 52	616 20	8,525	0 0E+00	7 0E+00
	5.81E±01	4 83E 02	7 90E-05	/ 38E+01	9 96E-02	2 43E-03	22	447 21	684 75	9,271	0 0E+00	8 0E-01
107062 1,2-Dichloroethane	1 74E+01	1045-01	90-10-6	2 50E+U3	1 36E-05	3 32E-07	52	503 <b>65</b>	754 00	11,689	0 0E+00	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20F-06	2 005+03	2 105.02	9 /85-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xylene	4 07E+02	7 00E-02	7 BOF-06	1 616+02	3 015-01	3 12E-04	22	345 65	51913	7,800	0 0E+00	2 0E-01
	1 82E+02	8 70E-02	8 605-06	5 26E+02	2 72F-01	2000	Ç Y	412.27	617 05	8,523	00=+00	7 0E+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 715-03	9 %	383 78	591 79	7,930	0 0E+00	4 0E-01
108952 Phenoi	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98 1.03	3 %	404 07	632.40	8,410	0 0E+00	2 0E-02
	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E.05	6 4	455 02	694.20	10,920	0 0E+00	2 1E+00
115297 Endosulfan	2 14E+03	1 15E-02	4 55E-06	5 105-01	4 59E-04	1 12E-05	25	674.43	67 500	000,5	3 35-04	005+00
11791/ Dis(z-einyinexyi)primelate	1 51E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	25	657 15	806.00	4, 46	4 05-06	70-31 7
118741 Hexachleoberrane	8 32E+07	151E-02	3 585-06	2 00E-02	2 74E-03	6 68E-05	52	704 09	862 22	15,000	00100	7 05-00
120127 Anthracene	3 30E+04	3 42E-02	5.91E-06	6 20E+00	5 41E-02	1 32E-03	22	582 55	825 00	14 447	4 6E-04	00+00
120821 1.2.4-Trichlorobenzene	1 78F±03	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05	52	615 18	873 00	13.121	0 0E+00	1 1 1 1 0 0
120832 2,4-Dichlorophenol	1 47F+02	3 465-02	9 27E-06	3 UUE + UZ	5 82E-02	1 42E-03	52	486 15	725 00	10,471	00+300	2 0E-01
121142 2,4-Dinitrotoluene	9 55E+01	2 035-01	7 06E-06	2 205-03	1 30E-04	3 17E-06	52	482 15	708 17	11,000	0 0E+00	1 1E-02
	6 31 € + 01	1 96E-02	1 05E-05	2.50F+02	3 21E-05	92/E-08	32	590 00	814 00	13,467	1 9E-04	0 0E+00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7.54F-01	7 83E-74	2 6	416 14	678 20	8,000	2 4E-05	0 0E+00
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	1 35E-01	4 51E-04	1 105-05	3 %	394 40 667 06	02020	8,288	5 85-07	0 0E+00
156592 cs-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03	2 15	333.65	544.00	14,370	0.0E+00	11501
100000 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03	52	320.85	516.50	7.13 R 717	201100	3 55-02
205002 Renzo(h)Anomathone	3 47E+06	1 905-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06	22	809 15	1078 24	17,000	2 1F-04	705-07
206440 Fluoranthana	1.075+05	2 20E-02	3 3 5 E - O 6	1 50E-03	4 55E-03	11E-04	52	715 90	969 27	15 000	2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26F-02	5.565-06	2 00E-01	3 40E-04	161E-05	52	655 95	905 00		0 0E+00	1 4E-01
	3 98E+05	2 48E-02	6.21E-06	1 60E-03	3 88E-03	0.28E-07	52 1	753 15	1019 70	16,000	2 1E-05	00=+00
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70F-04	9 %	603.01	008/8	16,455	2 1E-06	0 0E+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05	3 12	596 55	839.36	3,000	4 9E-03	00+00
51905/ DBG-HCH (DBG-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	52	596 55	839.36	13,000	200	00400
SOR202 2 6-Dinitrotohopene	4 5/E+01	6 26E-02	1 005-05	2 80E+03	7 26E-01	1 77E-02	52	381 15	587 38	2,000	3.75.05	200-400
621647 N-Nitrosodi-n-propylamine	2 40F±01	5.455.02	7 ZDE-U6 9 17E 06	1 82E+02	3 06E-05	7 46E-07	52	558 00	770 00	12,938	196-04	0 OE+00
	8 32F+04	1 32F-02		3 695+03	9 23E-05		22	209 60	746 87	11,000	2 0E-03	00=+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6.30F-06	5.625.03	3 90E-04	9515-06		613.96	848 76		2 6E-03	0 0E+00
8001352 Toxaphene	2 57E+05	1.16E-02		7 40E-01	2.46F-04	1,14E-02	S 12	629 88	1750 00		0 OE+00	3 0€-04
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 605-03	6 %	65/ 15 402 50	87331	14,000	3 2E-04	0 0E+00
11097691 Aroctor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02		3 52	377.50	512.27	19,000	100.04 0.04 0.04	0 H+00
126/4112 Arodof 1016 (PCB-1016) 53460210 Arodof 1242 (BCB 1242)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04		340 50	475 22	000,85	1 OH O	0,01+00
מספר בין דראן יי פרי הארן	\$ 30E+04	2 14E-02	5315-06	3 40E-01	2 13E-02	5 20E-04	52	345 50	482 20	18,000	106-04	00E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

	1	ENTER	User-defined stratum A	soli vapor	permeability,	cm²)							
	-				ğ								_
		Soil	stratum A SCS	soil type	(used to estimate	permeability)	IS.	ENTER	Stratum C soil water-filled	porosity,	υ Φ	(cm³/cm³)	03
	1	ENTER		scs	soil type	water table	S	ENTER	Stratum C	porosity	°	(unitless)	0.43
	1	ENTER	Sol	stratum	directly above	(Enter A, B, or C)	၁	ENTER	Stratum C soil dry	bulk density,	್ಟಿ	(g/cm³)	1.7
dono	a lie	ENTER I L <sub>WT</sub> (cell D28)	Thickness of soil	stratum C,	(Enter value or 0)	9:: (cm)	274 32	ENTER	Stratum B soil water-filled	porosity,	B. W.	(cm <sub>3</sub> /cm <sub>3</sub> )	0.27
Chemical 4 4 Doblescoots	i, r-Dichiologinylerie	NTER ENTER Totals must add up to value of L <sub>wT</sub> (cell D28)	Thickness of soil	stratum B,	(Enter value or 0)	(cm)	548,64	ENTER	Stratum B soil total	perosity,	9	(unitless)	0.42
		ENTER Totals mu	Thickness	of soil	stratum A,	(cm)	548 64			ם	<b>.</b> 6	(g/cm³)	17
		ENTER	Death	below grade	to water table,	(cm)	13716	ENTER	Stratum A soil water-filled	porosity,	ψ,	(cm <sub>3</sub> /cm <sub>3</sub> )	0.2
ENTER Initial groundwater conc. Cw. (ug/L)		Depth	below grade to bottom	of enclosed	space floor,	(cm)	15	ENTER	Stratum A	poresity,	ح د	(unitless)	0.43
Chemical CAS No (numbers only, no dashes)		ENTER	Average soll/	groundwater	temperature, T.	<u></u> (၃)	16	ENTER	Stratum A soil dry	bulk density,	<b>√</b> નુ	(g/cm³)	15

ENTER

ENTER

ENTER

Enclosed space floor width,

Enclosed space floor length,

ENTER

				- 1		1											
Indoor	air exchange	rate,	Я	(1/h)	0.45												
Floor-wall	seam crack	width,	*	(cm)	01	,	ENTER	Target hazard	quotient for	noncarchogens,	쥪	(unitless)		1		late risk-based	groundwater concentration
Enclosed	space	height,	f	(cm)	488	3	ENTER	Target	risk for	carcinogens,	포	(unitless)		1 0E-08		Used to calcu	groundwater
space	floor	width,	W	(cm)	1 196	,	ENTER		Exposure	frequency,	Ш	(days/yr)		350			J
space	floor	length,	L	(cm)	961		ENTER		Exposure	duration,	<b>a</b>	(yrs)		30			
Soil-bldg	pressure	drfferential,	ΔP	(g/cm·s²)	40		ENTER	Averaging	time for	noncarcinogens,	AT <sub>NC</sub>	(yrs)		30			
space	floor	thickness,	Lone	(cm)	7)		ENTER	Averaging	time for	carcinogens,	ATc	(yrs)		70			
	Soil-bidg space space Enclosed Floor-wall	Soil-bidg space space Enctosed Floor-wall pressure floor floor space seam crack	Soil-bidg space space Enclosed Floor-wall pressure floor floor space seam crack air differential, length, width, height, width,	Soll-bldg space space Enclosed Floor-wall pressure floor floor space seam crack differental, length, width, height, width, AP Le We Ha w	Soil-bldg space space Enclosed Floor-wall pressure floor floor space seam crack differential, length, width, height, width, AP Le We H <sub>B</sub> w (g/cm-s²) (cm) (cm)	Soil-bldg space space Enclosed Floor-wall	Soil-bldg         space         space         Enclosed         Floor-wall           pressure         floor         floor         space         seam crack           differential,         length,         width,         width, $\Delta P$ Le         We         Ha         w           (g/cm·s²)         (cm)         (cm)         (cm)           40         961         961         488         0.1	Soil-bldg   Space   Space   Enclosed   Floor-wall	Soil-bidg         space         Enclosed         Floor-wall           pressure         floor         space         seam crack           differential,         width,         height,         width,           AP         Ls         Ws         Hs         w           (g/cm-s²)         (cm)         (cm)         (cm)           40         961         961         488         01           ENTER         ENTER         ENTER         ENTER         ENTER           Averaging         Target         Target         Target hazard	Soil-bidg         space         space         Enclosed         Floor-wall pressure           pressure         floor         space         seam crack and crack and crack width, height, width, height, width, width, width, width, width, width, width, width, width, and (cm)         (cm)	Soil-bidg         space         Enclosed         Floor-wall           pressure         floor         space         seam crack           differential         length         width         width           Le         We         He         w           (g/cm-s²)         (cm)         (cm)         (cm)         (cm)           40         961         488         0.1         1           ENTER         ENTER         ENTER         ENTER         ENTER           Averaging         Exposure         Exposure         Exposure         Exposure         Exposure           montancinogens         duration, frequency, carcinogens, noncarcinogens	Soil-bidg         space         Encicsed         Floor-wall pressure         Floor-wall pressure         Space         seam crack width, width	Soil-bidg         space         Encicsed         Floor-wall pressure         Floor-wall pressure         Space         seam crack width, with, wi	Soil-bidg         space         Encicsed         Floor-wall pressure         Floor-wall floor         space         seam crack width, w	Soll-bldg         Space         Enclosed         Floor-wall pressure         Floor-wall pressure         Space         Space	Soil-bidg         Space         Space         Enclosed         Floor-wall pressure           pressure         floor         space         seam crack differential           Le         Veriff         Hear         width, width, height, width, wid	Soil-bidg         space         space         Enclosed         Floor-wall pressure           AP         Le         Wedth, Height, width, APB         Height, width, Width, Height, Width, Width, APB         Wedth, Width, Height, Width, Width, APB         Wedth, Width, Width, Width, Width, Width, Width, APB         Medth, Width, Width, Width, Width, Width, Width, Width, APB         Medth, Width,
## CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)
Unit nsk factor, URF (µg/m³)*1
Pure component water solubility, S (mg/L)
Organic carbon partition coefficient, K <sub>oc</sub> (cm <sup>3</sup> /g)
Critical temperature, T <sub>c</sub> (*K)
Normal boiling point, T <sub>B</sub>
Enthalpy of vaporization at the normal botiling point, $\Delta H_{vb}$ (cal/mol)
Henry's law constant reference temperature, T <sub>R</sub>
Henrys law constant at reference temperature, H
Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)
Diffusivity in air,  D.  (cm²/s)

# INTERMEDIATE CALCULATIONS SHEET

Floor- wall seam perimeter, Xonet	3,844	Diffusion path length, La	1356 6	
Water-filled porosity in capillary zone, $\theta_{* \ cz} $ $(cm^3/cm^3)$	0.294	Total overall effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	1 09E-03	
Alr-filled porosity in capillary zone, $\theta_{\bullet}$ ca $(cm^3/cm^3)$	0 136	Capillary zone effective diffusion coefficient, D** (cm*/s)	6.30E-04	
Total porosity in capillary zone, $\eta_{cz}$	0.43	Stratum C effective diffusion coefficient, $\mathbf{D}^{\mathrm{eff}}_{\mathbf{C}}$	5.47E-04	Reference conc. RfC (mg/m³)
Thickness of capillary zone, Lez (cm)	17 05	Stratum B B effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	9 22E-04	Unit nsk factor, URF (µg/m³) 1
Stratum A soli soli effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, $D^{eff}$ $C^{eff}$	3 65E-03	Infinite source bldg conc. Could (µg/m³)
Stratum A soil relative air permeability, kg (cm²)	0.746	Vapor viscosity at ave soil temperature, $\mu_{TS}$	177E-04	tofinite source indoor attenuation coefficient, $\alpha$ (unitiess)
Stratum A soil intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)	7,88E-01	Exponent of equivalent foundation Paciet number, exp(Pe¹) (unitiess)
Stratum A effective total fluid saturation, S <sub>a</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0419	Henry's law constant at ave, groundwater temperature, Hrs (atm-m³/mol)	1.87E-02	Area of crack, Austrice (cm <sup>2</sup> )
Stratum C soil air-filled porosity, $\theta_n^c$ $(cm^3/cm^3)$	0 130	Enthalpy of vaporization at ave groundwater temperature, ΔΗ,,τs (cal/mol)	6,353	Crack effective diffusion coefficient, Dresk (cm²/s)
Stratum B soil aur-filled porosity, $\theta_a^{B}$	0 150	Crack depth below grade, Z <sub>crack</sub>	15	Average vapor flow rate into bidg , Q <sub>sol</sub> (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio,  n	4 16E-04	Crack radius, r <sub>crack</sub> (cm)
Source- building separation, L <sub>T</sub>	1356 6	Area of enclosed space below grade, A <sub>B</sub>	9 24E+05	Source vapor conc , Caura (µg/m³)
Exposure duration, t	9 46 <b>E</b> +08	Bidg ventilation rate, Quiene (cm <sup>3</sup> /s)	5 63E+04	Convection path length, Lp (cm)

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS

NCREMENTAL RISK CALCULATIONS.	Hazard quotient from vapor intrusion to indoor ar, noncarcinogen (unitless)	¥
INCREMENTAL	incremental risk from vapor infrusion to indoor air, carcinogen (unitless)	₹
JLATIONS	Final indoor exposure groundwater conc, (ug/L)	2005-100
ATION CALCI	Pure component water solubility, S S (µg/L)	2 2 2 20
R CONCENTR	Risk-based indoor exposure groundwater conc, (µg/L)	2005
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	Indoor exposure groundwater conc, noncarcinogen (µg/L)	
RISK-BASEI	Indoor exposure groundwater conc , carcinogen (μg/L)	

(DO NOT USE RESULTS IF ERRORS ARE PRESENT) ERROR SUMMARY BELOW

Mean Grain Diameter (cm)

θ, (cm³/cm³)

(cm<sub>3</sub>/cm<sub>3</sub>)

Soil Properties Lookup Table

a (1/cm)

SCS Soil Type

VLOOKUP TABLES

Ž	0.20	0 008	1 09	M (unitiess) 0.083	o <sub>e</sub> (cm /cm )	9, (cm /cm )	Mean Grain Diameter (cm)						
0.26		0 0 19	131	0 237	0 41	0 095	0016						
5		0.036	1 56	0 359	0 43	0.078	0 020						
14 59		0 124	2 28	0 561	0 41	0 057	0 040						
29 70		0 145	2 68	0 627	0.43	0 045	0 044						
0 12		0 027	1 23	0 187	0 38	0 100	0 028						
<u></u>		0.059	148	0 324	0 39	0 100	0 029						
0.25		0.016	1 37	0 270	0.46	0 034	0 0046						
0 07		6005	9 6	0 083	0.26	0 0 0 0	0 0039						
0 45		020	2 4 1	0 291	0.40 0.40	0.089	0.0036						
4 42		0 075	189	0 471	041	0 065	0 030						
					Сћети	Chemical Properties Lookup Table	skup Table						
	Organic	ñ			Pure		Henry's	Henry's			Enthatpy of		
	carbon				component		law constant	law constant	Normal		vaporization at	Ş	
	partition		>	Diffusivity	water	Henry's	at reference	reference	balting	Critical	the normal	risk	Reference
	coefficient,			in water,	solubility.	aw constant	temperature,	temperature,	point,	temperature,	bailing paint,	factor,	conc.
	Λ <sub>ος</sub> /om <sup>3</sup> /ο,		U.,	, , , , ,	n (	Ī	I I	<u>د</u> و	<b>-</b> 6	P €		URF.	ည္
		l	(8)	(Cit /8)	(mg/L)	(anmess)	(am-m/mol)	9	2	(K)	(cal/mol)	(m/br/)	(mg/m²)
	2 63E+06	-	37E-02	4 95E-06	2,50E-02	3 32E-04	8 10E-06	25	533 15	5 72075	11 000	9.75.05	004400
	1 02	02E+06 4:	30E-02	9 00E-06	1 62E-03	4 63E-05	1 13E-06	120	715 90		15,000	2 15-03	200
	9	1 00E-02 2	2 73E-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	1 73	_		15.000	000+00	7 05-03
	3 80E+06	~	02E-02	5 18E-06	2 49E-03	6 035-07	1 47E-08	25			16,000	2 1E-03	0 0E+00
	1 74E+02	~	80E-02		7 93E+02	1 25E+00	3 05E-02	ř			7,127	1 5E-05	0 0E+00
	3 98E+05		5 10E-02		9 40E-03	1 37E-04	3 34E-06	25		Υ-	15,000	2 1E-04	000+00
	1 205+05	- •	185-02	4 3/11-06	5 60E-02	1 998-03	4 85E-05	52			13,000	3 7E-04	00E+00
	1 07E+03		42E-02	7 34E-06	6 805 +00	5 74E-04	1 40E-05	25			13,000	3 7E-04	0 0E+00
	6.00	- u:	36F-02		3 50F±03	6 21E-04	101E-00 154E-05	07.6	25.510 0	242.25	13,000	4 6E-03	00+00
	575	• -	24E-01	1 14E-05	1 00E+06	1 59E-03	3.88F-05	2, 12,			000'01	204	25501
	3 98E+01	_	04E-01	1 00E-05	7 92E+03	1 505-01	3 66 03	25			0,000 888 888	23,05	00+000
	1 78E+03	2	50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25			9,510	4 0E-06	00+900
	6 92	۰	00E-02		7 40E+04	3 61E-04	8 80E-06	25			10,346	0 0E+00	3 5E-01
	5 89E+01	1 ۵۰	80E-02		175E+03	2 28E-01	5 56E-03	25			7,342	8 3E-06	0 0 1 + 00
	1 10E+02	_	80E-02	8 80E-06	1335+03	7 05E-01	1 72E-02				7,136	0 OE+00	1 0E+00
	1 235+04	- •	25E-02	4 74E-06	2 50E-01	3 08E-04	7.516-06				12,000	0 OE+00	1 15-03
	80+1100+ 80+1100+	- •	30E-02	4 46E-UB	4 500,00	6 48E-04	1585-05				14,000	0 0 0 0 0 0 0 0	1 8E-02
	4 47		44E-02	5.875-06	1 20E-02	A 61E-04	4 00E-06	0 %	09880	4 86377	14,000	6 9F-05	004400
	105		28E-02	1215.05	1.52E+04	2 56F-01	6 24E-03	22			13,000	9 / 5-03	0.00+00
75014 Vinyl chloride (chtoroethene)	186		065-01	1 23E-06	2.76E+03	1116+00	2 24E-03	, v			5,7 F	0.0E+00	20-100
-	1 17E+01	•	01E-01	1 17E-05	1 30E+04	8 98F-02	20-11: 12				6,706	4 7E-03	20110
	4 57E+01	1	04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	25.			6.391	0.05+0.0	7 0F-01
	8 71E+01	-	49E-02	1 035-05	3 10E+03	2 19E-02	5 34E-04	25			9.479	1 1E-06	0 0E+00
	5 50E+01	- 7	98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25			7,000	1 8E-05	0 0E+00
	3 16	7	42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	25	330.55	5 52300	6,895	0 0E+00	5 0E-01
	5 89E+01	6	00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	30475	5 576 05	6,247	5 0E-05	0 0E+00
	141E+06	•	12E-02	5 69E-06	1 80E-01	4 47E-02	1 09€-03	25	5 603 69	9 84631	13,000	1 3E-03	0 0E+00
77474 Hexachlorocyclopentadiene	2 00E+05	- 1	61E-02	7 21E-06	1 80E+00	1 11E+00	2 71E-02	25			10,931	0 OE+00	7 0E-05
	4 68E+01	o r	23E-02		1205+04	2 72E-04	6 63E-06	25			10,271	2 7E-07	0 0E+00
	4 07 E 4 0 4 0 4 0 4 0 4 0 4 0 4 0 4 0 4 0 4	~ r	20-170	0 135-00	2 BUE+U3	135-01	2 80E-03	N d	369 52	572 00	7,590	0 0E+00	4 0E-03
	1 66E+02		90E-02		1 10F+03	3 / 4E-02 4 22E-01	9 IZE-04 1 03E-03	ŭ č	36036		8,522	1 25-05	004400
	9 33	_	10E-02	7 90E-06	2.97E+03	141E-02	3.44E-04	i 73	41960		966'8	5 8E-05	001+00
	7 08	08E+03 4:	21E-02		4 24E+00	6 36E-03	1 55E-04	75	5 550 54		12,155	0 OE+00	2 1E-01
						;							

84662 Osethytotte Sais	L	1			VLOOKUP TABLES								
84742 Di-n-buty optibalate	2 88E+U2	2 56E-02	6 35E-06	1 08E+03	185E-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 8E+00	
85687 Butyl benzył phthalate	5 75E+04	1 74E-02	4 83E-06	2.69F+00	5 17F-05	9.39E-10	ខ	613 15	79867	14,751	S-H-0	355-01	
	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05F-04	- 20E-06	0 6	650 60 633 38	839 68	13,000	00+100	7 05-01	
86737 Fluorane	1 38E+04	3 63E-02	7 88E-06	1 98E+00	2 61E-03	6.37F-05	3 %	570 44	970.00	13,000	2016	00-11	
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	25	627.87	899 00	12 077	20 37 A	001100	
87885 Bonischlone-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	25	486 15	738 00	10.206	2 2E-05	00E+00	
88062 2 4 6-Trichlorophenol	3 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	52	582 15	813 20	14,000	3.4E-05	000	
91203 Naphthalene	2 00F+03	5 90E-02	7 505-06	8 00E+02	3 19E-04	7 78E-06	52	519 15	749 03	12,000	3 1E-06	0 0E+00	
91941 3,3-Dichlorobenzidina	7 24E+02	1 94E-02	6 74E-06	3 11 E+00	1 64 F-07	4 835-04 4 00 E 00	8 8	491 14	748 40	10,373	0 0E+00	14E-01	
95476 o-Xylene	3 63E+02	8 70E-02		1 78E+02	2 13E-01	5 20E-03	8 %	360 26 417 60	/54 U3	13,000	1 3E-04	0 0E+00	
	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 205-06	32	464 19	697.60	10.801	20100	1 8E-01	
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03		453 57	705 00	9.700	0 0E+00	2 0E-01	
95976 Z-Uniorophenol 95954 2 4 E-Trichlossancol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9,572	00+400	185-02	
90954 Z.4.5-Inchecopressor	1 60E+03	2 91E-02		1 20E+03	1 78E-04	4 34E-06		526 15	759 13	13,000	0.01100	3 5E-01	
	3 63 5 + 02	7 505-02	2 50E-06	2 09E+03	9 84 E-Q4	2 40E-05		483 95	719 00	10,566	0 0E+00	2 0E-03	
100425 Styrene	7 76E+02	7 10E-02	8 00 5-06	3 105+02	3 23E-01	7 88E-03		409 34	617.20	8,501	0 0E+00	1 0E+00	
105679 2,4-Dimethytphenol	2 09E+02	5 84E-02	8 695-06	7 87F+03	8 20E-05	2 76E-03		41831	636 00	8,737	0 0E+00	1 0E+00	
106423 p-Xylene	3 895+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	2 00E-06	9 8	484 13	707 60	11,329	0.000	7 0E-02	
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43F-03		411 32	010 ZU	6,525	001100	7 0E+00	
106478 p-Chloroandine	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07		503 65	754 00	11,589	200	1000	
10/052 1,Z-Dichloroethane	1 74E+01	104E-01	90E-06	8 52E+03	4 01E-02	9 78E-04		356 65	561 00	7.643	2 66-05	0.05+00	
108383 m-Xdepe	5 25 E+00	8 50E-02	9 205-06	2 00E+04	2 10E-02	5 12E-04		345 65	519 13	7,800	0 0E+00	2.0E-01	
108883 Tolliene	1 825402	70E-02	7 80E-06	1 61E+02	3 01 5-01	7 34E-03		412 27	617 05	8,523	0 0E+00	7 0E+00	
108907 Chlorobanzene	2 105-102	7 205 02	8 50E-08	5 Z6E+02	2 72E-01	6 63E-03	\$2	383 78	591 79	7,930	0.05+00	4 0E-01	
108952 Phenot	2.13C+02	8 20E-02		4 /2E+02	1 52E-01	371E-03		404 87	632 40	8,410	0 0E+00	2 0E-02	
111444 Bis(2-chloroethyf)ether	1 55E+01	6 92 F-02		1 725 + 04	7 200 04	3 98E-07	52	155 02	694 20	10,920	0 0E+00	2 1E+00	
115297 Endosulfan	2 14E+03	1 15E-02	4 55E-06	5 10F-01	4 59E-04	1 801-05		151 15	659 79	9,000	3 35-04	0 0E+00	
117817 Bis(2-ethylhexy/)phthalate	151E+07	3 51E-02		3 40E-01	4 18E-06	1 02F-07	8 %	67443 65716	942 94	14,000	0.05+00	2 1E-02	
117840 Di-n-octyl phthalate	8 32E+07	151E-02		2 00E-02	2 74E-03	6 68F-05		00 70	00 000	12,999	4 OE-06	0.0E+00	
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03	22	582 55	825 00	14 447	4 5E-04	70-40	
120121 1 2 4 Tricklockson	2 95E+04	3 24E-02		4 34E-02	2 67E-03	6 51E-05		115 18	873 00	13.121	0.05+00	11 to t	
12082   1,z,4-1/minoropenzene 120832 2 4-Dichlomphenol	1 /8E+03	3 00E-02		3 00E+02	5 82E-02	1 42E-03		486 15	725 00	10,471	0 OE+00	2.05-01	
121142 2 4-Dintrotofilens	0 555404	3 405-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06		482 15	708 17	11,000	0 0E+00	1 1E-02	
	5 31E+01	1 965 02	7 USE-06	2 70E+02	3 80E-06	9 27E-08		290 00	814 00	13,467	1 9E-04	0 05+00	
127184 Tetrachloroethylene	1.55F+02	7 20F-02	8 20E-05	2 60E+03	3 21 5-02	7 83E-04		416 14	678 20	8,000	2 4E-05	0 0E+00	
129000 Pyrene	1 05E+05	2 72E-02		1 35E-01	7 54E-01	184E-02	25	94 40	620 20	8,288	5 8E-07	0 0E+00	
156592 cis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	167F-01	4 07E-03	6 4 6 4	997 GF	936 00	14,370	0 0 0 0	1 16-01	
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 395-03		320.85	546.60	281,	000	3 5E-02	
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 605-06	25 8		318 35 1078 24	17,00	2 45 64	/ UE-02	
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1115-04			969 27		2 H 2	00100	
202450 Fluorantiene 207089 Benzo/kMisszethene	1 U/E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	161E-05	25 6		905 00		00=00	1 4E-01	
218019 Chrysene	1 23E+00	2 26E-U2	5 56E-06	8 00E-04	3 40E-05	8 295-07		753 15	1019 70		2 1E-05	0 0 0 0	
309002 Aldrin	2.45E+06	1325-02	4 AGE-06	1 805-03	3 885-03	9 46E-05			979 00		2 1E-06	0 0E+00	
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7.34F-06	2 00F±00	4 35E-04	1 /01-04		603 01	839 37	13,000	4 9E-03	0 0E+00	
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7.445-07	0 K	396 33 506 56	839 36	13,000	18E-03	0 0E+00	
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	177E-02		381.15	587.38	2,000	371.04	0.05+00	
606202 2,6-Dinitrotoluene	8 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07		558 00	770.00	12 038	2000	2 UE-02	
621647 N-Nitrosodi-n-propytamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06	25	209 609	746 87	11,000	4 H	00=+00	
102457.5 Heptiachior epoxide 7430078 Merrany (plomontal)	8 32E+04	1325-02	4 23E-06	2 00E-01	3 90E-04	9 515-06			848 76	13.000	2 6F-03	00+00	
8001352 Toxanbera	10+07 c	3 U/E-UZ	6 305-06	5 62E-02	4 67E-01	1 14E-02		88	1750 00		00000	3 0E-04	•
11096825 Arodor 1260 (PCB-1260)	2 90E±05	1 385.02	4 346-05	7 40E-01	2 46E-04	6 00E-06	25 6	15	873 31		3 2E-04	0 00+00	-
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02	\$ 00E-06	5 70F-02	1 09E-01	4 60E-03	25 4 1	S 6	539 37	19,000	1 0E-04	0 0E+00	- 4
12674112 Arador 1016 (PCB-1016)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	8 K 9 K		512 27 478 20	19,000	10E-04	0 OE+00	
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02	5 31 5-06	3 40E-01	2 13E-02	5 20E-04	32	2 2	413 22	18,000	1 0E-04	0 0 0 0 0 0	
					F 97 (					22/2	1 L	, ,	$ \omega$
													,

VERSION 1 2 September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

			ENTER		_	Suraturin A Soil vapor	R g	<b>-</b> ₹	(cm²)				•	led				
			ENTER	Soul	stratum A	soli type	(used to estimate	soil vapor	permeability		3	ENTER	Stratum	soil water-filled	porosity,	9 <sup>°°</sup> c	(cm³/cm³)	
			ENTER			SCS	soil type	directly above	water table		2	ENTER	Stratum C	soil total	porosity,	ပ	(unitless)	
			ENTER		ő	stratum	directly above	water table,	(Enter A, B, or C)	(		ENTER	Stratum C	soil dry	bulk density,	ું	(g/cm³)	
			ENTER	of Lwr (cell D28)	Thickness	stratum C,	m	h <sub>o</sub>	(cm)	200	9/5 36	ENTER	Stratum B	soil water-filled	porosity,	a, 6	(cm³/cm³)	
	Cheminal	Chloroform	ENTER	Totals must add up to value of Lwr (cell D28)	Thickness	stratum B,	(Enter value or 0)	ę	(cm)		152.4	ENTER	Stratum B	soil total	porosity.	e E	(unitless)	
_			ENTER	Totals mu	Thickness	of soil	stratum A,	Ę	(cm)	0, 0,	21876	ENTER	Stratum B	soil dry	bulk density.	8 <sub>0</sub> 0	(g/cm³)	
			ENTER		d to C	below grade	to water table,	Lwt	(cm)	00 005	1706 88	ENTER	Stratum A	soil water-filled	porosity,	<b>√</b> ,*0	(cm³/cm³)	
	ENTER Intrai groundwater conc , Cw	2 633076923		Depth	below grade	of enclosed	space floor.	<b>ל</b>	(cm)	,	c l	ENTER	Stratum A	soil total	porosity,	Ψ.	(unitless)	
	ENTER Chemical CAS No (numbers only,	67863	ENTER		Average	groundwater	temperature,	ր Տ	(၁)	Ş	Q.	ENTER	Stratum A	soil dry	bulk density,	્યું	(g/cm³)	

15	0.43	0.2	17	0 42	0.27	17	0 43	03
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
Enclosed		Enclosed	Enclosed					
space	Soil-bidg	space	space	Enctosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
thickness,	differential,	length,	width,	height,	width,	rate,		
-Called	ďΔ	ŗ,	Ws	f	*	£		
(cm)	(g/cm-s²)	(cm)	(cm)	(сш)	(ст)	(1/h)		
ļ						., .		
5	40	106	200	400		0.40		
	ENTER	ENTER	ENTER	ENTER	ENTER			
	Averaging			Target	Target hazard			
	time for		Exposure	risk for	quotient for			
	noncarcinogens,		frequency,	carcinogens,	noncardrogens,			
ATc	AT <sub>NC</sub>	8	ш	፰	된			
	(vrs)		(davs/yr)	(unitless)	(unitless)			

Used to calculate risk-based groundwater concentration

1 0E-06 (unitless)

#### 2 of 7

CHEMICAL PROPERTIES SHEET

Reference conc., RtC (mg/m³)
Unit risk factor, URF (µg/m³)*1
Pure component water solubility, S (mg/L)
Organic carbon partitron coefficient, K <sub>oc</sub> (cm <sup>3</sup> /g)
Critical temperature, T <sub>c</sub> ( <sup>9</sup> K)
Normal boiling point, T <sub>B</sub>
Enthalpy of vaporization at the normal boiling point, $\Delta H_{\nu,b}$ (cal/mol)
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H
Diffusivity in water, D., (cm²/s)
Duffusivity in air, D, (cm²/s)

		04200		
Floor-wall seam perimeter,	3,844	Diffusion path length, L <sub>d</sub>	1691 88	
Water-filled porosity in capillary zone, $\theta_w \alpha$ (cm. $^3$ /cm <sup>3</sup> )	0 294	Total overall effective diffusion coefficient, $D^{eff}_{T}$ (cm <sup>2</sup> /s)	9 41E-04	
Air-filled porosity in capillary zone, $\theta_a \alpha$ $(cm^3/cm^3)$	0 136	Capillary zone effective diffusion coefficient, Deff cm²/s)	7 36E-04	
Total porosity in capiliary zone, n <sub>cz</sub> (cm³/cm³)	0 43	Stratum C C effective diffusion coefficient, Doff (cm²/s)	6 40E-04	Reference conc., RfC (mg/m³)
Thickness of capillary zone, Let	17 05	Stratum B B effective diffusion coefficient, D** (cm²/s)	1 07E-03	Unit risk factor, URF (µg/m³) 1
Stratum A soul effective vapor permeability, k,	6.98E-10	Stratum A A effective diffusion coefficient, Deff (cm²(s)	4,22E-03	Infinite source bldg conc , Couston (µg/m³).
Stratum A soil relative air permeability, k <sub>rq</sub> (cm²)	0 746	Vapor viscosity at ave, soil temperature, ltrs (g/cm-s)	1 77 <b>E-</b> 04	Infinite source indoor attenuation coefficient, $\alpha$ (unitiess) 5.16E-06
Stratum A soil intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)	1 04E-01	Exponent of equivalent foundation Peciet number, exp(Pe <sup>f</sup> ) (unitless)
Stratum A effective total fluid saturation, Sie (cm <sup>3</sup> /cm <sup>3</sup> )	0 419	Henry's law constant at ave. groundwater temperature, Hrs (atm-m³/mo!)	2.47E-03	Area of crack, Aerea (cm²)
Stratum C soil air-filled porosity, $\theta_a^c$ (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, AH <sub>v TS</sub> (cal/mol)	7,492	Crack effective diffusion coefficient, Done* (cm²(s)
Stratum B soil aur-filled porosity, $\theta_a^{a}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0,150	Crack depth below grade, Zonet (cm)	15	Average vapor flow rate into bldg., Quest (cm <sup>3</sup> /s)
Stratum A soil alr-filled porosity, $\theta_a^A$ (cm³/cm³)	0 230	Crack- to-total area ratio, n	4 16E-04	Crack radius, frask (cm)
Source- building separation, L <sub>T</sub>	1691 88	Area of enclosed space below grade, A <sub>s</sub>	9 24E+05	Source vapor conc., C <sub>source</sub> (µg/m³)
Exposure duration, t	9 46E+08	Bidg ventilation rate, Q <sub>bateling</sub> (cm <sup>3</sup> /s)	5 63E+04	Convection path length, Lp (cm)

### RESULTS SHEET

SNOIL
CALCULA
<b>FRATION</b>
CONCENT
<b>JDWATER</b>
D GROUN
ISK-BASE
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INCREMENTAL RISK CALCULATIONS

Incremental nsk from	vapor	infrusion to	indoor air,	carcinogen	(unitless)
Final	indoor	exposure	groundwater	conc,	(µg/L)
Pure	component	water	solubility,	S	(μg/L)
Risk-based	indoor	exposure	groundwater	conc	(µg/L)
Indoor	exposure	groundwater	conc.,	noncarcinogen	(µ9/L)
Indoor	exposition	groundwater	conc.	carcinogen	(mg/L)

Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

Reference conc , RfC (mg/m³)

						VLOOKUP TABLES	ES						
			<u>,</u>		,								
Scs soli Lype	K (cm/h)	- 1			θ, (cm²/cm³)	e, (cm³/cm³)	Mean Grain Diameter (cm)						
ن د	020	0.008	109	0 083	0 38	0 068	0 0092						
	0 70	8000 9000	131	7530	0.41	0 095	0 016						
্য	14 59	0 124	2,50	0.561	0 6	0.0/8	0 020						
S	29.70	0 145	2 68	0 627	4.0	0.045	440						
၁၄	0 12	0 027	1 23	0 187	0 38	9 0	0 025						
JOS.	131	0 059	1 48	0 324	0 39	0 100	0 029						
<u> </u>	0 25	0 0 16	1 37	0 270	0 46	0 034	0 0046						
2 <u>C</u>	7 C	0 005	109	0 083	0.26	0 0 0 0	0 0039						
18	0.00	0.00	1 41	0 187	0.43	0 089	0.0056						
SL	4 42	0 075	189	0 471	0 41	0.065	0 030						
					Chemics	Chemical Properties Locking Table	rin Tohla	į					- 1
		Organic			Pure		Hanov's	e, co					
		carbon			component		faw constant	7	Normal		Enthatpy of	<u>i</u>	
		partition	Diffusivity	Diffusivity	water	Henry's	at reference		bolling	Critical	the normal	CIER PER	à
	•	coefficient,	n air,	ın water,	solubility,	law constant	temperature,	œ.		temperature,	bating point,		, 0
		جو	o <b>"</b> "	1 °	ທ	Ì	x '	<b>1</b>	r <sub>e</sub>	J <sub>c</sub>	ΔHν <sub>b</sub>	-R	
CAS No Chemical		(cm,/g)	(cm²/s)	(cm,/s)	(mg/L)	(unitless)	(atm-m³/mol)	(°C)	( <b>°</b> K)	(°K)	(cal/mol)	) (m/m))	Ē
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 105-06	75	533.15	720 75	11,000	30 75 0	
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 13E-06	22	715.90	969.27	15,000	9 / E-03	
51285 2,4-Dinitrophenal		1 00E-02	2 73E-02	90-390 6	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0E+00	
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03	
56235 Carbon tetrachlonde		174E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	1 5E-05	
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	15 000	2 15-04	
Appearance LOtt / Johnson		20E+03	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	52	624 24	885 73	13,000	3 7E-04	_
60659 garnina-non (Lingane)		10/E+03	1 42E-02	7 34 6-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04	_
65850 Benzolo Acid		6.00F-04	5 36E-02	7 075 08	3 KOE+03	6 195-04	1515-05	25	613 32	842 25	13,000	4 6E-03	_
67641 Acetone		5.755-01	1 24F-02	1 14 F-05	1 000+03	1 50 103	1-54E-06	25	720 00	751 00	10,000	0 0E+00	
67663 Chloroform		3.98E+01	1046-01	1.00E-05	7.926+03	1505-03	3 665.03	8 8	329.20	508 10	6,955	0.05+00	
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00F+01	1 595-01	50-1188 K	C7 #6	70 60	030 40	6,968	2 3E-05	
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3.61E-04	8805-08	3 5	390 88	563 05	010,8	4 UE-U6	
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	22 22	353 24	562 16	7 342	8 3E-06	
71556 1,1,1-Trichloroethane		1.10E+02	7 80E-02	8 BOE-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0000	
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7.51E-06	25	718 15	986 20	12,000	0 0E+00	
72548 DDD		9 //E+04	156E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0 0E+00	
72559 DDE		4 47F+06	1 44F-02		3 OUE-02	8 8 11 04	4 UUE-UB	52	639 90	863 77	14,000	6 9E-05	_
74839 Methyl bromide		1 05E+01	7 28E-02	1215-05	1.52E+04	256-04	2 10E-03 6 24E-03	0 Y	930 44	850 38	13,000	9 7E-05	_
75014 Vinyl chloride (chloroethene)	(9)	1,86E+01	1 06E-01	1 23E-06	2 76E+03	1115+00	2.715-02	2 20	259.25	432.00	41 / C	2 0 E + 00	
75092 Methylene chloride		117E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2,19E-03	52	313 00	510 00	6,706	4 75-07	
75150 Carbon disuffide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	52	319 00	552 00	6,391	0.00	
/5252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 345-04	25	422 35	00 969	9,479	1 1E-06	_
75343 1 1 Dichtorogham		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363,15	585 85	2,000	1 8E-05	_
75354 1 1-Dichlocoethylene		5 89E 401	4 4ZE-0Z	1 000 000	5 00E+03	2 30E-01	5 61E-03	52	330 55	523 00	6,895	0 0E+00	
76448 Heptachfor		141E+06	1 12E-02	5.695-06	1 805-01	4 47 5-02	2 615-02	51.5	304 75	5/605	6,247	5 0E-05	
77474 Hexachlorocyclopentadiene	92	2 00E+05	1 61E-02	7 215-06	1 80E+00	1.11E+00	0.711-00	G #	512 15	746.00	13,000	1 35-03	_
78591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 635-06	3 2	48835	715 00	17,01	2 7F-07	_
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	115E-01	2 80E-03	S 1	369 52	572 00	7.590	0 00 +00	-
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8,322	1 6E-05	_
79345 1 1 2 2. Tetrachiomethans		1 66E+02		9 10E-06	1 10E+03	4 22E-01	1 03E-02	52	360 36	544 20	7 505	1 7E-06	_
83329 Acenaphhene		7 08E+03	/ 10E-02 4 21E-02	7 80E-06	2 97E+03	1 41E-02 6 36E-03	3 446-04	25	41960	661 15	966'8	5.8E-05	_
		2	4 6 16 7	י מפריטני	4 24C+C	0 20E-03	1 335-04	S	550 54	803 15	12,155	00+300	

84663 Diethdehmaise	1				VLOOKUP TABLES							
84742 Di-hauty nhthalate	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13.733	0.05	2 85+00
85687 Butyl benzyl phthalate	5 75F+04	1 74E-02	7 80E-UB	1 126+01	3 85 E-08	9 39E-10	52	613 15	798 67	14,751	00000	3 55-01
86306 N-Nitrosodiphenylamine	1 29E±03	120.02	90000	2 595+00	5 17E-05	1 26E-06	52	09 099	839 68	13,000	0.00	7 0E-01
86737 Fhorene	1 385+04	3635 03	90 100 1	3 515 +01	2 05E-04	5 00E-06	22	632 28	890 45	13,000	1.4E-06	0 0E+00
86748 Carbazole	3 396+03	3 90 F-02	7.0315-06	1 98E+00	2 61 5-03	6 37E-05	52	570 44	870 00	12,666	0 0E+00	146-01
87683 Hexachloro-1,3-butadiene	5 37E+04	5615-02	6 16F-06	3 235400	0.202.0	1 53E-08	52	627 87	899 00	13,977	5 7E-06	0 0E+00
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 105-06	1 955+03	1001-96	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0 0E+00
88062 2,4,6-Trichlorophenol	3815+02	3 18E-02	6 25E-06	8 00E+02	3 19F-04	7 785.06	8 8	582 15	813.20	14,000	3.4E-05	0 0E+00
91ZU3 Naphthalene	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 B3F-04	2 5	404 14	749 03	12,000	3 1E-06	0 0E+00
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	674E-06	3 11E+00	1 64E-07	4 00E-09	3 %	560.26	754.03	10,373	0.05+00	1 4E-01
95487 2-Methydopool (n. mana)	3 63 E + 02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	2 2	417 60	630.30	13,000	2 3 E 4	001100
95501 1 2-Dichlomberges	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 205-06	32	464 19	697.60	108.01	00+30	, UE+00
95578 2-Chlorophenol	9 88E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	25	453 57	705 00	9.700	00+40	2000
95954 2,4.5-Irichlorophenoi	1 505+02	2016-02	9 46E-06	2 20E+04	1 60E-02	3 90 E-04	22	447 53	675 00	9.572	001100	1 85-02
98953 Nitrobenzana	2 ARE +03	2916-02	/ 03E-06	1 20E+03	1 785-04	4 34E-06	52	526 15	759 13	13,000	0.01	3 56-02
100414 Ethylbenzene	3 635+01	7 505-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	25	483 95	719 00	10.566	0 OF+00	0.00
100425 Styrene	7 76E+02	7 10F-02	8 00E-08	1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20	8,501	0 0E +00	1 OE+00
105679 2,4-Dimethylphenol	2 09E+02	5 84F-02	8.69E.08	7 875+02	- 150-01	2 76E-03	52	418 31	636 00	8,737	0 0E+00	1 0E+00
	3 89E+02	7 69E-02	8 44E-06	1 85F+02	3 14E-01	2 005-06	52	484 13	707 60	11,329	0 0E+00	7 0E-02
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7.38E+01	0 96F-02	7 427 00	9 5		616 20	8,525	0 0E+00	7 0E+00
	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1.36E-05	2 22E-03	8 8	447 21	684 75	9,271	0 0E+00	8 0E-01
107062 1,2-Dichloroethane	1 74E+01	1 04E-01	9 90E-06		4 01E-02	3325-07	S t	503 65	754 00	11,689	0 0E+00	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06		2 10E-02	5 12 E 04	8 8	336 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	161E+02	3.04E-01	7 245 62	9 8	345 65	519 13	7,800	0 0E+00	2 0E-01
	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 635 03	2 5	72.214	617 05	8,523	0 0E+00	7 0E+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 7 1 1 0 0	9 8	363 /8	591 79	7,930	0 0E+00	4 0E-01
	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 635-05	20-1-1-0-2-4-0-4-0-4-0-4-0-4-0-4-0-4-0-4-0-4-0	9 8	4U4 8/	632 40	8,410	0 OE+00	2 0E-02
	1.55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 805.05	9 8	455 02	694 20	10,920	0 OE+00	2 1E+00
11529/ Endosultan	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12 5-05	3 %	674.43	6/ 600	000'6	3 36-04	0 0E+00
	1 51E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 025-07	3 %	657 15	247 34 000 000	14,000	0 0E+00	2 1E-02
11874 Hexachiomboses	8 32E+07	1 51E-02		2 00E-02	2 74E-03	6 68E-05	2 2	704 09	862 22	10,999	4 UE-06	0 0E+00
120127 Anthracene	5 50E +04	5 42E-02	5915-06	6 20E+00	5 41E-02	1 32E-03	52	582 55	825.00	27,000	00E+00	7 05-02
	4301.00	3 24E-02		4 34E-02	2 67E-03	6 51E-05	32	615 18	873.00	13 121	40000	00000
	1 475+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03	25	486 15	725 00	10.471	0.05+00	200400
121142 2,4-Dinitrotoluene	9 555 +01	3 400-02	8 //E-U6	4 50E+03	1305-04	3 17E-06	52	482 15	708 17		0.05+00	116.02
124481 Chlorodibromomethane	6.31F±01	1 96E-02	1 050 06	2 /0E+02	3 80E-06	9 27E-08	52	280 00	814 00		196-04	0.05+0.0
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-05	2 00E+03	3 21E-02 7 54E 03	7 83E-04	52	416 14	678 20	8,000	2 4E-05	0 0E+00
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135F-01	4.515-04	1 64E-02	52	394 40	620 20	8,288	5 8E-07	0 0E+00
156592 as-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	167E-01	4 075 02	S 8	667 95	936 00		0 0E+00	1 16-01
156605 trans-1,2-Dichloroethytene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 855-01	9.395.03	9 %	333 65	244 90 24 35		0 0E+00	3 5E-02
195550 Indeno(1,2,5-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06		320 B3 809 15	016 50	6,717	0.0E+00	7 0E-02
205440 Flucanthana	1235+06	2 25E-02		1 50E-03	4 55E-03	1 11E-04		715.90	469 27	200	45.	0.05+00
207089 Benzo(k)fluoranthene	1 235+05	3 025-02		2 06E-01	6 50E-04	1 61E-05		655 95	905 00		2 IE-04	7 4 10 0 1
218019 Chrysene	3 98E+05	2 48E.02	3 30E-06	8 00E-04	3 40E-05	8 29 6-07		753 15	1019 70			0.05±0.0
309002 Aldnn	2 45E+06	1.32F-02		1 000-03	3 88E-03	9 46E-05	52	714 15	979 00	16 455		005+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02		2 (IDE+II)	4 356-03	1 70E-04		603 01	839 37			0 0 0 0
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3.05E-05	- UBE-US		596 55	839 36			0 OE+00
542756 1,3-Dichloropropene	4 57E+01	6 26 5-02	1 00E-05	2 80E+03	7 26E-01	1 77 11.03	3 8	59655 384 47	839 36	13,000		0 0E+00
606202 2,6-Dinitrotoluene	6 925+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7.46E-07	3 2	361 (3	38/38		3 7E-05	2 0E-02
621647 N-Mitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2.25E-06		338 00	7,000	12,938		0 0E+00
TA220275 Management (Alegeria)	8 32E+04	1 32E-02		2 00E-01	3 90E-04	9515-06	3 %	513 96	1400/	000,11		0 0E+00
745557 0 Melculy (elemental)	5 20E+01	3 07E-02		5 62E-02	4 67E-01	1 14E-02	2 5	679.88	1750.00			0 OE+00
11096825 Andor 1260 (PCB-1260)	20/5405	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	25	657 15	873.31	7 00 7	0.0E+00	3 0E-04
11097691 Arodor 1254 (PCB-1254)	2 005+05	1 385-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	25	402 50	539 37			0.05+00
12674112 Arador 1016 (PCB-1016)	3.30F+04	2 22E.02	3 00E-06	3 /UE-UZ	8 20E-02	2 00E-03	55	377 50	512 27	19.000	1 0F-04	20+100
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02	5.315-06	3.40E-01	119E-02	2 90E-04	25	340 50		18,000		00±00 00±00
		I I	; ;	2	2   0   -0	5 20E-04	55	345 50	482 20	18,000	1 0E-04	0 OE+00

VERSION 1 2 September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

					_	_		
		ENTER	User-defined stratum A	soil vapor	permeability	<i>₃</i>	(cm²)	
					R		•	٦
		ENTER	stratum A SCS	soil type		soil vapor	permeability)	is.
		ENTER	•	scs	soil type	directly above	water table	s
		ENTER	Soli	stratum	directly above	water table,	(Enter A, B, or C)	O
	ıne	ENTER Lwr (cell D28)	Thickness of soil	stratum C,	(Enter value or 0)	Š	(cm)	97536
Сћетіса	Trichloroethyle	ENTER st add up to value of	Thickness of soil	stratum B,	(Enter value or 0)	ቈ	(cm)	152.4
:		ENTER Totals mu	Thickness	of soil	stratum A,	ď	(cm)	579 12
		ENTER	Depth	below grade	to water table,	LwT	(cm)	1706 88
ENTER Initial groundwater conc , Cw (µg/L)	2 088461538	ENTER Depth	below grade to bottom	of enclosed	space floor,	Ļ	(cm)	15
ENTER Chemical CAS No (numbers only, no dashes)	79016	ENTER	Average soil/	groundwater	temperature,	<b>.</b> °	(2)	16
	ENTER Initial groundwater conc. Cw (µg/L)	ENTER Initial groundwater conc. Cw (ug/L) Tric	ENTER         ENTER         Chemical         Chemical           conc, Cw. (ug/L)         Chemical         Chemical           2 038461538         Trichloroethylene         ENTER         ENTER         ENTER           ENTER         ENTER         ENTER         ENTER         ENTER           Depth         Totals must add up to value of Lwr (cell D28)         Soil	ENTER Initial groundwater conc. Conc. Cw. Cw. Cw. Cw. Cw. Chemical (μg/L)         Chemical (μg/L)         Chemical (μg/L)         ENTER ENTER ENTER ENTER ENTER Soil Soil Scool (cell D29)         ENTER ENTER ENTER Soil Scool (cell D29)         ENTER ENTER Soil Scool (cell D29)         ENTER Soil Scool (cell D29)         ENTER Soil Scool (cell D29)         Soil Scool (cell D29)         Scool (cell D29)	ENTER Initial groundwater conc. Cw. Cw. Cw. Chemical (μg/L)         Chemical (μg/L)         ENTER ENTER ENTER ENTER ENTER Stratum A stratum A to bolow grade of soil stratum B. stratum C. st	ENTER Initial groundwater conc.         Chemical           CW         Chemical           Lgg/L)         Chemical           ENTER         ENTER         ENTER         ENTER         ENTER         ENTER         ENTER         Soil         Soil         Soil         Strafum A         SCS         Soil         SCS         Soil strafum A         SCS         Soil strafum A         SCS         Soil strafum B         SCS         Soil strafum A         SCS         Soil strafum B         SCS         Soil strafum B         SCS         Soil strafum B         SCS         Soil spee         Soil spee         Soil spee         SCS         Soil spee         Soil spee         Soil spee         Soil spee         Soil spee         SCS         Soil spee         Soil spee	ENTER Initial groundwater conc.         Chemical           conc.         Chemical           Lgg/L)         Chemical           ENTER         ENTER         ENTER         ENTER         ENTER Soil           ENTER         ENTER         ENTER         ENTER         ENTER Soil           Depth         Thickness         Thickness         Thickness         Soil         Soil           below grade         Totals must add up to value of Lwr (cell D28)         Soil         Soil         Soil           below grade         Totals must add up to value of Lwr (cell D28)         Soil         ScS         Soil           of enclosed         below grade         of soil         stratum A, (Enter value or 0) (Enter value or 0) (Enter value or 0)         Grad to estimate OR         (used to estimate OR           LF         Lwr         hs         hc         hc         hc	ENTER linitial groundwater conc. Cw. Cw. Cw. Light.         Chemical (19/L)         Chemical (19/L)         ENTER ENTER ENTER ENTER Trickhoroethylene         ENTER Stratum A (208461538)         ENTER ENTER ENTER ENTER ENTER Stratum A (2011 D28)         ENTER ENTER ENTER ENTER ENTER ENTER Stratum A (2011 Stratum B stratum C, spoil of soil
C.	0.43	70		740	770		2.2	2
------------	------------------------	----------	----------	----------	------------	--------------	-----	---
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
Enclosed		Enclosed	Enclosed					
space	Soil-bidg	space	space	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
thickness,	differential,	length,	width,	height,	width,	rate,		
Lareck	ΔP	L	WB	r	3	æ		
(ma)	(g/cm-s <sup>2</sup> )	(cm)	(cm)	(ma)	(cm)	(1/h)		
15	40	961	961	488	10	0.45		

ENTER
Stratum C
soil water-filled
porosity,  $\theta_{w}^{c}$ (cm<sup>3</sup>)

ENTER Stratum C soil total porosity,

ENTER
Stratum C
soul dry
bulk density,
Pbc
(g/cm³)

ENTER Stratum B soil water-filled plorosity,  $\theta_w^B$ 

ENTER Stratum B soil total porosity,

ENTER Stratum B soil dry bulk density, Po. (g/cm³)

ENTER Stratum A Str soil water-filled porosity,  $\theta_w^A$ 

ENTER Stratum A soil total porosity,

ENTER Stratum A soil dry bulk density, Pb<sup>A</sup> (g/cm³)

ENTER Target hazard	quotient for noncardnogens, THQ	(unitless)	-	Jsed to calculate risk-based
ENTER Target	nsk for carcinogens, TR	(unitiess)	1 0E-06	Used to calcu
ENTER	Exposure frequency, EF	(days/yr)	350	
ENTER	Exposure duration, ED	(yrs)	30	
ENTER	time for noncarcinogens, AT <sub>ac</sub>	(yrs)	30	
ENTER	time for carcinogens, AT.	(yrs)	0,	

#### 2 of 7

CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)
Unit nsk factor, URF (µg/m³)-1
Pure component water solubility, S S
Organic carbon partition coefficient, $K_{cc}^{cc}$
Cntical temperature, T <sub>c</sub>
Normal bouing point, T <sub>B</sub>
Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H
Diffusivity in water, D., (cm <sup>2</sup> /s)
Diffusivity in air, D <sub>6</sub> (cm <sup>2</sup> /s)

# INTERMEDIATE CALCULATIONS SHEET

Floor- wall seam perimeter, Xenck (cm)	3,844	Diffusion	path length,	(B)	1691 88						
Water-filled porosity in capillary zone, $\theta_{w,cz}$ $(cm^3/cm^3)$	0 294	Total overall effective	diffusion coefficient,	D•# <sub>↑</sub> (cm²/s)	7 10E-04						
Air-filled porosity in capillary zone, $\theta_{a,ca}$ $(cm^3/cm^3)$	0 136	Capillary zone effective	diffusion coefficient,	D <sup>eff</sup> <sub>c2</sub> (cm²/s)	5 55E-04						
Total porosity in capillary zone, n <sub>ca</sub>	0 43	Stratum C effective	diffusion coefficient,	۵"c (cm²/s)	4 82E-04		Reference	conc ,	RfC	(mg/m <sub>3</sub> )	NA
Thickness of capillary zone, La	17 05	Stratum B effective	diffusion coefficient,	D <sup>eff</sup> s (cm²/s)	8 11E-04		Cait	factor,	URF	(µg/m³)-1	1 7E-06
Stratum A soil effective vapor permeability, k, (cm²)	6 98 <b>E</b> -10	Stratum A effective	diffusion coefficient,	D°", (cm²/s)	3.20E-03	Infinite	source	conc,	Chullding	(µg/m³)	1 21E-03
Stratum A soll relative air permeability, k <sub>to</sub>	0 746	Vapor viscosity at	ave soil temperature,	μτs (g/cm-s)	1.77E-04	Infinite	indoor attenuation	coefficient,	ಶ	(unitless)	4 35E-06
Stratum A soil intrinsic permeability, k	9 36 <b>E-</b> 10	Henry's law constant at	ave groundwater temperature,	H'rs (unitless)	2 78E-01	Exponent of equivalent	foundation Peclet	number,	exp(Pe <sup>f</sup> )	(unitless)	3 39E+03
Stratum A effective total fluid saturation, Sie (cm <sup>3</sup> /cm <sup>3</sup> )	0 419	Henry's law constant at	ave groundwater temperature,	H <sub>rs</sub> (atm-m³/mol)	6 60E-03		Area of	crack,	Agrack	(cm²)	3,84E+02
Stratum C sol au-filled porosity, e <sub>a</sub> (cm³/cm³)	0 130	Enthalpy of vaporization at	ave groundwater temperature,	ΔH, τs (cal/mol)	8,483	Crack	effective diffusion	coefficient,	Donack	(cm <sup>2</sup> /s)	3 20E-03
Stratum B soil air-filled porosity, $\theta_a^{\ B}$ (cm³/cm³)	0 150	Crack depth	below grade,	Zonek (cm)	15	Average	vapor flow rate	into bidg ,	Q.	(cm³/s)	6 67E-01
Stratum A soil air-filled porosity, $\theta_n^A$ (cm³/cm³)	0 230	Crack- to-total	area ratio,	ກ (unitless)	4 16E-04		Crack	radius,	rack	(cm)	0 10
Source- building separation, L <sub>7</sub>	1691.88	Area of enclosed space	below grade,	A <sub>e</sub> (cm²)	9 24E+05		Source	cone,	CROWING	(mg/m³)	2 78E+02
Exposure duration, r	9 465+08	Bidg	ventilation rate,	Q <sub>bulding</sub> (cm <sup>3</sup> /s)	5 63E+04		Convection path	length,	ቲ	(cm)	15

### RESULTS SHEET

RISK-BASE	RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	ER CONCENTR	ATION CALCI	ULATIONS	INCREMENTAL	INCREMENTAL RISK CALCULATIONS	δ
rochul	rochal	Dickhaead	Š	- - - -	Incremental	Hazard	
expositive	PXDOX	יחליסרי	rule tubuuduut	111111111111111111111111111111111111111	msk rrom	dnoneur	
	o incoder	5		000	nde.	nom vapor	
groundwater	groundwater	exposure	water	exposure	intrusion to	intrusion to	
conc,	couc,	groundwater	sofubility,	groundwater	indoor air,	indoor air,	
carcinogen	noncarcinogen	conc	ဟ	conc,	carcinogen	noncarcinogen	
(µg/L)	(μg/L.)	(µg/L)	(µg/L)	(µg/L)	(unitless)	(unitless)	
	:						
1 18E+03	NA	1 18E+03	1 10E+06	1 18E+03	Ϋ́	Ž	

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

VLOOKUP TABLES

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	K, (6	K, (cm/h) a (1/cm)		1 <u>.</u> 1		Ө, (ст³/ст³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)						
0.019 151 0.257 0.41 0.078 0.016 0.005 0.		0 20 0		_	0 083	0 38	0 068	0 0092						
0.050	•		1019	3	0 237	0 41	0 095	0 016						
0 cycle         2 cycle         0 cycle         0 cycle         0 cycle           0 cycle         2 cycle         0 cycle         0 cycle         0 cycle         0 cycle           0 cycle         1 cycle         0 cycle         0 cycle         0 cycle         0 cycle           0 cycle         1 cycle         0 cycle         0 cycle         0 cycle         0 cycle           0 cycle         1 cycle         0 cycle         0 cycle         0 cycle         0 cycle           0 cycle         1 cycle         0 cycle         0 cycle         0 cycle         0 cycle           0 cycle         1 cycle         0 cycle         0 cycle         0 cycle         0 cycle           0 cycle         1 cycle         0 cycle         0 cycle         0 cycle         0 cycle           0 cycle         1 cycle         0 cycle         0 cycle         0 cycle         0 cycle           1 cycle         1 cycle         0 cycle         0 cycle         0 cycle         0 cycle           1 cycle         1 cycle         0 cycle         0 cycle         0 cycle         0 cycle           1 cycle         1 cycle         0 cycle         0 cycle         0 cycle         0 cycle           1 cycle	~ ~		134	200		0.43	0.078	0.020						
0.052 123 0.092 0.003	ւ თ		145	268		0.41	7500	0.040						
0.0165 1137 0.0224 0.0309 0.0030 0.0165 1137 0.0237 0.043 0.0030 0.0167 1132 0.0331 0.0431 0.0039 0.0030 0.017 1131 0.0231 0.0431 0.0430 0.0030 0.017 1131 0.0231 0.0431 0.0431 0.0431 0.0030 0.017 1132 0.0231 0.0431 0.0431 0.0431 0.0431 0.0030 0.017 1132 0.0231 0.0431 0.0431 0.0431 0.0431 0.0030 0.017 1132 0.0231 0.0431 0.			027	123		038	0 100	0.025						
0 0005 197 0 0270 0 048 0 0034 0 00059 0 000			059	148	0 324	0 39	0 100	0 029						
Organic         1 08 0 0059         0 0039         0 0039           0 070         1 08 0 0471         0 047         0 087         0 0016           0 070         1 41         0 047         0 087         0 0016           0 070         1 41         0 047         0 087         0 0016           0 070         1 41         0 048         0 087         0 0016           0 070         1 41         0 048         0 087         0 0016           0 070         0 080         0 080         0 0016         0 0018           perform         0 080         0 080         0 080         0 080           centrol         0 080         0 080         0 080         0 080           centrol         0 080         0 080         0 080         0 080           centrol         0 080         0 080         0 080         0 080           centrol         0 080         0 080         0 080         0 080         0 080           centrol         0 080         0 080         0 080         0 080         0 080         0 080           centrol         0 080         0 080         0 080         0 080         0 080         0 080           centrol		0.25	1016	137		0 46	0 034	0 0046						
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Organic         Chamical Properties Lookup Table         Henry's accordant			020	141	0.291	0.45	0 067	0 011						
Chemical Properties Lookup Table   Henry's Henry's Henry's Component   Henry's Henry's Henry's Component   Henry's Henry's Henry's Component   Henry's Henry's Component   Henry's Henry's Component   Henry		4 42 0	075	1 89	0 471	0 41	0 065	0 030						
Chemical Properties Lookup Table   Henry's														
Diffusivity   Diffusivity   Component   Diffusivity   Diffusivity   Diffusivity   Component   Diffusivity   Diffusivity   Diffusivity   Component   Diffusivity   Diffusivity   Component   Diffusivity   Diffusivity   Component   Diffusivity   Diffusivity   Component   Diffusivity	1					Chemic	ol Proporties 1 oc	Aris Table						
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mark   mark		partitic				water	Honn/e	of reference	iaw collstant	IBILION THIE		vaponzation at		
Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup>2</sup> (s)   Cim <sup></sup>		acitaco					nettly s	at relevence	reserence		Cuttoal	the normal		Reference
(cmf/8) (cmf/8		¥					ים ביים	lemperature,	temperature,		temperature,	boiling point,	factor,	conc,
137E-02         4 95E-06         2 50E-02         3 32E-04         8 10E-06         25           2 73E-02         9 00E-06         1 62E-03         3 32E-04         1 47E-08         25           2 73E-02         9 00E-06         1 62E-03         1 62E-05         1 44E-07         25           2 02E-02         9 00E-06         2 79E+03         1 32E-04         3 4E-07         25           3 00E-02         9 00E-06         9 79E-02         1 37E-04         3 0EE-05         25           1 18E-02         4 37E-06         5 00E-02         1 99E-03         4 85E-05         25           1 18E-02         4 37E-06         5 00E-03         1 37E-04         4 85E-05         25           1 26E-03         4 37E-06         5 00E-03         1 37E-04         4 85E-05         25           1 26E-03         4 46E-06         5 00E-03         1 31E-05         1 40E-05         25           1 24E-07         1 14E-05         1 00E-06         1 31E-04         1 51E-05         25           2 06E-03         2 00E-04         1 50E-01         1 50E-01         1 50E-05         2 50E-03         <		3/ <sub>c</sub> mɔ)			:m²/s)	(mg/L)	(unittess)	(atm-m³/mol)	<u>r</u> ()	<u> </u>	ς Σ	ΔH <sub>v5</sub>	CRF	Rfc (m <sub>3</sub> /m <sub>3</sub> )
137E-02         495E-06         2 50E-02         3 32E-04         8 10E-06         2 50E-05           137E-02         495E-06         1 62E-03         3 32E-04         8 10E-06         2 44E-07         25           2 73E-02         9 00E-06         1 62E-03         1 52E-06         4 44E-07         25           2 02E-02         9 10E-06         2 49E-03         6 03E-07         1 47E-08         25           2 02E-02         9 10E-06         9 40E-06         9 40E-06         9 40E-06         9 50E-02         1 40E-05         2 45E-06         9 40E-06         2 50E-03         1 40E-05         2 50E-03											,		1 (4)	/ III (#)
2 30E-02         3 00E-06         1 62E-03         4 53E-05         1 13E-06         2 35E-05         1 44E-07         25           2 30E-02         5 18E-06         2 49E-03         1 82E-05         1 47E-09         25           2 02E-02         5 18E-06         2 49E-03         1 52E-05         2 44E-07         25           2 02E-02         5 18E-06         2 49E-03         1 37E-04         3 34E-06         2 5           1 18E-02         4 37E-06         5 06E-00         1 40E-05         1 40E-05         1 40E-05         2 5           1 18E-02         4 74E-06         6 90E-00         5 74E-04         1 54E-06         2 5         2 5           1 24E-01         1 40E-01         6 19E-03         6 31E-04         1 6 16E-05         2 5         2 5           1 24E-01         1 40E-01         6 35E-03         1 56E-03         3 86E-05         2 5         2 5           1 24E-01         1 40E-01         1 50E-03         1 50E-01         3 86E-03         2 5         2 5           1 24E-01         1 40E-03         1 50E-03         3 86E-03         3 86E-03         3 86E-03         2 5         2 5         2 5         2 5         2 5         2 5         2 5         2 5         2 5		2 63E	•-•		4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05	0 0E+00
2 72E-72         5 78E-76         1 72E-76         4 74E-71         2 5           2 02E-72         5 18E-02         5 18E-03         1 47E-08         2 47E-04         2 56E-07         4 44E-71         2 5           1 18E-02         8 30E-06         7 34E-06         5 50E-07         1 37E-04         3 56E-05         2 5           1 18E-02         4 37E-06         5 50E-07         1 37E-04         1 51E-05         2 5           1 18E-02         4 37E-06         6 50E-07         1 37E-04         1 51E-05         2 5           1 18E-02         4 37E-06         6 50E-07         1 37E-04         1 51E-05         2 5           1 28E-02         7 34E-06         1 95E-01         6 18E-04         1 51E-05         2 56E-05         2 56E-03         2 56E-03         2 56E-03         3 56E-05         3 56E-03		1021	4 6		9 00E-06	1 62E-03	4 63E-05	1 13E-06	52	715 90	969 27	15,000	2 1E-03	0 0E+00
2 00E-02         3 00E-02         4 0E-03		200	40		9 00E-00 5 18E 06	2 405 00	1 825-05	4 44E-07	52 1	605 28	827 85	15,000	0 0E+00	7 0E-03
5 10E-02         9 00E-06         9 00E-06         9 00E-06         9 00E-06         9 00E-06         25           1 18E-02         4 37E-06         5 60E-02         1 99E-03         4 85E-06         25           1 18E-02         4 37E-06         5 60E-02         1 99E-03         4 85E-06         25           1 25E-02         4 74E-06         1 95E-03         6 19E-04         1 54E-06         25           1 24E-01         1 47E-06         1 95E-03         6 31E-05         1 54E-06         25           1 24E-01         1 47E-06         1 95E-03         6 31E-05         25         25           1 24E-01         1 47E-06         1 95E-03         6 31E-05         3 88E-05         25           1 04E-01         1 00E-05         7 00E-01         1 59E-01         3 88E-05         25           2 50E-03         3 00E-02         3 00E-02         3 00E-03         3 00E-03         2 00E-03         3		1 74F	4 r		3 10E-08	7 035-03	1 265-07	14/E-08	52.5	743 24	990 41	16,000	2 1E-03	0 0E+00
118E-02         437E-06         500E-02         199E-03         40E-05         25           142E-02         734E-06         600E-02         199E-03         40E-05         25           142E-02         734E-06         196E-01         574E-04         151E-05         25           5 36E-02         77E-06         350E+03         631E-05         156E-03         366E-03         25           1 04E-01         1.00E-05         79E+03         150E-01         366E-03         386E-05         25           2 50E-03         6 80E-06         76E-01         156E-01         366E-03         366E-03         25           8 00E-02         9.30E-06         76E-04         361E-04         86E-06         25           8 00E-02         9.30E-06         76E-01         366E-01         256E-01         256E-03           8 00E-02         9.30E-06         175E-03         26E-01         175E-02         25           1 56E-02         476E-06         164E-04         406E-06         256E-01         26E-03         26E		398	- KA		9 00E-06	9 40F-03	1.37F-04	3 34E-06	9 %	349 90	556 60	7,127	15E-05	0 0 0 0 0
142E-02         734E-06         6 80E+00         574E-04         140E-05         25           126E-02         474E-06         195E-01         6 19E-04         151E-05         25           126E-02         474E-06         195E-01         6 19E-04         151E-05         154E-06         25           126E-03         79TE-06         195E-01         6 19E-04         151E-05         154E-06         25           104E-01         1,00E-05         192E+03         159E-01         3 88E-05         25           2 50E-03         6 80E-06         740E+04         3 61E-04         3 80E-05         25           2 50E-03         9 80E-06         175E+03         2 22E-01         3 88E-05         25           1 25E-02         9 80E-06         175E+03         2 22E-01         3 88E-05         25           1 25E-02         4 80E-06         1 80E-04         3 61E-04         4 60E-06         2 56E-03         25           1 56E-02         4 80E-06         1 50E-01         3 08E-04         1 50E-03         2 56E-03         2 56E-		1 205	-		4 37E-06	5 60E-02	1 995-03	4 85F-05	25.	624 24	985 73	15,000	275.04	001.00
125E-02         474E-06         195E-01         619E-04         151E-05         25           5 36E-02         797E-06         350E+03         631E-05         154E-06         25           1 24E-01         1 14E-05         1 00E+06         1 50E-01         3 88E-05         25           1 04E-01         1 00E+06         1 50E-01         3 88E-05         25           2 50E-03         6 80E-06         7 40E+04         3 61E-04         3 66E-03         25           2 50E-03         9 80E-06         7 40E+04         3 61E-04         8 80E-06         25           2 80E-02         9 80E-06         1 75E+03         2 28E-01         3 88E-05         25           1 80E-02         9 80E-06         1 75E+03         2 28E-01         5 66E-03         25           1 80E-02         9 80E-06         1 33E+03         7 65E-01         1 75E-02         25           1 56E-02         4 46E-04         4 50E-02         6 48E-04         1 56E-03         25           1 56E-02         4 76E-06         9 00E-02         1 64E-04         1 76E-02         25           1 69E-02         1 20E-01         3 88E-04         1 56E-03         25           1 69E-02         1 20E-01         3 64		1 07E	_		7 34E-06	6 80E+00	5 74E-04	1.40E-05	2, 2,	506 55	690 36	13,000	2 7 T	001100
5 36E-02         7 97E-06         3 50E+03         6 31E-05         1 54E-06         25           1 24E-01         1 14E-05         1 00E+06         1 59E-03         3 88E-05         25           1 04E-01         1 10E-03         1 50E-01         3 88E-03         25           2 50E-03         6 90E-06         7 40E+04         3 61E-04         8 80E-06         25           8 90E-02         9 30E-06         7 40E+04         3 61E-04         8 80E-06         25           1 80E-02         9 80E-06         1 73E+03         2 28E-01         1 72E-02         25           1 55E-02         4 74E-06         4 50E-01         1 64E-04         7 51E-06         25           1 56E-02         4 74E-06         4 50E-01         1 64E-04         4 70E-02         25           1 56E-02         4 74E-04         2 50E-01         3 68E-03         25         25           1 66E-04         4 50E-02         6 48E-04         4 70E-02         25         25           1 66E-02         4 76E-06         4 76E-03         1 64E-04         4 70E-02         25         25           1 06E-02         1 20E-01         8 61E-03         2 50E-03         2 50E-03         2 50E-03         2 50E-03		2 14E	-		4 74E-06	1 95E-01	6 19E-04	1516-05	35	613.32	842.25	13,000	40-11-04 461-03	000
124E-01         114E-05         100E+06         159E-03         388E-05         25           104E-01         1.00E-05         792E+03         150E-01         368E-03         25           104E-01         1.00E-05         792E+03         150E-01         368E-03         25           20E-02         9.00E-06         7.05E-01         361E-04         880E-02         256E-03         25           8 00E-02         9.00E-06         1.33E+03         7.05E-01         1.72E-02         25           1 25E-02         8.00E-06         1.33E+03         7.05E-01         1.72E-02         25           1 25E-02         4.06E-06         9.00E-02         1.64E-04         4.00E-06         25           1 56E-02         4.06E-06         9.00E-02         1.64E-04         4.00E-06         25           1 69E-03         1.26E-01         8.01E-04         4.00E-06         25         25           1 69E-03         1.26E-04         2.56E-01         6.48E-04         2.0E-03         25           1 69E-03         1.26E-04         2.50E-04         2.50E-04         2.50E-03         25           1 06E-03         1.00E-05         1.00E-03         1.00E-03         2.0E-03         2.0E-03		6 00.	υ		7 97E-06	3 50E+03	6 31E-05	1 54E-06	22	720 00	751 00	10,000	000	1 4 1 + 01
1 04E-01         1,00E-05         7 92E+03         150E-01         3 66E-03         25           2 50E-03         6 80E-06         5 00E+01         1 59E-01         3 88E-03         25           8 00E-02         9 30E-06         7 76E+04         3 61E-04         8 80E-06         2 56E-03         25           7 80E-02         8 80E-06         7 75E+04         2 26E-01         7 51E-06         2 56E-03         25           1 25E-02         4 74E-06         2 50E-01         3 08E-04         7 51E-06         2 56E-03		575	_		1 14E-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	6.955	00+100	3.55-01
2 50E-03         6 80E-06         5 00E+01         1 59E-01         3 88E-03         25           8 00E-02         9 .30E-06         7 40E+04         3 61E-04         8 80E-06         2 50E-01         2 56E-03         25           7 80E-02         8 80E-06         1 33E+03         7 52E-01         1 72E-02         25           1 25E-02         4 7E-06         2 50E-01         3 08E-04         7 51E-06         25           1 56E-02         4 7E-06         4 50E-02         6 48E-04         1 58E-05         25           1 56E-02         4 7E-06         4 50E-02         6 48E-04         1 58E-05         25           1 65E-02         4 7E-06         4 50E-02         6 48E-04         1 58E-05         25           1 65E-02         4 7E-06         4 50E-02         6 48E-04         1 58E-05         25           1 65E-02         1 20E-01         8 61E-04         2 16E-03         2 16E-03 <td< td=""><td></td><td>3 981</td><td>_</td><td></td><td>1.00E-05</td><td>7 92E+03</td><td>1 50E-01</td><td>3 66E-03</td><td>25</td><td>334 32</td><td>536 40</td><td>6,988</td><td>2 3 = -05</td><td>00=+00</td></td<>		3 981	_		1.00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6,988	2 3 = -05	00=+00
8 00E-02         9.30E-06         7 40E+04         3 61E-04         8 80E-05         2 80E-06         7 40E+04         3 61E-04         8 80E-05         2 80E-06         1 75E+03         2 28E-01         5 56E-03         2 5           1 25E-02         4 74E-06         2 50E-01         3 08E-04         7 51E-05         2 5           1 56E-02         4 46E-06         4 50E-02         6 48E-04         7 51E-05         2 5           1 56E-02         4 46E-06         4 50E-01         6 48E-04         7 51E-05         2 5           1 56E-02         4 76E-06         9 00E-02         1 64E-04         4 00E-05         2 5           1 44E-02         5 8TE-06         1 20E-01         8 61E-04         2 10E-05         2 5           1 44E-02         5 8TE-06         1 20E-01         8 61E-04         2 10E-05         2 5           1 06E-01         1 20E-01         8 61E-04         2 10E-05         2 5           1 06E-01         1 17E-05         1 30E+04         3 98E-02         2 19E-03         2 5           1 06E-01         1 00E-05         1 19E+03         1 24E+00         3 02E-02         2 5           2 8BE-02         1 06E-05         3 10E+03         2 10E-02         3 06E-03         3 06E-03 <td></td> <td>1 78E</td> <td>8</td> <td></td> <td>6 80E-06</td> <td>5 00E+01</td> <td>1 59E-01</td> <td>3 88E-03</td> <td>25</td> <td>458 00</td> <td>695 00</td> <td>9,510</td> <td>4 0E-06</td> <td>000+00</td>		1 78E	8		6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00	695 00	9,510	4 0E-06	000+00
8 80E-02         9 80E-06         175E+03         2 28E-01         5 6E-03         25           1 25E-02         4 80E-06         1 75E+03         2 28E-01         5 6E-02         2 5           1 56E-02         4 46E-06         4 50E-01         3 08E-04         7 51E-06         2 5           1 56E-02         4 46E-06         4 50E-01         3 08E-04         1 56E-02         2 5           1 56E-02         4 46E-06         4 50E-02         1 64E-04         4 00E-06         2 5           1 69E-02         4 76E-06         9 00E-02         1 64E-04         4 00E-06         2 5           1 44E-02         5 87E-06         1 20E-01         8 61E-04         2 10E-05         2 5           1 44E-02         5 87E-06         1 20E-01         8 61E-04         2 10E-05         2 5           1 01E-01         1 20E-01         1 11E+00         2 11E-02         2 5           1 04E-01         1 00E-05         1 19E+03         1 24E+00         3 02E-02         2 5           1 04E-01         1 00E-05         1 19E+03         2 19E-02         2 5         2 5           2 08E-02         1 06E-03         3 20E-01         3 02E-02         2 5         2 5           2 08E-03         <		6 92E	<b>0</b> 0 (		9.30E-06	7 40E+04	3 61E-04	8 80E-06	25	390 88	563 05	10,346	0 0E+00	3 5E-01
7 80E-02         8 80E-06         1 33E+03         7 05E-01         1 72E-02         25           1 25E-02         4 74E-06         2 50E-01         3 08E-04         7 51E-06         25           1 56E-02         4 50E-01         3 08E-04         7 51E-06         25           1 69E-02         4 50E-02         1 64E-04         4 00E-06         25           1 44E-02         5 87E-06         1 20E-01         8 61E-04         2 10E-05         25           1 06E-01         1 20E-04         2 56E-01         2 10E-05         2 5         25           1 06E-01         1 20E-04         2 56E-01         2 10E-05         2 5         25           1 06E-01         1 20E-04         2 56E-01         2 10E-05         2 5         2 5           1 06E-01         1 20E-04         2 56E-01         2 10E-05         2 5         2 5           1 01E-01         1 10E-03         1 24E-00         2 19E-03         2 19E-03         2 2 10E-03         2 2 10E-03         2 10E-03         2 2 10E-03         2 2 10E-03         2 2 10E-03         2 2 10E-03         2 2 10E-03         2 2 10E-03         2 2 10E-03         2 2 10E-03         2 2 10E-03         2 2 10E-03         2 2 10E-03         2 2 10E-03         2 2 10E-03		5 89E	101		9 80E-06	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342	8 3E-06	0 0E+00
1,50E-02         4,70E-03         5,00E-04         1,50E-06         2,50E-04         1,50E-06         2,50E-04         1,50E-06         2,50E-06         2,50E-04         1,50E-06         2,50E-06         2,50E-04         4,50E-06         2,50E-04         2,50E-06         2,50E-04         2,50E-06         2,50E-06         2,50E-07         2,50E-04         2,50E-03		101			8 80E-05	335+03	7.055-01	1 72E-02	25	347 24	545 00	7,136	0.000	1 0E+00
169E-02         4 78E-06         9 00E-02         1 64E-04         4 00E-05         25           1 44E-02         5 87E-06         1 20E-01         8 61E-04         2 10E-05         25           1 24E-02         1 21E-05         1 52E+04         2 56E-01         6 24E-03         25           1 06E-01         1 23E-06         2 76E+03         1 11E+00         2 71E-02         25           1 01E-01         1 77E-05         1 30E+04         8 98E-02         2 19E-03         25           1 04E-01         1 00E-05         1 19E+03         1 24E+00         3 02E-02         25           1 04E-01         1 00E-05         1 19E+03         2 19E-02         3 04E-04         25           2 98E-02         1 06E-05         6 74E+03         6 56E-02         1 60E-03         25           2 98E-02         1 06E-05         6 74E+03         6 56E-02         1 60E-03         25           2 98E-02         1 06E-05         6 74E+03         6 56E-02         1 60E-03         25           1 12E-02         1 06E-03         2 25E+03         1 07E+00         2 71E-02         25           1 12E-02         1 56E-03         1 27E-04         6 63E-06         2 80E-06         2 80E-06		9776	_		4 46E-06	4 50F-02	5 48F-04	7.31E-06 1.59E-05	5 5 5 6	CL 817	986 20	12,000	0.05+00	1 1E-03
144E-02         587E-06         120E-01         861E-04         210E-05         25           7 28E-02         121E-05         152E+04         256E-01         624E-03         25           7 28E-02         121E-05         152E+04         256E-01         624E-03         25           1 01E-01         177E-05         130E+04         898E-02         219E-03         25           1 04E-01         1 07E-05         130E+04         898E-02         219E-03         25           1 04E-01         1 03E-05         1 19E+03         1 24E+00         30E-02         25           2 98E-02         1 05E-05         6 74E+03         6 56E-02         1 60E-03         25           2 98E-02         1 06E-05         6 74E+03         6 56E-02         1 60E-03         25           2 98E-02         1 06E-05         6 74E+03         6 56E-02         1 60E-03         25           2 98E-02         1 06E-05         6 74E+03         6 56E-02         1 60E-03         25           1 12E-02         1 06E-03         2 25E+03         1 77E+00         2 61E-02         25           1 61E-02         7 21E-06         1 80E+04         1 11E+00         2 71E-02         2 80E-03         2 80E-03 <t< td=""><td></td><td>100</td><td>_</td><td></td><td>4 76E-06</td><td>9 00E-02</td><td>1 64E-04</td><td>4 ODE-05</td><td>3 K</td><td>639 90</td><td>040 43 863 77</td><td>14,000</td><td>00=+00</td><td>1 85-02</td></t<>		100	_		4 76E-06	9 00E-02	1 64E-04	4 ODE-05	3 K	639 90	040 43 863 77	14,000	00=+00	1 85-02
7 28E-02         1 21E-05         1 52E+04         2 56E-01         6 24E-03         25           1 06E-01         1 23E-06         2 76E+03         1 11E+00         2 71E-02         25           1 01E-01         1 17E-05         1 30E+04         8 98E-02         2 71E-02         25           1 04E-01         1 00E-05         1 19E+03         1 24E+00         3 02E-02         25           2 98E-02         1 06E-05         6 74E+03         6 50E-02         5 34E-04         25           2 98E-02         1 06E-05         6 74E+03         6 50E-02         1 60E-03         2 56E-02         2 56E-03		4 47E			587E-06	1 20E-01	8 61E-04	2 10E-05	25 25	636 44	86038	13,000	0 3E 00	00+900
106E-01         123E-06         276E+03         111E+00         271E-02         25           101E-01         17E-05         130E+04         8 98E-02         219E-03         25           104E-01         100E-05         110E+03         124E+00         302E-02         25           104E-01         100E-05         110E+03         124E+00         302E-02         25           298E-02         106E-05         674E+03         656E-02         160E-03         25           742E-02         106E-05         674E+03         656E-02         160E-03         25           9 00E-02         104E-03         226E+03         107E+00         261E-03         26           1 12E-02         5 69E-06         1 80E-01         447E-02         109E-03         25           1 61E-02         7 21E-06         1 80E+01         11E+00         271E-02         25           1 52E-02         8 72E-04         2 80E-03         2 80E-03         2 80E-03         2 80E-03         2 80E-03           1 80E-06         1 10E+03         3 74E-04         2 80E-03         2			7		1 21E-05	1 52E+04	2 56E-01	6 24E-03	52	276 71	467 00	5,714	00+100	5 OE-03
101E-01         117E-05         130E+04         8 98E-02         2 19E-03         25           104E-01         100E-05         119E+03         124E+00         302E-02         25           1 04E-01         100E-05         110E+03         2 19E-02         304E-04         25           2 98E-02         106E-05         6 74E+03         6 56E-02         160E-03         25           7 42E-02         106E-05         5 05E+03         2 30E-01         5 61E-03         25           9 00E-02         104E-05         2 25E+03         1 07E-00         2 61E-03         25           1 12E-02         5 69E-06         1 80E-01         4 47E-02         2 61E-03         25           1 51E-02         5 69E-06         1 80E-01         1 11E+00         2 71E-02         2 5           2 55E-02         1 80E-01         1 11E+00         2 71E-02         2 5           3 78E-02         8 78E-06         1 20E+04         2 72E-04         6 63E-03         25           7 90E-02         9 10E-06         1 10E+03         3 74E-02         3 74E-04         2 5           7 90E-02         9 10E-06         1 10E+03         3 74E-01         3 74E-04         25           7 90E-02         7 90E-0	75014 Vinyl chloride (chloroethene)	_	Ψ.		1 23E-06	2 76E+03	1 11E+00	2 71E-02	52	259 25	432 00	5.250	8 4F-05	0.05+00
1 04E-01         1 00E-05         1 19E+03         1 24E+00         3 02E-02         25           1 49E-02         1 03E-05         3 10E+03         2 19E-02         5 34E-04         25           2 98E-02         1 06E-05         3 10E+03         2 19E-02         5 61E-03         25           7 42E-02         1 06E-05         5 06E+03         2 20E-01         5 61E-03         25           9 00E-02         1 04E-05         2 2EE+03         1 07E-00         2 61E-03         25           1 12E-02         5 69E-06         1 80E-01         4 47E-02         1 09E-03         26           1 61E-02         7 21E-06         1 80E+00         1 11E+00         2 71E-02         2 55           2 83E-02         6 76E-06         1 20E+04         2 77E-04         6 63E-06         25           7 80E-02         8 73E-04         2 80E-03         1 15E-01         2 80E-03         25           7 90E-02         9 10E-06         1 10E+03         4 22E-01         1 03E-02         25           7 90E-02         1 10E+03         4 22E-01         3 44E-04         25           7 10E-02         7 90E-06         2 97E+04         25           7 10E-02         7 90E-06         3 74E-02		1 17E	-		1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	313 00	510 00	6.706	4 7E-07	3 0 1 + 0 0
149E-02         103E-05         310E+03         219E-02         534E-04         25           298E-02         106E-05         674E+03         656E-02         160E-03         25           742E-02         106E-05         506E+03         230E-01         561E-03         25           9 00E-02         104E-05         506E+03         230E-01         261E-02         25           1 12E-02         59E-06         180E-01         47F-02         109E-03         25           1 51E-02         721E-06         180E-01         417E-02         271E-02         275E-03         275E-04         653E-06         25           7 82E-02         87E-06         120E+04         272E-04         653E-06         25           7 80E-02         88E-06         140E-03         146E-01         25         25           7 90E-02         910E-06         110E-03         422E-01         103E-04         25           7 10E-02         7 90E-06         2 97E+03         141E-02         344E-04         25		4 57E	_		1 00E-05	1 19E+03	1 24E+00	3 02E-02	52	319 00	552 00	6.391	0.05+0.0	7 OF-01
2 98E-02         1 06E-05         6 74E+03         6 56E-02         1 60E-03         25           7 42E-02         1 05E-05         5 06E+03         2 30E-01         5 61E-03         25           9 05E-02         1 04E-05         5 06E+03         2 30E-01         5 61E-02         25           1 12E-02         1 04E-05         1 80E-01         4 47E-02         1 09E-03         25           1 16E-02         7 21E-06         1 80E+04         1 11E+00         2 71E-02         2 71E-02         25           7 82E-02         8 73E-06         1 20E+04         2 72E-04         6 63E-06         25           7 80E-02         8 80E-06         4 42E-03         3 14E-01         2 80E-03         25           7 90E-02         1 10E-03         4 22E-01         1 03E-04         25           7 10E-02         7 90E-06         2 97E+03         3 44E-04         25           7 10E-02         7 90E-06         2 97E+03         3 44E-04         25		8 71E	_		1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422 35	00 969	9,479	1 1E-06	0.00
7 42E-02         1 05E-05         5 06E+03         2 30E-01         5 61E-03         25           9 00E-02         1 04E-05         2 2EF+03         1 07E+00         2 61E-02         26           1 12E-02         5 69E-06         1 80E-01         4 47E-02         1 09E-03         26           1 16E-02         5 6 23E-06         1 20E+04         1 71E-00         2 71E-02         25           6 23E-02         6 72E-04         6 63E-06         2 80E+03         1 15E-01         2 80E-03         25           7 80E-02         8 80E-06         4 42E+03         3 74E-02         9 12E-04         25           7 90E-02         9 10E-06         1 10E+03         4 22E-01         1 03E-04         25           7 10E-02         7 90E-02         9 10E-06         1 10E+03         4 22E-01         25           7 10E-02         7 90E-06         1 90E-06         1 41E-02         3 44E-04         25		5 50E	-		1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	2,000	1 8E-05	0 0E+00
9 00E-02 1 04E-05 2 25E+03 1 07E+00 2 61E-02 25 1 12E-02 6 99E-06 1 80E-01 4 47E-02 1 09E-03 25 1 12E-02 5 69E-06 1 80E-01 1 11E+00 2 71E-02 25 1 161E-02 7 21E-02 25 1 20E-03 1 20E+00 1 11E+00 2 71E-02 25 1 20E-02 8 73E-06 2 80E+03 1 15E-01 2 80E-03 25 7 80E-02 8 80E-06 4 42E+03 3 74E-02 9 12E-04 25 7 90E-02 9 10E-06 1 10E+03 4 22E-01 1 03E-02 25 7 10E-02 7 90E-02 7 90E-02 7 90E-02 7 90E-02 7 90E-02 7 90E-06 2 97E+03 1 41E-02 3 44E-04 25		3 16E	~		1 05E-05	5 06E+03	2 30E-01	5 61E-03	25	330 55	523 00	6.895	0 0E+00	5 0E-01
112E-02         569E-06         180E-01         447E-02         109E-03         25           116E-02         721E-06         180E+00         11E+00         271E-02         25           6 23E-02         6 75E-02         6 63E-06         2 80E-03         15E-04         2 80E-03         25           7 82E-02         8 73E-06         2 80E+03         115E-01         2 80E-03         25           7 80E-02         8 80E-06         4 42E+03         374E-02         9 12E-04         25           7 90E-02         9 10E-06         1 10E+03         4 22E-01         1 03E-02         25           7 10E-02         7 90E-02         7 90E-06         2 97E+03         141E-02         3 44E-04         25		5 89E	o		1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6,247	5 OE-05	005+00
161E-02     721E-06     180E+00     11E+00     271E-02     25       6 23E-02     676E-06     120E+04     272E-04     663E-06     26       7.82E-02     873E-06     280E+03     115E-01     280E-03     25       7 80E-02     8 80E-06     4 42E+03     374E-02     912E-04     25       7 90E-02     9 10E-06     1 10E+03     4 22E-01     1 03E-02     25       7 10E-02     7 90E-06     2 97E+03     14 1E-02     3 44E-04     25		1 4 1 E	-		5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	1 3E-03	0 OE+00
6 23E-02 6 76E-06 1 20E+04 2 77E-04 6 63E-06 25 7.82E-02 8 73E-06 2 80E+03 1 15E-01 2 80E-03 25 7 80E-02 8 80E-06 4 42E+03 3 74E-02 9 12E-04 25 7 90E-02 9 10E-06 1 10E+03 4 22E-01 1 03E-02 25 7 10E-02 7 90E-06 2 97E+03 1 41E-02 3 44E-04 25		2 005	- 1		7 21E-06	1 80E+00	1116+00	2 71E-02	22	512 15	746 00	10,931	0 0E+00	7 0E-05
7.8XE-V2 8 73E-V6 2 80E+03 115E-01 2 80E-03 25 7 80E-02 8 80E-06 4 42E+03 3 74E-02 9 12E-04 25 7 90E-02 110E+03 4 22E-01 1 03E-02 25 7 10E-02 7 90E-06 2 97E+03 141E-02 3 44E-04 25		4 684	P		6 76E-06	1 20E+04	2 725-04	6 63E-06	25	488 35	715 00	10,271	2 7E-07	0 0E+00
/ 80E-02 80E-06 442E+03 374E-02 912E-04 25 ? 790E-02 910E-06 110E+03 422E-01 103E-02 25 710E-02 790E-06 297E+03 141E-02 344E-04 25		4 3/12	- 1		8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7,590	0 0E+00	4 0E-03
7 10E-02 7 90E-06 2 97E+03 141E-02 3 44E-04 25		5 UTE	_		8 80E-06	4 42E+03	3.74E-02	9 12E-04	25	386 15	602 00	8,322	1 6E-05	00=+00
20 10 10 10 10 10 10 10 10 10 10 10 10 10		933			3 10E-00	2 076403	4 225-01	1 03E-02	52	36036	544 20	7,505	17E-06	0.0100
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84742 Oloshimarara	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	25	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 Birth hanny ohtholete	5 38E+04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10	52	613 15	798 67	14,751	0 0E+00	3 5E-01
86306 N-Nitrosodiobendamioe	1 205 104	1 /45-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06	25	990 99	839 68	13,000	0 0E+00	7 0E-01.
86737 Fluorene	1 38 - 103	3 635.02	0 33E-06	3 51 = +0.1	2 05 5-04	5 00E-06	52	632 28	890 45	13,000	1 4E-06	0 0E+00
86748 Carbazole	3 39E+03	3 905-02	7 035-06	1 98E+00	2 61E-03	6 37E-05	52	570 44	870 00	12,666	0 0E+00	14E-01
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23 1 + 00	3.345.01	1 335-08	S S	627.87	699 00	13,977	5 7E-06	0 0 0 0
87855 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1005-06	0 13E-03	0 K	486 15 582 15	738 00	10,206	2 2E-05	000
88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	22	519 15	749 03	12,000	3.15-05	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
91941 33-Dichlombenzidine	2 00E+03	5 90E-02	7 505-06	3 10 = +01	1 98E-02	4 83E-04	25	491 14	748 40	10,373	0 0E+00	14601
95476 o-Xvlene	3 635+02	1 94E-UZ	4 74E-U6	3 115+00	1 64E-07	4 00E-09	52	560 26	754 03	13,000	135-04	0 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30F-06	2 60F+04	2 13E-01	5 20E-03	52	417 60	630 30	8,661	0 0E+00	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 905-02	7 90E-06	1 56E+02	7 795-02	1 20E-06	Ç ;	464 19	697 60	10,800	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	18501
95578 2-Chlorophenol	3 88E+02	5 0 1 E-02	9 46E-06	2 20E+04	1 60E-02	3977-05	6 K	4535/	00 27 20	9,700	00E+00	2 00-01
95954 2,4,5-Trichlorophenol	1 60E+03	291E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	3 5	526 15	759 13	3,572	001100	2000
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	22	483 95	719 00	10.566	005+00	2 4 4 6 6
100414 Ethylbenzene 100425 Shrene	3 63E+02		7 80E-06	1 69E+02	3 23E-01	7 88E-03	52	409 34	617.20	8,501	00+400	1 OE+00
105674 2 4-Directhylabana	7 /00-102	/ 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03	22	41831	636 00	8,737	0.05+00	1 0E+00
106423 p-Xvlene	2 USE+UZ	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	52	484 13	707 60	11,329	0 0E+00	7 0E-02
106467 1,4-Dichlorobenzene	6 17F+02		0 44E-U0	7 295402	3 14E-01	7 66E-03	56	411 52	616 20	8,525	0 0E+00	7 0E+00
106478 p-Chloroantine	6 615+01	4 83E-02	1.01E-05	5.305+03	3 36E-02	2 435-03	52	447 21	684 75	9,271	0.0110	8 05-01
107062 1,2-Dichloroethane	174E+01	1 04E-01	90-306-6	8 52E+03	4 01E-02	3 32E-07	3 K	503 65 366 66	754 00	11,689	0 0E+00	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12F-04	3 12	345.65	5100	7,043	2.6E-05	0 0 0 0
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01 5-01	7 34E-03	3 12	412.27	617.05	000'	001100	2 05-01
108883 Toluene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03	22	383.78	591.79			7 OE 500
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03	52	404 87	632 40		0.00	200
111444 Bis/2-chlomothathathat	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 985-07	52	455 02	694 20		0 0E+00	2 15+00
115297 Endosultan	1 55E+01 2 14E+03	5 92E-02	7 53E-06	1 72E+04	7 38E-04	1 805-05	52	451 15	659 79	9,000	3 35-04	0 0E+00
117817 Bis(2-ethythexyd)phthalate	151E+07	3 51E-02	3 66 5-06	3 40E-01	4 595-04	1 12E-05	52	674 43	942 94	14,000	0 0E+00	2 1E-02
117840 DHn-octyl phthalate	8 32E+07	1 51E-02	3 58E-06	2 00F-02	2 74E-03	1 025-07	52	657 15	806 00	15,999	4 0E-06	0 0E+00
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5915-06	6 20E+00	5415-02	1.325-03	8 %	704 US	862.22	15,000	00+300	7 0E-02
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6.515-05	3 %	562 55 615 18	873.00	14.447	4 6E-04	0 OE+00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 OOE+02	5 82E-02	1 42E-03	22	486 15	725 00			20-11-0
121142 2 4-Districtions	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06	52	482 15	708 17	11,000	0000	1112
124481 Chlorodibromomethane	8 33E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27 5-08	52	290 00	814 00	13,467	1 9E-04	0 0E+00
127184 Tetrachloroethylene	1 55E+02	7 20F-02	8 20E-08	2 005+03	3.21E-02 7.54E-04	7 83E-04	52	416 14	678 20	8,000	2 4E-05	0 0E+00
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	1 35E-01	4 515-04	1 345-02	ខ្ល	394 40	620 20	8,288	5 8E-07	005+00
156592 as-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333.65	936 U0 544 O0	14,370	0.00	1160
100005 trans-1,Z-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516 50		0.05+00	7 05-02
205992 Benzo(b) Miscauthana	3 4/E±06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 605-06		809 15	1078 24		2 1E-04	0 OE+00
206440 Fluoranthene	1 07E+05	3 025-02	3 3 5 E - 0 6	1 50E-03	4 55E-03	1 11E-04		715 90	969 27		2 15-04	0 OE+00
207089 Benzo(k)fluoranthens	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3.40F-05	1 61E-05	52	655 95	905 00		0 0E+00	1 4E-01
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46F-05		714 15	07 970	16,000	2 1E-05	0 0 0 0 0
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 705-04	2 52	603 01	839.37	0,400	2 in 42	0.05+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7.34E-06	2 00E+00	4 35E-04	1 06E-05		596 55	839 36	13,000	1 8E-03	005+00
542758 1 3-Dehlommanene	1 20E+U3	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5 3E-04	0 0E+00
606202 2.6-Dinitrototuene	6 92F+01	3 27 E.02	1 00E-05	2 80E+03	7 26E-01	1 77E-02	8	381 15	587 38	7,000	3 7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89F+03	3 00E-03	7 46E-07		558 00	770 00	12,938	1 9E-04	0 0E+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	0 5 1 E OB	9 10	509 60	74687		2 0E-03	0 OE+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	114E-02	3 %	629.88	048 /6 1750 00		2 6E-03	9 H 0
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	22 23	657 15	873.31	77,12,	00=+00 3 3E 64	3 UE-04
11090825 Arociof 1250 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	-	402 50	539 37	19.000	1 OF-04	00-110
12674112 Arodor 1016 (PCB-1016)	3.305+04	1 20E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	22	377 50	512 27	19,000	1 0E-04	0 OE+00
53469219 Aroclor 1242 (PCB-1242)	3 30E+04	2 14 6-02	531E-06	3 40F-01	1 19E-02 2 13E-02	2 906-04	52 5	340 50	475 22	18,000	1 0E-04	0 OE+00
					70-00	0.40E	q	25 20	482 20	18,000	1 0E-04	0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 1.2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

		ENTER	User-defined stratum A soil vapor	k, k, (cm²)		
		ļ	0	5	' 'I	
		ENTER Soil	stratum A SCS soil type		SI	ENTER Stratum C soil water-filled porosity, $\theta_u^c$ $(cm^3/cm^3)$
		ENTER	SCS	directly above	s	ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)
		ENTER	Soil stratum	water table, (Enter A, B, or C)	o	ENTER Stratum C soil dry bulk density, $ ho_{b}^{c}$ (g/cm³)
	lene	ENTER 11 <sub>wr</sub> (cell D28)	Thickness of soil stratum C,	hc hc (cm)	97536	ENTER Stratum B soil water-filled porosity, $\theta_w^{-8}$ ( $cm^3/cm^3$ )
Chemical	Tetrachloroethylene	INTER ENTER ENTER Totals must add up to value of L <sub>w1</sub> (cell D28)	Thickness of soil stratum B,	h <sub>B</sub> (cm)	152 4	ENTER Stratum B soil total porosity, n (unitless)
		ENTER Totals mu	Thickness of soil	h <sub>A</sub> (cm)	579 12	ENTER Stratum B soil dry bulk density, p <sub>b</sub> (g/cm³)
		ENTER	Depth below grade	Lwr (cm)	1706 88	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ (cm³/cm³)
ENTER Initial groundwater conc. Cw (µg/L)	2 570769231	ENTER	below grade to bottom of enclosed	Le (cm)	15	ENTER Stratum A soli total porosity, n (unitless)
ENTER Chemical CAS No (numbers only,	127184	ENTER	Average soil/ groundwater femperature	T <sub>s</sub>	16	ENTER Stratum A soil dry bulk density, Pb. (g/cm. <sup>3</sup> )

(g/cm <sup>3</sup> )	(unitless)	(cm³/cm³)	(g/cm³)	(unitless)	(cm³/cm³)	(g/cm³)	(unitless)	(cm³/cm³)
15	0.43	0.2	1,7	0.42	0.27	1,	0.43	03
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
Enclosed		Enctosed	Enclosed					
sbace	Soil-bldg	space	space	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
thickness,	differential,	length,	width,	height,	width,	rate,		
Loreck	ď∇	Ļ	WB	Ę	*	Я		
(cm)	(g/cm-s <sup>2</sup> )	(cm)	(cm)	(cm)	(ma)	(1/h)		
	:						1 [	
c	04	96	196	488	0.0	0.45		

-			<del>.</del>		ı				
	ENTER	Target hazard quotient for	noncardnogens	Ā	(nutless)		١	Jsed to calculate risk-based	groundwater concentration
	ĸ	ō, ≆	gens,		'SS)		90	to calcu	ndwater
	ENTER	Target risk for	carcinogens,	¥	(unitless)		1 0E-06	Used	grou
	ENTER	Exposure	requency.	뮤	(days/yr)		350	 	
	Ë	Ä	frequ	ш	(day		3		
	ENTER	Exposure	duration,	8	(yrs)		30		
	ENTER	Averaging time for	noncarcinogens,	AT	(yrs)		30		
					Ì		-		
	ENTER	Averaging time for	carcinogens,	ΑTc	(yrs)		70		
J					ŀ	1			

## CHEMICAL PROPERTIES SHEET

. 1	Г
Reference conc , RfC (mg/m³)	
Unit nsk factor, URF (µg/m³)-1	
Pure component water solubitity, S (mg/L)	20 00 000 000 0000 0000 00000 00000 00000
Organic carbon partition coefficient, K <sub>ce</sub> (cm <sup>3</sup> /g)	00, 222,
Critical temperature, T <sub>c</sub>	0000
Normal boiling point, T <sub>B</sub>	204 40
Enthalpy of vaponzation at the normal borling point, $\Delta H_{v,h}$ (cal/mol)	8 286
Henry's law constant reference temperature, T <sub>R</sub> (°C)	25
Henry's law constant at reference temperature, H (atm-m³/mol)	1 84F-02
Diffusivity in water, D <sub>w</sub> (cm²/s)	8 20E-06
Diffusivity in air, D <sub>\$</sub>	7 20E-02   8 20E-06

# INTERMEDIATE CALCULATIONS SHEET

		ı r	
Floor- wall seam penmeter, X <sub>cret</sub> (cm)	3,844	Diffusion path length, L <sub>d</sub>	1691.88
Water-filled porosity in capillary zone, $\theta_w \propto (cm^3/cm^3)$	0 294	Total overall effective diffusion coefficient, Deff (cm²/s)	6 45E-04
Air-filled porosity in capillary zone, $\theta_{a,cz}$ $(cm^3/cm^3)$	0 136	Capillary zone effective diffusion coefficient, Deff (cm²/s)	5 05E-04
Total porosity in capillary zone, $^{1}$ cm $^{3}$ (cm $^{3}$ /cm $^{3}$ )	0 43	Stratum C C effective diffusion coefficient, Deff (cm²/s)	Reference conc., RfC (mg/m³)
Thickness of capillary zone, Lez (cm)	17 05	Stratum B B B effective diffusion coefficient, D <sup>off</sup> (cm²/s)	7.38E-04  Unit risk factor, URF (µg/m³)*1
Stratum A soil effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, D** (cm*/s)	2 92E-03 Infinite source bidg conc , Coulding (µg/m³)
Stratum A soul relative air permeability, krg (cm²)	0 746	Vapor viscosity at ave soil temperature, µrs (g/cm-s)	Infinite source indoor attenuation coefficient, a (unitiess)
Stratum A soil intrinsic permeability, k	9 36E-10	Henry's law constant at ave. groundwater temperature, H' <sub>75</sub> (unitless)	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless) 7 48E+03
Stratum A effective total fluid saturation, S <sub>a</sub> S <sub>a</sub>	0.419	Henry's law constant at ave groundwater temperatura, H <sub>TS</sub>	112E-02 Area of crack, Acreck (cm²)
Stratum C soil air-filled porosity, $\theta_a^c$ $(cm^3/cm^3)$	0.130	Enthalpy of vaporization at see groundwater temperature, AHv. rs (cal/mol)	9,492 Crack effective diffusion coefficient, Domek (cm²/s)
Stratum B soil air-filled porosity, $\theta_s^B$ (cm $^3$ /cm $^3$ )	0 150	Crack depth below grade. Zonek	Average vapor flow rate into bldg , Quel (cm <sup>3</sup> /s)
Stratum A soit air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, η	Crack radius, forms (cm)
Source- building separation, L <sub>T</sub>	1691 88	1 1	9 24E+05 Source vapor conc , Causa (µg/m³)
Exposure duration, r	9 46E+08	Bldg ventilation rate, Qeudeno (cm <sup>3</sup> /s)	5 63E+04 Convection path length, Ly (cm)

### RESULTS SHEET

INCREMENTAL RISK CALCULATIONS	Incremental Hazard nsk from quotient vapor from vapor Intrusion to infrusion to indoor air, carcinogen noncarcinogen (unitless)	***
	Final indoor exposure froundwater conc. (µg/L)	2 181102
TION CALCULA	υ»   <u> </u>	200000
R CONCENTRA		2 1 X E + O 2
NSK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	Indoor exposure groundwater conc. noncarcinogen (µg/L)	٩V
RISK-BASED	Indoor exposure groundwater conc, carcinogen (µg/L)	- X

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

Reference conc, RfC (mg/m³)

						VLOOKUP TABLES	ES					
			erties i	ertes Lookup Table								
es soil Type	K, (cm/h)			M (unitless)	0, (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)					
<u>ت</u> د	0 50	0 00	109	0 083	0,38	0 068	0 0092					
<u>.</u>	2 5	8000	- 4 - 4	0.257	4 4	0.085	0.016					
<u> </u>	- 14	0 124	- c	0 000	2 6	0.00	0 020					
ေတ	29 70	0 145	2 68	0.627	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	0 00	2000					
၁၄	0 12	0 027	1 23	0 187	0.38	0 100	0.025					
SCL	131	0 059	148	0 324	0 39	0 100	0.029					
3	0 25	0 016	1 37	0 270	0.46	0 034	0 0046					
Sic	0 02	0 002	1 09	0 083	0.26	0 0 0 0 0 0	0 0038					
SICL	0 04	0 010	123	0 187	0 43	0 089	0 0056					
75 E	0 45	0 020	141	0 291	045	0 067	0011					
	74.4	6200	80	747		0 065	0 030					
					Сћетиса	Chemical Properties Lookup Table	kup Table			1		
		Organic			Pure		Henry's	Henry's	:		Enthalpy of	
		Cartition	Definehute	Diffusion	component	Connection	law constant	law constant	Norma		vaponzation at	
	_	coefficient	In air.	Cinusivity	>	Henry's	at reference temperature	reterence	bouling	Critical	the normal	챯
		\$2	ٔ م	۵	_	# # # # # # # # # # # # # # # # # # #	reinperature, H	telliperatore, To	point,	temperature, To	polling point,	factor,
CAS No Chemical		(cm <sup>3</sup> /g)	(cm <sup>2</sup> /s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/mol)	(C)	ક	S	_	(mq/m³) 1
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 105-06	25	533 15	720.75	٤	9.75-05
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	90-300 6	1 62E-03	4 63E-05	1135-06	25	715.90	969 27	15,000	100
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	90- <u>3</u> 90 6	2 79E+03	1 82E-05	4,44E-07	32 22	605 28	827.85	15,000	0.05+00
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	52	743 24	990 41	16.000	2 15-03
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	1 SE-05
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	137E-04	3 34E-06	25	708 15	1004 79	15,000	2 1E-04
57.749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3 7E-04
		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 405-05	25	596 55	839 36	13,000	3 7E-04
And Dieloria		2 14E+04	1 25E-02	4 74E-06		6 19E-04	1 51E-05	25	613 32	842 25	13,000	4 6E-03
62641 Acatom		6 UOH -01	5 36E-02	7.97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10,000	0 OE+00
67663 Chlomform		3 /3E-01	1245-01	1 14 1-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	6,955	0 OE+00
67721 Hexachloroethane		1 785 +03	2 500 03	- 00E-03	7 92E+03	1 20 1 01	3 66E-03	52	334 32	536 40	6.988	2 3E-05
71363 Butanol		6 92 = +00	8 00E-02	9.30F-06	3 00E+01	3 615.04	3 88E-U3 9 90E-06	97.	458 00	695 00	9,510	4 0E-06
71432 Benzene		5 89E+01	8 80E-02	90E-06	1 75E+03	2 28E-01	55 EG-1162 G	2, 25	353.24	562 16	7 345	0.05+00
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	00=+00
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	718 15	986 20	12,000	00+300
725435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	52	651 02	848 49	14,000	0 0E+00
72459 000		1 00E+06	1 69E-02	4 75E-06	9 00E-02	1 64E-04	4 00E-06	52	639 90	863 77	14,000	6 9E-05
74839 Methyl bromide		1 05 = +01	7 28E-02	1215-05	1 52E+04	980.04	2 10E-05	2, 2	636 44	86038	13,000	9 7E-05
75014 Vinyl chloride (chloroethene)	ene)	1 B6E+01	1 06E-01	1235-06	2 76E+03	1116+00	2 2 1 E-02	2 K	259.25	487.00	41 / C	0.0E+00
75092 Methylene chloride		1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	52	313.00	510 00	6.706	4 7E-07
75150 Carbon disuffide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	52	319 00	552 00	6.391	00=0
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	52	422,35	00 969	9,479	1 1E-06
75274 Bromodichioromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 8E-05
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	25	330 55	523 00	6,895	0 OE+00
76448 Hentschlor		3 89E+01	9 UUE-02	1 0415-05	2.25E+03	1 07E+00	2 615-02	52	304 75	576 05	6,247	5 OE-05
77474 Hexachlorocyclopentadiene	40	2 OOF +05	1 61E-02	7 215-06	1 80E±00	1 1 1 1 1 1 1 1 1	50-E60 L	52	603 69	34631	13,000	1 35-03
78591 Isophorone	2	4 68E+01	6 23E-02	6.76E-06	1 20F+04	2725-04	20-31 / 2	0 K	488 35	715 00	10,931	0 UE+00
78875 1,2-Dichtoropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1156-01	2 80E-03	25	369 52	572 00	7.590	0.05+00
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	: <b>5</b> 2	386 15	602 00	8,322	1 6E-05
79016 Trichloroathylene		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4.22E-01	1 03E-02	25	360 36	544 20	7,505	1 7E-06
79345 1,1,2,2-Tetrachloroethane	Ð	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	25	419.60	661 15	966'8	5 8E-05
S3329 Acenaphmene		7.08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	52	550 54	803 15	12,155	0 0E+00

84689 Destruction	i c		1		VLOOKUP TABLES							
84742 Distributed obtained	2 90E+02	2 56E-02	6 355-06	1 08E+03	185E-05	4 51E-07	x	567 15	757 00	13,733	0.0E+00	2 8E+00
85687 Butyl benzyl ohthatate	5 755+04	1 74E-02	7 80E-U0	2 605 100	385E-08	9 39E-10	52	613 15	798 67	14,751	0 0E+00	3 5E-01
86306 N-Nitrosodiphenylarine	1 29E+03	3 125-02	4 03E-06	2 515+01	206004	1265-06	23 3	09 099	839 68	13,000	0 0E+00	7 0E-01
86737 Fluorene	1 38E+04	3 63E-02	7 88F-06	1 985+00	2.615.03	5 00E-06	8 8	632 28	890 45	13,000	1 4E-06	0 0E+00
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26 - 07	1 535.00	9 %	570 44	870 00	12,666	00440	145-01
87683 Hexachloro-1,3-butadiene	537E+04	5 61E-02	6 16E-06	3 23E+00	3 34 6-01	8.15E-03	3 5	486 15	738.00	13,977	9,46	00-100
87865 Pentachlorophenol	592E+02	5 60E-02	6 10E-06	1 95E+03	1 00 - 06	2 44E-08	25	582 15	813.20	14,000	3.45-05	00+400
91203 Nanktalone	3 81E+02	3 18E-02	6.25E-06	8 00E+02	3 195-04	7 78E-06	52	519 15	749 03	12,000	3 15-06	00+00
91941 3.3-Dichlomberzidina	2 UUE+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	14E-01
95476 o-Xylene	3 63 F + 02	8 70E-02	1 00E-06	3 11E+00	1 64E-07	4 00E-09	52	560 26	754 03	13,000	1 3E-04	0 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40F-02	8 305-06	2 ROF+04	4 02E-01	5 20E-03	52	417 60	630 30	8,661	0 OE+00	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 905-03	8 8	464 19	697 60	10,800	0.000	18E-01
95578 2-Chlorophenol	3 885+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90F-04	0 K	45557	925	9,700	00000	2 0E-01
95954 2,4,5-Trichlorophenol	1 60E+03	291E-02	7 03E-06	1 20E+03	1.78E-04	4 34E-06	3 52	526 15	759 13	13,000		1 8E-UZ
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	52	483 95	719 00	10,566	00000	2 0 5 0 3
100414 Ethyloenzene 100425 Shrene	3 63E+02	7 50E-02		1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20	8,501	0 0E+00	100+00
105679 2 4-Dimethydobosos	7 / 6E+02	/ 10E-02		3 10E+02	1 13E-01	2 76E-03	22	418 31	636 00	8,737	0 0E+00	1 0E+00
106423 p-Xviene	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	22	484 13	707 60	11,329	0 0E+00	7 0E-02
106467 1.4-Dichlorobenzene	6 175+02	7 09E-02		1 85E+02	3 14 E-01	7 66E-03	56	411 52	616 20	8,525	0 0E+00	7 0E+00
106478 p-Chloroaniline	6 61E+01	4 83E-02	1011105	5 30E+03	3 30E-02	2 435-03	52	447 21	684 75	9,271	0 0E+00	8 0E-01
107062 1,2-Dichloroethane	1 74E+01	1 04E-01	905-06	8 52E+03	4 01E-03	3 32E-07	52 2	503 65	754 00	11,689	0 0E+00	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 125-04	8 %	300 00 345 65	361 QQ	7,643	2 6E-05	0 0E+00
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7.34E-03	3 %	412.27	513 IS	000'	0.05+00	2 0E-01
	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03	25	383 78	591 79	7,930	00+100	00±±000
	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3.71E-03	22	404 87	632.40	A 410	201	20000
19695Z Fneno!		8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	52	455 02	694 20	10.920	00+60	2 1F+00
115297 Fodesulfan	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	52	451 15	629 79	000'6	3 3E-04	00000
	1 515+07	2 515 02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	25	674 43	942 94	14,000	0 0E+00	2 1E-02
117840 Di-ri-octyl phthalate	8 32F+07	1515-02	3 50E-Ub	3 405-01	4 18E-06	1 02E-07	52	657 15	806 00	15,999	4 0E-06	0 0E+00
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5 915-06	6 20E+00	Z /4E-03	6 685-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	1 32E-03 6 51E-05	8 8	582 55	825 00	14.47	4 6E-04	0 0E+00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1.42 F-03	S K	486 15	8/300	13,121	0000	1 16+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06	3 5	482 15	708 17	10,4/1	001+00	2 0E-01
121142 2,4-Dinitrotoluene	9 55E+01	2 03€-01	7 06E-06	2 70E+02	3 80E-06	9 27 E-08	32	200 00	814.00	13 467	1 95 04	1 15-02
124481 Chlorodibromoethane	6,31E+01	1 96E-02		2 60E+03	3 21E-02	7 83E-04	22	416 14	678 20	8,000	2 4E-05	00+400
129000 Pyrana	1 555+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	52	394 40	620 20	8,288	5 8E-07	0 0 = +00
156592 cls-1.2-Dichloroethylene	2 55F±01	7 365 03	7.24E-06	1355-01	4 515-04	1 10E-05	52	667 95	936 00	14,370	0 0E+00	1 1E-01
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 195-05	3 30E+03	1 6/E-03	4 07E-03	52	333 65	544 00	7,192	0 0E+00	3 SE-02
193395 Indeno(1,2,3-cd)pyrene	3 47 E+06	1 90E-02	5 66E-06	2 20F-05	6.568-05	9 39E-03	8 8	320 85	516 50	6,717	0 0E+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02		1 50E-03	4 55E-03	1115-04	3 K	715 00	10/8 24	17,000	2 1E-04	0 OE+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	161E-05	3 5	655 95	905 00	000,01	45-11-24 45-10-0	0.05+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02		8 00E-04	3 40E-05	8 29E-07	22	753 15	1019 70	16,010	2 10 08	145-01
218019 Chrysene	3 98E+05	2 48E-02		1 60E-03	3 88E-03	9 46E-05	52	714 15	979 00	16,455	2 15-05	00+40
305002 Aktin 310846 aloka-HCH (aloka-DHC)	2 45E+06	1 325-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	22	603 01	839 37	13,000	4 95-03	000+00
319857 beta-HCH (beta-BHC)	1 26E±03	1 425-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05	52	596 55	839 36	13,000	1 8E-03	0 0E+00
542756 1,3-Dichloropropene	4 57E+01	6 265-02	1005.05	2 #UE-U	3 UDE-UD	7445-07	52	596 55	839 36	13,000	5 3E-04	0 0E+00
606202 2,6-Dinitrotoluene	6 92€+01	3 27E-02	7.26F-06	1 82E+03	3 ORE-US	7.457.03	8 8	381 15	587 38	7,000	3 7E-05	2 06-02
621647 N-Nitrosod-n-propylamine	2 40E+01	5 45E-02		9 89F+03	9 245-05	2 255 05	Q t	358 00	770 00	12,938	1 95-04	0 0E+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02		2 00E-01	3 90E-04	9.515-06	6 K	509 60 613 06	74687	11,000	2 0E-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 305-06	5 62E-02	4 67E-01	1 14E-02	3 15	62088	1750.00	13,000	2 65-03	00+400
8001352 Toxaphene	2 57E+05	1 16E-02		7 40E-01	2 46E-04	6 00E-06	55	657 15	873.31	17 000	30,000	3 UF-04
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	189E-01	4 60E-03	25	402 50	539 37	19.000	1 OF -04	00+100
1109/091 A0XIOL 1234 (PCB-1234) 12674112 Arador 1016 (PCB-1016)	2 WE+US	1 56E-02	5 00E-06	5 70E-02	8 20E-02		52	377 50	512 27	19,000	1 OE-04	100
53469219 Arodor 1242 (PCB-1242)	3 30 0 + 04	2 42E-02 2 14E-02	4.4	4 20E-01	1 19E-02	2 90E-04	52	340 50	475 22	18,000	1 OE-04	0 0 0 0
		<u>;</u>	?	200000	2 ISE-02	5 20E-04	22	345 50	482 20	18,000	1 0E-04	0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 1.2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

YES

	ENTER	User-defined stratum A	soil vapor permeability, k <sub>v</sub> (cm²)				
	ENTER	stratum A SCS	soil type (used to estimate OR soit vapor permeability)	] Is	ENTER Stratum C	porosity, θ <sub>*</sub> <sup>C</sup> (cm³/cm³)	03
	ENTER	i c	soal type directly above	S	ENTER Stratum C	porosity, n <sup>c</sup> (unitless)	0.43
	ENTER	Soil	stratum directly above water table, (Enter A. B. or C.)	S	ENTER Stratum C	bulk density,  Pb <sup>C</sup> (g/cm³)	11
opu	ENTER	Thickness	stratum C, (Enter value or 0) h <sub>C</sub> (cm)	975 36	ENTER Stratum B	porosity, $\theta_w^B$ $(cm^3/cm^3)$	0.27
Chemical Carbon tetrachionde	ENTER ENTER ENTER TOTAL CORE (Cold 1728)	Thickness	stratum 5, (Enter value or 0) h <sub>B</sub> (cm)	152 4	ENTER Stratum B	porosity, n <sup>8</sup> (unitless)	0.42
	ENTER Totals mus	Thickness	of soil stratum A, h, (cm)	579 12	ENTER Stratum B	bulk density,  p <sub>b</sub> (g/cm³)	17
, _	ENTER	Depth	below grade to water table, LwT (cm)	170688	ENTER Stratum A	porosity, $\theta_w^A$ $(cm^3/cm^3)$	0.2
ENTER Initial groundwater conc , Cw (µg/L)	ENTER	below grade to bottom	or enclosed space floor, L <sub>F</sub> (cm)	15	_	porosity.  n <sup>A</sup> (unitless)	0 43
CAS No (numbers only, no dashes)	ENTER	Average soll/	groundwater temperature, $T_s$	16	ENTER Stratum A	bulk density, Pe <sup>A</sup> (g/cm²)	15

15	40	961	961	488	0.1	0.45
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	
Averaging	Averaging			Target	Target hazard	
time for		Exposure	Exposure	rlsk for	quotlent for	
carcinogens,	_	duration,	frequency,	carcinogens,	noncarcinogens,	
ATc		9	퓌	Œ	돧	
(yrs)	(yrs)	(yrs)	(days/yr)	(unitiess)	(unitless)	
70	30	30	350	1 0E-06		
				plea of basil	lead to calculate rick-hased	
				200	מומים ויצע המים מים	

Indoor ax exchange rate, ER (1/h)

Floor-wall seam crack width,

Enclosed space height, Hs

ENTER Enclosed space floor width,

Enclosed space floor length, Le

Soil-bidg pressure differential,

ENTER Enclosed space floor thickness, Losek (cm)

ENTER

## CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)
Unit nsk factor, URF (µg/m³)'¹
Pure component water solubility, S (mg/L)
Organic carbon partition coefficient, K <sub>oe</sub> (cm³/g)
Cntical temperature, T <sub>c</sub> (*K)
Normal boding point, T <sub>B</sub>
Enthalpy of vaponzation at the normal bolling point, $\Delta H_{vb}$ (cal/mol)
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H
Diffusivity in water, D., (cm <sup>2</sup> /s)
Ddfusivity in alr, D <sub>6</sub> (cm²/s)

# INTERMEDIATE CALCULATIONS SHEET

,			
Floor- wall seam penmeter, Xeack (cm)	3,844	Diffusion path length, L <sub>d</sub> (cm)	
Water-filled porosity in capillary zone, $\theta_{w,cz}$ $(cm^3/cm^3)$	0 294	Total overall effective diffusion coefficient, Doff (cm²/s)	
Air-filled porosity in capillary zone, $\frac{\theta_{a,\alpha}}{(cm^3/cm^3)}$	0 136	Capillary zone effective diffusion coefficient, Doff (cm²/s)	
Total porosity in capillary zone, nca (cm³/cm³)	0 43	Stratum C G effective diffusion coefficient, Deff (cm²/s)	Reference conc , RfC (mg/m³)
Thickness of capillary zone, La (cm)	17 05	Stratum B effactive diffusion coefficient, Doff (cm²/s)	Unit risk factor, URF (µg/m³)
Stratum A soil effective vapor permeability, k, (cm²)	6 98E-10	Stratum A effective diffusion coefficient, D"A (cm²/s)	Infinite source bldg conc. Courang (µg/m³)
Stratum A soil relative air permeability, k <sub>rg</sub>	0 746	Vapor viscosity at ave soil temperature, µrs (g/cm-s)	Infinite source indoor attenuation coefficient, a (unitiess)
Stratum A soil soil intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)	Exponent of equivalent foundation Peciet number, exp(Pe <sup>(</sup> ) (unitiess)
Stratum A effective total fluid saturation, Se (cm <sup>3</sup> /cm <sup>3</sup> )	0.419	Henry's law constant at ave, groundwater temperature, temperature, atm-m³/mo!)	Area of crack, Area (cm²)
Stratum C soil au-filled porosity, $\theta_{\mathbf{u}}^{\mathbf{c}}$ $(\mathrm{cm}^3/\mathrm{cm}^3)$	0,130	Enthalpy of vaporization at ave groundwater temperature, AH <sub>v.Ts</sub> (cal/mol)	Crack effective diffusion coefficient, Dote (cm²/s)
Stratum B soil air-filled porosity, $\theta_{lackbox$	0 150	Crack depth below grade, Z <sub>creck</sub> (cm)	Average vapor flow rate into bidg , Que (cm³/s)
Stratum A soit air-filled porosity, $\theta_{\mathbf{a}}^{A}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio,  η (unitless)	Crack radius, radius, cm)
Source- building separation, Lr (cm)	1691 88	Area of enclosed space space below grade, A <sub>B</sub> (cm²)	Source vapor conc , Caura (µg/m³)
Exposure duration, r	9 46E+08	Bldg ventilation rate. Quitano (cm³/s)	Convection path length, L.p. (cm)

#### RESULTS SHEET

exposure exposure indoor component indoor groundwater exposure water exposure user conc. groundwater solubility, groundwater carcinogen noncarcinogen conc. S conc. (ug/L) (ug/L) (ug/L)	Incremental Hazard
groundwater exposure water exposure conc, groundwater solubility, groundwater noncarcinogen conc, S conc, (µg/L) (µg/L) (µg/L)	vapor from vapor
conc, groundwater sclubility, groundwater noncarcinogen conc., S conc. (ug/L) (ug/L) (ug/L)	intrusion to intrusion to
noncarcinogen conc., S conc. $(\mu g/L)$ $(\mu g/L)$ $(\mu g/L)$	
$(\mu g \Lambda_c)$ $(\mu g \Lambda_c)$ $(\mu g \Lambda_c)$	2
4.40E.04	112

0 068 0 078 0 057 0 057 0 045 0 100 0 100 0 070 0 065

0 38 0 41 0 43 0 41 0 43 0 38 0 46 0 46 0 45 0 45

0 083 0 237 0 359 0 561 0 574 0 324 0 270 0 187 0 187

109 131 156 228 228 123 148 109 123 189

0 20 0 26 1 04 14 59 0 12 0 02 0 02 0 07 0 42

VLOOKUP TABLES

θ, (cm³/cm³)

θ, (cm³/cm³)

Soil Properties Lookup Table

SCS Soil Type

				Chemic	Chemical Properties Lookup Table	Table						
	Organic			Pure	•	Henry's	Hann's			Path of Life		
	carbon			component		law constant	law constant	Normal		vaporization at	<u> </u>	
	partition	Diffusivity	Deffusivity	water	Henry's	at reference	reference	poiling	Critical	the normal	ılsk	Reference
	Ž,	_	ביי ה	soluzility,	T.	сепрегацие, Н	temperature, Ts	point,	temperature, T.	boiling point,	factor,	conc,
CAS No Chemical	(cm³/g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m³/mol)	် ပြ	S	χ Σ	_	(ua/m³)	(En/en)
50293 D.T.	9073696	4 976 00	00 100 4	LOW	i i						,	()
50200 DOI:	4 635+06	3/E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05	0 0E+00
6+285 24-Dintegraphs of	00E+00	4 30E-02	9 00E-06	1 625-03	4 63E-05	1 13E-06	25	715 90	969 27	15,000	2 1E-03	0 0E+00
53703 Dispersion North Contract	1 00E-02	2 73E-02	90-E-06	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0E+00	7 0E-03
537 US Dipenzianini acene	3 80 = +06	2 02E-02	5 18E-06	2 49E-03	6,03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03	0 0E+00
Socoo Caroon (etrachionde	174E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	15E-05	0 0E+00
50000 Benz(8)anthracene	3 98E+05	5 10E-02	900=00	9 40E-03	137E-04	3 34E-06	25	708 15	1004,79	15,000	2 1E-04	0 OE+00
Foods	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	52	624 24	885 73	13,000	3.7E-04	0 OE+00
occes gamma-MCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 805+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3.7E-04	0.05+00
60571 Dieldrin	2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 515-05	25	613 32	842 25	13,000	4 65-03	0 0E+00
63534 Benzoic Acid	6 00E-01	5 36E-02	7 97E-06	3 50 0 + 03	6 31E-05	1 54E-06	25	720 00	751 00	10,000	0 0E+00	1 4F+01
6/641 Acetone	5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	6.955	00+00	3.5F-01
6/663 Choratam	3 98E+01	104E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6,988	2 3E-05	0.0E+00
2,000 n	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00	695 00	9.510	4 0E-06	0.0F+00
7 1353 Butanol	6 92E+00	8 00E-02	9 30 5-06	7 40E+04	361E-04	8 80E-06	25	390 88	563 05	10.346	0.0E+00	3.5E-01
/1432 Benzene	5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	22	353 24	562 16	7.342	8 3E-06	0.05+00
70000 T.1.1-Inchloroethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0 0E+00	1 0E+00
72206 Engrin	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	22	718 15	986 20	12,000	0 0E+00	1 1E-03
72548 DDD	9 77E+04	1 56E-02	4 45E-06	4 50E-02	6 48E-04	1 58E-05	22	651 02	848 49	14,000	0 0E+00	1 8E-02
72550 000	1 00E+06	1 695-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05	0 0E+00
74830 Mothy house	4 4/ 11/06	1 44E-UZ	5 87E-06	1 20E-01	8 61E-04	2 10E-05	52	636 44	860 38	13,000	9 7E-05	0 0E+00
75014 View refloads (effects)	105 100 1	7.285-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	25	276 71	467 00	5,714	0.000	5 0E-03
75092 Methylene chloride	1411101	רטיקיט ר	1 235-06	2 /6E+03	1 11E+00	2 71E-02	25	259 25	432 00	5,250	8 4E-05	0 0E+00
75150 Carbon districted	4 57 5 401	2010	175-05	1 308 +04	8 98E-02	2 19E-03	25	313 00	510 00	6,706	4 7E-07	3 0E+00
75252 Bromoform	8 71E+01	4 495-02	1 035.05	2 105+03	7.4E+00	3 02E-02	25	319 00	552 00	6,391	0.000	7 0E-01
75274 Bromodichioromethans	5.50F±01	2 08E-02	1.08 1.05	240403	20-361 7 20-361 7	5 34E-04	25	422 35	00 969	9,479	1 16-06	0 0E+00
75343 1,1-Dichloroethane	3 16E+01	7 42E-02	1 055-05	5.06E+03	2 30E-02	1 605-03	5 5	363 15	585 85	7,000	185-05	001100
75354 1,1-Dichloroethylene	5.89E+01	CO-300 6	1 045.05	2 255+03	1 075+00	200	9 1	2000	00 520	CSD'D	0.05+00	5 OF-01
76448 Heptachlor	1 41 5+06	1.125-02	5.695.06	1 805-01	4475-03	70-310-7	8 8	304 73	5/6 05	6,247	5 0E-05	0.00
77474 Hexachlorocyclopentadiene	2 00F+05	1615-02	7.21E-06	1 805+00	1 115+00	70-1100-	8 8	903 09	846 31	13,000	38-03	0.00
78591 Isopharane	4 68F+01	6 23 F 02	6.76E-06	1 205+00	2725.04	2715-02	2 5	51 21 C	746 00	10,931	0 05+00	7 OE-05
78875 1 2-Dichlorompana	4 375401	20 102 7	90 100	10.100	10 LUT 7	9 635-05	<b>9</b>	500	15.00	10,271	2 7E-07	00±±00
79005 1 2.Trichlorothan	101010	70-376	00-100	2 60E+03	1155-01	2 80E-03	25	369 52	572 00	7,590	00000	4 0E-03
70048 Trichlomostructure	10-1100	7 905-02	8 80E-05	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8,322	1 6E-05	00E+00
79345 1 1 2 Tetrachloroethere	1 66E+02	7 90E-02	9 10E-06	1 100+03	4 22E-01	1 03E-02	25	360 36	544 20	7,505	1 7E-06	0 0E+00
	9 33E+01	7 105-02	7 90E-06	2 97E+03	141E-02	3 44E-04	22	419 60	661,15	966'8	5 8E-05	0 0E+00
occa Acenaphinene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0.000	2 1E-01
												•

	1	!			VLOOKUP TABLES							•
64742 France Communication	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 8E+00
94/42 Di-n-buty phthalate	3 396 +04	4 38E-02		1 12E+01	3 85E-08	9 39E-10	52	613 15	798 67	14,751	0 0E+00	3 55-01
occost Butyl Denzyl primarate	5 75E+04	1,74E-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06	22	660.60	839 68	13,000	0 0E+00	7 0E-01
occup N-Nitrosodiphenylamine	1 295 +03	3 12E-02	6 35€-06	3 51E+01	2 05E-04	5 00E-06	52	632 28	890 45	13,000	1 4E-06	0 0E+00
60/3/ Fluorene	1 38E+04	3 63E-02	7 88E-06	1 98E+00	2 61E-03	6 37E-05	52	570 44	870 00	12,666	0 0E+00	14E-01
87683 Devacables 1.3 http://oce	3 39E+03	3 905-02		7 48E+00	6 26E-07	1 53E-08	52	627 87	899 00	13,977	5.7E-06	0 0E+00
87865 Pentachlorophenol	5.92 11.04	5 60F-02	6 10E-06	3 23E+00	3.34E-0.1	8 15E-03	53	486 15	738 00	10,206	2 2E-05	00000
88062 2,4,6-Trichlorophenal	3.81E+02	3 18E-02	6 25E-06	8 00E+02	3 195-04	7 78F-06	2 5	519 15	749.03	000,51	2 4 1 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	200
91203 Naphthalene	2 00E+03	5 90E-02		3 10E+01	1 98E-02	4 83E-04	52	49114	748 40	10.373	0 0E+00	14E-01
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 11E+00	1 64E-07	4 00E-09	52	560 26	754 03	13,000	135-04	0 0E+00
	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	25	417 60	630.30	8,661	0 0E+00	7 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1,20E-06	25	464 19	09 269	10,800	00+300	1 8E-01
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	52	453 57	705 00	9,700	0 0E+00	2 0E-01
955/4 2 4 F. Trophorope	3 885 +02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9,572	0 0E+00	1 8E-02
98953 Mitchenzene	6 48F±03	2 91E-02	/ USE-UB	1 20E+03	1/81:-04	4 34E-06	5 5 5 1	526 15	759 13	13,000	0 0E+00	3 55-01
100414 Ethylbenzene	3 63 F + 02	7.505-02	7 80E-06	2 USE+U3	3 24 11-04	2 40E-05 7 88E 03	8 4	463.95	719 00	10,566	0 0E+00	2 0E-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 135-01	2 76F-03	25.5	409.54	636.00	0,00 0,00 0,00 0,00	20+110-0	1 06+00
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	25	484 13	707 60	11 329	90.40	7 OF-02
106423 p-Xytene	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	26	411 52	616 20	8.525	00E+00	7 0E+00
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	52	447 21	684 75	9,271	0 0E+00	8 0E-01
105478 p-Chloroaniine	6 6 1 E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	22	503 65	754 00	11,689	0 0E+00	1 4E-02
10,002 1,z-Dkindingmane 108054 Vind acetate	1 /4E+U1	1045-01	905-06	8 52E+03	4 01E-02	9 78E-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m. Kylene	3 235+00	7 000 03	3 ZUE-U0	4 C4T :03	2 10E-02	5 12E-04	8	345 65	519 13	7,800	0 0€+00	2 0E-01
108883 Tolliene	1 875+02	20-202 0	1 00E-00	1 515+02	3015-01	7.345-03		412 27	617 05	8,523	0 0E+00	7 0E+00
108907 Chlorobenzene	2 19F+02	7 30E-02	8 20E-08	3 20E+02 4 72E+03	2 /2E-01	27100	2 2	383 78	591 79	7,930	0 0 0 0 0	4 0E-01
	2.88E+01	8 20F-02	9 10F-06	A 28F+04	1 63 1 0 5	3 000.07		404 0/ 464 0/	604.20	0,410	0 UE+00	2 UE-02
111444 Bis(2-chloroethyl)ether	1 55E+01	6 925-02	7.53F-06	1 72F±04	7 38E-04	1 800.08		455 02	07 460	028,01	U UE +00	2 15 00
	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	3 5	451 15 674 43	67 500 67 500	9,000	3.35-04	0 01 00
117817 Bis(2-ethythexyt)phthalate	151E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07		657 15	806 00	15,999	4 0F-06	0.05+00
117840 Den-octyl phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05		704 09	862 22	15,000	00=+00	7 0E-02
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5.916-06	6 20E+00	5 41E-02	1 32E-03		582 55	825 00	14,447	4 6E-04	00+300
12012/ Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6.51E-05		615 18	873 00		0 05+00	1 1E+00
	1 475+03	3 00E-02	8 235-06	3 00=+02	5 82E-02	1 42E-03		486 15	725 00		0 0 0 0	2 0E-01
121142 2 4-Districtory and	0 555403	3 405-02	7 06E 06	2 705+03	1 30E-04	31/15-06		482 15	708 17		0 0E+00	1 15-02
124481 Chlorodibromomethane	6.31F+01	1 965-02	1 05E-05	2 / UE+02 2 60E+03	3 245-02	9 2 / E-08	Q E	590 00	814 00	13,467	# 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 OE+00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 OOE+02	7 54E-01	1 84F-02		394.40	620.20	0000	2 4t-U5	000100
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 105-05		667 95	936 00		0.05+00	1 15-01
156592 ds-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00		0.000	3 55-02
155605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516 50		0 0E+00	7 0E-02
195590 indeno( 1,2,5-cd.)pyrene	347E+05	1 905-02		2 20E-05	6 56E-05	1 60E-06		809 15	1078 24	17,000	2 1E-04	0 0E+00
20552 Delizational and an entering 206440 Filographene	1 075+05	3.025-02	5 26E-06	1 50E-03	4 55E-U3	1115-04		715 90	969 27	15,000	2 16-04	0 0E+00
207089 Benzofkiftuaranthene	1236+06	2 26E-02		4 00 E	3 40E-0#	0 300 03	Q t	000 90	905 00	13,815	0.05+00	1 4E-01
218019 Chrysene	3 98E+05	2 48E-02		1 60E-03	3 88 F-03	9 465-05		714 15	07 6101	16,000	2.1E-05	0.05+00
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70F-04		503.03	839.37	20,450	200	00-10-0
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		596.55	839.36	13,000	1 8 H	00+400
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839.36	13,000	5 35-04	00+100
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		38115	587 38	000'	3 7E-05	2 0E-02
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02		1 82E+02	3 06E-05	7 46E-07		558 00	770 00	12,938	1 9E-04	0 0E+00
621047 Nethirosogi-n-propyiamine	2 40E+01	5 455-02		9 89E+03	9 Z3E-05	2 25E-06		209 60	746 87	11,000	2 0E-03	0 OE+00
7439976 Mercury (elemental)	5 205+04	3.075-02	4 235-Ub	2 00E-01	3 905-04	9 51E-06		613.96	848 76	13,000	2 6E-03	0 OE+00
A001352 Toxanbana		1 16E-02		2 40E-02	2 46F 04	1 145-02	នូង	629 88	1750 00	14,127	0 0E+00	3 0E-04
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02		8 00F-02	1 89F-01	4 60E-03	0 K	657.15	6/331	14,000	3254	0 0 0 0
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00F-03	3 15	377 50	512.27	200	1 UP-04	001=00
12674112 Araclar 1016 (PCB-1016)	3 30E+04	2 22E-02		4 20E-01	1 19E-02	2 90E-04	2 2		475 22	18,000	10 H	00=100
53469219 Aroctor 1242 (PCB-1242)	3 30E+04	2 14E-02	5315-06	3 40E-01	2 13E-02	5 20E-04	52	345 50	482 20	18,000	1 0E-04	00=+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

ENTER Initial groundwater conc,

Chemical CAS No

ENTER

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

		ENTER	User-defined stratum A soil vapor permeability, ky	/	
			æ		
		ENTER	SCS Soil type (used to estimate sell vapor	SI	ENTER Stratum C soil water-filled porosity, $\theta_{\rm s}^{\rm c}$ $({ m cm}^3/{ m cm}^3)$
		ENTER	SCS soil type directly above	S	ENTER Stratum C soil total porosity, nc (unitiess)
		ENTER	Soil stratum directly above water table, (Fnter A. B. or C.)	o	ENTER Stratum C soil dry bulk density, $\rho_{\rm b}^{\rm c}$ (g/cm³)
	sthane	ENTER (Lwt (cell D28)	Thickness of soil stratum C, (Enter value or 0) t <sub>C</sub>	975 36	ENTER Stratum B soll water-filled porosity, $\theta_w^{B}$ (cm <sup>3</sup> /cm <sup>3</sup> )
Chemical	Bromodichloromethane	NTER ENTER ENTER Totals of Lwr (cell D28)	Thickness of soil stratum B, (Enter value or 0) he (cm)	152 4	ENTER Stratum B soil total porosity, n <sup>a</sup> (untless)
		ENTER Totals mus	Thickness of soil stratum A, h <sub>A</sub>	579 12	ENTER Stratum B soil dry bulk density, pb (g/cm³)
		ENTER	Depth below grade to water table, Lwr (cm)	1706 88	ENTER Stratum A soil water-filled porosity, 6 % (cm³/cm³)
C.w (µg/L)	2 32	ENTER Depth	below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	15	ENTER Stratum A soul total porosity, n <sup>A</sup> (unritess)
(numbers only, no dashes)	75274	ENTER	Average soll/ groundwater temperature, T <sub>s</sub> (°C)	16	ENTER Stratum A soil dry bulk density, p <sub>b</sub> <sup>A</sup> (g/cm³)

(cm <sub>3</sub> /cm <sub>3</sub> )	03					
(unitless)	0.43					
(g/cm³)	1 21	ENTER	Indoor	rate,	(1/h)	0.45
(cm³/cm³)	0.27	ENTER	Floor-wall	width,	(cm)	0.1
(unitless)	0 42	ENTER	Enctosed	height,	(cm)	488
(g/cm³)	17	ENTER	space floor	width,	(cm)	1961
(cm³/cm³)	0.2	ENTER	space	length, La	(cm)	961
(unitless)	0 43	ENTER	Soil-bldg pressure	differential, ΔP	(g/cm-s²)	40
(g/cm³)	15	ENTER Enclosed	space	thickness, L <sub>one</sub> k	(сш)	15

0.1	ENTER Target hazard	quotient for	noncarchogens,	H	(unitless)	-	Used to catculate risk-based	groundwater concentration	1,50
488	ENTER	nsk for	carcinogens,	포	(unitiess)	1 0E-06	Used to catcul	groundwater	
961	ENTER	Exposure	frequency.	띪	(days/yr)	350			
961	ENTER	Exposure	duration,	G	(yrs)	30			
40	ENTER Averaging	time for	noncarcinogens,	AT <sub>NC</sub>	(yrs)	30			
15	ENTER Averaging	time for	carcinogens,	ΑT <sub>C</sub>	(yrs)	70			

## CHEMICAL PROPERTIES SHEET

	Reference	, 800 900	<b>7</b>	(mg/m³)
Chat	돌 .	ractor,	AR.	(µg/m³)-1
Pure component	water	Solubility	တ	(mg/L)
Organic	partition	coemicient,	Ϋ́8	(cm <sub>3</sub> /g)
	Called	=		- 1
Normal	Dog 1	֓֞֝֟֟֓֟֟֟֟֓֟֟ ֓֓֓֞֓֞֓֞֓֞֓֞֓֞֓֓֓֞֓֞֓֓֓֞֓֞֓֓֓֓֡֓֡֓֓֡֓֓֓֡֓֓֡	<b>-</b>	ફ્
Enthatpy of vaponzation at	the normal	position point.	۵Η,,	(cal/mol)
Henry's law constant	reference	emberame,	<b>~</b>	္မ
Henry's law constant	al reference	'a meradina	E '	(atm-m³/mol)
1	Durusiyiry in impor	in water	₃ <b>*</b> '	(cm <sup>2</sup> /s)
; ;	in air		ວ້ ີ	(cm²/s)

Floor- wall seam permeter, X-ceat	3,844	Drifusion path length, Le	1691 88	
Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.294	Total overall effective diffusion coefficient, $D^{eff}_{\Gamma}$ (cm <sup>2</sup> /s)	2 96E-04	
Air-filled porosity in capillary zone, $\theta_a = (cm^3/cm^3)$	0 136	Capillary zone effective diffusion coefficient, Deff cm²(s)	2 30E-04	
Total porosity in capiliary zone, n <sub>ca</sub> (cm³/cm³)	0.43	Stratum C C effective diffusion coefficient, Doff (cm²/s)	2 04E-04	Reference conc , RfC (mg/m³)
Thickness of capillary zone, L <sub>cz</sub>	17,05	Stratum B B diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	3 22E-04	Unit risk factor, URF (µg/m³) 1
Stratum A soil effective vapor permeability, k, (cm²)	6 98E-10	Stratum A effective diffusion coefficient, Deff (cm²/s)	1 21E-03	Infinite source source bldg conc., C <sub>bulding</sub> (μg/m³)
Stratum A soll relative air permeability, $k_{ro}$ $(cm^2)$	0 746	Vapor viscosity at ave soil temperature, Hrs (g/cm-s)	1 77E-04	Infinite source indoor attenuation coefficient, a (unitless)
Stratum A soil untrinstc permeability, k (cm²)	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitiess)	4 49E-02	Exponent of equivalent foundation Peclet number, exp(Pe <sup>§</sup> ) (untiless)
Stratum A effective total fluid saturation, S <sub>ae</sub> (cm³/cm³)	0.419	Henry's law constant at ave, groundwater temperature, H <sub>Ts</sub> (atm-m³/mol)	1 07E-03	Area of crack, Acret (cm²)
Stratum C soil air-filled porosity, $\theta_o^c$ (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, AH, 15 (cal/mol)	7,723	Crack effective diffusion coefficient, Deact (cm <sup>2</sup> /s)
Stratum B soll air-filled porosity, $\theta_{\mathbf{a}}^{\mathbf{B}}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zanet (cm)	15	Average vapor flow rate into bidg .  Q <sub>sot</sub> (cm <sup>3</sup> /s)
Stratum A soil all-filled porosity, $\theta_{\rm in}^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.230	Crack- to-total area ratio, n	4 16E-04	Crack radius, fends (cm)
Source- building separation, L <sub>T</sub> (cm)	1691.88	Area of enclosed space space below grade, As	9 24E+05	Source vapor conc , Ceorce (µg/m³)
Exposure duration, t	9 46E+08	Bidg. ventilation rate, Q <sub>barkeng</sub> (cm <sup>3</sup> /s)	5 63E+04	Convection path length, L <sub>p</sub> (cm)

#### RESULTS SHEET

RISK-BASE	USK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	ER CONCENTR	ATION CALC	ULATIONS	INCREMENTAL	INCREMENTAL RISK CALCULATIONS
					Incremental	Hazard
Indoor	Indoor	Risk-based	Pure	Final	nsk from	quotient
exposnue	exposine	indoor	component	ndoor	vapor	from vapor
groundwater	groundwater	exposure	water	exposure	intrusion to	intrusion to
conc,	conc.,	groundwater	solubility,	groundwater	indoor air,	indoor air,
carcinogen	noncarcinogen	COUC		conc,	carcinogen	noncarcinogen
(µg/L)	(µg/L)	(hg/L)	(µg/L)	(mg/L)	(unitless)	(unitless)
1 30E+03	ΑN	1 30E+03	6 74E+06	1 30E+03	¥	¥Z

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

VLOOKUP TABLES

Soil Properties Lookup Table

T Too ou	į.				ئو تو	نه نه							
aca soli i ype	V. (CIII/II)			1	θ. (cm'/cm')	θ, (cm²/cm²)	Mean Grain Diameter (cm)						
<u>ပ</u> (	0 70	0 008	1 09	0 083	0.38	990 0	0 0092						
ָל ָּר	0 26	0 0 19	131	0 237	0 41	0 095	0 016						
	2	0 036	1 56	0 359	0 43	0 078	0 050						
S.	14 59	0 124	2.28	0 561	0 41	0 057	0 040						
m :	29 70	0 145	2 68	0 627	0 43	0 045	0 044						
ည်း	0 12	0 027	1 23	0.187	0 38	0 100	0 025						
SC.	33	0 028	1 48	0 324	0 39	0 100	0 029						
10.	0.25	0 016	1 37	0,270	0 46	0 034	0 0046						
Sign	0 05	0 002	1 09	0 083	0.26	0.000	0 0039						
SICL	0 0 2	0 010	1.23	0 187	0 43	0 089	0 0026						
SIL	0 45	0 020	14.	0 291	0 45	290 0	0 011						
JS.	4 42	0 075	1 89	0 471	0 41	0 065	0 030						
								_					
										;			
					Chemic	Chemical Properties Lookup Table	okup Table						
		Organic			Pure		Henry's	Henry's			Enthalox of		
		carpon			component		law constant	law constant	Norma		vanorization at	ţ.	
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	polino	Crifical	the normal	1 20	Deference
	_	coefficient,	ın air,	in water,	solubility,	law constant	femperature,	temperature,	point.	temperature.	bolling point	factor a	Pariente de la constante de la
		ጜ	០ឺ	្នំ	Ø	ì	I	· -	<u>۔</u> ۔	Ľ	HV	<u> </u>	2 6
CAS No Chemical		(cm <sub>3</sub> /g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m³/mot)	ို ပို	. £	? <del>{</del>	_	(m/m <sup>3</sup> ).1	(mod/m <sup>3</sup> )
		-								,		(	/
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 505-02	3 32E-04	8 10E-06	25	533 1	72075	11 000	970.05	0
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 135-06	35	715 90		000,11	2 6	00+100
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	90- <u>3</u> 90 6	2 79E+03	1.82E-05	4 44E-07	, K			000,51	50-11-0	00100
53703 Dibenz(a,h)anthracene		3 80至+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	147E-08	3 45	743.24		000'61	006400	00.100
56235 Carbon tetrachlonde		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3.055-02	8 60			70,00	20-11-4	00+100
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 OOE-06	9 40E-03	1 37E-04	3.346-06	35.5		•	15,121	- c	00+100
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 855-05	3,5			13,000	40-14-4	00+100
58899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40F-05	2,5			13,000	יים ליים אין היים אין היים	0000
60571 Dieldrin		2.14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	151E-05	35.			13,000	100	000
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 505+03	631E-05	1.548-06	35			000'61	4 40.03	00400
67641 Acetone		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1.595-03	2 88E-05	3 %			000,0	00400	1411
67663 Chloroform		3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 661.03	3 %		536.40	CC6'0	201100	3 55-01
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25			0,300	ייי של הייי הייי של הייי	000
71363 Butanol		6 92€+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 805-06	3 5			9,010	מילים לי	00=+00
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25			7.342	80.TE	00+100
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	52			7.136	0 0E+00	101100
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25			12.000	001100	1 1F-03
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25			14,000	00++00	1 8 1 0 2
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25			14,000	8.9F-05	0.0E+00
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25			13,000	9.7E-05	0 0E+00
74839 Methyl bromide		1 05臣+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	25			5,714	00+00	5 0F-03
/5014 Vinyl chloride (chloroethene)	ane)	1 86E+01	1 06E-01	1 23E-06	2,76E+03	1 11E+00	2 71E-02	25	259 25		5,250	8 4E 05	00+00
/5092 Methylene chloride		1 17E+01	1 01E-01	1 17E-05	1.30E+04	8 98E-02	2 19E-03	25			6,706	4 7E-07	3 011+00
75150 Carbon disulfide		4 57E+01	1 04E-01	1.00E-05	1 19E+03	1 24E+00	3 02E-02	25	319 00		6,391	0 0E+00	7 0E-01
/ 5252 Bromotom		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422 35		9,479	1 1E-06	0 0E+00
722/4 Bromodichloromethane		5.50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 8E-05	0 0E+00
7044 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	25	330 55		6,895	0 0E+00	5 0E-01
75344 1,1-Dichloroethylene		5.89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6,247	5 OE-05	0 0E+00
7449 neplacing		1 41 1 + 06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	52	603 69	84631	13,000	1 3E-03	0 0E+00
78501 Insubation	<b>e</b>	Z 00E+05	1 61E-02	7 21E-06	1 805+00	1115+00	2 71E-02	25			10,931	0 0E+00	7 0E-05
7887# 4 2-Dichloroman		1011004	20-ESE-02	0 70170	1 205+04	2 72E-04	6 63E-06	52	488 35		10,271	2 7E-07	0 0E+00
79005 1.1.2-Trichlorethans		10,40,40	7 805 03	6.73E-06	2 BUE+03	1 15E-01	2 80E-03	25	369 52		7,590	0.0E+00	4 0E-03
79016 Trichloroethylene		1 66F+02	7 905-02	8 80E-06 9 10E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15		8,322	1 6E-05	0 05+00
79345 1.1.2.2-Tetrachloroethane	a	9 33 = +0.4	7 100-02	2 OOE OE	0.025.03	4 445 00	1 035-02	52			7,505	1 7E-06	0 0E+00
83329 Acenaphthene	,	7 08E+03	4 21E-02	7.69E-06	4 24E+00	A 36E-02	4400	8 8		661	966'8	5 8E-05	0 0E+00
)		3	101	00-1160	4 44ET-00	0 201-02	1 55E-04	8	550 54	803 15	12,155	000+00	2 1E-01

84662 Diethyinhthalate	001000		i i		VLOOKUP TABLES								
84742 Di-n-buty ohthalate	3 30E+04	4 38E-02	7 855 06	1 08E+03	1855-05	4 51E-07	8	567 15	757 00	13,733	0.00	2 8E+00	
85687 Butyl benzyl phthalate	5 75F+04	1 74E-02	4 83E-05	2 605+00	3 855-08	9 39E-10	52	613 15	798 67	14,751	0.000	3 55-01	
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02		2 51E+01	2.050.00	- 20E-30	8 8	660 60	839 68	13,000	0 0E+00	7 0E-01	
86737 Fluorene	1 38E+04	3 63E-02	7.885-06	1 98E+01	2.615.03	3 UUE-UB	3 2	632.28	890 45	13,000	1 4E-06	0 0 0 0	
86748 Carbazole	3 39E+03	3 90E-02		7 48E+00	6.26F-07	1 575-08	0 %	5704	90000	12,606	06+30	1 4E-01	
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3.34E-01	8 155-03	3 %	486 15	738 00	179,51	0 / H	00+100	
87865 Pentachtorophenol	5 92E+02	5 60E-02	6 105-06	1 95E+03	1 00E-06	2 44E-08	22	582 15	813.20	14 000	3.45.05	00+40	
90002 Z,4,5-i fichiorophenol 91203 Nambibalana	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	22	519 15	749 03	12,000	3 15-06	0 OE+00	
91941 3.3-Dichlomberzique	2 24E+03	5 90E-02	7 50E-06	3 10E+01	1 98 <b>E-</b> 02	4 83E-04	52	491 14	748 40	10,373	0.0E+00	1 4E-01	
95476 o-Xytene	3.635+02	8 705-02	40000	3 17E+OU	1 64 E-07	4 00E-09	52	560 26	754 03	13,000	135-04	0 0E+00	
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30F-06	2 60F±04	4 02E-01	5 20E-03	25	417 60	630 30	8,661	00000	7 OE+00	
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79F-02	1 90E-08	Q Y	464 19	697 60	10,800	0 0E+00	1 8E-01	
95578 2-Chlorophenol	3 88E+02	501E-02		2 20E+04	1 60E-02	3 90 5-04		453 57	/US 00 675 00	9,700	201400	2 OE-01	
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06		526 15	759 13	13,000	00+40	3 SE-02	
98853 Nitrobenzene	6 46E+01	7 60E-02		2 09E+03	9 84E-04	2 40E-05	52	483 95	719 00	10,566	000+00	2 05-03	
100424 Emylbenzene	3 63E+02	7 50E-02		1 69E+02	3 23E-01	7 88E-03		409 34	617 20	8,501	00+900	1 0E+00	
105679-24-Dimethylahone	7 /bE+02	/ 10E-02		3 10€+02	1 13E-01	2 76E-03		418 31	636 00	8,737	0 0E+00	1 0E+00	
106423 p-Xylene	3 895+02	2 69E-02	8 6911-06	787E+03	8 20E-05	2 00E-06		484 13	707 60	11,329	0 0E+00	7 0E-02	
106467 1,4-Dichlorobenzene	6 17E+02	6 BOE-02		1 38E+02	3 14E-U1	7 66E-03		411 52	616 20	8,525	0 0E+00	7 0E+00	
106478 p-Chloroantline	6.61E+01	4 83E-02		5.30F+03	36E-05	2 22 23	2 6	447.21	684 75	9,271	0 0 0	8 00-01	
107062 1,2-Dichloroethane	1 74E+01	104E-01		8 52E+03	4 01E-02	3 32E-07	0 K	503 65 256 66	00 47 50	11,689	0.05+00	1 4E-02	
108054 Vinyl acetate	5 25E+00	8 505-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	3 15	330 03 345 65	510 13	7, 7	2 6E-05	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
108383 m-Xylene	4 07E+02	7 00E-02		1 61E+02	3 01E-01	7 34E-03		412.27	617.05	000	00==00	Z 0E-01	
10883 fotuene		8 70E-02	8 60 <b>E</b> -06	5 26E+02	2 72E-01	6 63E-03	52	383 78	591 79	7 930	0.05+00	4 08-03	
108907 CMorobenzene 108952 Bhanal		7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03	22	404 87	632 40	8,410	0000	2 05-02	
111444 Bis(2-chlomothythor	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	52	455 02	694 20	10,920	0 0 0 0	2 1E+00	
115297 Endosufan	1 55E+U1 2 14E+03	6 92E-02	7 53E-06	1 72E+04	7 385-04	1 80E-05	72	451 15	629 79	9,000	3 3E-04	0 0E+00	
117817 Bis(2-ethythexyt)phthalate		3515-02		2 TO TO TO TO TO TO TO TO TO TO TO TO TO	4 39E-14	1125-05		674 43	942 94	14,000	0 0E+00	2 1E-02	
117840 Di-n-octyl phthalate	8 32E+07	151E-02		2 00 5 -0.0	7.10E-00	1 UZE-U/		657.15	806 00	15,999	4 0E-06	0 0E+00	
118741 Hexachlorobenzene	5 50E+04	5 42E-02		6 20E+00	5.416-02	1 32 E-03	6 K	704 09 583 68	862 22	15,000	00±00 00±00	7 0E-02	
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05	3 %	362 33 615 18	973.00	14 44 7	4 6F-04	0.05+00	
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02		3 00E+02	5 82E-02	1 42E-03		486 15	725.00	10,471		1 15+00	
120832 2,4-Dichlorophenol		3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06		482 15	708 17	11,000	00100	1 1E-02	
121142 z,4-Dinigologne	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08		590 00	814 00	13,467	195-04	0.05+00	
127184 Tetrachioroethdene	0 31E+U1	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04		416 14	678 20	8,000	2 4E-05	0 0 0 0 0	
129000 Pyrene	1 055+05	20=02	8 20E-06	2 00E+02	7.54E-01	1 84E-02		394 40	620 20	8,288	5 8E-07	0 0E+00	
155592 cis-1,2-Dichloroethyfene	3 55E+01	7.36E-02	1 135-05	3 50F±03	4 675.01	1 105-05		667 95	936 00	14,370	0 OE+00	1 1E-01	
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3.85F-01	9 30 11-03	8 8	333 65	544 00	7,192	0 0E+00	3 5E-02	
193395 indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1605-06		100 45	016 00	71/0	0.05+00	7 0E-02	
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1115-04		715 90	969 27	000,41	2 TT 0	00+100	
207080 Pertolianumene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 61E-05		655 95	905 00	13,815	0 0E+00	1 4F-01	
218019 Chrysene	3 QRE+06	2.485.02	3 35E-U6	8 00E-04	3 40E-05	8 29E-07	25 7	753 15	1019 70	16,000	2 15-05	0 0E+00	
309002 Aldrin	2.45E+06	1 32E-02	4 865.08	1 000-03	3 03E-03	9 46E-05	22	714 15	979 00	16,455	2 1E-06	0 0E+00	
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7.345-06	2 00F±00	6 97E-U3	1 70E-04		603 01	839 37	13,000	4 9€-03	0 0E+00	
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3.05E-05	7.445.07	0 4	396 35 506 55	839 36	13,000	1 8E-03	0 0E+00	
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	839 36 597 30	13,000	5 35 04	0 0 0 0 0	
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07		558.00	770 00	000, 5	2010	2 UE-02	
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 255-06		509 60	74687	11,000	2000	00000	
7439976 Mercury (elemental)	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9 51E-06	25 6		848 76	13,000	2 6E-03	0 0E+00	
8001352 Toxaphene	2 575+05	1 165-02	0 30E-00	5 62E-02	4 67E-01	1 14E-02			1750 00	14,127	0 0E+00	3 0E-04	
	2 90E+05	1.38F-02	4 32F-06	A 00E-01	7 40E-04	6 00E-08	52	657 15	873 31	14,000	3 2E-04	0 0E+00	
11097691 Arador 1254 (PCB-1254)	2 00E+05	1 56E-02	; 5	5 70E-02	8 20E-02	4 00E-03	3 %	40250	539.37	19,000	1 05 04	0 0E+00	
12674112 Arodor 1016 (PCB-1016)	3 305+04	2 22E-02	5	4 20E-01	1 19E-02	2 905-04		340.50	314.27	19,000	1 OE-04	0 0E +00	
53469219 Aroclor 1242 (PCB-1242)	3 30E+04	2 14E-02	9	3 40E-01	2 13E-02	5 20E-04	22 72 73 73 73 73	345 50	473 22	18,000	1 0E-04	0 00 +00	
									;	2	<b>5</b>	י טיבייטין	_

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1 2 September, 1998

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

ENTER Initial groundwater conc.,

Chemical CAS No (numbers only,

ENTER

YES

		ER.	Jser-defined stratum A	apor	SOUILY.	<u>(</u>						
		ENTER	User-define stratum A	soil vapor	permeaoi , k	(cm²)						
				(	5							
		ENTER	stratum A SCS	soil type	(used to estimate soil vapor	permeability)	SC	ENTER	Stratum C	porosity,	ບ ອີ	(cm <sub>3</sub> /cm <sub>3</sub> )
		ENTER		SCS	directly above	water table	S	ENTER	Stratum C	porosity,	ی	(nutless)
		ENTER	Soll	stratum	water table,	(Enter A, B, or C)	O	ENTER	Stratum C	bulk density,	୍ଦୁ	(g/cm³)
	rlene	ENTER I Lwr (cell D28)	Thickness of soil	stratum C.	(Ciller value of c)	(cm)	2286	ENTER	Stratum B	porosity,	8 <sup>*</sup> 8	(ст <sub>3</sub> /ст <sub>3</sub> )
Chemical	1,1-Dichloroethylene	NTER ENTER ENTER Totals must add up to value of L <sub>w1</sub> (cell D28)	Thickness of soil	stratum B,	ha ha	(cm)	274 32	ENTER	Stratum B	porosity,	<b>"</b> C	(unitless)
		ENTER Totals mu	Thickness		, This	(cm)	243 84	ENTER	Stratum B	bulk density,	<b>g</b>	(g/cm³)
_		ENTER	Depth	below grade	LwT	(cm)	2804 16	ENTER	Stratum A	porosity,	<b>∀</b> ,¥	(cm <sub>3</sub> /cm <sub>3</sub> )
(µg/L)	2 295	ENTER Depth	below grade to bottom	of enclosed	space iloui, Le	(cm)	15	ENTER	Stratum A soil total	porosity,	<b>4</b> _	(unitless)
no dashes)	75354	ENTER	Average soil/	groundwater	T <sub>s</sub>	(ర్జి)	16	ENTER	Stratum A soil drv	bulk density,	₹a	(g/cm³)

15	0 43	0.2	17	0 42	0 27	17	0 43	4
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
Enclosed		Enclosed	Enclosed					
space	Soil-bidg	space	space	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
thickness,	differential,	length,	width,	height,	width,	rate,		
Loreck	ďδ	ŗ	Wg	f	*	띪		
(cm)	(g/cm-s²)	(cm)	(cm)	(cm)	(cm)	(1/h)		
							1	
15	40	961	961	488	0.1	0.45		
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER			
Averaging	Averaging			Target	Target hazard			
time for	time for	Exposure	Exposure	risk for	quotient for			
carcinogens,	noncarcinogens,	duration,	frequency,	carcinogens,	noncardnogens,			
ΑT <sub>C</sub>	ATNC	8	Ш	Ŧ	된			
(Ars)	(AUS)	(vrs)	(davs/vr)	(unitless)	(unitless)			

and outstanding	THO	(unitless)		Jsed to calculate risk-based groundwater concentration
nsk for	carcinogens, TR	(unitless)	1 0E-06	Used to ca groundwa
Exposure	frequency, EF	(days/yr)	350	
Exposure	duration, ED	(yrs)	8	
time for	noncarcinogens, AT <sub>NC</sub>	(yrs)	30	
time for	carcinogens, AT <sub>c</sub>	(yrs)	70	

## CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)
Unit nsk fador, URF (µg/m³) <sup>-1</sup>
Pure component water sotubility, S (mg/L)
Organic carbon partition coefficient, K <sub>cc</sub> (cm <sup>3</sup> /g)
Critical temperature, Tc (%)
Normal bosling point, T <sub>B</sub>
Enthalpy of vaportzation at the normal boiling point, $\Delta H_{\nu,p}$ (cal/mol)
Henry's law constant reference temperature, Ta
Henry's law constant at reference temperature, H
Diffusivity in water, D <sub>w</sub> (cm²/s)
Diffusivity in air, Ds. (cm²/s)

# INTERMEDIATE CALCULATIONS SHEET

total full contacts of permeability, permeab	Stratum B
S <sub>ns</sub> (cm²/cm²)         k²         k²         L <sub>cz</sub> (cm²)         (cm²/cm²)         (cm	air-filled porosity,
0.303   4.49E-10   0.834   3.75E-10   17.05   0.43   0.136   0.294     Henry's law Henry's law Vapor A B C Zone overall constant at constant at constant at constant at we soil diffusion source Infinite foundation indoor source Unit attenuation bldg nisk Reference conc.    Area of Peciet attenuation bldg nisk Reference conc. Area exp(Pe <sup>f</sup> ) α C <sub>buston</sub> (μg/m³) (μg/m³) (μg/m³) (μg/m³) (μg/m³)	္ မ ့ မ
Henry's law Henry's law Vapor A B C zone overall constant at constant at viscosity at effective	0 130
Henry's law Henry's law Vapor A defective effective effe	
constant at constant at viscosity at effective	Enthalpy of
ave groundwater ave soil diffusion diffusion diffusion diffusion temperature, temperature, coefficient, conc, factor, conc, conc, coefficient, coefficient, conc, conc, conc, coefficient, component coefficient, conc, factor, conc, conc, coefficient, conc, conc, conc, coefficient, coefficient, conc, conc, conc, conc, coefficient, conc, con	vaporization at
H <sub>TS</sub>   H <sub>TS</sub>   H <sub>TS</sub>   Deff.   Coefficient, conc, factor, conc, coefficient, communities   Coefficient, conc, factor, conc, coefficient, coefficient, conc, factor, conc, coefficient, coefficient, conc, factor, conc, coefficient, coeffi	ave groundwater
H <sub>Ts</sub> μts         D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup>mt</sup> <sub>A</sub> D <sup></sup>	temperature,
(unitiess)         (g/cm-s)         (cm²/s)         (cm²/s)         (cm²/s)         (cm²/s)         (cm²/s)         (cm²/s)           7 88E-01         1 77E-04         3 65E-03         9 22E-04         5 47E-04         6 30E-04         6 15E-04           Exponent of unfinite equivalent source foundation indoor source foundation indoor source number, coefficient, conc, exp(Pe¹)         Unit         Reference           Paciet attenuation bldg nisk number, coefficient, conc, exp(Pe¹)         Coulding         nisk nisk number           exp(Pe¹)         α Coulding         URF RfC           (unitless)         (ug/m³)¹ (ug/m³)¹ (ug/m³)¹ (ug/m³)²	ΔH, τs
T 88E-01         1 77E-04         3 65E-03         9 22E-04         5 47E-04         6 30E-04         6 15E-04           Exponent of Infinite equivalent source foundation indoor source foundation indoor source number, coefficient, conc, factor, conc, exp(Pe)         Unit risk Reference conc, factor, conc, axp(Pe)         Coulding         RFC           exp(Pe)         α         Coulding         (μg/m³)*         (μg/m³)*         (μg/m³)*	(cal/mol)
Exponent of Infinite equivalent source Infinite foundation indoor source Unit Peciet attenuation bidg risk number, coefficient, conc., factor, exp(Pe) \( \alpha \) (unitless) \( \alpha \) (unitless) \( \alpha \) (unitless)	6,353
equivalent source Infinite foundation indoor source Unit Peciet attenuation bidg risk number, coefficient, conc, factor, exp(Pe <sup>f</sup> ) α C <sub>bulding</sub> URF (unitiess) (unitiess) (μg/m³) (μg/m³)	
foundation indoor source Unit Peciet attenuation blog risk number, coefficient, conc, factor, exp(Pe') α C <sub>buldeng</sub> URF (unitiess) (unitiess) (μg/m³) (μg/m³)	Crack
Peciet attenuation bldg risk number, coefficient, conc., factor, exp(Pe $^{\dagger}$ ) $\alpha$ Couding URF (unitiess) (unitiess) (unitiess) (upim $^3$ ) (unitiess)	effective
number, coefficient, conc, factor, exp(Pe') $\alpha$ $C_{\rm building}$ $URF$ $(\mu nitless)$ $(\mu g/m^3)$ $(\mu g/m^3)$ $(\mu g/m^3)$	diffusion
exp(Pe $^{\prime}$ ) $lpha$ C <sub>outsing</sub> URF ( $\mu$ Unitless) (ug/m $^3$ ) (ug/m $^3$ ) $^{\prime}$ ( $\mu$	coefficient,
(unitiess) (unitiess) (µg/m³) (µg/m³)**	Dank
	(cm <sup>2</sup> /s)

### RESULTS SHEET

RISK-BASE	RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	ER CONCENTR	ATION CALC	ULATIONS	INCREMENTAL	INCREMENTAL RISK CALCULATIONS.
Indoor	Joopul	Rick. hase	9	Ğ	Incremental	Hazard
exposine	BANDSIILE	nodoor Indoor	- me	industrial	HSK HOH	denone
-	a in poorting	5		DOD!!	vapor	пош vapor
groundwater	groundwater	exposure	water	exposnre	intrusion to	infrusion to
cone,	conc,	groundwater	solubility,	groundwater	indoor air,	indoor air,
carcinogen	noncarcinogen	conc,	ഗ	couc,	carcinogen	noncarcinoden
(J/Gr/)	(μg/L)	(µg/L)	(µg/L)	(mg/L)	(unitless)	(unitiess)
2 66E+01	A'A	2 66E+01 2 25E+06 2 66E+01	2 25E+06	2 66E+01	ΑZ	42

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

Soil Properties Lookup Table

VLOOKUP TABLES

Sept Time			Soil Properties Lookup	1.8018	ج ن د	ئو ج							
Ses son type	1	a (i/cm)	N (unitless)	M (unitiess)	в, (cm./cm.)	e, (cm"/cm")	Mean Grain Diameter (cm)						
ပ	0.20	0 008	1 09	0 083	0 38	890 0	0 0092						
<u>.</u>	0 26	0 019	131	0 237	041	0 095	0 0 16						
	<del>-</del> 8	0 036	1 56	0 359	0 43	0 078	0 020						
S	14 59	0 124	2 28	0 561	0 41	0 057	0 040						
w (	29 70	0 145	2 68	0 627	0 43	0 045	0 044						
200	0 12	0 027	1 23	0 187	0 38	0 100	0 025						
	18.	690.0	148	0 324	0 39	0 100	0 029						
, c	0.25	0.016	137	0 270	0 46	0 034	0 0046						
200	0 00	0 002	1 09	0 083	0.26	0 0 0 0	0 0038						
, i	2 6	0.0.0	57.	781.0		0 088	0 0056						
SL	4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0.020	189	0.291	0.45	0 067	0011						
							0000	_					
	•												
					Chemic	Chemical Properties Lookup Table	kup Table						
	_	Organic			Pure		Henry's	Henry's			Enthalpy of		
		carbon			camponent		law constant	law constant	Normal		vaporization at	ļ.	
-	_	partition	Diffusivity	Olffusivity	water	Henry's	at reference	reference	polling	Critical	the normal	i X	Reference
	ង	coefficient,	in air,	ın water,	solubility,	law constant	temperature,	temperature,	pour,	temperature,	boiling point,	factor,	conc
		λg,	<b>.</b>	<u>.</u>	Ø	Ì	I	Ļ	۳	۲	۵H,	C.R.	g.
CAS No Chemical		(cm <sub>3</sub> /g)	(cm²/s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/mot)	(°C)	( <del>)</del>	ξ. Σ	=	(md/m <sub>3</sub> )	(ma/m³)
FOC 50503				:	1						ĺ		
100 88806		2 535+05	13/E-02	4 95E-05	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05	0 0 0 0
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	90-300 6	1 62E-03	4 63E-05	1 13E-06	25	71590	969 27	15,000	2 1E-03	0 0E+00
5 1285 Z,4-Dinitrophenol		1 00E-02	2 73E-02	90-390 6	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0E+00	7 0E-03
55703 Dibenz(a,n)anthracene		3 BOE+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03	0 0 0 0
50235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7.127	1 5E-05	000+00
55553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9,40€-03	137E-04	3 345-06		708 15	1004 79	15,000	2 15-04	000+00
57.49 Chiordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05		624 24	885 73	13,000	375-04	00+300
S8899 gamma-HCH (Lindane)	_	1 07E+03	1 42E-02	7 34E-06	6 80€+00	574E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04	0 0 = +00
605/1 Dieldrin		2 14E+04	1 25E-02	4.74E-06	1 95E-01	6 19E-04	1 51E-05	25	613 32	842 25	13,000	4 6E-03	0 0 0 0 0
GOODU BRIZDIC ACID		6 00E-01	5 36E-02		3 50E+03	6 31E-05	1 545-06		720 00	751 00	10,000	0 0E+00	1 4E+01
67653 OFFICE		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	9'6'9	0 OE+00	3 5E-01
67724 Harran		3 98E+01	1 04E-01		7 92E+03	1 505-01	3 66E-03	25	334 32		6,988	2 3E-05	0 0E+00
74959 Distant		1 /8E+03	2 50E-03		5 00E+01	1 59E-01	3 88E-03	25	458 00		9,510	4 0E-06	0 00 +00
71432 Rentede		6 92E+00	8 UOE-02		/ 40E+04	3615-04	8 80=-06	25	390 88	563 05	10,346	0 OE+00	3 55-01
71556 1 1.1-Trichlomothene		1 1051101	2 00E-02	90-1108	1 /55+03	2.28E-01	5 56E-03	25	353 24	562 16	7,342	8 3E-06	0 0E+00
72208 Endrin		1 235 + 04	1 265 02	8 80E-06	7 335+03	7 05E-01	1 72E-02		347 24	545 00	7,136	0 0E+00	1 0E+00
72435 Methorychlor		9 775+04	1 565-02	4 465 06	1 200 TO 1	10000	/ 51E-06		718,15	986 20	12,000	0 OE+00	1 16-03
72548 DDD		1 00F+06	1 695-02	4 76F-06	4 30E-02	1 845-04	1 58E-05	2 2	651 02	848 49	14,000	0.0E+00	1 8E-02
72559 DDE		4 47E+06	1 44E-02	5 87F-06	1 20F-01	86111-04	4 00E-00		029 90	863 //	14,000	5 SE C	0.00+00
74839 Methyl bromide			7 28E-02	121E-05	1.52E+04	2.56F-01	\$ 24E.03		276 74	467.00	13,000	20-II 6	00+100
75014 Vinyl chloride (chloroethene)	hene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1116+00	2.715-02	4,	25025	497 00	5,7,0 0,000	001100	00000
75092 Methylene chloride		1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 195-03	3 15	313.00	510.00	907'6	4.7E-07	00+00
75150 Carbon disuffide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	52	319 00	552 00	6.391	00+00	7 OF-01
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04		422 35	696 00	9,479	1 1E-06	0 0 = 0
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03		363 15	585 85	2,000	1 8E-05	0 0 0 0
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61 E-03		330 55	523 00	6,895	00+100	5 05-01
75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 615-02	25	304 75	576 05	6.247	5 OE-05	0 0E+00
76448 Heptachlor		1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	1 3E-03	0 0 0 0
79501 learning and adjent	iene	2 00E+05	1 61E-02	7.21E-06	1 805+00	1 11E+00	2 71 6-02	52	512 15	746 00	10,931	0 0E+00	7 0E-05
78975 1 2.Okhlorone		4 585+01	6 235-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	22	488 35	715 00	10,271	2 7E-07	00=+00
70005 1.2.Tablooplane		4 3/8+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	22	369 52	572 00	7,590	0 0E+00	4 0E-03
79016 Trichloroethylene		3 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	52	386 15	602 00	8,322	1 6E-05	0 0 0 0
79345 1 1.2 2-Tetrachloroethane	đ	9 335+01	7 105-02	90-100 6	105+03	4 22E-U1	1 03E-02	25	360 36	544 20	7,505	1 7E-06	0 0E+00
83329 Acenaphthene	2	7 08E+03	4 21E-02	7 69F-06	4 24F±00	4 7E-02	3.44E-04	52	419 50	661 15	3996	5 8E-05	005+000
		:	[ ]	) 	; ; ; ;	3	t-100 -	3	1000	0.00	C61.21	00+400	2 1E-01

0					VLOOKUP TABLES							
84742 Dishingthinatate	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 Buth beary obthalate	5 755 +04	4 38E-02	/ 80E-06	1 125+01	3 85E-08	9 39E-10	52	613 15	798 67	14,751	0 0E+00	3 5E-01
86306 N-Nitrosodiphenylamine	1 29E+03	3 12 F-02	4 83E-06	2 51E+00	3 1/E-U3	1.261-06	52	660 60	839 68	13,000	0 0E+00	7 0E-01
86737 Fluorene	1 38E+04	3 63 E-02	7 88E-06	1 987 +00	2 615-03	3 00E-06	0 4	620.28	890.45	000'51	1450	00+00
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1535-08	3 %	627 B7	00000	12,000	0.0F-00 8.7E-08	200
87683 Hexachloro-1,3-butadiene	537E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	22	486 15	738 00	10,206	2.2E-05	001100
87855 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03		2 44E-08	52	582 15	813 20	14,000	3 4E-05	0 0E+00
91203 Nanhthalana	3.81E+02	3 18E-02	6 25E-06	8 00E+02	3 196-04	7 78E-06	52	519 15	749 03	12,000	3 1E-06	0 0E+00
91941 3,3-Dichlorobenzidine	7 24E+02	3 90E-02	74F-06	3 116+01	1 98E-02	4 83E-04	25	491 14	748 40	10,373	0 0 0 0	1 4E-01
95476 o-Xylene	3 63E+02	8.70E-02	1 00E-05	1 78E+02	2 13E-01	5 20F-03	8 %	560 26 417 60	754 03 630 30	13,000	135-04	00E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 205-06	3 23	464 19	697.60	10.800	00100	1 85-01
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	32	453 57	705 00	9,700	00=+00	2 0E-01
955/8 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9,572	0.00+00	1.8E-02
98954 Artohantena	1 605+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	52	526 15	759 13	13,000	0 0E+00	3 5E-01
100414 Ethylbenzene	3.636+01	7 505-02	8 50E-06	Z 09E+03	984E-04	2 40E-05	£2 :	483 95	719.00	10,566	00=+00	2 0E-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 105+02	3 23E-01	76E-03	, 25 7	409 34	617 20	8,50 1,50 1,50	004400	105+00
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2.00E-06	3 5	416.31	207 60		001100	1000
106423 p-Xylene	3 89E+02	7.69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	8 8	411 52	616 20	8.525	00+00	7 05+00
106467 1,4-Dichlorobenzene	6 17E+02	6 905-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	52	447 21	684 75		0 0 0 0	8 OE-01
106478 p-Chloroanline	661E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	52	503 65	754 00		0 0E+00	1 4E-02
108054 Vitori acceptant	1746+01	1046-01	90-306	8 52E+03	4 01E-02	9 78E-04	22	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m. Videna	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04		345 65	519 13		0 0E+00	2 0E-01
108883 Toluene	1 825-02	7 OUE-02	7 00E-05	1.01E+02	3 01E-01	7 34E-03		412.27	617 05		0 0E+00	7 0E+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06		1 525-01	3 715.03	ខ្ល	383 /8 404 93	591 79		0 05 +00	4 OE-01
108952 Phenol	2 88E+01	8 20E-02	9.10E-06	8 28E+04	1 635-05	3 7 E-03	6 K	404 87	654.20		0.00	2 0E-02
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	3 %	451 15	659.70	028,0	2 2E 04	7 12 400
115297 Endosulfan	2 14E+03		4 55E-06	5 10E-01	4 59E-04	1 12E-05	22	674 43	942.94		0.05+00	2 15-02
117817 Bis(2-ethythexyl)phthalate	151E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	25	657 15	806 00		4 0E-06	0 0E+00
117840 Di-h-octyr prithalate	8 32E+07	151E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05		704 09	862 22		0 0E+00	7 0E-02
120127 Anthracene	3 95E+04	5 42E-02	5 91E-06	6 20E +00	5 41E-02	1 32E-03		582 55	825 00		4 6E-04	0 0E+00
120821 1.2.4-Trehlorobenzene	1 785+03	3 005-02	7 74E-U0 8 23E-U6	4 34E-02	2 6/E-03	6 51E-05	52	615 18	873 00		0 0E+00	1 1E+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	3 50E + 02	1 30F-04	3 17E-05	2 %	486 15	725 00	10,471	20 H C	2 0 0 0 0 1
121142 2,4-Dmitrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9.27E-08	2 %	590.00	708 17		0 0E+00	1 1E-02
	631E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 835-04	32	416 14	678.20	200	- 30.04 - 40.04	004400
127184 Tetrachioroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 845-02	52	394 40	620 20	8,288	5 8E-07	00+00
129000 Pyrene 156502 April 2-Decklosophytop	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 106-05		667 95	936 00		0 0E+00	115-01
156605 trans-1,2-Dichlomethylane	5.25E+01	7 075-02	1 135 03	3 50E+03	1 67E-01	4 07E-03		333 65	544 00		0 0E+00	3 SE-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 905-02	5.665-06	2 205-03	5 55E-01	4 59 11-03	2 2	320 85	516 50		00E+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1115-04		715 90	060 27	17,000	2 15-04	00000
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	161E-05		655 95	905 00		7 HO	3.45.01
	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07		753 15	1019 70		2 1E-05	0.05+00
200002 Aldes	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05		714 15	00 626		2 1E-06	0 0E+00
310846 alpha-HCH (alpha-BHC)	4 225 + 00	1 325-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	52	603 01	839 37		4 9E-03	0 0E+00
319857 beta-HCH (beta-BHC)	1 26E+03	1 425-02	7.345-06	2 40F-01	4 50E-04 3 05E-05	1 06E-U5		596 55	839 36		1 8E-03	0 0E+00
542756 1,3-Dichloropropena	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1775-07		390 33 481 15	839 35	13,000	5 3E-04	0 0 0 0 0
606202 2,6-Dinitrotoluena	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07		558 00	770 00		2 /u 62	70=07 0 0E-07
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06		09 609	74687	11,000	2 0F-03	204.00
1024573 Heptachlor epoxide	8 32E+04	1 325-02		2 00E-01	3 90E-04	9 51 E-06	55	613 96	848 76		2 6E-03	00+00
9001369 Tovanhana	3 20E+01	3 U/E-02		5 62E-02	4 67E-01	1 14E-02	52	629 88	1750 00	_	0 0E+00	3 0E-04
11096825 Amolor 1260 (PCB-1260)	2 37 E+U3	1 165-02	4 345-06	7 40E-01	2 46E-04	6 00E-06		657 15	873 31		3 2E-04	0 0E+00
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02		5 70E-02	1 89E-01	4 60E-03	22.	402 50 377 50	539 37	000,61	2 등 수 유 등	0 OE+00
12674112 Arador 1016 (PCB-1016)	3 30E+04	2 22E-02		4 20E-01	1 19E-02	2 90E-04	3 %	340.50	312 27 475 22	9,000		0 OE+00
53469219 Arador 1242 (PCB-1242)	3 30E+04	2 14E-02		3 40E-01	2 13E-02	5 20E-04	3 23	345 50	482 20	18,000	10H04	0 0E+00
										***	1	U VETVO

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

× g

YES

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

		ENTER	User-defined stratum A soil vapor permeability, K, (cm²)
		ENTER	stratum A SCS soit type (used to estimate OR soit vapor permeability)
		ENTER	SCS soil type directly above water table
		ENTER	Soil stratum directly above water table, (Enter A. B. or C)
	oethane	ENTER (Lwr (cell D28)	Thickness Thickness of soil stratum B, stratum C, (Enter value or 0) (Enter value or 0) h <sub>e</sub> h <sub>C</sub> (cm) (cm) (cm)
Chemical	1,2,2-Tetrachioroethane	NTER ENTER ENTER Totals must add up to value of L wr (cell D28)	Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)
	1	ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub> (cm)
•		ENTER	Depth below grade to water table, Lwr (cm)
ENTER initial groundwater conc , Cw (µg/L)	2 234285714	ENTER Depth	below grade to bottom of enclosed space floor, Lr (cm)
ENTER Chemical CAS No (numbers only, no dashes)	79345	ENTER	Average solt/ groundwater temperature, Ts (°C)

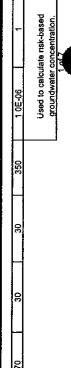
						1	_	1						
ENTER	Stratum C	soil water-filled	porosity,	•	(cm³/cm³)		03							
ENTER	Stratum C	soil total	porosity,		(unitless)		0 43							
ENTER	Stratum C	soil dry	bulk density,		(g/cm³)		17		ENTER		Indoor	air exchange	rate,	æ
ENTER	Stratum B	soil water-filled	porosity,	8 °6	(cm³/cm³)		0.27		ENTER		Floor-wall	seam crack	width,	*
ENTER	Stratum B	soil total	porosity,	a_C	(unitless)		0 42		ENTER		Enclosed	space	height,	ī.
ENTER	Stratum B	soil dry	bulk density,	<b>.</b> 6	(g/cm³)		17		ENTER	Enclosed	space	floor	width,	N
ENTER	Stratum A	soil water-filled	porosity,	θ,*^	(cm³/cm³)		0.2		ENTER	Enclosed	sbace	floor	length,	و
ENTER	Stratum A	soil total	porosity,	<b>∢</b> _	(nuidess)		0.43		ENTER		Soil-bidg	pressure	differential,	ΔP
ENTER	Stratum A	soll dry	bulk density,	٠. م	(g/cm³)		15		ENTER	Enclosed	space	floor	thickness,	Lone

(E)

(cm)

(cm)

15	40	961	1 961	488	0.1	
ENTER		ENTER	ENTER	ENTER		
Averaging	Averaging			Target	Target hazard	
time for		Exposure	Exposure	risk for		
carcinogens,	_	duration,	frequency.	carcinogens,		
ΑΤ <sub>C</sub>	ATNC	G	Ħ	표		
(yrs)	(yrs)	(yrs)	(days/yr)	(nuitless)	(unitless)	
70	30	30	350	1 05-06	,	



#### 2 of 7

## CHEMICAL PROPERTIES SHEET

						,
	Reference	2000	2	(mq/m <sub>3</sub> )		
Ş	ısk	factor.	LR.	(ma/m) 1		
component	water	solubility,	s	(mg/L)		
carbon	partition	coefficient,	گ <u>د</u>	(cm <sub>3</sub> /g)		
		-				
Normal	Polling	point,	<b>"</b> "	(K)		3000
vaponzation at	the normal	bor'ng point,	ΔH,	(cal/mol)		00000
						35
law constant	at reference	temperature,	I			S AAE OA
;	Diffusivity	ın water,	₫ '	(cm <sup>2</sup> /s)		7 000 00
						7 105 02 7 005 08
	law constant law constant vaporization at Normal carbon component	law constant faw constant vaponzaton at Normal carbon component Unit Diffusivity at reference reference the normal boiling Critical partition water nsk	law constant faw constant vaporization at Normal carbon component Unit Diffusivity at reference reference the normal boiling Critical partition water risk in water, temperature, temperature, boving point, point, temperature, coefficient, solubility, factor.	law constant faw constant vaporization at Normal carbon component Unit Diffusivity at reference reference the normal boiling Critical partition water risk in water, temperature, temperature, boiring point, temperature, coefficient, solubility, factor, $D_{\star}$ H $T_{R}$ $\Delta M_{\star,b}$ $T_{B}$ $T_{C}$ $K_{cc}$ $S$ URF	law constant vaporization at Normal reference the normal bolling Critical partition water risk temperature, coefficient, solubility, factor, TR ΔΗν, Tg Tc K <sub>cc</sub> S URF (°C) (calfinol) (°K) (°K) (cm³/g) (mq/L) (μα/m³);	law constant flaw constant vaportzation at Normal at reference reference the normal bolling temperature, temperature, boving point, to H $\Lambda$ $\Lambda$ $\Lambda$ $\Lambda$ $\Lambda$ $\Lambda$ $\Lambda$ $\Lambda$ $\Lambda$ $\Lambda$

# INTERMEDIATE CALCULATIONS SHEET

Floor-wall seam permeter,	3,844	Diffusion path length,	1600 44	
Water-filled porosity in capillary zone, $\frac{\theta_{w,cz}}{(cm^3/cm^3)}$	0 294	Total overal! effective diffusion coefficient, $D^{eff}_{r}$ (cm <sup>2</sup> /s)	7 90E-04	
Air-filled porosity in capillary zone, $\theta_{a}$ $cz$	0 136	Capillary zone effective diffusion coefficient, D°ff (cm²/s)	5 83E-04	
Total porosity in capillary zone, $n_{cz}$	0 43	Stratum C effective diffusion coefficient, Doff (cm²/s)	5 23E-04	Reference conc. RfC (mg/m³)
Thickness of capillary zone, L <sub>ca</sub>	17 05	Stratum B B effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	7 95E-04	Unit risk factor, URF (µg/m³)**
Stratum A soil effective vapor permeability, k, (cm²)	5 99E-11	Stratum A A effective diffusion coefficient, D*** (cm²/s)	2 90E-03	Infinite source bidg. conc., Conding (Hg/m³)
Stratum A soil relative air permeablity, k <sub>ra</sub>	662 0	Vapor viscosity at ave soil temperature, Hrs (g/cm-s)	1 77E-04	Infinite source indoor attenuation coefficient, a (unitiess)
Stratum A soil soil intrinsic permeability, k	7 49E-11	Henry's law constant at ave groundwater temperature, H'rs (unitiess)	8 36E-03	Exponent of equivalent foundation Peclet number, exp(Pe <sup>1</sup> ) (unitiess)
Stratum A effective total flud saturation,  See (cm³/cm³)	0.361	Henry's faw constant at ave groundwater temperature, H <sub>TS</sub> (atmm³/mol)	1 98E-04	Area of crack, Acask (cm²)
Stratum C soil air-filled porosity, $\theta_{\mathbf{a}}^{c}$ (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, AH, 15 (cal/mol)	10,480	Crack effective diffusion coefficient, Donnet (cm²/s)
Stratum B soil air-filled porosity, $\theta_e^{\rm g}$	0 150	Crack depth below grade, Zenek (Cm)	15	Average vapor flow rate into bidg , Qual (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, ea^A (cm³/cm³)	0 230	Crack- to-total area ratio,  η	4 16E-04	Crack radius, frank (cm)
Source- building separation, L <sub>T</sub>	1600 44	Area of enclosed space below grade. A <sub>B</sub>	9 24E+05	Source vapor conc, C <sub>tource</sub> (µg/m³)
Exposure duration, t	9 46E+08	Bidg ventitation rate, $Q_{\rm bolteng}$ (cm $^3/s$ )	5 63E+04	Convection path length, Le (cm)

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INCREMENTAL RISK CALCULATIONS

Hazard quotient	intrusion to	noncarcinogen	(unitless)
Incremental risk from	intrusion to	carcinogen	(untriess)
Final	exposure	conc.,	1 2 27 E ± 03
Pure	water	S	2 97F±06
Risk-based indoor	exposure	conc,	
Indoor	groundwater	noncarcinogen	NA NA
Indoor exposure	groundwater conc.	carcinogen (un/l.)	3 27E+03

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

		1	Soil Properties Lookup Table	okup Table								
SCS Soil Type	K, (cm/h)			M (unitless)	в, (ст³/ст³)	<sub>ժ</sub> , (cm³/cm³)	Mean Grain Diameter (cm)					
ပ (	0 20	0 008	1 09	0 083	0 38	0 068	0 0082					
₫.	9.79	0.019	133	0 237	0.41	0 095	0 016					
9	2 4	0.036	1 56	0.358	0 4	000	0.020					
3 0	20 40	0 145	2 68	0.501	4 0	0.037	770					
SC	0 12	0 027	1 23	0 187	0.38	0 100	0 025					
SCL	131	0 0 0 5 9	1 48	0 324	0 39	0 100	0 028					
<u>.</u>	0.25	0 016	1 37	0.270	0 46	0 034	0 0046					
SIC	0.05	0 002	1 09	0 083	0 26	0 0 0 0 0	0 0038					
SICL	0 0 0	0.010	123	0 187	0 43	0 080	0 0026					
SL SL	0 45 4 42	0 020	141	0 291	0 45	0 065	0 011					
					Chemic	Chemical Properties Looking Table	kin Tahia					
		Organic			Pure		hepry's	Henvs			Enthalpy of	
		carbon			component		taw constant	law constant	Normat		vaporization at	C
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	bolling	Critical	the normal	¥\$F
		coefficient,	in alt,	ın water,	solublity,	taw constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,
SN O V O		ν. (211 <sup>3</sup> /2)		, ( <sup>2</sup> )	ν ( <sup>1</sup> τ	T i	H	۾ ق	<b>-</b> 5	ro ş		URF.
		(dir /g)	(cui /s)	(cus /s)	(mg/L)	(unitiess)	(am-m /moi)	(2)	(V)	(Y	(cal/mol)	. ("ш/б <del>п</del> )
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	52	533 15	720.75	11,000	9 7E-05
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 13E-06	25	715 90	969 27	15,000	2 1E-03
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	90-390 6	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0E+00
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1€-03
56235 Carbon tetrachlonde		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 255+00	3 05E-02	25	349 90	556 60	7,127	1 5E-05
57749 Chlomene		3 98E+05	5 10E-02	9 005-06	9 40E-03	137E-04	3.34E-06	25	708 15	1004 79	15,000	2 1E-04
5889 campa-HCH (1 logane)		1 07F+03	1 42E-02	7.34E-06	5 BUE-02	1 99E-03 5 74E-04	4 85E-05	5 ¥	524 24 506 55	885 /3	13,000	3.75-04
60571 Dieldrin		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19F-04	151E-05	3 52	613.32	842.25	13,000	4 6E-04
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	154E-06	25 25	720 00	751 00	000,01	00100
67641 Acetone		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	6,955	0 0 0 0
67663 Chloroform		3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6,988	2 3E-05
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 595-01	3 88E-03	25	458 00	695 00	9,510	4 0E-06
71363 Butanol		6 92E+00	8 00E-02	9 305-06	7 40E+04	3 61 E-04	8 80E-06	52	390 88	563 05	10,346	0 00 00
71556 1.1.1-Trichloroethane		1 10E+02	7 80E-02	9 80E-08	1.33E+03	7 05F-01	3 59E-U3 1 72E-U3	5 K	353 24	545.00	7,342	8.3E-06
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7.516-06	25.25	718 15	986.20	12,000	00+100
72435 Methoxychlor		977E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	123	651 02	848 49	14,000	0 00+00
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	52	636 44	86038	13,000	9 7E-05
75014 Vind chloride (chloroethene)	(ouo	1 05E+01	7 28E-02	1215-05	1 52E+04	2 56E-01	6 245-03	52	276 71	467 00	5,714	000+00
75092 Methylene chloride	<u>^</u>	117E+01	101E-01	1 17E-05	1 30E+04	8 98E-02	2.115.02	3 52	313.00	510.00	5,706	4 7 15-07
75150 Carbon disuffide		4.57E+01	1 04E-01	1 00E-05	119E+03	1 24E+00	3 02E-02	25	319 00	552 00	6,391	00+00
75252 Bromoform		8 71E+01	1 496-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422 35	00 969	9,479	1 1E-06
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	2,000	1 8E-05
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61 6-03	25	330 55	523 00	6,895	000+000
78448 Hortzchior		1448+01	9 005-02	1 04E-05	2 25E+03	1 0/E+00	2 61E-02	52	304 75	576 05	6,247	5 OF-05
77474 Hexachlorocyclopentadiene	908	2 00E+05	161E-02	7 21E-06	1 BOE+00	1 11F+00	1 USE-US	67	512 15	746 00	15,000	20-110
78591 Isophorone	!	4 68E+01	6 235-02	6 76E-06	1,20E+04	2 72E-04	6 635-06	52 52	488 35	71500	10,271	2.7E-07
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2.80E-03	25	369 52	572 00	7,590	00+300
79005 1,1,2-Trichtoroethane		501E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8,322	1 6분-05
79016 Trichloroethylene		1 66E+02	7 90E-02	9 105-06	1 10년 +03	4 22E-01	1 03E-02	25	360 36	544 20	7,505	17E-06
79345 1,1,2,2-Tetrachloroethane	92	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	25	41960	661 15	8,996	5.8E-05
ביים ערמוישליים ערכים		SOFFICE.	4 4 1 E-04	1 095-00	4 Z4E+0	0 305-03	1 55E-04	9	550 54	803 15	12, 155	0.05+00

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35E-10.7.         75E-20.7.         75E-20.7. <t< td=""><td>her halate</td><td>7 50E-02 5 84E-02 7 69E-02 6 90E-02 4 83E-02 1 10E-01 8 50E-02 7 70E-02 8 70E-02 8 70E-02 8 70E-02 1 15E-02 1 15E-02 3 51E-02 3 24E-02</td><td>7 80E-06 8 00E-06 8 48E-06 7 90E-06 1 01E-05 9 90E-06 9 90E-06 8 70E-06 7 53E-06 7 53E-06 3 56E-06 3 56E-06</td><td>1 69E+02 3 10E+02 1 85E+03 1 85E+01 7 38E+01 5 30E+03 2 00E+04 1 61E+02 5 26E+02 4 72E+02 8 28E+04 1 72E+04 3 40E-01 3 40E-01</td><td>323E-01 13E-01 13E-01 3 14E-01 9 96E-05 1 36E-05 2 10E-02 2 10E-02 3 01E-01 1 52E-01 1 52E-01 1 52E-01 4 59E-04 4 59E-04</td><td>7 88E-03 2 76E-03 2 00E-06 7 66E-03 3 32E-07 9 78E-04 5 74E-03 6 63E-03 3 71E-03 1 10E-05 1 12E-05</td><td></td><td>29 34 11 52 11 51 51 51 51 51 51 51 51 51 51 51 51</td><td>617 20 636 00 710 60 684 75 754 00 561 00 519 13 617 05 532 79 632 79 642 942 94</td><td></td><td>3 12 43 3</td></t<>	her halate	7 50E-02 5 84E-02 7 69E-02 6 90E-02 4 83E-02 1 10E-01 8 50E-02 7 70E-02 8 70E-02 8 70E-02 8 70E-02 1 15E-02 1 15E-02 3 51E-02 3 24E-02	7 80E-06 8 00E-06 8 48E-06 7 90E-06 1 01E-05 9 90E-06 9 90E-06 8 70E-06 7 53E-06 7 53E-06 3 56E-06 3 56E-06	1 69E+02 3 10E+02 1 85E+03 1 85E+01 7 38E+01 5 30E+03 2 00E+04 1 61E+02 5 26E+02 4 72E+02 8 28E+04 1 72E+04 3 40E-01 3 40E-01	323E-01 13E-01 13E-01 3 14E-01 9 96E-05 1 36E-05 2 10E-02 2 10E-02 3 01E-01 1 52E-01 1 52E-01 1 52E-01 4 59E-04 4 59E-04	7 88E-03 2 76E-03 2 00E-06 7 66E-03 3 32E-07 9 78E-04 5 74E-03 6 63E-03 3 71E-03 1 10E-05 1 12E-05		29 34 11 52 11 51 51 51 51 51 51 51 51 51 51 51 51	617 20 636 00 710 60 684 75 754 00 561 00 519 13 617 05 532 79 632 79 642 942 94		3 12 43 3
7 106-02 8 1000-04 8 1412 1 13E-01 1 13E-01 2 13E-01 2 1418 1 3 636 0 1413 2 1418 1 14	e her halate	7 10E-02 7 69E-02 6 90E-02 4 83E-02 1 104E-01 8 50E-02 7 70E-02 8 70E-02 8 70E-02 1 15E-02 3 51E-02 3 24E-02 3 24E-02	8 00E-06 8 69E-06 7 90E-06 1 01E-05 9 90E-06 9 90E-06 8 70E-06 8 70E-06 1 53E-06 7 53E-06 3 56E-06 3 56E-06	3 10E+02 7 87E+03 7 38E+01 5 30E+02 8 52E+03 8 52E+03 1 6 16 16 16 16 1 6 16 16 16 16 16 16 16 16 16 16 16 16	13E-01 8 20E-05 8 20E-05 9 96E-02 1 38E-02 2 10E-02 2 10E-02 2 72E-01 1 63E-04 1 63E-04 4 59E-04 4 59E-04	2 76E-03 2 00E-06 7 66E-03 3 32E-07 9 78E-04 5 34E-04 7 34E-03 3 71E-03 3 71E-03 1 12E-05 1 10E-05		18 31 11 52 11 52 13 65 66 65 67 65 12 27 12 27 12 27 13 37 8 14 87 14 87	636 00 707 60 684 75 754 00 561 00 519 13 617 05 531 79 632 40 659 79 942 94		
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8.64	her halate	7 69E-02 6 90E-02 1 04E-01 1 04E-01 8 50E-02 7 7 00E-02 7 30E-02 6 92E-02 1 15E-02 3 51E-02 3 24E-02	8 44E-06 1 7 90E-06 9 90E-06 9 20E-06 7 80E-06 8 70E-06 9 10E-06 7 53E-06 3 56E-06 3 58E-06	1 855-02 7 388-01 8 52E-03 2 00E+04 1 61E+02 5 61E+02 4 72E+02 8 28E+04 1 72E+04 3 40E-01 3 40E-01	3 14E-01 9 96E-02 9 96E-05 2 10E-02 2 10E-02 2 72E-01 1 53E-04 5 9E-04 4 59E-04 4 18E-06	7 66E-03 2 43E-03 3 32E-07 9 78E-04 7 34E-03 6 53E-03 3 71E-03 3 98E-07 1 12E-05 1 02E-07		11 52 53 65 56 65 12 27 23 27 56 65 57 65 51 78 51 78	616 20 684 75 754 00 519 13 617 05 5391 79 694 20 659 79 942 94		
60 FECH         20 FECH <t< td=""><td>her halate</td><td>6 90E-02 1 08E-02 1 08E-02 7 00E-02 7 30E-02 8 20E-02 6 92E-02 1 15E-02 3 51E-02 3 24E-02 3 24E-02</td><td>7 90E-06 9 00E-06 9 20E-06 7 80E-06 8 70E-06 9 10E-06 7 53E-06 3 65E-06 3 58E-06</td><td>7 38E+01 5 30E+03 8 52E+03 2 00E+04 1 61E+02 5 26E+02 4 72E+04 1 72E+04 1 72E+04 3 40E-01 2 00E-02</td><td>9 96E-02 1 36E-05 2 10E-02 3 01E-01 2 72E-01 163E-05 7 38E-04 4 59E-04</td><td>2.43E-03 3.22E-04 5.12E-04 7.34E-03 6.53E-03 3.71E-03 3.98E-07 1.12E-05 1.02E-07</td><td></td><td>77 21 56 65 56 65 12 27 24 87 55 02 15 15</td><td>684 75 754 00 519 13 617 05 591 79 694 20 659 79 942 94</td><td></td><td></td></t<>	her halate	6 90E-02 1 08E-02 1 08E-02 7 00E-02 7 30E-02 8 20E-02 6 92E-02 1 15E-02 3 51E-02 3 24E-02 3 24E-02	7 90E-06 9 00E-06 9 20E-06 7 80E-06 8 70E-06 9 10E-06 7 53E-06 3 65E-06 3 58E-06	7 38E+01 5 30E+03 8 52E+03 2 00E+04 1 61E+02 5 26E+02 4 72E+04 1 72E+04 1 72E+04 3 40E-01 2 00E-02	9 96E-02 1 36E-05 2 10E-02 3 01E-01 2 72E-01 163E-05 7 38E-04 4 59E-04	2.43E-03 3.22E-04 5.12E-04 7.34E-03 6.53E-03 3.71E-03 3.98E-07 1.12E-05 1.02E-07		77 21 56 65 56 65 12 27 24 87 55 02 15 15	684 75 754 00 519 13 617 05 591 79 694 20 659 79 942 94		
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9 Method         2 Method	halate	1 04E-01 7 00E-02 8 70E-02 8 70E-02 8 20E-02 6 92E-02 1 15E-02 3 51E-02 3 24E-02	9 90E-06 7 80E-06 8 60E-06 8 70E-06 7 753E-06 3 66E-06 3 58E-06 3 58E-06	8 52E+03 2 00E+04 2 00E+04 5 26E+02 4 72E+02 1 72E+04 5 10E-01 3 40E-01 2 00E-02	4 01E-02 2 10E-02 2 72E-01 1 52E-01 1 63E-05 7 38E-04 4 59E-04	9 78E-04 5 12E-04 7 34E-03 6 63E-03 3 71E-03 3 98E-07 1 12E-05 1 02E-07		56 65 12 27 33 78 55 02 15	561 00 519 13 691 70 632 40 699 20 659 79 942 94		
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172E-02   370E-02   370E-02   370E-03   370E-03   370E-03   370E-03   370E-02   370E-03   370E-02   370E-03   370E-02   370E-03   370E	her halate ,	8 705-02 7 305-02 8 205-02 6 925-02 1 155-02 3 515-02 5 425-02 3 245-02	9 00E-06 8 70E-06 9 10E-06 7 53E-06 4 55E-06 3 66E-06 3 58E-06	5 26E +02 4 72E +02 8 28E +04 1 72E +04 5 10E -01 3 40E -01 2 00E -02	2 72E-01 1 52E-01 1 63E-05 7 38E-04 4 59E-04 4 18E-06	6.34E-03 6.34E-03 3.71E-03 3.98E-07 1.12E-05 1.02E-07		33 78 34 87 55 02 51 15	591 79 591 79 632 40 694 20 942 94		
2 19E+0.7         7 30E+0.6         4 77E+0.4         152E-0.7         3 71E-0.3         2 40 81         552 40         17.50           1 56E+0.1         6 87E+0.2         4 77E+0.4         152E-0.5         3 96E-0.7         25 40 81         552 40         17.50           1 56E+0.1         6 87E+0.2         7 53E-0.6         1 77E+0.4         1 56E-0.7         2 6 47 15         562 40         9 00           2 56E+0.1         3 56E-0.6         3 40E-0.7         2 56E-0.7         2 6 56E-0.7         2 6 57 15         9 400         1 500           3 56E-0.4         3 56E-0.6         3 40E-0.7         2 56E-0.7         2 6 56E-0.7         2 6 56E-0.7         2 6 60         3 40E-0.7         2 6 60         3 60E-0.7         3 6 60         3 60E-0.7         3 6 60         3 60E-0.7         3 6 60         3 60E-0.7         3 6 60         3 60E-0.7         3 6 60         3 60E-0.7         3 6 60E-0.7 </td <td>her halate , ene</td> <td>7 305-02 8 205-02 6 925-02 1 155-02 3 515-02 1 515-02 5 425-02</td> <td>9 70E-06 9 10E-06 7 53E-06 4 55E-06 3 66E-06</td> <td>8 28E+04 1 72E+02 1 72E+04 5 10E-01 3 40E-01 2 00E-02</td> <td>1 52E-01 1 63E-05 7 38E-04 4 59E-04</td> <td>3 71E-03 3 98E-07 1 80E-05 1 12E-05 1 02E-07</td> <td></td> <td>55 02 51 15</td> <td>532 40 632 40 659 79 942 94</td> <td></td> <td></td>	her halate , ene	7 305-02 8 205-02 6 925-02 1 155-02 3 515-02 1 515-02 5 425-02	9 70E-06 9 10E-06 7 53E-06 4 55E-06 3 66E-06	8 28E+04 1 72E+02 1 72E+04 5 10E-01 3 40E-01 2 00E-02	1 52E-01 1 63E-05 7 38E-04 4 59E-04	3 71E-03 3 98E-07 1 80E-05 1 12E-05 1 02E-07		55 02 51 15	532 40 632 40 659 79 942 94		
2 88E+01         8 20E+02         3 10E-04         8 20E+04         1 50E-05         2 45 10E-04         1 50E-05         2 45 10E-05         6 45 10E-06         1 50E-05         1 50E-05         2 45 10E-05         6 45 11 <td< td=""><td>her halate halate</td><td>8 20E-02 6 92E-02 1 15E-02 3 51E-02 1 51E-02 5 42E-02 3 24E-02</td><td>9 10E-06 7 53E-06 4 55E-06 3 66E-06 3 58E-06</td><td>8 28E+04 1 72E+04 5 10E-01 3 40E-01 2 00E-02</td><td>1 63E-05 7 38E-04 4 59E-04 4 18E-06</td><td>3 98E-07 1 80E-05 1 12E-05 1 02E-07</td><td></td><td>35 25</td><td>694 20 659 79 942 94</td><td></td><td></td></td<>	her halate halate	8 20E-02 6 92E-02 1 15E-02 3 51E-02 1 51E-02 5 42E-02 3 24E-02	9 10E-06 7 53E-06 4 55E-06 3 66E-06 3 58E-06	8 28E+04 1 72E+04 5 10E-01 3 40E-01 2 00E-02	1 63E-05 7 38E-04 4 59E-04 4 18E-06	3 98E-07 1 80E-05 1 12E-05 1 02E-07		35 25	694 20 659 79 942 94		
155E-01         152E-02         153E-04         172E-04         178E-04         160E-05         265F-15         68979         9,000           151E-07         316E-02         153E-04         172E-04         160E-05         26715         66971         9,000           151E-07         316E-02         316E-06         316E-07         416E-07         366E-08         316E-07         366E-08         316E-07         366E-08         316E-07         366E-08         316E-07         326E-07	her halate ; ene	6 92E-02 1 15E-02 3 51E-02 1 51E-02 5 42E-02 3 24E-02	7 53E-06 4 55E-06 3 66E-06 3 58E-06	1 72E+04 5 10E-01 3 40E-01 2 00E-02	7 38E-04 4 59E-04 4 18E-06	1 80E-05 1 12E-05 1 02E-07		51 15	659 79 942 94		
118E-02         456E-06         5 10E-01         4 58E-04         112E-03         2 674 5         94 94         14 00           2 14E-03         118E-02         4 58E-06         5 10E-01         4 58E-06         1 12E-03         25 647         94 94         14 00           8 22E-07         1 51E-02         3 58E-06         2 00E-02         2 74E-03         6 88E-05         25 704         8 6222         15 500           8 22E-07         1 51E-02         3 58E-06         2 00E-02         2 74E-03         6 58E-05         2 5 70         9 8222         15 500         14/47           2 59E-04         3 20E-02         3 74E-03         5 26E-03         2 5 60         1 47E-03         2 5 60         1 47E-03         1 5 60         1 100           1 78E-03         3 00E-02         3 00E-03         3 00E-03         3 00E-03         3 00E-03         3 00E-03         3 10E-03	halate } ene	1 15E-02 3 51E-02 1 51E-02 5 42E-02 3 24E-02	4 55E-06 3 66E-06 3 58E-06	5 10E-01 3 40E-01 2 00E-02	4 59E-04 4 18E-06	1 12E-05 1 02E-07		?	942 94		
8 151E-07         351E-07	halate Fine	3 51E-02 1 51E-02 5 42E-02 3 24E-02	3 66E-06 3 58E-06	3 40E-01 2 00E-02	4 185-06	1 02E-07		74 43			
8 50E+04         3 54E-07         5 00E+03         2 74E-03         6 68E-05         2 5 704 09         88 2 22         15,000           2 96E+04         3 24E-02         5 10E-03         2 56E-04         3 24E-02         2 5 615 18         8 70 00         14,47           2 96E+04         3 24E-02         5 10E-03         2 56E-03         2 5 615 18         8 73 00         14,47           1 78E+03         3 00E+02         8 27E-03         3 17E-03         2 5 615 18         8 73 00         14,47           1 78E+03         3 00E+02         8 27E-03         3 17E-03         2 5 615 18         8 73 00         14,47           1 78E+03         3 00E+02         3 00E+02         3 00E+02         3 17E-03         2 5 610 10         14,47           1 55E+03         1 00E+03         2 00E+03         3 00E+02         3 00E+03	918	1 516-02 5 426-02 3 246-02	3 586-06	2 00E-02			ř	57 15	806 00		_
9 96E+04         3 24E+02         3 41E+02         4 14E+02         2 13E+03         2 5 82 55         8 25 50         1 44.47           1 78E+03         3 24E+02         3 41E+03         5 41E+03         3 41E+03         2 5 615         18         73 00         14,477           1 78E+03         3 40E+02         3 70E+02         6 71E+03         2 5 615         18         73 00         14,477           1 78E+03         3 40E+02         3 70E+02         3 70E+02         2 5 616         3 70E+03	8	3 24E-02	t t	100	2 745-03	6 68E-05	۲ 27	94 09	862 22		
4 March 1         2 March 2         7 March 2         2 March 2         7 March 2         2 March 2 <t< td=""><td>ЭЦЭ:</td><td>3 245-02</td><td>5 916-06</td><td>6 205+00</td><td>5 41E-02</td><td>1 32E-03</td><td>52</td><td>32 55</td><td>825 00</td><td></td><td></td></t<>	ЭЦЭ:	3 245-02	5 916-06	6 205+00	5 41E-02	1 32E-03	52	32 55	825 00		
1,100   1,10	2	2 00E 03	7 /4E/00	4 34E-02	2 6/E-03	6 51E-05		5 18	873 00		
1,000   1,00		3 000-02	0 23E-00	3 00E+02	3 62E-02	1 425-03		36 15	725 00		
6 31E+01 196E-02 105E-02 2 50E+04 2 50E+04 2 5 304 40 678 20 134 678 20 155E+04 2 5 305E+04 2 50E+02 2 50E+04 2 5 305E+04 2 5	- 0	3 48E-02	7.08E.08	4 50E+05	- 30E-04	37170		52.25	708 17		
15EF-02   12EF-02   12EF-03   15EF-01   141E-04   110E-05   156F-02   1340-14   150E-04   156F-04   14370   156F-04   136F-04   14370   1437		1 96 1 0 2	1058-05	2 / UL+02 2 60E+03	3 215.00	9 27 E-06	6 <del>1</del>	3 7	814 00		7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
105E+05   272E-02   724E-06   135E-01   451E-04   107E-05   272E-02   135E-01   451E-04   107E-05   255E+01   735E-02   119E-05   250E+03   250E+03   250E+03   250E+03   250E+03   250E+03   250E+03   250E+03   250E+03   250E+03   250E+03   250E+03   250E-02   250E-02   250E-02   250E-02   250E-03   250E		7 20E-02	8 20E-06	2 00E+02	7 54E-01	1845-02	6 % 4 %	4 40	6/8 20		
8         55E+01         736E-02         113E-05         350E+03         16F-01         407E-03         25         333 65         544 00         7,192           8         52E+01         707E-02         113E-05         6 30E-05         1 60E-06         2 20E-05         5 56E-05         1 60E-06         2 20E-05         5 56E-05         1 60E-06         2 20E-05         1 60E-06         2 20E-05         2 56E-06         1 60E-06         2 20E-05         2 56E-07         1 60E-06         2 20E-05         2 56E-07         3 56E-07	-	2 72E-02	7 24E-06	1 35E-01	4 51E-04	1 10E-05	25 66	37.95	936.00		
6         525E+01         707E-02         119E-05         6 30E+03         385E-01         9 38E-03         25 320 85         516 50         6,717           127E+06         1 90E-02         5 66E-06         2 20E-05         6 66E-06         2 20E-05         6 66E-06         1 50E-06         1 50E-07         5 50E-06         1 50E-07         5 50E-07		7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03	25	3 65	544 00		E+00 3 5E-02
3 4/E+06         1 90E-02         5 66E-06         2 20E-05         6 56E-05         1 50E-06         25         809 15         1078 24         17,000           1 725E+06         2 26E-02         5 56E-06         1 50E-03         4 55E-03         1 11E-04         25         715 90         989 27         15,000           1 725E+06         2 26E-02         5 56E-06         1 60E-04         3 46E-05         2 555 95         905 00         13,815           1 22E+06         2 26E-02         5 56E-06         1 60E-03         3 88E-03         9 46E-05         25         714 15         979 00         16,455           2 45E+06         1 22E-02         4 6EE-06         1 80E-01         6 9TE-03         1 70E-04         25         503 01         893 77         13,000           1 23E+03         1 22E-02         4 6EE-06         1 80E-01         6 9TE-03         7 44E-07         25         508 55         839 36         13,000           1 24E-02         7 34E-06         2 40E-01         3 5E-04         1 76E-07         25         508 55         839 36         13,000           4 57E-01         6 22E-02         7 34E-06         1 82E-02         3 6E-05         7 44E-07         25         558 00         770 00 <td< td=""><td>j.e</td><td>7 07E-02</td><td>1 19E-05</td><td>6 30E+03</td><td>3 85E-01</td><td>9 39E-03</td><td></td><td>20.85</td><td>516 50</td><td></td><td></td></td<>	j.e	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		20.85	516 50		
123E+90         2 Z2E-OZ         5 S6E-OB         1 S6E-O3         4 S5E-O3         111E-O4         25         715 90         969 27         15,000           1 07E+05         3 02E-O2         5 35E-OB         1 50E-O3         4 55E-O3         1 61E-O5         25         714 15         97 90         13,815         15,000           1 23E-O2         6 35E-OB         1 60E-O3         3 8BE-O3         9 46E-O5         25         774 15         97 90         13,815         16,000         13,815         16,000         13,815         16,000         13,815         16,000         16,455         17,000         16,455         17,000         16,455         13,000         16,455         13,000         16,455         13,000         16,455         13,000         16,455         13,000 <td< td=""><td>œ.</td><td>1 90E-02</td><td>5 66E-06</td><td>2 20E-05</td><td>6 56E-05</td><td>1 60E-06</td><td></td><td>. 915</td><td>1078 24</td><td></td><td></td></td<>	œ.	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06		. 915	1078 24		
107E+03   30E-02   6.35E-03   6.00E-04   101E-05   25E-05   5.55E-03   6.00E-04   101E-05   25E-07   25   5.55E-03   6.00E-04   3.00E-04   3.00E-05   3.	anthene	2.26E-02	5 56E-06	1 50E-03	4 55E-03	1115-04		2 80	969 27		_
3 ME-04         3 ME-05         3 ME-05         3 ME-05         3 ME-05         3 ME-05         4 ME-05         5 Me-05         7 Me-05 <t< td=""><td>- ,</td><td>3 025-02</td><td>0 33570</td><td>2 OBE-61</td><td>5 50E-04</td><td>161E-05</td><td></td><td>55 95</td><td>905 00</td><td>_</td><td>_</td></t<>	- ,	3 025-02	0 33570	2 OBE-61	5 50E-04	161E-05		55 95	905 00	_	_
2 45E+03         1 27E-02         2 10E-03         3 00E-03         3 00E-03         2 7/4 19         3 7/4 19         9 7/4 10         10,000           1 23E+03         1 42E-02         7 34E-06         2 00E+03         4 35E-04         1 06E-05         25         596 55         839 36         13,000           1 23E+03         1 42E-02         7 34E-06         2 00E+03         3 05E-05         7 44E-07         25         596 55         839 36         13,000           4 57E+01         6 25E-02         7 34E-06         2 40E-01         3 05E-05         7 44E-07         25         596 55         839 36         13,000           6 22E-01         1 42E-02         7 34E-06         2 80E-03         7 26E-06         7 46E-07         2 5 596 55         839 36         13,000           6 22E-01         1 52E-02         2 80E-03         7 26E-06         7 26E-06         7 46E-07         7 46E-07         7 5 596 00         7 70 00         12,300           8 32E-04         1 32E-02         2 7 56E-06         3 98E-03         3 96E-03         3 5 50E-07         1 4 50C		2485-02	9 36E-06	1 805 03	3 885.03	0 45F OF		<u> </u>	07 6101		
122E+03 142E-02 73E-06 200E+00 435E-04 106E-05 25 506 55 893 96 13,000 126E+03 142E-02 73E-06 200E+00 435E-04 106E-05 2 566 55 893 96 13,000 126E+03 142E-02 73E-06 240E+03 726E-01 74E-07 25 596 55 893 96 13,000 12,938 13.000 1		1 32F-02	4 R6F-06	1805-03	5 97E-03	1 705-04		0 5	979.00		E-06 0 0E+00
1 26E+03         1 42E-02         7 34E-06         2 40E-01         3 05E-05         7 44E-07         25         596 55         893 36         13,000           4 57E+01         6 26E-02         1 00E-05         2 80E+03         7 26E-01         1 77E-02         25         586 55         893 36         13,000           8 0 2E+01         3 27E-02         7 26E-06         1 82E+02         3 06E-05         7 46E-07         25         558 00         770 00         12,938           9 2 2E-02         4 27E-02         3 27E-02         4 27E-02         3 27E-05         2 56 00         770 00         12,938         7,000           9 3 2 2E-02         4 2 2E-02         4 2 2E-03         3 06E-05         3 06E-05         2 56 00         770 00         12,938         7,000           5 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		55.	839.36		
4 57E+01         6 26E-02         1 00E-05         2 80E+03         7 26E-01         1 77E-02         25         381 15         587 38         7,000           8 92E+01         3 27E-02         7 26E-06         1 82E+02         3 06E-05         7 46E-07         25         558 00         770 00         12,938           8 24E+01         3 27E-02         8 17E-06         9 88E+03         9 23E-05         2 25E-06         25         509 60         746 87         11,000           8 22E+04         1 32E-02         4 23E-03         9 23E-05         2 56 613 96         848 76         13,000           2 50E+01         3 07E-02         4 50E-04         4 67E-01         1 44E-02         2 5 629 88         1750 00         14,177           2 50E+01         3 06E-06         5 62E-02         4 67E-04         6 00E-06         2 5 629 88         1750 00         14,107           2 50E+05         1 36E-02         4 67E-04         6 00E-06         5 67 15         87 31         14,000           2 50E+05         1 56E-02         8 20E-02         1 89E-01         4 60E-03         2 5 629 88         1750 00         14,000           2 50E+05         1 56E-02         2 00E-03         2 00E-03         2 00E-03         2 00E-03	_	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		6 55	839.36	-	
6 92E+01         3 27E-02         7 26E-06         1 82E+02         3 06E-05         7 46E-07         25         558 00         770 00         12,938           e         2 40E+01         5 48E-02         8 17E-06         9 89E+03         9 23E-05         2 25E-06         25         509 60         746 87         11,000           8 22E+04         1 32E-02         4 23E-03         2 95E-05         2 56 96         746 87         11,000           2 50E+01         3 07E-02         4 07E-01         3 99E-04         4 07E-02         2 56 98         1750 00         14,127           2 50E+05         1 16E-02         4 50E-04         1 08E-04         6 00E-06         5 62 98         1750 00         14,127           2 90E+05         1 36E-02         4 0E-04         1 08E-04         4 06E-04         4 06E-04         4 06E-04         2 00E-03         2 56 515         873 1         14,000           2 00E+05         1 56E-02         5 00E-06         5 70E-03         2 00E-03         2 00E-03<	4	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		11 15	587.38		
e         2 40E+01         5 45E-02         8 17E-06         9 39E+03         9 23E-05         2 25E-06         25         509 60         746 87         11,000           8 32E+04         1 30F-02         4 23E-02         2 00E-01         3 90E-04         9 51E-06         25         613 96         848 76         13,000           5 20E+01         3 07E-02         4 67E-01         1 14E-02         25         629 88         1750 00         14,127         0           2 50E+05         1 16E-02         4 67E-04         6 00E-06         2 657 88         1750 00         14,127         0           2 90E+05         1 36E-02         4 67E-04         6 00E-06         2 657 18         6 657 18         14,000         14,127         0           2 90E+05         1 36E-02         4 67E-04         4 60E-03         2 657 18         14,000         14,127         0           2 90E+05         1 56E-02         5 70E-03         2 8 20E-04         2 8 20E-03         2 8 20E-03         2 377 50         512 27         19,000           3 90E+04         2 22E-02         5 42E-01         1 19E-02         2 90E-04         2 340 50         475 22         18,000	9	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07		90 88	770 00		
8 32E+04 1 32E-02 4 23E-06 2 00E-01 3 90E-04 9 51E-06 25 613 96 848 76 13,000 5 20E+01 3 07E-02 6 30E-06 5 62E-02 4 67E-01 14E-02 2 5 629 88 1750 0 14,127 (2 57E+05 116E-02 4 34E-06 7 40E-01 2 46E-04 6 00E-06 25 657 15 873 31 14,000 2 00E+05 136E-02 4 34E-06 5 70E-02 8 20E-02 2 00E+05 156E-02 5 00E-06 5 70E-02 8 20E-02 2 00E-03 25 377 50 512 7 19,000 3 00E+04 2 22E-02 5 42E-06 4 20E-01 119E-02 2 90E-04 25 340 50 475 22 18,000	lamine 2	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06		09 60	746 87	•	
5 20E+01 3 07E-02 6 30E-06 5 62E-02 4 67E-01 114E-02 25 629 88 1750 00 14,127 0 2 57E+05 116E-02 4 34E-06 7 40E-01 2 46E-04 6 00E-06 25 657 15 873 31 14,000 3 2 90E+05 136E-02 4 32E-06 8 00E-02 189E-01 4 60E-03 25 402 50 539 37 19,000 1 2 00E+05 156E-02 5 00E-06 5 70E-02 8 20E-02 2 00E-03 25 377 50 512 7 19,000 1 3 3 0E+04 2 22E-02 5 42E-06 4 20E-01 119E-02 2 00E-04 25 340 50 475 22 18,000 1	80	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9 51E-06		3 96	848 76		
257E+05     116E-02     434E-06     740E-01     246E-04     6 00E-06     25     657 15     873 31     14,000     3       250E+05     138E-02     432E-06     8 00E-02     189E-01     4 60E-03     25     402 50     539 37     19,000     1       2 00E+05     156E-02     5 00E-06     5 70E-02     8 20E-02     2 00E-03     25     377 50     512 27     19,000     1       3 3 0E+04     2 22E-02     5 42E-06     4 20E-01     119E-02     2 90E-04     25     340 50     475 22     18,000     1	emental) 5	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02		•	750 00	_	_
2 50E+05 138E-02 432E-06 8 00E-02 189E-01 4 60E-03 25 402 50 539 37 19,000 1 2 00E+05 156E-02 5 00E+06 5 70E-02 8 20E-02 2 00E-03 25 377 50 512 27 19,000 1 3 30E+04 2 22E-02 5 42E-06 4 20E-01 119E-02 2 90E-04 25 340 50 475 22 18,000 1	7	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06		7 15	873 31		_
2 00E+05 1 56E-02 5 00E+06 5 70E-02 8 20E-02 2 00E-03 25 377 50 512 27 19,000 1 30E+04 2 22E-02 5 42E-06 4 20E-01 1 19E-02 2 90E-04 25 340 50 475 22 18,000 1	7	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03		2 50	539 37		
3.0E+04 2.2E-02 34E+06 4.2E-01 1.9E-02 20E-04 25 340.50 475.22 18,000 1	N C	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03		7 50	512 27	-	
CO 4 TO LOCAL COLLEGE	יי פיי	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04		200	475 22	_	

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

OR

YES

YES

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

	ENTER	User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm²)		
		R	' 닉	
	ENTER	stratum A SCS Soil type (used to estimate soil vapor permeability)	īs	ENTER Stratum C soil water-filled porosity, $\theta_w^c$ $\theta_w^c$ (cm³/cm³)
	E A HILL	SCS soll type directly above	8	ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)
	ENTER	Soit stratum directly above water table, (Enter A, B, or C)	O	ENTER Stratum C soil dry bulk density, P <sub>b</sub> P <sub>b</sub> (g/cm³)
	ENTER	Thickness of soil stratum C, (Enter value or 0) hc (cm)	1127 76	ENTER Stratum B soul water-filled porosity, $\theta_w^B$ $(cm^3/cm^3)$
Chemical	NTER ENTER ENTER COLORS  Color of the color of the colors	Thickness of soil stratum B, (Enter value or 0) h <sub>e</sub>	96 09	ENTER Stratum B soil total porosity, n a
	ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub> (cm)	762	ENTER Stratum B soil dry bulk density, p <sub>b</sub> (g/cm <sup>3</sup> )
	ENTER	Depth below grade to water table, Lwr (cm)	1950 72	ENTER Stratum A soil water-filled porosity.  6,4 (cm³/cm³)
ENTER Initial groundwater conc. Cw (49/L)	ENTER	below grade to bottom of enclosed space floor, L <sub>F</sub>	15	ENTER Stratum A soli total porosity, n A
Chemical CAS No (numbers only, no dashes)	ENTER	Average soll/ groundwater temperature,	16	ENTER Stratum A soil dry bulk density, p. <sup>A</sup> (g/cm³)

ENTER Stratum C soil water-filled porosity, 6,c (cm <sup>3</sup> /cm <sup>3</sup> )	0.3		
ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)	0.43		
ENTER Stratum C soil dry bulk density, P <sub>b</sub> <sup>c</sup> (g/cm³)	17	ENTER Indoor air exchange rate, ER (1/h)	
ENTER Stratum B soil water-filled porosity, $\theta_w^8$ (cm³/cm³)	0.27	Floor-wall seam crack width, w (cm) (cm) ENTER Target hazard quotient for noncarcinogens, THO	(unitless)
ENTER Stratum B soil total porosity, n <sup>8</sup> (unitless)	0 42	EntreR Enclosed space height, He (cm) (cm) ENTER Target nsk for carcinogens,	(unitless)
ENTER Stratum B soil dry bulk density, p <sub>B</sub> (g/cm³)	17	Enclosed space floor width, WB (Cm) (Cm) ENTER EXPOSURE frequency, EF	(days/yr)
ENTER Stratum A soil water-filled porosity, $\theta_w^A$ (cm³/cm³)	0.2	ENTER Endosed space floor floor length, La (cm) (cm) 961 Exposure duration, ED	
ENTER Stratum A solt total porosity, n <sup>A</sup> (unitless)	0 43	Soll-bldg pressure differentiat, AP AP (g/cm-s²) (g/cm-s²) ENTER Averaging time for time for the forth the for the forth t	(yrs)
ENTER Stratum A soil dry bulk density, Po <sup>A</sup> (g/cm <sup>3</sup> )	15	ENTER Enclosed space floor thickness, Lorax (cm) 15  ENTER Averaging time for carcinogens, ATc	(yrs)

Used to calculate risk-based groundwater concentration ENTER
Target
nsk for
carcinogens,
TR
(untitess) 0E-06 Exposure frequency, EF (days/yr) (STS)

#### 2 of 7

CHEMICAL PROPERTIES SHEET

Reference conc., RfC (mg/m³)
Unit nsk factor, URF (µg/m³) <sup>-1</sup>
Pure component water solubility, S S (mg/L)
Organic carbon partition coefficient, $K_{\infty}$ $(cm^3/g)$
Critical temperature, T <sub>C</sub> ( <sup>2</sup> K)
Normal bolling point, T <sub>B</sub> (*K)
Enthalpy of vaporization at the normal boding point, $\Delta H_{s,b}$ (cal/mol)
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H (atm-m³/mol)
Diffusivity in water, D. (cm <sup>2</sup> /s)
Diffusivity in alr, D <sub>•</sub> (cm²/s)

# INTERMEDIATE CALCULATIONS SHEET

	Source		Stratum B soil	Stratum C soil	Stratum A effective	Stratum A soil	Stratum A soil	Stratum A soil	Thickness of	Fotal	Air-filled	Water-filled	Floor-
Exposure	guipiinq	air-filled	arr-filled	ar-filled	total fluid	intrinsic	relative air	effective vapor	capillary	capillary	capillary	capillary	Seam
duration,	separation,		porosity,	porosity,	saturation,	permeability,	permeability,	permeability,	zone,	zone,	zone,	zone,	perimeter,
<b>.</b>	ئ	o o	9	) <b>"</b>	เก๋	¥	ج	<u>\$</u>	ר <sup>מ</sup>	ارد	д 9	Ф В	Xerack
(sec)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sup>3</sup> /cm³)	(cm³/cm³)	(cm³/cm³)	(cm²)	(cm²)	(cm²)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sup>3</sup> /cm³)	(cm)
9 46E+08	1935 72	0 230	0 150	0 130	0.419	9 36E-10	0 746	6 98E-10	17 05	0.43	0 136	0 294	3.844
	Area of							Stratum	Stratum	Stratum	Capillary	Total	
	enclosed	Crack-	Crack	Enthalpy of	Henry's law	Henry's law	Vapor	∢	Ф	O	Zone	overall	
Bidg	space	to-total	depth	vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
ventilation	pelow	агеа	pelow	ave groundwater	ave groundwater	ave groundwater	ave soil	diffusion	diffusion	diffusion	diffusion	diffusion	path
rate,	grade,	ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient,	coefficient,	length,
Obuilding	₹	۴	Zonack	ΔH <sub>v,TS</sub>	H <sub>TS</sub>	H.	Lt.s	ا مور	D	<b>ں</b> اور	D ال	ם ד	יב י
(cm <sub>3</sub> /s)	(cm²)	(unitiess)	(cm)	(cal/mol)	(atm-m³/mol)	(unitless)	(g/cm-s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(ma)
100 200 2	20.710.0	10 3011		200 1	411	, 0 1, 0 ,	, 0 000	30 200	***************************************				
5 635+04	8 24E+U5	4 16E-04	13	7,492	24/E-03	1 04E-01	177E-04	4.22E-03	1 07E-03	6 40E-04	7 36E-04	9 71E-04	1935 72
						Exponent of	Infinite						
			Average	Crack		equivalent	source	Infinite					
Convection	Source		vapor	effective		foundation	indoor	source	ž				
path	vapor	Crack	flow rate	diffusion	Area of	Peclet	attenuation	pldg	risk	Reference			
length,	couc,	radius,	into bldg ,	coefficient,	crack,	number,	coefficient,	conc ,	factor,	conc,			
ڻ	Cacuros	Grack	Q,	Dogge	Acrack	exp(Pe¹)	ಶ	Coulding	URF	RfC			
(cm)	(µg/m³)	(cm)	(cm <sub>3</sub> /s)	(cm <sup>2</sup> /s)	(cm²)	(unitless)	(nutless)	(mg/m <sub>3</sub> )	(µg/m³)	(mg/m <sub>3</sub> )			
ţ	4 047	0.40	1000		00.77	100					_		
_	1414	=======================================	2	7.75	11 +1 DX	A A A	7 XX1	20.0	40.45	- N			

#### RESULTS SHEET

RISK-BASE	RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	ER CONCENTR	ATION CALC	ULATIONS	INCREMENTAL	INCREMENTAL RISK CALCULATIONS
Indoor exposure groundwater conc, carcinogen (µg/L)	Indoor exposure groundwater conc, noncarcinogen (ug/L)	Risk-based indoor exposure groundwater conc. (µq/L)	Pure component water solubility, S S (uq/L)	Final indoor exposure groundwater conc, (uo/L)	Incremental nsk from vapor intrusion to indoor air, carcinogen	Hazard quotlent from vapor infrusion to indoor air, noncarchrogen
						(0000000)
09E+02	AN	2 09E+02	7 92E+06	2 09E+02	Æ	AN

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

1,000,000,000,000,000,000,000,000,000,0	37 59 61 61 82 24 24 25 30 83 83 83 83 83 84 87 87 87 80 83 83 83 83 83 83 83 83 83 83 83 83 83	0 095 0 078 0 045 0 100 0 100 0 034 0 070 0 089 0 067 0 065 Henry's	0 016 0 020 0 040 0 025 0 025 0 0039 0 0068 0 0011 0 0039 0 0011 0 0039 0 0011 0 0039 0 011 1 13E-06 1 13E-08 1 47E-08 3 05E-02	211-	10 C m	w.		Unit Ref factor, o URF (199/m <sup>3)-1</sup> (in C196/m <sup>3)-1</sup> (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in C196/m <sup>3</sup> )-1 (in	Reference conc. RrC RrC (mg/m³)
13	224 224 770 770 771 771 771 771 771 771 771 83 83 83 83 83 83 84 84 84 84 84 84 84 84 84 84 84 84 84	0.078 0.045 0.045 0.100 0.034 0.070 0.067 0.067 0.065 Henry's	0 020 0 040 0 044 0 025 0 025 0 0056 0 0011 0 0011 0 0011 0 0011 H 13E-06 1 13E-06 1 47E-08 3 05E-02	211	10 C m		8	Res (n	erence onc . ng/m³) 0 0E+00 0 0E+00
12	227 224 236 83 897 71 71 71 71 71 71 71 71 71 71 71 71 71	0 045 0 100 0 100 0 034 0 070 0 069 0 067 0 065 Properties Lookup Ta	0 044 0 025 0 029 0 0039 0 0039 0 0011 0 0011 0 0039 0 0014 0 0039 0 0044 0 0029 0 002	211-2	10.00	žo č		Reg (E)	erence onc , RfC ig/m³) 0 0E+00
191   0.224   0.29   0.00   0.004	24 70 83 83 87 71 71 71 71 87 80 80 80 72 90 73 90 73 90 73 90 80 80 80 80 80 80 80 80 80 80 80 80 80	0 100 0 034 0 030 0 089 0 067 0 067 0 065 Properties Lookup Ta	0.029 0.0046 0.0039 0.0048 0.0039 0.0011 0.0039 0.00139 Henry's reference reference Herefe	10 to to to	10.00	in t		8 ° E	erence onc , Rric ig/m³) 0 0E+00
197   0.053   0.054   0.004   0.0059     142   0.187   0.43   0.005   0.005   0.005     143   0.471   0.41   0.005   0.005   0.005     144   0.027   0.44   0.005   0.005     159   0.471   0.41   0.005   0.005   0.005     150   0.471   0.41   0.005   0.005   0.005     150   0.471   0.45   0.005   0.005   0.005     150   0.471   0.45   0.005   0.005   0.005     150   0.471   0.41   0.005   0.005   0.005     150   0.471   0.45   0.005   0.005   0.005     150   0.471   0.41   0.005   0.005   0.005     150   0.471   0.471   0.41   0.005   0.005     150   0.471   0.471   0.471   0.005   0.005     150   0.471   0.471   0.471   0.005   0.005     150   0.471   0.471   0.471   0.005   0.005     150   0.471   0.471   0.471   0.005   0.005     150   0.471   0.471   0.471   0.471   0.471   0.471   0.471   0.471   0.471     150   0.471	70 87 87 91 71 71 71 80 80 80 80 80 80 80 80 80 80 80 80 80	0 034 0 070 0 089 0 067 0 065 Properties Lookup Ta r constant r constant	0 0046 0 0039 0 0039 0 0011 0 0011 reference nperature, H H 113E-06 4 44E-07 1 47E-08	, and and and and and and and and and and	10.00	20.5	9 9	Rei (m	erence onc . Rric ig/m³) 0 0E+00 0 0E+00
121   0.137   0.147   0.45   0.089   0.0094     121   0.471   0.44   0.087   0.0094     122   0.471   0.44   0.087   0.087   0.0094     123   0.471   0.44   0.045   0.087   0.0094     124   0.471   0.44   0.045   0.087   0.0094     125   0.471   0.44   0.045   0.087   0.0094     125   0.471   0.471   0.45   0.087   0.087     125   0.471   0.471   0.481   0.087   0.081   0.081     125   0.471   0.471   0.481   0.087   0.081   0.081   0.081     125   0.081   0.081   0.081   0.081   0.081   0.081   0.081     125   0.081	Pur compo wat wat soluble soluble Solu	0 067 0 067 0 065 Properties Lookup Ta Henry's	Henry's 0 011 0 0030 0 011 0 0030 0 011 0 0 011 0 0 011 0 0 011 0 0 0 0	2 11 -	10.00	20.5	9 9	Re C	erence onc. Rrf. ig/m³) 0 0E+00
181   0.291   0.45   0.067   0.01	71 Compo wat solubly solubly (mg/ compo co	0 067 0 065 Oroperties Lookup Ta Properties Lookup Ta r constant H.	0 0011 0 0011 N constant reference Therature, H H M-m-m³/mol) 113E-06 113E-06 144E-07 147E-08	211-	1000	20.5		R. E.	erence onc. RfC ig/m³) 0 0E+00
Diffusivity   Difusivity	Pur compo wat solub solub S S (mg/ compo c	Properties Lookup Ta Henry's v constant H-H-H-H-H-H-H-H-H-H-H-H-H-H-H-H-H-H-H-	Henry's  w constant reference  mperature,  H  113E-06 444E-07 147E-08 305E-02	2 11 -	10.00	20.5	9 9	Res C	erence onc., RfC ig/m³) 0 0E+00
Diffusivity   Difusivity	Pur compo wath wath soluble so	Properties Lookup Ta Henry's v constant H'	Henry's w constant reference reference H H 13E-06 113E-06 147E-07 305E-02	211.7	10.00	202	9	Red (F)	erence onc., RfC 19(m³)
Correction   Cor	Pure component water solubility. S S (mg/L)  06 2 50E-02 06 2 79E+03 06 2 49E-03 06 7 93E+02 06 7 95E+02 06 6 5 60E-02	Henry's v constant H'	3 10E-06 1 13E-06 1 44E-07 1 47E-08 3 05E-02	211-	10 C M	20.6	9	Rei	erence onc , RfC 19/m³) 0 0E+00
Diffusivity   Diffusivity	component water solubility.  S (mg/L)  06 2 50E-02 06 2 79E+03 06 2 49E-03 06 7 93E+02 06 9 40E-03 06 5 60E-02	Henry's v constant H'	3 10E-06 1 13E-06 1 44E-07 1 47E-08 3 05E-02	211-	10 C M	νr	2 9	9 E	erence onc , RfC 19/m³) 0 0E+00
Diffusivity   Diffusivity	water solubility.  S  (mg/L)  06 2 50E-02  06 2 79E+03  06 2 49E-03  06 7 93E+02  06 9 40E-03  06 9 60E-02	Henry's v constant H'	3 10E-06 1 13E-06 1 44E-07 1 47E-08 3 05E-02	. ស្រស្សា ក	10 C M	νr	ء ا	B. E.	erence onc , RfC ng/m³) 0 0 € +00
Cartillo   Cartillo	solubility.  S  (mg/L)  06 2 50E-02  06 2 79E+03  06 2 79E+03  06 2 79E+03  06 9 40E-03  06 9 40E-03  06 5 60E-02	v constant H'	3 10E-06 1 13E-06 1 44E-07 1 47E-08 3 05E-02	. ស ស ស ស	က္ထွစ္	νr		S E	onc , RfC ng/m³) 0 0E+00
(cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm <sup>2</sup> ) (cm 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137E-02         49E-06         250E-02         332E-04         810E-08         250E-02         232E-04         810E-08         255.05         255.05         444E-06         255.05         445E-06         255.05         444E-07         255.06         255.05         255.06         255.05         255.06         <	6666666		8 10E-06 1 13E-06 4 44E-07 1 47E-08 3 05E-02		33 15 15 90 05,28	720 75 060 97			0 0E+00
4 30E-02         5 18E-06         2 28E-03         4 54E-04         2 5 15 90           2 02E-02         5 18E-06         2 49E-03         6 03E-05         4 4E-07         25 549           2 02E-02         5 18E-06         2 49E-03         6 03E-07         1 47E-08         25 704 15           2 02E-02         5 18E-06         2 49E-03         1 37E-04         3 36E-05         25 704 15           1 18E-02         4 37E-06         5 60E-02         1 99E-03         4 88E-05         25 50E-02           1 18E-02         4 37E-06         5 60E-03         1 99E-03         4 88E-05         25 542 4           1 24E-01         1 14E-05         3 50E-03         1 99E-03         1 54E-05         25 50E 52           1 24E-01         1 14E-05         3 50E-03         3 11E-04         3 11E-05         2 50E 52           1 24E-01         1 14E-05         3 50E-01         3 11E-04         3 88E-03         2 50E 53           2 50E-03         6 80E-06         3 11E-04         3 11E-04         3 88E-03         2 50E 63           1 60E-01         1 14E-03         3 10E-04         3 10E-04         3 10E-05         3 33 33           2 50E-03         4 80E-02         3 10E-04         3 10E-05         3 34 33 </td <td></td> <td>3 32E-04</td> <td>1 13E-06 4 44E-07 1 47E-08 3 05E-02</td> <td></td> <td>15 90 05.28</td> <td>060 97</td> <td></td> <td></td> <td>00±±00</td>		3 32E-04	1 13E-06 4 44E-07 1 47E-08 3 05E-02		15 90 05.28	060 97			00±±00
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7 80E-02         8 80E-06         7 93E-02         125E+00         3 05E-02         25 349           5 10E-02         9 00E-06         9 40E-03         137E-04         3 34E-06         25 708 15           1 18E-02         4 37E-06         8 00E-07         137E-04         3 4E-05         25 708 15           1 18E-02         7 34E-06         8 00E-07         1 91E-05         25 720 00         25 720 00           1 25E-02         7 34E-06         8 00E-07         1 91E-05         2 90E-06         2 90E-07           1 24E-01         1 14E-05         1 92E-01         1 98E-03         3 88E-03         25 332 20           1 24E-01         1 14E-05         1 90E-04         1 50E-01         3 88E-03         25 332 20           1 24E-01         1 14E-05         2 90E-04         1 50E-01         3 88E-03         25 332 20           1 24E-01         1 14E-03         2 28E-01         3 88E-03         25 332 20           2 50E-03         3 90E-04         1 50E-01         3 86E-03         25 332 20           3 80E-02         3 90E-04         1 50E-01         3 86E-03         25 332 20           4 80E-02         4 50E-02         2 50E-01         3 86E-03         2 50E-03         2 50E-01           <	9 9 9 9	1 82E-05 6 03E-07	3 05E-02		70.00	827.85	-		7 OE-03
18E-02   9.00E-06   9.40E-03   137E-04   3.34E-06   2.5 708 is   1.42E-02   3.75E-06   9.40E-03   1.95E-03   4.86E-05   2.5 50.24   4.42E-02   3.75E-06   6.00E-02   1.95E-03   4.86E-05   2.5 50.24   4.42E-02   3.75E-06   6.00E-04   1.95E-04   1.95E-03   4.86E-05   2.5 50.32   2.5 50.20   1.25E-02   4.74E-06   1.95E-04   1.95E-04   1.95E-03   3.86E-05   2.5 7.00   2.50E-03   3.00E-06   3.90E-06   1.99E-03   3.86E-03   3.86E-05   2.5 7.00   2.50E-03   3.00E-06   3.00E-07   3.00E-04   4.00E-02   3.00E-06   3.00E-04   4.00E-05   3.00E-06   4.00E-04   4.00E-06   2.50E-03   4.00E-04   4.00E-06   2.50E-03   4.00E-04   4.00E-06   2.50E-03   4.00E-04   4.00E-06   2.50E-03   4.00E-04   4.00E-06   2.50E-03   4.00E-05   4.00E-04   4.00E-06   2.50E-03   4.00E-05   4.00E-04   4.00E-06   2.50E-03   4.00E-05   4.00E-	E-06 E-06	1 25E+00			06 61	556.60	15,000	1.5F-05	001100
138E-02         4 37E-06         5 60E-02         1,99E-03         4 68E-05         2 5 692 5           142E-02         7 34E-06         6 90E+00         5 74E-04         1 40E-05         2 5 695 5           142E-02         7 34E-06         6 90E+00         5 74E-04         1 40E-05         2 5 695 5           12EE-01         1 14E-05         1 90E-05         7 90E-03         3 88E-05         2 5 93 20           1 04E-01         1 00E-05         7 90E-03         1 50E-01         3 88E-05         2 5 93 20           1 04E-01         1 00E-05         7 90E-03         3 88E-03         2 5 33 34 32           2 50E-03         8 90E-06         7 40E-04         3 81E-04         8 80E-05         2 5 39 08           8 80E-05         9 30E-06         1 75E-03         2 28E-01         7 51E-06         2 5 65 102           1 80E-02         8 90E-06         1 75E-04         7 51E-06         2 5 65 102           1 80E-02         4 76E-06         5 00E-04         7 51E-02         2 5 89 5           1 80E-02         4 76E-06         5 00E-04         3 61E-03         2 88 4           1 80E-03         1 20E-04         4 600E-06         2 5 65 102           1 80E-03         1 11E-04         1 10E-04	E-06	1 37E-04	3 34 €-06		38 15	1004 79			00=+00
1.26E-02         7.7E-02         9.0E-03         9.1E-03         1.7E-03         2.5 938.55           1.26E-02         7.97E-06         3.06E-03         9.1E-03         1.51E-05         25 938.55           1.26E-03         1.26E-03         1.50E-03         9.9E-03         9.9E-03         9.9E-03           1.26E-01         1.26E-03         1.50E-03         9.9E-03         9.9E-03         2.50E-03         9.9E-03         9.9E-03 <td< td=""><td>80</td><td>1.99E-03</td><td>4 85E-05</td><td></td><td>24 24</td><td>885 73</td><td></td><td></td><td>0 0E+00</td></td<>	80	1.99E-03	4 85E-05		24 24	885 73			0 0E+00
5 36E-02         7 97E-06         3 50E+03         6 31E-05         1 54E-06         2 50E+03         1 54E-06         2 50E-03         3 88E-05         2 5 720 00           1 24E-01         1 14E-05         1 00E+06         1 59E-03         3 88E-05         2 5 329 20           1 24E-01         1 00E-05         7 92E+03         1 59E-01         3 88E-05         2 5 33 32           2 50E-03         6 80E-06         7 40E+04         3 61E-04         8 80E-05         2 5 33 24           1 7 50E-02         9 80E-06         1 75E+03         2 28E-01         5 56E-03         2 5 33 24           1 7 50E-02         9 80E-06         1 75E+03         2 28E-01         5 56E-03         2 5 33 24           1 7 50E-02         9 80E-06         1 75E+03         2 28E-01         5 56E-03         2 5 56E-03           1 7 50E-02         9 80E-06         1 7 50E-01         6 48E-04         4 50E-05         5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	90	6 19E-04	1 40E-05		3 33	83936	13,000		000+000
124E-01         114E-05         100E+06         159E-03         388E-05         25         329         20           104E-01         100E-05         7,92E+03         150E-01         366E-03         25         334         32           104E-01         100E-05         7,92E+03         150E-01         366E-03         25         334         32           8 00E-05         7,0EF+03         2,28E-01         36E-05         25         390         38           8 80E-02         9,0E-06         175E+03         2,28E-01         5,6E-03         25         332         24           1 75E-02         9,0E-06         130E+03         7,0EE-01         172E-02         25         347         24         25         347         24         36E-03         25         347         24         36E-03         25         347         24         36E-03         36E-03         25         347         24         347         24         36E-03         36E-03         36E-03         25         347         24         347         34         34         34         34         34         34         34         34         34         34         34         34         34         34         34	E-06	6 31 6-05	1 54E-06		20.02	751 00		000+00	4 E +04
1 046-01         1 006-05         7,92E+03         1 56E-01         3 66E-03         25         458 00           2 50E-03         6 80E-06         7 40E+04         1 56E-01         3 88E-03         25         458 00           8 00E-02         9 60E-06         7 46E+03         2 28E-01         8 80E-02         2 50E-03         25         353 24           7 80E-02         9 60E-06         1 75E+03         2 28E-01         3 68E-04         7 5EE-06         2 5         347 24           1 55E-02         4 74E-06         1 20E-01         3 68E-04         4 56E-02         2 56E-03         2 5         347 24           1 56E-02         4 74E-06         1 20E-01         3 68E-04         4 06E-05         2 56E-01         2 56E-01         2 56E-03	E-05	1 59E-03	3 88E-05		29 20	508 10			3 5E-01
2 305-03         3 005-04	50.5	1 505-01	3 66 E-03		34 32	536 40			0 0E+00
8 80E-02         9 80E-06         175E+03         2 28E-01         5 5EE-03         25 35 24           7 80E-02         8 80E-06         133E+03         7 05E-01         172E-02         25 347 24           1 25E-02         4 76E-06         2 50E-01         3 88E-04         7 51E-06         25 718 15           1 56E-02         4 76E-06         2 50E-01         3 68E-04         7 51E-06         25 718 15           1 56E-02         4 46E-06         4 50E-07         6 48E-04         4 00E-06         2 53 90           1 44E-02         5 648E-04         2 56E-03         2 76 71         2 76 71           1 44E-02         1 21E-05         1 52E+04         2 56E-01         2 71E-02         2 53 90           1 00E-01         1 23E-06         2 76E-03         1 11E+00         2 71E-02         2 59 25           1 01E-01         1 23E-06         2 76E-03         1 11E+00         2 71E-02         2 59 25           1 01E-01         1 23E-04         2 56E-01         1 24E+00         2 71E-02         2 59 25           1 01E-01         1 25E-04         2 56E-01         1 24E+00         2 71E-02         2 59 25           1 01E-02         1 30E-04         2 56E-01         2 56E-01         2 56E-02         2	0 ~	3.61E-04	3 885-03		28 00	695 00	9,510 4	4 0E-06	0 0E+00
7 80E-02         8 80E-06         133E+03         7 05E-01         172E-02         25         347 24           1 25E-02         4 74E-06         2 50E-01         3 08E-04         7 51E-06         25         718 15           1 56E-02         4 74E-06         2 50E-01         3 08E-04         7 51E-06         25         718 15           1 56E-02         4 46E-06         4 50E-02         6 48E-04         4 00E-06         2 56 102           1 44E-02         5 76E-03         1 50E-04         2 56E-01         2 70E-03         2 76 71           1 06E-01         1 23E-06         2 76E-03         1 11E+00         2 71E-02         2 59 25           1 01E-01         1 23E-06         2 76E-03         1 11E+00         2 71E-02         2 59 25           1 01E-01         1 23E-06         2 76E-03         1 11E+00         2 71E-02         2 59 25           1 01E-01         1 23E-06         2 76E-03         1 24E+00         2 71E-02         2 59 25           1 04E-02         1 06E-03         1 24E+00         2 76E-03         2 50E-03         2 50E-03           1 04E-03         1 06E-03         1 06E-03         2 76E-03         2 76E-03         2 76E-03         2 76E-03           1 05E-03 <td< td=""><td>. —</td><td>2 28E-01</td><td>5 56E-03</td><td></td><td>33.24</td><td>562 16</td><td></td><td></td><td>005+00</td></td<>	. —	2 28E-01	5 56E-03		33.24	562 16			005+00
125E-02         474E-06         250E-01         308E-04         75E-06         25         718 15           156E-02         476E-06         250E-01         1648E-04         156E-05         25         718 15           169E-02         476E-06         150E-01         164E-04         400E-05         25         65102           169E-02         166E-01         160E-03         276E-03         176E-03         276E-03         276E-03 <td>-</td> <td>7 05E-01</td> <td>1 72E-02</td> <td></td> <td>17 24</td> <td>545 00</td> <td>7,136 0</td> <td></td> <td>1 00-100</td>	-	7 05E-01	1 72E-02		17 24	545 00	7,136 0		1 00-100
106E-01   106E-02   106E-04   106E-05   106E	. 2	3 08E-04	7.515-06		18 15	986 20			1 1투-03
1.016-01         1.23E-02         1.01E-04         2.01E-04		6 48E-04	1 58E-05		20 02	848 49	14,000 0		1 8E-02
7 28E-02         1 21E-05         1 52E+04         2 56E-01         6 24E-03         2 76 71           1 06E-01         1 23E-06         2 76E+03         1 11E+00         2 71E-02         25 25           1 01E-01         1 77E-05         1 30E+04         8 98E-02         2 71E-02         25 25           1 04E-01         1 00E-05         1 19E+03         1 24E+00         3 02E-02         25 313 00           1 04E-02         1 05E-05         3 10E+03         2 19E-02         5 34E-04         25 319 00           1 49E-02         1 05E-05         3 10E+03         2 19E-02         5 61E-03         2 330 55           2 98E-02         1 06E-05         6 74E-03         2 50E-01         5 61E-03         2 5 316           1 12E-02         1 06E-05         6 76E-03         1 07E+00         2 61E-02         2 5 304 75           1 12E-02         5 69E-06         1 80E-01         4 7E-02         1 60E-03         2 5 115           1 12E-02         5 69E-06         1 80E-01         1 11E+02         2 71E-02         2 5 115           6 23E-02         1 60E-03         2 72E-04         6 68E-03         2 71E-02         2 5 603 6           7 80E-02         8 60E-06         1 10E+03         2 72E-04		8 61E-04	2 10F-05		36.44	960.38		9 3E-03	00+100
1 06E-01         1 23E-06         2 76E+03         1 11E+00         2 71E-02         25 25           1 01E-01         1 77E-05         1 30E+04         8 98E-02         2 19E-03         25         313 00           1 04E-01         1 00E-05         1 19E+03         1 24E+00         3 02E-02         25         313 00           1 04E-02         1 00E-05         1 19E+03         1 29E-02         5 34E-04         25         310 00           2 98E-02         1 00E-05         6 74E+03         2 50E-02         1 60E-03         25         303 15           7 42E-02         1 05E-05         5 06E+03         2 30E-01         5 61E-02         25         304 75           1 12E-02         5 69E-06         1 80E-01         4 7E-02         1 60E-03         25         304 75           1 61E-02         7 21E-06         1 80E-01         4 7E-02         2 7E-02         2 61E-03         25         304 75           1 61E-02         7 21E-06         1 80E-01         1 71E-02         2 7E-02         2 51 15         2 80E-03         2 7E-04         6 63E-03         2 51 15         2 80E-03	E-05	2 56E-01	6 24E-03		76 71	467 00			5 OE-03
101E-01         177E-05         130E-04         8 98E-02         2 19E-03         25         313 00           1.04E-01         100E-05         130E-02         2 19E-02         2 34E-04         25         313 00           1.04E-01         100E-05         10E-02         2 10E-02         2 34E-04         25         319 00           1 49E-02         106E-05         6 74E-03         2 50E-02         1 60E-03         2 363 15           2 98E-02         106E-02         1 60E-03         2 50E-03         2 60E-03         2 61E-03         2 533 15           3 12E-02         106E-02         2 50E-03         1 07E+00         2 61E-02         2 5 304 75           4 16E-02         2 56E-03         1 07E+00         2 61E-02         2 5 304 75           4 16E-02         2 56E-03         1 07E+00         2 61E-02         2 5 304 75           5 16E-02         2 56E-03         1 07E+00         2 71E-02         2 5 304 75           6 23E-03         1 56E-04         2 72E-04         6 63E-03         2 5 15           7 80E-02         8 80E-06         1 10E+03         3 74E-04         2 80E-03         2 80E-03           7 90E-06         2 91E-04         2 25E-04         2 25E-04         2 25E-04         <	2	111E+00	271E-02		59 25	432 00			0 OE+00
1.0E-02 100E-03 110E-03 124E+00 30EE-02 25 319 00 100E-02 100E-03 110E+03 124E+00 30EE-02 25 319 00 10E-02 100E-03 10E-03 10E-03 25 319 00 10E-02 100E-03 10E-03 25 310 10E-03 10E-03 10E-03 10E-03 10E-03 10E-03 10E-03 10E-04 10	දිරි ද	8 98E-02	2 19E-03		3 00	510 00			3 0E+00
1 98E-02         1 06E-03         3 10E+03         4 19E-02         5 34E-04         25 422.35           2 98E-02         1 06E-05         1 60E-03         2 361.6         3 631.6           7 42E-02         1 06E-05         5 06E+03         2 30E-02         5 61E-02         25 303.65           9 00E-02         1 04E-05         2 25E+03         1 07E+00         2 61E-02         25 304.75           1 12E-02         5 69E-06         1 90E-01         4 47E-02         1 09E-03         25 603.69           1 61E-02         2 56E-03         1 07E-00         2 77E-02         25 512.15           6 23E-02         6 63E-06         2 72E-04         6 63E-06         25 369.52           7 82E-02         8 76E-06         1 10E+03         2 74E-02         2 80E-03         25 369.52           7 80E-02         8 90E-06         4 42E+03         3 74E-02         9 12E-04         25 386.52           7 90E-02         9 10E-06         1 10E+03         4 22E-01         1 03E-04         25 369.36           7 90E-02         9 10E-06         2 91E-04         2 5 61E-03         2 50.66         2 50.66           7 90E-05         2 91E-04         2 7 61E-06         2 91E-04         2 5 80.36         2 91.66	- (	1 24E+00	3 02E-02		00 61	552 00			7 05-01
2 one-24         1 one-25         3 of 45           2 one-25         3 one-25         1 one-25         3 one-25           4 One-25         1 one-25         2 one-25         3 one-25         3 one-25           9 One-25         1 one-25         5 one-35         3 one-35         3 one-35         3 one-35           1 12E-02         5 one-35         1 one-35         3 one-35 <t< td=""><td>200</td><td>Z 19E-0Z</td><td>5 34E-04</td><td></td><td>22.35</td><td>696 00</td><td></td><td></td><td>001100</td></t<>	200	Z 19E-0Z	5 34E-04		22.35	696 00			001100
9 00E-02 1 04E-05 2 25E+03 1 07E+00 2 01E-02 25 303 35 35 35 35 35 35 35 35 35 35 35 35 35	20.00	0 30E-02	1 405-03		33.15	585 85	7,000	18E-05	0 OE+00
112E-02     569E-06     180E-01     47E-02     109E-03     25       161E-02     721E-06     180E+00     111E+00     271E-02     25     512 15       623E-02     676E-06     120E+04     272E-04     663E-06     25     488 35       782E-02     873E-02     873E-03     280E-03     25     369 52       780E-02     873E-04     272E-01     280E-03     25     369 52       790E-02     910E-06     110E+03     422E-01     103E-04     25     360 56       710E-02     790E-06     297E-03     441E-02     34E-04     25     419 60	E-05	1 07E+00	2615-02		25 26	576.05			00+00
161E-02         7.21E-06         180E+00         111E+00         277E-02         25         512 15           6.23E-02         676E-06         1.20E+04         272E-04         6.3E-06         25         488 35           7 82E-02         8 73E-06         2 80E+03         1.15E-01         2 80E-03         25         369 52           7 80E-02         8 80E-06         4 42E+03         3 74E-02         9 12E-04         25         386 15           7 90E-02         9 10E-06         1 10E+03         4 22E-01         1 03E-02         25         360 36           7 10E-02         7 90E-06         2 97E-04         4 41E-02         3 44E-04         25         419 60	E-06	4 47E-02	1 09E-03		33 69	846 31			00+00
6 23E-02 6 76E-06 1 20E+04 2 72E-04 6 63E-06 25 488 35 7 7 2 5 60 3 5 7 8 8 35 7 8 8 9 5 7 8 8 9 5 7 8 8 9 5 7 8 8 9 5 7 8 8 9 5 7 8 9 6 5 9 1 8 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9 5 9 1 8 9	E-06 1	111€+00	2.71E-02		12 15	746 00			7 0E-05
7 82E-02 8 73E-06 2 80E-03 1 15E-01 2 80E-03 2 5 369 5 2 7 80E-02 8 80E-06 4 42E-03 3 74E-02 9 12E-04 2 5 386 15 7 90E-02 9 10E-06 1 10E+03 4 22E-01 1 03E-02 2 5 360 3 6 7 10E-02 7 90E-06 2 97E-04 1 41E-02 3 44E-04 2 5 419 60 6 7 10E-03 7 60E-05 6 7 10E-03 7 60E-05 6 7 10E-03 7 60E-04 2 5 7 10E-03 7 60E-04 2 5 7 10E-03 7 60E-04 2 5 7 10E-03 7 60E-04 2 5 7 10E-03 7 60E-04 2 5 7 10E-04 2 5 7 10	100	2 72E-04	6 63E-06		38 35	715 00		_	000+00
7 10E-02 8 60E-00 4 42E+03 3 7 4E-02 9 12E-04 25 386 15 2 7 90E-02 9 10E-06 1 10E+03 4 22E-01 1 03E-02 25 360 36 1 7 10E-02 7 90E-06 2 97E-03 1 4 1E-02 3 4 4 E-04 25 4 19 60	E-06 2	1 15E-01	2 80E-03		39 52	572 00	_		4 0E-03
1 7.10E-02 7.90E-06 2.97E-03 1.41E-02 3.44E-04 25 419.60	9 6	3 /4E-02 4 22E-01	9 12E-04		36 15 36 36	602.00			001100
3 4 345 02 4 345 00 6 4 345 00 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	90E-06	1.41F-02	3.445-04		9 9	544 20 661 15			004
4 ZIE-02 / 89E-09 4 Z4E+00 6 36E-03 155E-04 25 550 54	E-06 4	6 36E-03	155E-04		50 54	803 15		-	2 15-01
4 Z I E-0 Z V 4 68	28 5 8 8	######################################	E-06 2 80E+03 1 E-06 4 40E+03 3 E-06 1 10E+03 4 E-06 2 97E+03 1 E-06 4 24E+00 6	E-06 2 80E+03 115E-01 2 E-06 4 40E+03 3 74E-02 9 E-06 110E+03 4 22E-01 1 E-06 2 97E+03 141E-02 3 E-06 4 24E+00 6 36E-03 1	E-06 2 80E+03 115E-01 2 80E-03 25 E-06 442E+03 374E-02 912E-04 25 E-06 110E+03 422E-01 103E-02 25 E-06 2 97E+03 141E-02 344E-04 25 E-06 4 24E+00 6 36E-03 155E-04 25	E-06 2 80E+03 115E-01 2 80E-03 25 E-06 442E+03 374E-02 912E-04 25 E-06 110E+03 422E-01 103E-02 25 E-06 2 97E+03 141E-02 344E-04 25 E-06 4 24E+00 6 36E-03 155E-04 25	E-06 2 80E+03 1 15E-01 2 80E-03 25 369 52 E-06 4 42E+03 3 74E-02 9 12E-04 25 386 15 E-06 1 10E+03 4 22E-01 1 03E-02 25 360 36 E-06 2 97E+03 1 41E-02 3 44E-04 25 419 60 E-06 4 24E+00 6 36E-03 1 55E-04 25 550 54	E-06         2 80E+03         1 15E-01         2 80E-03         25         369 52         572 00         7,590           E-06         4 42E+03         3 74E-02         9 12E-04         25         386 15         602 00         8,322           E-06         1 10E+03         4 22E-01         1 03E-02         25         360 36         544 20         7,505           E-06         2 97E+03         1 41E-02         3 44E-04         25         419 60         661 15         8,996           E-06         4 24E+00         6 36E-03         1 55E-04         25         550 54         803 15         12,155	E-06         2 80E+03         15E-01         2 80E-03         25         369 52         572 00         7,590         0 0E+00           E-06         4 42E+03         3 74E-02         9 12E-04         25         386 15         602 00         8,322         1 6E-05         1 6E-05           E-06         1 10E+03         4 22E-01         1 03E-02         25         360 36         544 20         7,505         1 7E-06         1 7E-05           E-06         2 97E+03         1 41E-02         3 44E-04         25         419 60         661 15         8,996         5 8E-05         1 6E-05           E-06         4 24E+00         6 36E-03         1 55E-04         25         550 54         803 15         12,155         0 0E+00

					VLOOKUP TABLES							
84742 O. a. h. h. d. J. H. H. J. L.	2 88E+02	2 56E-02	635E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0.05+00	2 8E+00
85687 Ruft henry philalete	5 250-104	4 38E-02	7 86E-06	1 12E+01	3 855-08	9 39E-10		613 15	798 67	14,751	O 0E+00	3 55-01
86306 N-Nitroendinhenvlamine	1 29E+03	3 125 02	4 02E-00	2 645.04	0 1/1 40	1 265-06		660 60	839 68	13,000	0 0E+00	7 0E-01
86737 Fluorene	1 385+04	3 63 F-02	7 88F-06	1 985+00	2 615-04	3 UUE-U6		632.28	890 45	13,000	14E-06	00=+00
86748 Carbazole	3 39 103	3 90E-02	7 03E-06	7 48E+00	6 26F-07	1535-08	9 %	5/0 44 627 87	8/0.00	12,000	0 0E+00	1 4E-01
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15F-03		486 15	738.00	10,206	275.05	00+00
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08		582 15	813.20	14,000	3 46-05	00±00
88062 2,4,6-Trichlorophenol	3.81E+02	3 18E-02		8 00E+02	3 19E-04	7 78E-06		519 15	749 03	12,000	3 1E-06	0 0E+00
91203 Naphrhalene 91941 3 3 Dichlombanardos	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04		491 14	748 40	10,373	0 0E+00	1 4E-01
95476 o-Xviene	2.62E±02	200000		3 11E+00	1645-07	4 00E-09		560 26	754 03	13,000	- 3H-04	0 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40F-02	8.30F-06	2 50E+04	4 925-05	3 20E-03	Q y	417 50	630 30	8,561	0 0 0 0 0 0	7 05+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02		1 56E+02	7 79E-02	1 90F-03		464 19 453 57	205.00	006,00	0.05+00	2 6 6
95578 2-Chlorophenol	3 88E+02	5 015-02		2 20E+04	1 60E-02	3 90 - 04		447 53	675 00	9.572	00+100	1 8F 02
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02		1 20E+03	1 78E-04	4 345-06	23	526 15	759 13	13,000	00+00	3 50-01
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	52	483 95	719 00	10,566	0.00	2 0E-03
100414 Ethylbenzene 100425 street	3 63E+02	7 50E-02		1 69E+02	3 23 6-01	7 88E-03	52	409 34	617 20	8,501	0 0E+00	1 0E+00
105679 2 4-Dimethylabecol	2 005 402	7 10E-02		3 10E+02	1 135-01	2 76E-03	22	41831	636 00	8,737	00=+00	1 0E+00
106423 p-Xylene	3 896+02	2 64E-02	8 44F-06	7 87E+03	8 20E-05	2 00E-06 7 66E-03	52 8	484 13	707 60	11,329	0000	7.0E-02
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 385+01	9 96E-02	2 43E-03		411 32	684 75	0,525	000+000	) UE+00
106478 p-Chloroantine	6 61E+01	4 83E-02		5 30E+03	1 36E-05	3 32E-07		03 65	5. 25.	11,689	001100	1 4 1 5 2
107062 1,2-Dichloroethane	1 74E+01	1 04E-01		8 52E+03	4 01E-02	9 78 5-04	22	356 65	561 00	7,643	2 6E-05	00000
108054 Vinyt acetate	\$ 25E+00	8 50E-02		2 00E+04	2 10E-02	5 12E-04	55	345 65	519 13	7,800	0 0E+00	2 0E-01
100000 m-Aylene	4 07E+02	7.00E-02		161E+02	3 OTE-01	7,346-03		412 27	617 05	8,523	0 0E+00	7 0E+00
100003 Tolographs	2 1055+02	3 70E-02	8 50 50 5	5 265+02	2 72E-01	6 63E-03	22	383 78	591 79	7,930	0 0E+00	4 0E-01
108952 Phenol	2 88F+01	8 20F-02		8 285+04	1 525-01	3 /15-03	8 8	04.87	632 40	8,410	00+900	2 0E-02
111444 Bis(2-chloroethyl)ether	1.55E+01	6 92E-02		172F±04	7 38F-04	3 30E-07	9 2	455 02	054 20	026'01	0 0E+00	2 1E+00
115297 Endosulfan	2 14E+03	1 156-02		5 10E-01	4 59E-04	1 125-05		674 43	942.94	000,81	20 HO	0 UE+00
117817 Bis(2-ethythexyl)phthalate	1 51E+07	3 51E-02		3 40E-01	4 18E-06	1 02E-07	25 6	657 15	806 00	15,999	4 OE-06	0.00
117840 Di-n-octyl phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05		704 09	862 22	15,000	0 OE+00	7 0E-02
12041 nexactionopenzene	5 50F+04	5 42E-02	5915-06	6 20E+00	5 41E-02	1 32E-03		582 55	825 00	14,447	4 6E-04	0 OE+00
120821 1.2.4-Trichlorohanzene	1 78 1 + 03	3.005.02	7 74E-05 8 23E-06	3.005.02	2 6/E-03	6 51E-05	52 5	15 18	873 00		0 0 = +00	1 1E+00
120832 2.4-Dichlorophanol	1.47E+02	3.46F-02		4 50F+03	3 82E-02	2,425-03 3,175-05	C H	486 15	725 00		00=+00	2 0E-01
121142 2,4-Duntrototuene	9 55E+01	2 03E-01		2 70E+02	3.80F-06	9.715.08	ς γ	500.00	708.17	000,11	0 05+00	115-02
124481 Chlorodibromomethane	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04	25.25	416 14	678.20	500.0	2 4F.04	00400
127184 Tetrachloroethytene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84 E-02	32	394 40	620 20	8.288	5 8E-07	00+90
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 10E-05		667 95	936 00		0 0E+00	116-01
150592 ds-1,Z-Dichloroethylene 156805 frans.1 2-Dichlomothylene	3 33E+01	7 355-02	1135-05	3 50E+03	1 67E-01	4 07E-03	52	333 65	544 00		0.05+00	3 5E-02
193395 Indeno(1,2,3-cd)pvrene	3 47E+06	1 905-02	5.665-06	2 20E-03	5 56E-05	9 38E-U3	9 4	320 85	516 50		0 05 +00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02		1 50E-03	4 55E-03	1115-04		715 90	107 6 24 060 27	000,71	2 15-04	00=+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 355-06	2 06E-01	6 60E-04	1 61E-05		655 95	905 GD	13,815	00400	1 4 1 - 01
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07			1019 70	16,000	2 1E-05	0 0 0 0 0
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 605-03	3 88E-03	9 46E-05	25 7		979 00	16,455	2 1E-06	0 05+00
309002 Aldnin	2 45 5 + 06	1 32E-02	4 86E-06	1 805-01	6 97E-03	1 70E-04		603 01	839 37	13,000	4 9E-03	00+300
319849 alpha-nCH (alpha-bhC)	123E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		596 55	839 36	13,000	1 8E-03	0 0E+00
515051 Setamon (Deta-Oric) 542756 1 3-Dichloropmone	4 57E+01	6 26E-02	1 345-00	2 40E-01	3 U3E-U5 7 26F 04	7 445-07		596 55	839 36	13,000	5 3E-04	0 0 = +00
606202 2.6-Dintrototrene	6 92F+01	3 27E-02	7 265-05	1 825-03	7 Z6E-01	1 //E-02	9	381 15	587 38	7,000	3 7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45F-02	8 17F-06	9 89F+03	3 U0E-03	7 40E-U/	22	00 866	770 00	12,938	1 95-04	0 0 0 0
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9.515-06	3 15	513 96	7400/ 8/8 76	000	2 UE-03	0.05+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02	25.6	629 88	1750 00		0.0F+00	205-00
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	25 6	657 15	873 31		3 2E-04	0 0E+00
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 385-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	25 4	402 50	539 37	19,000	1 0E-04	0 OE+00
1109/691 Arodor 1204 (FCB-1254)	2 00E+05	1 565-02	5 00F 06	5 70E-02	8 20E-02	2 00E-03	33	377 50	512 27	19,000	1 0E-04	0 0E+00
53469219 Arodor 1242 (PCB-1242)	3.30F+04	2 22E-02 2 14E-02	4 6	4 20E-01	1 19E-02 2 13E-03	2 90E-04 5 30E 04	8 K	340 50	475 22	18,000	1 0E-04	0 OE+00
	1	! !	1	,	40-40-	2 2017	3	200	482.20	18,000	1 0E-04	0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

윉

YES

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

	ENTER User-defined stratum A soil valpor permeability, k <sub>v</sub> (cm²)		
	ENTER Soil stratum A SCS soil type (used to estimate OR soil vapor	SI ENTER Stratum C Stol water-filled porosity,	03
	SCS soil type directly above water table	ENTER Stratum C son total porosity, n <sup>c</sup> (unitless)	0 43
	ENTER Soll stratum directly above water table, (Enter A, B, or C)	ENTER Stratum C soil dry bulk density, pc pc (g/cm³)	ENTER Indoor au exchange rate, ER (1/h)
908	ENTER TLyn (cell D28) Thickness of soil stratum C, (Enter value or 0) hc (cm)	ENTER Stratum B soil water-filled porosity, $\theta_w^8$ (cm³/om³)	0 27 ENTER Floor-wall seam crack width, w (cm)
Chemical Trichloroethylene	NTER ENTER ENTER  Totals must add up to value of L <sub>vrt</sub> (cell D28)  Thickness of soil of soil of soil stratum B, stratum C, stratum C, stratum A, (Enter value or 0) (Enter value or 0, h <sub>A</sub> h <sub>B</sub> (cm) (cm)	ENTER Stratum B soil total porosity, n <sup>8</sup> (unitless)	0.42 ENTER Enclosed space height, He
	ENTER Totals mu: Thickness of soil stratum A, h,	762 ENTER Stratum B soil dry bulk density, Pb (9/cm³)	ENTER Enclosed space floor width, We (cm)
	ENTER Depth below grade to water table, Lwr (cm)	ENTER Stratum A soal water-filled porosity, 6,4 (cm³/cm³)	ENTER Enclosed space floor fength, Le
ENTER Intial groundwater conc. Cw (49/L) (68 41538462	ENTER Depth below grade to bottom of enclosed space floor, Lr	ENTER Stratum A soal total porosity, n <sup>A</sup> (untless)	ENTER Soll-bidg pressure differential, ΔP (g/cm-s²)
Chemical CAS No (numbers only, no dashes)	ENTER Average soll/ groundwater temperature, Ts (°C)	ENTER Stratum A soil dry bulk density, $\rho_{c}^{A}$ (g/cm³)	ENTER Enclosed space floor thickness, Lored (cm)

Used to calculate risk-based groundwater concentration

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488

ENTER
Target hazard
quotient for
noncarcinogens,
THQ

ENTER
Target
nsk for
carcinogens,
TR

Exposure frequency, EF

Exposure duration, ENTER

ENTER
Averaging
time for
noncarcinogens,
AT<sub>NC</sub>
(yrs)

ENTER Averaging time for carcinogens,

(days/yr)

G (ST)

ဗ္က

ENTER

### 2 of 7

CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)	00.100
Unit nsk f factor, URF (µg/m³) ¹	1 75 06
Pure component water solubility, S S (mg/L)	1 105103
Organic carbon partition coefficient, $K_{ce}$ (cm³/g)	544 20   1 66E+02   1 10E+03   1 7E 06   0 0E:00
Critical temperature, T <sub>c</sub> (*K)	544 20
Normal bolling point, t T <sub>B</sub>	36036
Enthalpy of vaponzation at the normal bosing point, $\Delta H_{\rm v,b}$ (cal/mol)	7.505   360.36
Henry's law constant reference temperature, T <sub>R</sub>	25
Henry's law constant at reference temperature, H	7 90E-02   9 10E-06   1 03E-02
Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	9 10E-06
Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	7 90E-02

## INTERMEDIATE CALCULATIONS SHEET

the second		SOII SOII	soil File	effective	los	los	soil	Thickness of	porosity in	porosity in	porosity in	wall
	porosity,	porosity,	porosity,	saturation,	permeability,	permeability,	permeability,	capillary zone,	capillary zone,	capillary zone,	capillary zone,	seam perimeter,
	, φ,		ບູ ອີ່	เก้า	<i>s</i> z '	λ.,	\$ <sup>*</sup>	La	T C	θ <b>,</b> α	9°	X
7	(cm,/cm,)	(cm³/cm³)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm²)	(cm <sub>2</sub> )	(cm²)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm)
L	0.230	0 150	0 130	0 419	9 36E-10	0.746	6 98E-10	17 05	0 43	0.136	0 294	3,844
							Stratum	Strafum	Stratum	Capillary	7. 2.	
	Crack-	Crack	Enthalpy of	Henry's law	Henry's law	Vapor	∢	m	O	ZONE	overall	
	to-total	depth	vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
	area	pelow	ave groundwater	ave, groundwater	ave groundwater	ave. soil	diffusion	dıffusion	diffusion	diffusion	diffusion	path
	ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient,	coefficient,	length,
	E	Zorack	ΔH <sub>v, TS</sub>	H <sub>TS</sub>	Ή ξ	μτs	٥, ۴	ູ້	۵ پ	D B	ם ד	ٹ
	(unitless)	(cm)	(cal/moi)	(atm-m³/mol)	(unitless)	(g/cm-s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm)
	4 16E-04	15	8,483	6 60E-03	2 78E-01	177E-04	3 20E-03	8 11E-04	4 82E-04	5 55E-04	7 32E-04	1935 72
					Exponent of	Infinite						
		Average	Crack		equivalent	source	Infinite					
		vapor	effective		foundation	roopus	Source	Ž				
	Crack	flow rate	diffusion	Area of	Peclet	attenuation	.pldg	rısk	Reference			
	radius,	into bldg ,	coefficient,	crack,	number,	coefficient,	conc ,	factor,	conc.,			
	Corneck	Q.	Dose	Agrack	exp(Pe')	ಶ	Chulding	URF	RfC			
	(cm)	(cm <sub>3</sub> /s)	(cm <sup>2</sup> /s)	(cm <sub>2</sub> )	(unitless)	(unitless)	(m/bn)	(mg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sub>3</sub> )			

CONCENTRATION CALCULATIONS	
RISK-BASED GROUNDWATER CON	

INCREMENTAL RISK CALCULATIONS

Hazard quotient	from vapor intrusion to	indoor air,	noncarcinogen (unitless)	¥
Incremental nsk from	vapor intrusion to	indoor air,	carcinogen (unifless)	Ϋ́
Final	exposure	groundwater	(µg/L)	1 27E+03
Pure	_	solubility,		1 10E+06
Risk-based	exposure	groundwater	(µg/L)	1 27E+03
Indoor	groundwater	conc.	(µ9/L)	NA
Indoor	groundwater	carcinopen	(µg/L)	1 27E+03

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

VLOOKUP TABLES

SCS Sall Type K. C. C.L.		So	Soil Properties Lookun Table	kun Table									
	K (cm/h)	o (1icm)	M (coefficial)		0 (cm3/cm3)	C. Complement							
, <del>ਹ</del>	ı	5	1,	ı	I.	I,	mean Grain Diameter (cm)						
1)	0 0	0 008	60.	0.083	0.38	0 068	0 0092						
	2 5	8000		0.25	40	960	0.00 U						
SI	14.59	0 124	- c	0.581	7 7	0.000	0 020						
S	29 70	0 145	2 68	0 627	- 643	0.045	0.040						
SC	0 12	0 027	1 23	0 187	0 38	0 100	0 025						
SCL	131	0 029	1 48	0 324	0 39	0 100	0 028						
<u></u>	0 25	0 016	1 37	0.270	0 46	0 034	0 0046						
<u> </u>	0 05	0 002	109	0 083	0.26	0 0 0 0	0 0039						
SICL	000	0 010	123	0 187	0.43	0 089	9500 0						
St.	4 4 2	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.89	0.293	0 45	0.067	0.011						
		1			Chemica	Chemical Properties Lookup Table	np Table						1
		Carbon		,	Fure		Henry's				Enthalpy of		
	_		Diffusivity	Diffusivity	component	Henov,	at reference	<del>=</del>	Normal		vaporization at		
	<sub>0</sub>	_		In water.	>	law constant	temperature	temperature		Cattlean	me normal	risk Re	. Θ
		× <sub>8</sub>		<u>.</u>		Ì	I			T.	AH.	ERF.	•
CAS No Chemical		(cm³/g)	(cm <sup>2</sup> /s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/mol)	(၁)	(R)	( <b>k</b> )	)		-
50293 DDT		2 63E+06	1 37E-02	4 OSELDS	2 KDE-02	3 325.04	90 101	ä	200.45			1	
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 135-06	2, 23	715.90	969 27	000,11	9 / H C	
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 06 5-06	2 79E+03	1 82E-05	4 44E-07	25.25	605.28	827.85	15,000	20-11-0	
53703 Dibenz(a,h)anthracene		3 80€+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	52	743 24	990 41	16.000	2 15-03	
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05 E-02	52	349.90	556 60	7 127	55.05	
56553 Benz(a)anthracene		3 98톤+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 345-06	S 1	708 15	1004 79	15,000	2 th 2	
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	<b>5</b> 2	624 24	885 73	13,000	3 75-04	
58899 gamma-HCH (Lindane)		1 07 E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3.7E-04	
60571 Dieldrin		2 14E+04	1 25E-02	4 74E-06	195E-01	6 19E-04	1516-05	52	613 32	842 25	13,000	4 6E-03	
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10,000	0 0E+00	
67641 Acetone		575E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	6,955	0 0E+00	
6753 Chloroform		3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	52	334 32	536 40	886'9	2 3E-05	
71363 Butanol		1 /8E+03	2 505-03	6 805-06	5 00E+01	1 59E-01	3 885-03	32	458 00	695 00	9,510	4 0E-06	
71432 Benzene		5.89 = +0.5	8 80F-02	9 305-00	1 755+03	2 286-04	30-308 8 90-308 8	8 8	39088	563 05	10,346	0 0E+00	
71556 1,1,1-Trichloroethans		1 10E+02	7 80E-02	8 80E-06	133E+03	7 05E-01	1 72 E-02	3 %	347.24	545 00	7 136	00-25-0	
72208 Endrin		1,23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7.515-06	52	718 15	986 20	12,000	000-00	
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	52	651 02	848 49	14,000	000+00	
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9.00E-02	1 64E-04	4 00E-08	52	93 90	863 77	14,000	6 9E-05	
7209 DDE		4 47E+06	1 44E-02	587E-06	1 205-01	8 61E-04	2 10E-05	52	636 44	860 38	13,000	9 7E-05	
75014 Vital chindle (chlorosthere)	190	1 03E+01	1 08E 04	1 215-05	1 52E+04	2 56E-U1	6 24E-03	32	276 71	467 00	5,714	0.05+00	
75092 Methylene chloride	ě	1 17 F +01	1015-01	1175-05	1 30E+04	8 98E-03	2 / 15-02	9 %	22,622	432 00	5,250 907.6	20-n-r	
75150 Carbon disulfide		4.57E+01	1 046-01	1 00E-05	1 19E+03	1,24E+00	3 02E-02	3 52	319.00	552 00	6,700	70-U-4	
75252 Bromoform		8 71E+01	1 49€-02	1 035-05	3 10E+03	2 19E-02	5 34E-04	S2 12	422 35	00 969	9.479	116.06	
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 8E-05	
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	25	330 55	523 00	6,895	0 0E+00	
75334 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6,247	5 OE-05	
77474 Hexachlorocchoostadiesa	5	1 41E+05	1 125-02	3 535-05	1 80E-01	4 47 - 02	1 09E-03	52	603 69	846 31	13,000	3E-03	
78591 Isosborore	₽	4 68E+03	6 23E-02	6.75E-06	1 2011-00	2 72E 00	2 /1E-02	52	512.15	746 00	10,931	005+00	
78875 1 2-Dichlomoropane		4 37E+01	7 82E-02	9 735.06	2 BOE+04	40-04	9 635-06	52.5	488 35	715 00	10,271	2 7E-07	
79005 1,1,2-Trichloroethane		501E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	2 80E-03 9 12E-04	S 53	369 52 386 15	5/200	7,590	0 0E+00	
79016 Trichloroethylene		1 66E+02	7 90E-02	9 10E-06	1,105+03	4 22E-01	1 03E-02	25.25	360 36	544 20	7,505	1 7E-06	
79345 1,1,2,2-Tetrachloroethane		9 33E+01	7 10E-02	7 90E-08	2 97E+03	141E-02	3 44E-04	25	419 60	661 15	966'8	5 85-05	
83329 Acenaphthene		7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	22	550 54	803 15	12,155	0 0E+00	

200000	;				VLOOKUP TABLES							•
84742 Discharge attached	2 886.402	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 But herzy nuthalate	5 755404	4 305-02	/ 80E-U0	1 125+01	3 851-08	9 39E-10	8 8	613 15	798 67	14,751	00+300	3 55-01
86306 N-Nitrosodiohendamine	1295+03	3 12F-02	4 83E-06	2 69E+00	3 1/E-03	1.261-06	8 8	660 60	839 68	13,000	0 0 0 0 0 0	7 0E-01
86737 Fluorene	1385+04	3 535-02	7 885-06	1 985+00	2 61E-03	3 UUE-UB	6 4	632.28	890 45	000,51	145-06	00=+00
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1535-08	3 12	570 44 627 87	899.00	12,000	5 7F-06	00+100
87683 Hexachloro-1,3-butadiene	537E+04	5 61E-02	6.16E-06	3 23E+00	3 34E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0 0E+00
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	52	582 15	813.20	14,000	3 4E-05	0 0E+00
88062 2,4,6-Trichlorophenol	3.81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	52	519 15	749 03	12,000	3 1E-06	0 0E+00
91205 Naphualene 91941 3 3.Dichlombeozidos	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	146-01
95475 0-XVene	7 63E+02	94E-02		3 17E+00	1 64E-07	4 00E-09	52	560 26	754 03	13,000	- 35-04	00+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30F-06	2 60F+04	4 92E-01	3 20E-U3	6 5	417 60	630 30	8,661	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	7 05 50
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02		1 56F+02	7 79E-02	1 905-03	0 K	404 19 453 57	997 60	0,800	001100	2000
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 205 +04	1 60E-02	3 90E-04	3 52	455.57	675.00	9,700	000+00	1 8 1 .02
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	22	526 15	759 13	13,000	00=+00	3 5E-01
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 845-04	2 40E-05	52	483 95	719 00	10,566	00+400	2 0E-03
100414 Ethytbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20	8,501	0 0E+00	1 0E+00
105c70 3 4 Parathidations	/ /6E+02	/ 10E-02	8 00E-06	3 105+02	1 13E-01	2 76E-03	52	41831	636 00	8,737	0 0E+00	1 0E+00
106423 n-Xviene	2 USE+02	2 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	£ 5	484 13	707 60	11,329	00=+00	7 0E-02
106467 1.4-Dichlorobenzene	6 175+02	6 90F-02	7 90 5-06	7 385+01	3 14E-01	7 665-03	9 5	411 52	616 20	8,525	00=+00	7 05+00
	6 6 1 E+01	4.83E-02	101E-05	5.30F+03	1365-05	3 325-03	Q 4	44/ 21 503 65	584 /5 754 00	1,271	001100	4 OF-01
107062 1,2-Dichloroethane	1 74E+01	1046-01	90E-06	8 52E+03	4 01E-02	9 78E-04	2 22	356 65	56100	7,643	2 6F-05	70-11-0 10-0 10-0 10-0 10-0 10-0 10-0 10
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04		345 65	519 13	7,800	0.000	2 00-01
	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03		412 27	617 05	8,523	0 0E+00	7 0E+00
	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03		383 78	591 79	7,930	0.0E+00	4 0E-01
10890/ Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03	52	404 87	632 40	8,410	0 0E+00	2 0E-02
	2 88E+01	8 20E-02	9 105-06	8 28E+04	1 63E-05	3 98E-07		455 02	694 20	10,920	0 0E+00	2 1E+00
115207 Enderufen	1 555+01	6 92E-02	7 53E-06	1 72E+04	7 385-04	1 80E-05		451 15	629 79	9,000	3 3E-04	0 0E+00
117817 Bis(2-ethythexyl)obthatate	1516+07	3.516-02	4 33E-00	3 405-01	4 395-04	1 125-05	8 8	674 43	942.94	1,000	0 0E+00	2 1E-02
117840 Di-n-octyl phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 746-03	6 68F-05	9 45	557 13 704 09	865 00	15,999	4 OF 66	20 00 400
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03		582 55	825.00	14 447	4 6F-04	0.05+00
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51 5-05		615 18	873 00	13.121	0 0E+00	1 16+00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03		486 15	725 00	10,471	0 OE+00	2 0E-01
120832 2,4-Dichlorophenol	147E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06		482 15	708 17	11,000	0 0E+00	1 1E-02
12   142 2,4-Dinitrototuene 124481 Chlomalhomomothano	9 555+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08		290 00	814 00	13,467	19E-04	0 0E+00
127184 Tetrachloroethylene	1.55F+02	7 20E-02	8 20E-05	2 00E+03	3 27E-U2 7 54E-U1	7 83E-04	£ 2	416 14	678 20	8,000	2463	0 0 0 0
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	1 35E-01	4 515-04	1 10F-05		554 40	935.00	0,200	2 85-07	0 UE+00
156592 crs-1,2-Dichloroethylena	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 675-01	4 07E-03	52	333 65	544 00	7,192	000+00	3 5 6 5
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02		6 30E+03	3 85E-01	9 39E-03		320 85	516 50	6,717	00+400	7 0E-02
193395 indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02		2 20E-05	6 56E-05	1 60E-06	52	809 15	1078 24	17,000	2 1E-04	0 0E+00
205522 Desizo(c)modalidade	1 025+05	2 20E-02	900000	2 065 04	4 55E-03	1115-04		715 90	969 27	15,000	2 16-04	0.05+00
	1 23E+06	2 26E-02		8 00F-04	3 405-05	8 295-07	0 K	055 95 753 15	905 00	13,815	0 0E+00	1 4E-01
218019 Chrysene	3 98E+05	2 48E-02		1 60E-03	3 88E-03	9 46E-05		714 15	0/6/6	16.455	2 1E-03	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
309002 Aldrin	2 45E+06	1 325-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04		603 01	839 37	13,000	4 9E-03	00000
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05	52	596 55	839.36	13,000	185-03	0 0E+00
31985/ Deta-HCH (Deta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5 3E-04	0 0E+00
542/55 t,3-Dioritrophile 606202 2 6-Dioritrofilepe	6 97E+01	3 27E-02	1 00E-05	2 80E+03	7 26E-01	177E-02		381 15	587 38	000	3 7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamine		5 45E-02	8 17F-06	9 89F+03	9 235-05	2.25E-08	9 4	338 UU 508 80	746 97	12,938	1 9E-04	0 05+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02		2 00E-01	3 905-04	9.518-06		513 96	740 0/ R4R 76	200	2 UE-U3	0.05+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02		5 62E-02	4 67E-01	1 14E-02	22	629 88	1750 00	14 127	0.05+00	3 OE-04
8001352 Toxaphene	2 57E+05	1 16E-02		7 40E-01	2 46E-04	6 00E-06	55	657 15	87331	14,000	325	00+00
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02		8 00E-02	1 89E-01	4 60E-03		402 50	539 37	19,000	1 0E-04	00+300
1109/691 Arador 1234 (PCB-1254)	2 00E+05	1 565-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	52	377 50	512 27	19,000	1 0E-04	0 0E+00
120/4112 Append 1010 (PCB-1010) 53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 145-02	5.315-06	3 40F-01	1 19E-02 2 13E-02	2 90E-04	23 25	340 50	475 22	18,000	1 0E-04	0 0E+00
	1	! } !	;	>	4 105.76	£2-103 0	3	70 OK	482.20	000'81	1 0E-04	0 0E+001

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" In "YES" box)

YES

YES

Chemical

ENTER

CAS No

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

VERSION 1.2 September, 1998

User-defined permeability. stratum A soll vapor (cm<sub>3</sub> soil type (used to estimate OR soil vapor Soft Stratum A SCS permeability) SCS soil type directly above water table ENTER Soil stratum directly above water table, (Enter A, B, or C) ENTER of soil of soil stratum B, stratum C, (Enter value or 0) CALIER CALLER CALLER

Thickness Threvores

\*\*Record Control Co 1127 76 ě Ê 1,1,2-Trichloroethane Chemical 96 09 (cm) Thickness of soil stratum A, ENTER 762 (E) ₹ Depth below grade to water table, 1950 72 Ĭ. <u>E</u> ENTER Inital groundwater conc , Cw (µg/L) below grade to bottom of enclosed space floor, 2 526153846 ENTER Depth ٿ E 15 (numbers only, groundwater temperature, no dashes) Average soil/ 79005 ENTER

ENTER Stratum A soll dry sulk density, $\rho_b^A$ (g/cm³)	ENTER Stratum A sol total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, B <sub>w</sub> ^A (cm³/cm³)	ENTER Stratum B soil dry bulk density, P <sub>b</sub> (g/cm³)	ENTER Stratum B soil total porosity, n <sup>B</sup> (untless)	ENTER Stratum B soil water-filled porosity, $\theta_w^8$ $(cm^3/cm^3)$	ENTER Stratum C soll dry bulk density, p <sub>b</sub> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)	ENTER Stratum C soil water-filled porosity, e <sub>w</sub> c (cm³/cm³)
15	0.43	0.2	17	0.42	0.27	1.7	0.43	03
ENTER	ENTER	ENTER Enclosed	ENTER	ENTER	ENTER	ENTER		
space	Soil-bidg	space	space	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
thickness,	differential,	length,	width,	height,	width,	rate,		
Lond	ΔP	٦	Wa	£	*	R		
(cm)	(g/cm-s <sup>2</sup> )	(E)	(cm)	(cm)	(mo)	(1/h)		

15	40	961	961	488	0.1	
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	
Averaging	Averaging			Target	Target hazard	
time for	time for	Exposure	Exposure	nsk for	quotient for	
carcinogens,	noncarcinogens,	duration,	frequency,	carcinogens,	noncarcinogens,	
ATc	ATNC	G	Ш	ጅ	THO	
(yrs)	(yrs)	(yrs)	(days/yr)	(unitiess)	(unitless)	

Used to catculate risk-based groundwater concentration

1 0E-06

350

30

### CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)
Unit nsk factor, URF (μg/m³) <sup>-1</sup>
Pure component water solubility, S (mg/L)
Organic carbon partition coefficient, $K_{\infty}^{\infty}$ (cm <sup>3</sup> /g)
Cntrcal temperature, Tc (°K)
Normal boiting point, T <sub>a</sub>
Enthatpy of vaponzation at the normal boiling point, AH,,,,
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H
Diffusivity in water, D <sub>w</sub> (cm²/s)
Diffusivity in alr, D. (cm²/s)

## INTERMEDIATE CALCULATIONS SHEET

Water-filled Floor- porosity in wall capillary seam zone, perimeter, $\theta_{w,cz}$ $X_{ceta}$ $(cm^3/cm^3)$ $(cm)$	0.294 3,844		7 69E-04 1935 72
Air-filled W porosity in pr capillary capillary capillary element	0 136	_	5 80E-04 7
Total porosity in capillary zone,	0 43	Stratum C C effective diffusion coefficient, D™ (cm²/s)	Reference conc.  RIC  (mg/m³)
Thickness of capillary zone, L <sub>cx</sub> (cm)	17 05	Stratum B affective diffusion coefficient, D'" s (cm²/s)	Unit risk factor, URF (µg/m³)-1
Stratum A soll affective vapor permeability, k, (cm²)	6 98E-10	Stratum A effective diffusion coefficient, D <sup>uff</sup> (cm <sup>2</sup> /s)	Infinite source bidg conc. Chulsten
Stratum A soil relative air permeability, k <sub>ro</sub> (cm <sup>2</sup> )	0.746	Vapor viscosity at ave soil temperature, µrs (g/cm-s)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)
Stratum A soil intrinsic permeability, k	9 365-10	Henry's law constant at ave groundwater temperature, H'75 (unitiess)	Exponent of equivalent foundation Peciet number, exp(Pe <sup>f</sup> )
Stratum A effective total fluid saturation, Sie (cm³/cm³)	0 419	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol)	Area of crack, Avack (cm <sup>2</sup> )
Stratum C soil air-filled porosity, $\theta_{\mathbf{b}}^{\mathbf{c}}$	0 130	Enthalpy of vaporization at ave groundwater temperature, $\Delta H_{v.18}$ (cal/mol)	Crack effective diffusion coefficient, Done (cm²/s)
Stratum B soil air-filled porosity, $\theta_{\bf a}^{\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	0 150	Crack depth below grade, Zask (cm)	Average vapor flow rate into bidg.,  Q <sub>sol</sub> (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_n^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitiess)	Crack radius, rank (cm)
Source- building separation, L <sub>T</sub>	1935 72	Area of enclosed space below grade, A <sub>B</sub>	Source vapor conc., Ceurse (µg/m³)
Exposure duration, t	9,46E+08	Bidg ventilation rate, Qestain (cm <sup>3</sup> /s)	Convection path length,

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RISK-B/

INCREMENTAL RISK CALCULATIONS:

Hazard quotient	from vapor	intrusion to	indoor air,	noncarcinogen	(nuitless)	ΔN
Incremental nsk from	vapor	intrusion to	indoor air,	carcinogen	(nutless)	AN
Final	indoor	exposure	groundwater	conc,	(hg/L)	1 55E+03
Pure	component	water	solubility,	ဟ	(µ9/L)	4 42E+06
Risk-based	ındoor	expositive	groundwater	conc.	(µg/L)	1 55E+03
Indoor	exposite	groundwater	conc.	noncarcinogen	(µg/L)	ΑN
Indoor	exposure	groundwater	conc.	carcinogen	(µg/L)	1 55E+03

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

						VLOOKUP TABLES	LES						
SCS Soil Type	K, (cm/h)	S α (1/cm)	Soil Properties Lookup N (unitless) M (un	ookup Table M (unitless)	9, (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)						
o	0 20	0 008	1 09	0 083	0 38	0 068	2600 0						
	0.26	0.019	131	0 237	0 41	0 095	0 0 0 1 6						
_ <u>-</u>	\$ 5	0 036	1 56	0 359	0 43	0 078	0 020						
2 0	4 C C C	0 124	2 28	0 561	0 41	0 057	0 040						
SC	0 12	0 027	1 23	0 027	2 C	0.045	0.044						
SCL	131	0 059	148	0 324	68 O	0 0	0.029						
<u></u>	0.25	0 016	1 37	0 270	0 46	0 034	0.0046						
SIC	0 02	0 005	1 09	0 083	0.26	0 0 0 0 0 0 0 0 0 0	0 0039						
SICE	007	0 010	123	0 187	0 43	680 0	9500 0						
SL	4 42	0.020	1.89	0.281	0 45	0 065	0000						
					č								
		Cinemo			Chemic	Chemical Properties Lookup Table	okup Table						
		Carbon			Fure		Henry's	Henry's	:		Enthalpy of		
		partition	Diffusivity	Officerets	Component	1	law constant	aw constant	Normal	:	vaporization at	Calt	
		coefficient,	in air.	D water.	solubility	Security 8	at reference femografise	reference		Critical	the normal	nsk	Reference
		Ϋ́	۵	۵	S	ī	i i i i i i i i i i i i i i i i i i i	temperature, +		temperature,	balling point,	factor,	conc.
CAS No Chemical		(cm <sub>3</sub> /g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(ma/L)	(unitiess)	(afm-m³/mol)	<u>-</u> €	<u> </u>	ပ ၌		URF	5 5
								5	2	λ.	(cal/mol)	(m/grl)	(mg/m.)
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 105-06	25	533 15	720.75	11,000	20.07	00,00
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1,13E-06	32	715 90	969 27	000,51	20.00	00+10
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 OSE-06	2 79E+03	1 82E-05	4 44E-07	25	605 28	827.85	15,000	00400	2 OE 03
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1475-08	52	743 24	990.41	000,51	00-TT-0	20-10-0
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	50-15	00+100
55553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	15,000	2 1E-04	00+100
5/49 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3 75-04	00000
Socot Desired (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04	000+000
65850 Benzaja Asid		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	52	613 32	842,25	13,000	4 6E-03	0 0 0 0
67641 Acators		5 00E-01	5 36E-02	7.97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10,000	0 OE+00	1 4E+01
67663 Chlomform		3 08E±01	1245-01	1 14E-05	1 00E+06	1 59E-03	3 88臣-05	52	329 20	508 10	6,955	0 OE+00	3 5E-01
67721 Hexachlornethane		1 785.101	- C- H-C- C- C- C- C- C- C- C- C- C- C- C- C-	1 00E-05	7 925+03	1 50E-01	3 66 03	52	334 32	536 40	6,988	2 3E-05	00+300
71363 Butanol		6 92E+00	8 00F-03	9 30E-06	3 00E+01	1595-01	3 885-03	52 52	458 00	695 00	9,510	4 0E-06	0 0E+00
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75F+03	2 28E-01	8 50 E 50 E 50 E 50 E 50 E 50 E 50 E 50	G 16	39088	563 05	10,346	00=+00	3.5E-01
71556 1,1,1-Trichtoroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-03	2. K	347 24	307 JB	7,342	3 1 0	0.01+00
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7.516-06	2 K	718 15	045 00	12,000	00+100	1 05+00
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1586-05	3 %	651.02	960 20	14,000		                          
72548 DDD		1 00€+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863.77	14,000	80-180	0.05+0.0
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	12°	636 44	86038	13,000	9 7F-05	00+
74839 Methyl bromide	,	1 05臣+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	52	276 71	467 00	5.714	0.0F+00	505-03
75014 Vinyl chloride (chloroethene)	(euer	1 86E+01	1 06E-01	1 23E-06	2 76E+03	111€+00	271E-02	<b>5</b> 2	259 25	432 00	5,250	8 4E-05	0 0 +00
75450 Contraction designate		17E+01	1015-01	1 17E-05	1 30E+04	8 98E-02	2 195-03	25	313 00	510 00	90,706	4 7E-07	3 0E+00
7555 Bromoform		4 5/E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	25	319 00	552 00	6,391	0 0E+00	7 0E-01
75274 Bromodichloromethers		10+U1-01	1 49E-02	1.03E-05	3 10E+03	2 19E-02	5 34E-04	52	422 35	00 969	9,479	1 1E-06	0.000
75343 1 1-Dichlomethane		3 165+01	7 425 02	00 H00 L	6 /4E+03	6 56E-02	1 60E-03	55	363 15	585 85	2,000	1 8E-05	0 0E+00
75354 1 1-Dichlorosthylana		1010101	7 4 2 11 0 2 0	00000	5 USE +U3	2.30E-01	5 61E-03	52	330 55	523 00	6,895	0 0E+00	5 0 0 0 0 1
76448 Heotachtor		1416+08	1 125.02	- C4E-C3	2 25E+03	10/5+00	2 61E-02	25	304 75	576 05	6,247	5 OE-05	0 0E+00
77474 Hexachlorocyclopentadiene	enei	2 00F±05	1615.02	7.215.06	1 805-01	447E-02	1 09E-03	52	603 69	846 31	13,000	1 3E-03	0 00+00
78591 Isophorone	<u>.</u>	4 68E+01	6 23 F-02	6.76F-06	1 205+04	2 725-04	2 /1E-02	8 8	512.15	746 00	10,931	0 0E+00	7 01 05
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80F+03	1 15E-01	30-308 C	9 %	48830	00 00	10,271	2 /E-07	000+00
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 BOE-06	4 42E+03	3 74E-02	2 90E-U3	6 x	369 52	5/200	064,7	0 0E+00	4 05-03
79016 Trichloroethylene		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25 25	36036	544 20	7.505	1 77 C	00+100
79345 1,1,2,2-Tetrachloroethane	ne eu	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	22 52	41960	661 15	966 8	5.85-05	000+00
83329 Acenaphthene		7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	22	550 54	803 15	12,155	0 0E+00	2 1E-01
												!	-

	:				VLOOKUP TABLES							
84742 C. List and List	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567.15	757 00	13,733	0 0E+00	2 8E+00
85687 Burt board absolute	3 330 +104	4 385-02	7 865-06	1 12E+01	3 85E-08	9 39E-10	52	613 15	798 67	14,751	00+300	3 5E-01
86306 N. Mirrendinhandamine	100000	20-24-6	4 03E-00	2 695+00	5 1/E-U5	1 26E-06	52	660 60	83968	13,000	0.05+00	7 0E-01
86737 Fluorene	1 385+04	3 635 02	2 885.06	3 3 1 1 + 0 1	Z USH 44	5 00E-05	2 5	632.28	890.45	13,000	145-06	904
86748 Carbazole	3 395+03	3 BOE-02	7.035-06	7.485+00	2 0 IE-03	4 62 00	9 5	570 44	00078	12,556	0 0E+00	14F.C.
87683 Hexachlero-1 3-butadiene	5375+04	5.618.02	6 15E-06	3 235+00	3 245-01	935.00	9 4	1077 01	438.00	13,977	27170	00+100
87855 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00 1 06	2 445-08	3 %	582 15	13000	14,000	2 4F-05	200
88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	52	519 15	74903	12,000	3 1E-06	0 OE+00
91203 Naphthalene	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	22	491 14	748 40	10,373	0 0E+00	1 4E-01
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 11E+00	1 64E-07	4 00E-09	52	560 28	754 03	13,000	135-04	0 0E+00
904/6 0-Xytene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	52	417 60	630 30	8,661	0 0E+00	7 0E+00
95467 2-Methyphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	52	464 19	09 269	10,800	0 OE+00	1 8E-01
955U1 1,Z-Dichlorobenzene 95578 3,Chlomahogol	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 795-02	1 90E-03	53	453 57	705 00	9,700	0 0E+00	2 0E-01
95954.2.4.5.Trichlorophenal	3 665+02	2015-02	9 45E-05	2 20E+04	1 605-02	3 90 0-04	8 8	447 53	675 00	9,572	004400	1 85-02
98953 Nitrobenzene	6 46 0-103	7.605.02	7 03E-06	1 20E+U3	1 /8E-04	4 34E-06	£ 5	526 15	759 13	13,000	00+100	3 56-01
100414 Ethylbanzene	3 635+02	7 505-02	2 80E-06	1 695+02	3 23 11 01	2 40E-05	Q 1	463 55	00.60	10,566	000-00	2 UE-03
100425 Styrene	7 76E+02	7 10E-02	8 005-06	3 10F+02	1.13F-01	7 765-03	g K	409 34	07 / 10	6,5UT	004400	00+00
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00F-06	3 %	484 13	707 60	11 220	005+00	7 00-00
106423 p-Xylene	3 89E+02	7 69E-02	8 44E-06	1 85E+02		7 66E-03	292	411 52	616 20	8.525	0.0F+00	2 OF+00
106467 1,4-Dichlorobenzena	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 435-03	52	447 21	684 75	9,271	00=+00	8 05-01
106478 p-Chloroaniline	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	52	503 65	754 00	11,689	0 0E+00	1 4E-02
107062 1,2-Dichloroethane	1 74E+01	1 045-01	90 <del>-</del> 306 6	8 52E+03	4 01E-02	9 78E-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
108054 Vinyl acetate	\$ 25E+00	8 50E-02	9 20E-06	2 00E+04	2 105-02	5 12E-04	55	345 65	519 13	7,800	0.05+00	2 0E-01
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03	52	412 27	617 05	8,523	0.00	7 0E+00
	1 82E+02	8 70E-02	8 60 = 06	5 26E+02	2 72E-01	6 635-03	52	383 78	591 79	7,930	00+300	4 0E-01
10890/ Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03	52	404 87	632 40	8,410	0 0E+00	2 0E-02
	2 88E+01		9 105-06	8 28E+04	1 63E-05	3 98E-07	52	455 02	694 20	10,920	0 0E+00	2 1E+00
115297 Endosultan	1 55E+01	5 92E-02	7 53E-06	1 72E+04	7 38E-04	180E-05	52	451 15	659 79	000'6	3 3E-04	0 0E+00
	151E+07	3 515-02	3.66F-06	3 405-01	4 18E-06	1 125-03	9 %	0/4 43	\$ 25 S	000,41	000-00	2 1E-02
117840 Di-n-octyl phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 74E-03	6.68F-05	3 %	704 09	862.22		4 CE-US	10000
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03	22	582.55	825 00		4 65-04	00+00
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05	\$2	615 18	873 00	13.121	0000	1100
	1 78E+03	3 005-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03	52	486 15	725 00	10,471	0.000	2 00-01
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 305-04	3 17E-06	52	482 15	708 17		0.0E+00	1 15-02
	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	22	590 00	814 00		1 9E-04	0 0E+00
124461 Chlorodipromomethane	6.31E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04	52	416 14	678 20	8,000	2 4E-05	0 0€+00
	1 055+05	2 725-02	7 245 08	1 255 01	2 04 04 04 04 04 04 04 04 04 04 04 04 04	1845-02	Q t	394 40	620 20	8,288	5 8E-07	00+300
156592 dis-1.2-Dichloroethylene	3.558+01	7.36F-02	1 138-05	3.505+03	1678-01	1 10E-05	Q 15	22 SE	936 00	14,370	0000	1 16 03
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3.85E-01	9.395-03	3 %	320.85	518.50	6 717	001100	70-107
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 605-06	55	809 15	1078 24		2 1F-04	00110
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1116-04	25	715 90	969 27	15,000	2 1E-04	00+00
	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 61E-05	52	655 95	905 00		0 0E+00	1 4E-01
207089 Benzo(k)fluoranthene	1 23E+06	2,26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07	52	753 15	1019 70		2 1E-05	0 0E+00
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05	52	714 15	979 00	16,455	2 1E-06	0 0E+00
210846 alpha-HCU (alpha BUC)	4 225+05	1 32E-02	4 86E-06	1 80E-01	6.9/E-03	1 70E-04	52	603 01	839 37	13,000	4 9E-03	0 0E+00
319857 beta-HCH (beta-BHC)	1 25E+03	1 425-02	7 345.06	2 40E-01	4 33E-04	7 446 67	8 8	596 55	839.36	13,000	185-03	0 0E+00
	4 57E+01	6.26E-02	1 00F-05	2 80F+03	7 26F-01	1 775-07	6 K	381 15	939 30	13,000	9 5	0 0E+00
	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46F-07	3 %	558.00	20.02	200,7	3 / F-U3	Z OE-02
621647 N-Nitrosodi-n-propytamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06	2	209 609	746 87	11,000	2000	00+40
1024573 Heptachior epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9 51E-06	52	613 96	848 76	13,000	2 6F-03	200
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02	52	629 88	1750 00		00=+00	3 0F-04
	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	52	657 15	873 31		3 2E-04	0 0E+00
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	22	402 50	539 37	19,000	100-04	0.000
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 565-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	22	377 50	512 27	19,000	1 0E-04	0 0E+00
126/4112 Aradol 1016 (FC6-1016)	3 305+04	2 22E-02	3 42E-06	4 20E-01	1 195-02	2 90E-04	52	340 50	475 22	18,000	1 0E-04	0 0E+00
00400010 TOOLO 1014 (1 00114)	5 30E+04	70-261 7	0.0100	3 405-01	2 135-02	5 20E-04	R	345 50	482 20	18,000	1 0E-04	0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

R

YES

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

	_							•
	AT NA		stratum A	permeability.	نر	(cm²)		
	- 1			Ö		•	_	
	ENTER	Soil	SCS			permeability)	SI	ENTER Stratum C soil water-filled porosity, $\theta_w^c$ (cm <sup>3</sup> /cm <sup>3</sup> )
	Ж		SOS	soil type	directly above	water table	S	ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)
	ENTER		Soil	directly above	water table,	(Enter A, B, or C)	၁	ENTER Stratum C soll dry bulk density, p <sub>c</sub> (g/cm³)
	ENTER	f Lwr (cell D28) Thickness		(Enter value or 0)	ភិ	(cm)	1127 76	ENTER Stratum B soil water-filled porosity, $\theta_w^B$
Chemical	ENTER	Totals must add up to value of L <sub>wr</sub> (cell D28) Thickness	of soil stratum B,	(Enter value or 0)	ቒ	(cm)	96 09	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)
	ENTER	Totals mu	Thickness of soil	stratum A,	£	(cm)	762	ENTER Stratum B soil dry bulk density, Pb <sup>8</sup> (g/cm³)
. –	L ENTER		Depth below grade	to water table,	Lwn	(cm)	1950 72	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ $(cm^3/cm^3)$
ENTER Initial groundwater conc , Cw (µg/L)	ENTER	Depth below grade	to bottom of enclosed	space floor,	֓֞֞֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	(cm)	15	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitiess)
Chemical CAS No (numbers only, no dashes)	ENTER	Average	soil/ groundwater	temperature,	<u>ه</u> څ	(2)	16	ENTER Stratum A soil dry bulk density, 0,4 (g/cm³)

0 43										
1.7	ENTER	Indoor air exchange	rate, ER	(1/h)	0.45					
0.27	ENTER	Floor-wall seam crack	width, w	(cm)	1 0 1	ENTER	Target hazard	noncarcinogens,	된	(unitless)
0.42	ENTER	Enclosed space	height, Ha	(сш)	488	ENTER	Target nsk for	carcinogens,	፫	(nuitess)
17	ENTER	space floor	width, Wa	(cm)	] 961	ENTER	Exposure	frequency,	Ш	(days/yr)
0.2	ENTER Enclosed	space	length, La	(cm)	961	ENTER	Exposure	duration	8	(yrs)
043	ENTER	Soil-bidg pressure	omerenta, ∆P	(g/cm-s²)	40	ENTER	Averaging time for	noncarcinogens,	ATNC	(yrs)
15	ENTER Enclosed	space floor	Land	(cm)	15	ENTER	Averaging time for	carcinogens,	ATc	(yrs)

Used to calculate risk-based groundwater concentration

### 2 of 7

CHEMICAL PROPERTIES SHEET

	Reference	couc'	RfC	(mg/m³)
Ç	nsk	factor,	AR.	(µg/m³) <sup>-1</sup>
Pure component	water	solubility,	S	(T/6m)
Organic carbon	partition	coefficient,	ጭ	(cm <sub>3</sub> /g)
	Cutical	temperature,	T <sub>o</sub>	(X)
Normal	polling	point,	౼	ફ
Enthalpy of vaporization at	the normal	bouling point,	ΔH,δ	(cal/mol)
Henry's law constant	reference	temperature,	Ĕ	(C)
Henry's law constant	at reterence	temperature,	I	(atm-m³/mol)
	DIFFUSIVITY	in water,	៤	(cm²/s)
	Umsmy	in air,	₫ '	(cm <sup>2</sup> /s)

## INTERMEDIATE CALCULATIONS SHEET

Floor-wall seam perimeter,	3,844	Diffusion path length, L <sub>d</sub> (cm)	1935 72	
Water-filled porosity in capillary zone, $\theta_{w,\alpha}$	0 294	Total overall effective diffusion coefficient, Deff cm²/s)	6 66E-04	
Air-filled porosity in capillary zone, $\theta_{a,cz}$	0.136	Capillary Zone effective diffusion coefficient, Doff (cm²/s)	5 05E-04	
Total porosity in capillary zone, n <sub>cz</sub>	0 43	Stratum C effective diffusion coefficient, Deff (cm <sup>2</sup> /s)	4 38E-04	Reference conc , RfC (mg/m³)
Thickness of capillary zone, Lα (cm)	17 05	Stratum B B effective diffusion coefficient, D (cm²/s)	7,38E-04	Unit nisk factor, URF (µg/m³) 1
Stratum A soff effective vapor permeability, k,	6 98E-10	Stratum A A effective diffusion coefficient, Deff (cm²/s)	2 92E-03	Infinite source bldg conc., Counting (µg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub> (cm²)	0 746	Vapor viscosity at ave soil temperature, Hrs (g/cm-s)	177E-04	Infinite source indoor attenuation coefficient, at (unitless)
Stratum A soil soil intrinsic permeability, k	9 36E-10	Henry's law constant at ave, groundwater temperature, H' <sub>Ts</sub>	4 71E-01	Exponent of equivalent foundation Peclet number, exp(Pe <sup>§</sup> ) (unitiess)
Stratum A effective total fluid saturation, Se (cm <sup>3</sup> /cm <sup>3</sup> )	0419	Henry's iaw constant at ave groundwater temperature, H <sub>TS</sub> (atm-m³/mol)	1 12E-02	Area of crack,  Assack (cm <sup>2</sup> ) 3.84E+02
Stratum C soil air-filled porosity, e c (cm³/cm³)	0.130	Enthalpy of vaporization at ave groundwater temperature, $\Delta H_{\nu, TS}$ (cal/mol)	9,492	Crack effective diffusion coefficient, Deneck (cm²/s)
Stratum B soil aur-filled porosity, $\theta_a^{\ a}$ (cm³/cm³)	0 150	Crack depth below grade, Zasck (cm)	15	Average vapor flow rate into bidg , Q <sub>tot</sub> (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n	4 16E-04	Crack radius, radius, (cm)
Source- building separation, L <sub>1</sub>	1935 72	Area of enclosed space below grade, As	9 24E+05	Source vapor conc., C <sub>source</sub> (µg/m³)
Exposure duration, (sec.)	9 46E+08	Bldg ventilation rate, Q <sub>butdeng</sub> (cm <sup>3</sup> /s).	5 63E+04	Convection path length, Lp (cm)

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INCREMENTAL RISK CALCULATIONS.

Incremental	Vapor	intrusion to	indoor air,	carcinogen	(unitless)	
Final	indoor.	exposure	groundwater	conc,	(hg/L)	
ā	component	water	solubility,	ဟ	(µg/L)	
Rickshaend	ındoor	exposure	groundwater	couc,	(µ9/L)	
Indoor	exposure	groundwater	conc,	noncarcinogen	(µg/L)	
Indoor	exposure	groundwater	conc,	carcinogen	(µg/L)	

Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitiess)

NOT USE RESULTS IF ERRORS ARE PRESENT)
(DO NOT
SUMMARY BELOW

VLOOKUP TABLES

		3	Soil Department Looking	Ackin Table				_					
SCS Soil Type	K, (cm/h)	a (1/cm)	N (unitless)	M (unitiess)	θ, (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)						
ပ	0 20		٦.	0 083	0 38	0 068	0 0000						
<u>ਰ</u>	0.26	0 019	131	0 237	0 41	0 095	0.016						
	104	0 036	1 56	0 359	0 43	0 078	0 020						
รา	14 59	0 124	2 28	0 561	0.41	0 057	0 040						
en i	29 70	0 145	2 68	0 627	0 43	0 045	0 044						
35.	0 12	0 027	123	0 187	0 38	0 100	0 025						
	131	0 059	148	0 324	0 39	0 100	0 029						
<u> </u>	0 0	0 000	13/	0.270	0.45	0 034	0 0046						
SICL	0 0	0 010	123	0 187	0 43	0.089	95000						
Sir	0 45	0 0 0 0 0 0	141	0 291	0 45	790 0	0 011						
SL	4 42	0 075	189	0.471	041	0 065	0 030						
					Chamic	Chemical Properties Looking Table	kun Teble						
		Organic			Pure	obelies Fo	Hency's	Henry's			1		
		carbon			component		law constant	law constant	Norma		vapomantion of	1	
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference		Cutical	the normal		O of or other
	•	coefficient,	in air,	ın water,	solubility,	law constant	temperature	temperature.	point.	fernoerature	boiling point	factor	Reference
		Ž,	<b>a</b>	ភ្នំ	ဟ	I	· ·	ř	عر	Ļ	AH.	IRI.	. C
CAS No Chemical		(cm³/g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m³/mol)	(၁)	(X	, E	_	(m/m³)	(mg/m³)
50293 DDT		2.63E+08	1.376.02	4 955.08	2 500 00	9 22E 04	ro e	,	17 000				
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	9 OOE-OB	4 52E-02	3 32E-04 4 63E-05	8 105-06	25	533 15	720 75	11,000	9 7E-05	0 0E+00
51285 2,4-Dintrophenol		1 00E-02	2 73E-02	90-390 6	2 79E+03	1 82E-05	4 44 1-03	2, 2,	805 2E	909 27	000,61	2 15-03	0 0E+00
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1475-08	3, 50	743.24	927 63	15,000	2 45 03	) OF-03
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1.25E+00	3.05E-02	3 %	349.90	55660	19,000	לייין ד	00+100
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34E-06	25.	708 15	1004 79	121,7		000
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	62424	885 73	13.000	3 7E-04	001100
58899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04	00H-00
605/1 Dieldrin		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	25	613 32	842 25	13,000	4 6E-03	0 0E+00
67641 Antino		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6316-05	1 54E-06	25	720 00	751 00	10,000	0 OE+00	1 4E+01
67663 Chloroform		3 /5E-U1	1245-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	6,955	0 0E+00	3 5E-01
67721 Hexachlorosthans		2 30E+0-4	- 04E-01	1 UUE-US	7 92E+03	1505-01	3 66E-03	25	334 32	536 40	6,988	2 3E-05	0 0 € +00
71363 Butanol		6 92 11 + 00	8 00F-02	90508 90508	2 40F+04	1 53E-01	3 88E-03	25	458 00	695 00	9,510	4 0E-06	00000
71432 Benzene		5 89E+01	8 80E-02	90-308-6	1,75E+03	2 28E-01	5.56.5-03	2, 23	353.24	563 05	10,346	0 UE+00	3 5E-01
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 726-02	25	347 24	545 00	7 136	0.05+00	1000
72208 Endrin		1 23E+04	1 25E-02		2 50E-01	3 08E-04	7 51E-06	25	718 15	986 20	12,000	0 0E+00	1 1E-03
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58£-05	25	651 02	848 49	14,000	0 0E+00	1 8E-02
72550 000		100=+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	86377	14,000	6 9E-05	0 0E+00
74839 Methyl bromide		1 055+01	1 44E-02	1 245 05	1 205-01	8 61E-04	2 10E-05	25	636 44	860 38	13,000	9 7E-05	0 0E+00
75014 Vinyl chloride (chloroethene)	ane)	1.86E+01	1 06F-01	1235-06	2 76F±03	1116+00	3 715 03	27.	27672	467 00	5,714	0 0E+00	5 05-03
75092 Methylene chloride	•	1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98F-02	2.115.02	2.50	343 00	432.00	02,50	5 th	001100
75150 Carbon disulfide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24 €+00	3 02E-02	35.55	319.00	552.00	39.40	0.00	205-00
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422 35	00 969	9 479	1 15-06	0 0 = +00
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1,8E-05	0 0E+00
73343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 305-01	5 61E-03	25	330 55	523.00	6,895	0 0E+00	5 0E-01
75459 Hortzahler		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6,247	5 0E-05	0 0E+00
77474 Havachlorocuclosantadione	9	20001100	1.25-02	3 241 00	1 80E-01	4 47E-02	1 096-03	52	603 69	846 31	13,000	1 35-03	0 0E+00
78591 isophorone	<u> </u>	4 68F+01	6 23E-02	6 76E-06	1 205+00	7.755.04	271E-02	52	512 15	746.00	10,931	001100	7 0E-05
78875 1.2-Dichloropropane		4 37E+01	7.82F-02	8 73F-06	2 805+03	1 15E-01	0 30E 03	9 1	400 50	00 000	L/2,01	2/50/	00+400
79005 1,1,2-Trichloroethane		5.01E+01	7 80E-02	8 BOE-06	4 42E+03	3.74E-02	2 80E-03 9 12F-04	3 6	386 15	5/200	7,590 8,322	00E+00	4 UE-03
79016 Trichloroethylene		1 66E+02	7.90E-02	9 10E-06	1 10E+03	4 22E-01	1.03E-02	52 52	360 36	544 20	7,505	1 7E-06	00+400
79345 1,1,2,2-Tetrachloroethane	•	9 33E+01	7 10E-02		2 97E+03	141E-02	3 44E-04	; 52	419 60	661 15	966,8	5 8E-05	00=+00
83329 Acenaphthene		7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	00±400	2 1E-01
													-

				5	VLOOKUP TABLES							
84542 Clethyphthalate	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 BE+00
85687 Christian Literate	3 39E+04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10		613 15	798 67	14,751	0 0E+00	3 5E-01
86306 N Nitrografish on James	2 735-404	174E-02	4 83E-06	2 69E+00	5 17 E-05	1 26E-06		990 90	839 68	13,000	0 0E+00	7 0E-01
86737 Eligene	1 295-03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 00E-06		632 28	890 45	13,000	1 4E-06	0 0E+00
86748 Cartazola	3 305 104	3 63 5-02	7 235 06	1 98E+00	2 61E-03	6 37E-05		570 44	870 00	12,666	0 0E+00	14E-01
87683 Hexachloro-1.3-butadiene	5.375+04	5 61E-02	A 16E-06	3 235400	3 24 5 04	1 535-08		627.87	899 00	13,977	5 7E-06	8 10 0
87855 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44F-08		485 15 582 15	738 00	807,01 000,00	2 2E-03	004
88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	52	519 15	749 03	12,000	3 16-06	00+100
91203 Naphthalene	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98 <b>E-</b> 02	4 83E-04		491 14	748 40	10,373	0 0E+00	14E-01
95476 o.Xviene	/ 24E+02	1 945-02	6 74E-06	3 11E+00	164E-07	4 00E-09		560 26	754 03	13,000	13E-04	0 0E+00
95487 2-Methylphenol (o-cresol)	9 12F+01	7 40F-02	9 30E-05	2 60E+02	Z 13E-01	5 20E-03		417 60	630 30	8,661	0.0E+00	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 565+02	7 79E-02	1 20E-06		464 19 463 67	697 60	10,800	0.05+00	18501
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90 5-04		455 57	705.00	9,700	204400	1 8 6 5 5 5
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	22 52	526 15	759 13	13,000	0.05+00	3.5F.01
98953 Nitrobenzene	6 46E+01		8 60E-06	2 09E+03	9 84E-04	2 40E-05		483 95	719 00	10,566	00=00	2 0E-03
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03		409 34	617 20		0 0E+00	1 0E+00
1004Z3 Styrene 1058Z9 3 4. Dissettantonel	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03		418 31	636 00		0 0E+00	1 0E+00
105423 p. Kylene	2 USE+02	5 84E-02	8 695-06	7 87E+03	8 20E-05	2 00E-06	52	484 13	707 60		0 OE+00	7 0E-02
106467 1.4-Dichlombenzene	3 09E+02	6 90E-02	3 44E-U5	1 85E+02	3 14E-01	7 66E-03		411 52	616 20		0 0E+00	7 0E+00
	6 61F+01	4 83E-02	1015-05	7 30E+01	3 36E-02	2 435-03	22	447 21	684 75		0 0E+00	8 G
107062 1,2-Dichloroethane	174E+01	104E-01	90-306-6	8 52E+03	4 01E-02	3 32E-U/ 9 78F-04	6 %	303 65 356 65	34.00	11,669	0 0E+00	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	22 22	345 65	519 13	7.800	0.05+00	2 OF 10 C
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03		412 27	617 05		00+00	7 00+00
	1825+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03	25	383 78	591 79		00=+00	4 OE O.
10390/ Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03	25	404 87	632 40		0.05+00	2 0E-02
111444 Bir/O chlomothyloches	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	25	455 02	694 20		0 0E+00	2 1E+00
115297 Endosulfan	2 145+03	1 15F-02	7 53E-06	1 72E+04 5 10E-01	7 38E-04	1 80E-05	255	451 15	659 79	000'6	3 3E-04	0.00
	151E+07	3 51E-02	3 66 E-06	3 40E-01	4 38F-06	1 12E-03	0 K	6/4 43 6£7 1£	942.94		0 0E+00	2 1E-02
117840 Di-n-octyl phthalate	8 32E+07	1516-02	3 58E-06	2 00E-02	2 74E-03	6 68 105		704.09	862 22		4 05-00	7 00 00
118741 Hexachlorobenzene	5 50E+04	5 42E-02	591E-06	6 20E+00	5 41E-02	1 32E-03		582 55	825 00	14.447	4 6E-04	0 00 +00
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05	25 6	615 18	873 00		0 DE +00	1 1E+00
120821 1,2,4-1 rcnlotobenzene 120832 2 4 - Richlomopenal	1 /8E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03		486 15	725 00		0 0E+00	2 0E-01
	0 55E+02	3 405-02	8 / /E-Ub	4 50E+03	1 30E-04	3 17E-06		482 15	708 17	11,000	0 OE+00	1 1E-02
124481 Chlorodibromomethane	631E+01	1 96E-02	105F-05	2 FOE+02	3 215-00	3 27 E-US	9 4	590 00	814 00	13,467	1 95 04	0 0 0 0 0
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 546-01	1 845-02		394 40	620.20	8,000 ago	2 45-05	0 0 0 0 0 0 0
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 10E-05		667 95	936 00		0 0E+00	1 1E-01
155592 ds-1,2-Dichloroethylene	3.55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4,07E-03			544 00		0 OE+00	3 SE-02
193395 Indeno(1,2.3-cd)byrene	3 475+06	1 905-02	1 19E-US	6 30E+03	3 85E-01	9 39E-03			516 50		00E+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 265-02	5 56E-06	1 50E-03	4.55E-03	1 115-04	5 K	_	078 24	17,000	2 th 2	000
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1615-05		655 95	905.00		2 TE CB	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07		•	1019 70		2 1E-05	00+100
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05			979 00		2 1E-06	00+300
210846 slobe-HCH (slobe-BHC)	2 45E+U6 4 23E+06	1 325-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04			839 37	13,000	4 9E-03	0 0E+00
319857 beta-HCH (beta-BHC)	1 265+03	1425-02	7 34E-06	2 JUE+00	4 35E-04	1 06E-05	52	55	839 36	13,000	1 8E-03	0 0E+00
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77F-07		390 33 381 15	839 36 587 38		5 3E-04	0 0 0 0
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07			387.38	000, 5	2 de 65	2.0E-02
621647 N-Nitrosodi-n-propytamine	2 40E+01	5 45 5-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06			746 87	11,000	- 80-04 2 0F-03	00+400
1024573 Reptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9 516-06	25 6		848 76	13,000	2 6E-03	0 0E+00
7439970 Mercury (elemental)	5 20E+01	3 U/E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02		88	1750 00	_	0 OE+00	3 0E-04
11096825 Amelor 1260 (PCB-1260)	2 9/5+05	1 385-02	4 345-06	7 40E-01	2 46E-04	6 00E-06	22 22	<del>1</del> 5	873 31	14,000		0 0E+00
11097691 Aroctor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20F-02	2 00E-03	62 % 42 %	402 50 377 60	539 37	9,000		00+300
	3 30E+04	2 22E-02	5 42E-06		1 19E-02	2 90F-04		3 2	312.27	000,81		000
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02	531E-06	3 40E-01	2 13E-02	5 20E-04	22	3 8	482 20	000 85	2 2 2	001100
								}		2		U VET VVI

VERSION 1 2 September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

	ENTER	User-defined	stratum A soil vapor	, K	(cm²)													
	ENTER	Soil stratum A	SCS soil type		permeability)	IS	ENTER	soil water-filled	porosity,	o.*.	(cm²/cm²)	03						
	ENTER		SCS soil type	directly above	water table	s	ENTER	soil total	porosity.	o <sub>C</sub>	(unitless)	0.43						
	ENTER		Sod stratum drectiv above	water table,	(Enter A, B, or C)	၁	ENTER	soil dry	bulk density,	් ද	(g/cm²)	17	ENTER	Indoor	air exchange	rate,	8	(1/h)
	etnane	Lwr (cell D28) Thickness	of soil stratum C, (Enter value or 0)	Ę	(cm)	1127 76	Stratum 6	soil water-filled	porosity,	20 ° °	(cm./cm.)	0.27	ENTER	Floor-wall	seam crack	width,	*	(cm)
Сћетса	, 1, 2, 2- I etrachioroethane ENTER EN	Totals must add up to value of Lwn (cell D28) Thickness Thickness	of soil stratum B, (Enter value or 0)	_ <b>E</b>	(сш)	96 09	ENTER Stratum B	soil total	porosity,	د ع	(unitless)	0 42	ENTER	Enclosed	space	height,	£	(cm)
	ENTER	Totals mu	Thickness of soil stratum A,	בַּ (	(cm)	762	Stretum B	soul dry	bulk density,	g ,	(B)cm-)	17	ENTER	space	floor	width,	<sup>®</sup> ×	(cm)
	ENTER	:	Depth below grade to water table,	, Lw1	(cw)	1950 72	Stratum A	soil water-filled	porosity.	O	(cm/cm/	0.5	ENTER Enclosed	space	floor	length,	۳,	(cm)
ENTER Instat proudwater conc. Cw (Hg/L)	ENTER	Depth below grade	to bottom of enclosed space floor,	ָ לַּג	(cm)	15	Stratum A	soil total	porosity,	( t	(driness)	0 43	ENTER	Soil-bidg	pressure	dlfferential,	ΔA	(g/cm-s²)
ENTER Chemical CAS No (numbers only, no dashes)	ENTER	Average	soil/ groundwater temperature,	r, é	()	16	Stratum A	soil dry	bulk density,	(a )	( Biole)	15	ENTER	space	floor	thickness,	Lone	(cm)

Used to calculate risk-based groundwater concentration

ENTER
Target hazard
quotient for
honcarcinogens,
THQ

ENTER
Target
risk for
carcnogens,
TR
(untless)

Exposure frequency, EF

Exposure duration,

ENTER
Averaging
time for
noncardinogens,
AT<sub>NC</sub>
(yrs)

ENTER Averaging time for carcinogens,

ΑTc

(SLA)

(days/yr)

(S (S)

ENTER

ENTER

### CHEMICAL PROPERTIES SHEET

		Reference	couc.	RfC	(mg/m³)	20.100
	Š	nsk	factor,	URF	(µq/m³)-1	201
Pure	component	water	solubility.	S	(mg/L)	2077.00
Organic	carbon	partition	coefficient,	ጜ	(cm <sub>3</sub> /g)	0.000.04
		Critical	temperature,	Ľ	§	251 15
	Normal	polling	point,	卢	ફ	440 20
Enthalpy of	vaponzation at	the normal	boiling point,	ΔH <sub>ν,b</sub>	(cal/mol)	0 000   440 00   654 45   0 300 04   20 04   20 04
						3,5
Henry's	law constant	at reference	temperature,	I	(atm-m³/mol)	3.44E_04 25
		Diffusivity	ın water,	<u>a</u> *	(cm <sup>2</sup> /s)	7 OF JA
		Diffusivity			(cm <sup>2</sup> /s)	7 10E-02   7 90E-06

# INTERMEDIATE CALCULATIONS SHEET

Floor- wali saam perimeter, X <sub>steck</sub> (cm)	3,844	Diffusion path length, L4 (cm)	1935.72
Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.294	Total overall effective diffusion coefficient, $D^{eff}$ $(cm^2/s)$	7 78E-04
Au-filed porosity in capillary zone, $\theta_{\mathbf{n},\alpha}$	0 136	Capillary zone effective diffusion coefficient, Deff cm²/s)	45.5-3-1.0-3-1.0-3-1.0-3-1.0-3-1.0-3-1.0-3-1.0-3-1.0-3-1.0-3-1.0-3-1.0-3-1.0-3-1.0-3-1.0-3-1.0-3-1.0-3-1.0-3-1
Total porosity in capillary zone, $n_{ca}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 43	Stratum C G effective diffusion coefficient, Deff (cm²/s)	Reference conc. RfC (mg/m³)
Thickness of capillary zone,	17 05	Stratum B B effective diffusion coefficient, D E E (cm²/s)	Unit risk factor, URF (µg/m³)-1
Stratum A soil effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, D <sup>at</sup> (cm²/s)	Infinite source bldg conc. Courting (µg/m³)
Stratum A soil relative arr permeability, k <sub>rg</sub>	0 746	Vapor viscosity at ave soil temperature, $\mu_{TS}$ ( $g/cm$ -s)	Infinite source indoor attenuation coefficient, $\alpha$ (unitiess)
Stratum A soll intrinsic permeability, k (cm²)	9 36 <b>E</b> -10	Henry's law constant at ave groundwater temperature, H'rs (unitless)	Exponent of equivalent foundation Peciet number, exp(Pe <sup>1</sup> ) (unitiess)
Stratum A effective total fluid saturation, S <sub>te</sub> (cm³/cm³)	0419	Henry's law constant at ave groundwater temperature, Hys (atm-m³/mol)	Area of crack, Areack (cm <sup>2</sup> )
Stratum C soil air-filled porosity, e <sub>c</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0 130	Enthalpy of vaporization at ave groundwater temperature, AHv,75 (cal/mol)	Crack effective diffusion coefficient, Deset (cm²/s)
Stratum B soil air-filled porosity, $\theta_a^{\ B}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zarack (cm)	Average vapor flow rate into bidg , Q <sub>sol</sub> (cm <sup>3</sup> /s)
Stratum A soll air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitiess)	Crack radius. fond (cm)
Source- building separation, L <sub>T</sub>	1935 72	Area of enclosed space space below grade, A <sub>e</sub> (cm <sup>2</sup> )	
Exposure duration, t (sec)	9 46E+08	Bldg ventilation rate, Q <sub>buisher</sub> (cm <sup>3</sup> /s)	Convection path langth, Lp (cm)

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INCREMENTAL RISK CALCULATIONS

Hazard quotient from vapor intrusion to indoor air, nooncarcinogen (unitless)	NA
Incremental risk from vapor Intrusion to indoor air, carcinogen (unitless)	NA
Final indoor exposure groundwater conc., (ug/L)	1 19E+03
Pure component water solubility, S S (µg/L)	2 97E+06
Risk-based indoor exposure groundwater conc, (µg/L)	1 19E+03
Indoor exposure groundwater conc , noncarcinogen (µg/L)	Ą
Indoor exposure groundwater conc , carcinogen (µg/L)	1 19E+03

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

1	Comparison	and The And	7 (4) mo/	S.	arties L	i i		VLOOKUP TABLES	ES					
1	1	and I have been	4	ŀ	-1	ı	e (cm /cm )	e, (cm /cm )	Mean Grain Diameter (cm)					
1	1	) <u>C</u>	2 6	0 008	ŝ	0 083	0.38	0 068	0 0092					
14.50   10.50   12.5	1		2 5	6000	15.1	0.43/	140	0.035	0.016					
27   0 144   0 145	12   0.15   0.	. <u>9</u>	14.50	0 124		0 C	2 5	0 0 0	0.020					
1   0.027   0.027   0.027   0.029   0.000	131   0.027   123   0.157   0.158   0.150	Ø	29 70	0 145		0 627	0 43	0.045	0.040					
131   102	131 0 059 149 0 234 0 239 0 100 0 000 0 000 0 0 0 0 0 0 0 0 0 0	SC	0 12	0 027		0 187	0 38	0 100	0 025					
Companies   Comp	0.022 0.005 1.09 0.083 0.04 0.009 0.0039 0.005 0.009 0.0039 0.005 0.009 0.0039 0.005 0.007	30.	131	0 029	1 48	0 324	0.39	0 100	0 029					
Committee   Comm	Organic	<u> </u>	0.25	0.016	137	0.270	0.46	0 034	0 0046					
Committee   Comm	0.40   0.075   0.45   0.075   0.45   0.045   0.089	200	0 0	0 002	109	0 083	0.26	0 0 0 0 0 0 0 0 0	0 0039					
Commission   Com	CAS No   Chemical Properties Lookup Table   Chemical Properties Lookup Table   Chemical Properties Lookup Table   Chemical Properties Lookup Table   Chemical Properties Lookup Table   Chemical Chemic	מוכר	0 0	0 010	123	0 187	0 43	0 089	0 0026					
Chamical   Chamical   Chamical Picpanina   Lobus   Henry   H	Chemical and continued and c	7S	4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.89	0.291	0.45	0 065	0 011					
Companie   Companie   Companie   Committee   Committ	Chemical carbon   Cryanic carbon   Chemical Properties Lockup Table Herry's carbon   Chemical carbon													
Chamical Populic   Chamical Populic   Chamical Popularia   Chamical Po	Chemical Properties   Contain   Pannys   Chemical Properties   Contain   Pannys   Chemical Properties   Contain   Pannys   Carbon   Carb													
Company   Comp	Chemical   Chemical			C.			Chemic	al Properties Lo	okup Table					
Chandical   Configure   Conf	Chemical   Comfort   Diffusivity   Diffusi			Organic			Fure		Henry's	Henry's			Enthalpy of	
Chamical C	Chemical         Chemical         Conficient         In air.         In wiler.         A Maler.         Poblishiy.         Herrina         Interestors           2233 DOT         Chemical         (cm/s)         (cm/s) </th <th></th> <th></th> <th>Calibori</th> <th></th> <th>2</th> <th>component</th> <th></th> <th>law constant</th> <th>law constant</th> <th>Norma</th> <th></th> <th>vaporization at</th> <th></th>			Calibori		2	component		law constant	law constant	Norma		vaporization at	
Chamical   Chamical	Chemical         (cm²/g)         <			parition	Unitusivity	Diffusivity	water	Henry's	at reference	reference	polling	Critical	the normai	
Chemical (cmfg)	Chemical (crifs) (crif			roeliiceiii.	E	in water,	'Kıllığılık'	iaw constant	temperature,	temperature,	point,	temperature,	boiling point,	
Comparison   Com	2238 DOT         Common         Commo			(class)	(cm <sup>2</sup> /r)	(2) (2)	0 1	r 3	E	۳ (é	<u>-</u> 3	o .	ΔΗΛΡ	
Signature   Common	DDT         2 63E+06         137E-02         4 95E-06         2 50E-02         3 22E-04           Bennciallyrene         100E+06         4 30E-02         9 00E-06         1 62E-03         1 32E-06           Cabon tearchioide         1 20E+06         4 30E-02         9 00E-06         2 76E-03         1 32E-06           Cabon tearchioide         1 20E+06         2 02E-02         5 18E-06         2 49E-03         1 32E-06           Cabon tearchioide         1 20E+06         1 30E-02         8 00E-06         2 49E-03         1 32E-04           Chlordane         3 00E+06         3 18E-02         4 30E-02         8 00E-06         3 49E-03         1 32E-04           Chlordane         3 00E+06         3 18E-02         4 37E-06         5 00E-02         1 99E-03         1 32E-04           Chlordane         3 00E-01         3 00E-04         3 00E-06         4 35E-04         3 00E-07         3 1 32E-04           Acetore         4 00E-03         3 00E-04			/A	(2)	(2)	(119/L)	(SSAMUD)	(aun-m /mor)	(5)	Q	(Y)	(cal/mol)	
A. Deficiol pyreme         10E-05         20E-06	100E-06   100E-06   100E-06   100E-06   100E-06   100E-06   100E-06   100E-06   100E-06   100E-06   100E-06   100E-06   100E-07   100E	50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	27.027	11 000	
ADistrictories         1.056-00         2.78-6-00         2.06-6-00         2.44-6-00         2.66-60         2.06-60         2.44-60         2.66-60         2.44-60         2.66-60         2.46-60	2.4-Dinilitophenol         1,00E-02         2,73E-02         9,06E-06         2,79E-03         1,82E-05           Dibenz(a,h)antiracene         38E-06         2,0EE-02         5,18E-06         2,92E-02         1,22E-00           Caxbon letrachloide         1,74E-02         5,10E-02         9,0EE-03         1,37E-04         1,22E-00           Caxbon letrachloide         1,72E-03         1,74E-02         9,0EE-03         1,37E-04         1,25E-02         1,74E-03         1,74E-03         1,74E-03         1,74E-04         1,74E-02         1,74E-03         1,74E-03         1,74E-03         1,74E-03         1,74E-04         1,74E-03         1,74E-03 <td< td=""><td>50328 Benzo(a)pyrene</td><td></td><td>1 02€+06</td><td>4 30E-02</td><td>900E-06</td><td>1 62E-03</td><td>4 63E-05</td><td>1 135-06</td><td>16</td><td>715 90</td><td>969 27</td><td>15,000</td><td></td></td<>	50328 Benzo(a)pyrene		1 02€+06	4 30E-02	900E-06	1 62E-03	4 63E-05	1 135-06	16	715 90	969 27	15,000	
Second Composition	District A partition	51285 2,4-Dinitrophenol		1,00E-02	2 73E-02	90-390 6	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	
Carbon Natistachinoide   178E+02   208E-05	Barz(a) animate and animate and animate and animate and animate and animate ani	53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 475-08	25	743 24	990 41	16,000	
398E-06   319E-06   319E	Bearting and administration of the control	56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	99999	7,127	
Mathy brownides   10E-02   24F-03   50E-04   19E-04   19E-05   25 E-04   2	Table	55553 Benz(a)anthracene		3 98E+05	5 10E-02	90-300 6	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	15,000	
Particular continues   14E-04   15E-02   14E-04   15E-04	Disciplination of the control of the contro	58899 camma-HCH (Tindana)		1 075 +03	10000	4 3/E-06	5 50E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	
Benzoic Acid         6 00E-01         5 9E-02         7 9T-05         6 19E-04         7 9T-05	Benzoire Acid         6 10E-01         5 25C-02         7 9F-06         3 50E-01         6 10E-01	60571 Dialdrin		2 14 11 + 04	1 256-02	7.4E-08	1 065 01	2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 40 E-US	8 8	296 55	839 36	13,000	
Acetone         57E-01         128E-03         100E-05         10E-03         10E-	Aceitore 575E-01 124E-01 114E-05 000E-06 159E-03 1010croform 39EE+01 104E-01 100E-05 792E+03 150E-01 159E-01 104E-01 100E-05 792E+03 150E-01 159E-01 100E-06 1	65850 Benzoic Acid		6 OF 0.	5 36F-02	7.075.06	3 505-01	10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -	1 5 1 1 - 0 5	8 8	25 519	842 25	13,000	
Chloroform         39E+01         10AE-01         100E-05         192E+03         150E-01         36E-03         25 343.2         539.0           Chloroform         39E+01         10AE-01         10DE-01         159E-03         36E-03         25 486.0         895.0           Benzaler         6 BE-00         30E-06         10DE-01         159E-01         36E-03         25 33.4 <td>Chloroform  3 98E+01 1 04E-01 1 00E-05 7 92E+03 1 50E-01  Hexachloroethane  6 92E+00 8 00E-02 9 30E-06 5 00E+01 1,59E-01  Buttanot  1,1,1-Tichloroethane  1,10E+02 1 8 00E-02 9 80E-06 175E+03 2 28E-01  1,1,1-Tichloroethane  1,10E+02 1 8 00E-02 9 80E-06 175E+03 2 28E-01  1,1,1-Tichloroethane  1,10E+02 1 8 00E-02 9 80E-06 1 30E-04  Methyxychlor  1,0E+02 1 8 0E-02 1 4 6E-06 2 50E-01  Methyy bromide  1,0E+02 1 7 28E-02 1 7 26E-02 1 6 4 8E-04  Methy bromide  1,0EE+01 1 00E-01 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2</td> <td>67641 Acetone</td> <td></td> <td>5 75E-01</td> <td>1 24E-01</td> <td>1 14E-05</td> <td>1 00F+06</td> <td>1.59E-03</td> <td>3 8817-05</td> <td>67 6</td> <td>320 00</td> <td>0016/</td> <td>000,01</td> <td></td>	Chloroform  3 98E+01 1 04E-01 1 00E-05 7 92E+03 1 50E-01  Hexachloroethane  6 92E+00 8 00E-02 9 30E-06 5 00E+01 1,59E-01  Buttanot  1,1,1-Tichloroethane  1,10E+02 1 8 00E-02 9 80E-06 175E+03 2 28E-01  1,1,1-Tichloroethane  1,10E+02 1 8 00E-02 9 80E-06 175E+03 2 28E-01  1,1,1-Tichloroethane  1,10E+02 1 8 00E-02 9 80E-06 1 30E-04  Methyxychlor  1,0E+02 1 8 0E-02 1 4 6E-06 2 50E-01  Methyy bromide  1,0E+02 1 7 28E-02 1 7 26E-02 1 6 4 8E-04  Methy bromide  1,0EE+01 1 00E-01 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	67641 Acetone		5 75E-01	1 24E-01	1 14E-05	1 00F+06	1.59E-03	3 8817-05	67 6	320 00	0016/	000,01	
Hexachlorosthane 178E+03 2 50E-03 6 80E-06 5 00E+01 1.59E-01 3 8EE-03 25 489 0 655 0 650 0	Hexachloroethane 178E+03 250E-03 680E-06 500E+01 1.59E-01 692E+00 800E-02 930E-06 740E+04 361E-04 361E	67663 Chloroform		3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	36611.03	3 6	334 32	536.40	000	
Butanol         6 92E+00         8 00E-02         9 30E-06         7 40E+04         3 61E-04         8 60E-05         2 5 30         8 5 3 0	Butanot         6 92E+00         8 00E-02         9 30E-06         7 40E-04         3 61E-04           Bertzene         5 89E+01         8 80E-02         9 30E-06         1 75E+03         2 28E-01           L1,1-Tirchloroethane         1,10E+02         7 80E-02         9 80E-06         1 75E+03         2 28E-01           Androxychlor         9 77E-04         1 55E-02         4 74E-06         2 50E-01         3 08E-04           DDD         1 00E-06         1 69E-02         4 76E-06         9 00E-02         6 48E-04           DDD         4 77E-04         1 55E-02         4 76E-06         9 00E-02         6 48E-04           DDD         1 00E-06         1 44E-02         5 87E-06         1 20E-01         8 61E-04           DDD         4 77E-04         1 28E-02         1 21E-05         1 56E-01         8 61E-04           DDD         4 77E-04         1 23E-06         1 20E-01         8 61E-04         8 61E-04           DDD         4 77E-02         1 24E-02         5 87E-06         1 20E-01         8 61E-04           Methyl bromide         1 10E-01         1 23E-06         1 20E-03         1 24E-02         1 20E-03           Achtonic (chloroethane)         1 10E-01         1 20E-03         1 20E-03	67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1.59E-01	3.88E-03	3 %	459.05	020 40	00000	
tick of the control of the c	Particle   Particle	71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	22 22	390 88	563 05	10.346	
1,10E+02   1,50E+02   1,50E+02   1,50E+04	1,10E+02	71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342	
ychlor (britanchia) 123E+04 125E-02 474E-06 2 50E-01 3 08E-04 158E-05 25 61102 848 49 158E-05 100E-06 158E-04 158E-05 25 61102 848 49 158E-04 158E-04 158E-05 25 61102 848 49 158E-04 158E-04 158E-05 25 61102 848 49 158E-04 158E-04 158E-05 25 61102 848 49 158E-04 158E-04 158E-05 25 61102 848 49 158E-04 158E-04 158E-04 158E-04 158E-05 25 61102 848 49 158E-04	yothlor (chloroethene) 123E+04 125E-02 47E-06 25E-01 308E-04 100E+06 165E-02 46E-06 25E-02 1648E-04 100E+06 165E-02 46E-06 450E-02 648E-04 100E+06 165E-02 161E-06 120E-01 161E-04 100E+06 1.05E+01 728E-02 121E-05 152E+04 256E-01 101E+00 175E+01 1.05E+01 1.05E+02 1.05E+02 1.05E+02 1.05E+02 1.05E+02 1.05E+02 1.05E+02 1.05E+03 1.05E+02 1.05E+03 1.	71556 1,1,1-Trichloroethane		1.10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	
oxychlor         9 77E+04         1 56E-02         4 46E-06         4 50E-02         6 46E-04         4 50E-05         5 651 02         848 49           fowe-06         6 56E-02         4 76E-06         9 00E-02         1 66E-04         4 50E-05         2 651 02         848 49           fowe-06         6 56E-02         4 76E-06         9 00E-02         1 6EE-04         2 56E-03         2 776 71         467 00           yl bromide         1 05E+01         7 28E-02         1 21E-05         1 25E-04         2 56E-01         2 77E-02         2 5 259 25         4 47 00           yl bromide         chlorded childrocherhene)         1 86E+01         1 06E-01         1 23E-06         2 76E-02         2 76E-02         2 76E-03         2 77E-02         2 59 25         4 42         4 47           ylena chlorde         4 77E+01         1 04E-01         1 17E-05         1 30E-04         8 98E-02         2 19E-03         2 59 25         4 42         2 100           oright         4 77E+01         1 04E-01         1 06E-05         3 10E-03         3 10E-03         3 25 25         2 3 30         3 3 3 3 3         3 3 3 3 3         3 3 3 3 3         3 3 3 3 3 3         3 3 3 3 3 3 3         3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	oxychlor         9 77E+04         1 56E-02         4 46E-06         4 50E-02         6 48E-04           y bromide         1 00E+06         1 69E-02         4 76E-06         9 00E-02         1 64E-04           y bromide         1 00E+06         1 28E-02         1 21E-05         1 52E+04         2 56E-01           chlorde (chloroethene)         1 06E-01         1 06E-01         1 06E-01         8 06E-02         1 10E+00           ylene chlorde         1 17E+01         1 06E-01         1 23E-06         2 76E+03         1 11E+00           ylene chlorde         4 57E-01         1 06E-01         1 00E-05         1 30E-04         2 56E-01           ord dusulifide         4 57E-01         1 06E-01         1 00E-05         1 10E+03         1 24E+00           ord         4 57E-01         1 04E-05         1 06E-05         6 74E+03         6 56E-02           ord         3 16E+01         2 98E-02         1 06E-05         6 74E+03         6 56E-02           ord         3 16E+01         4 24E+03         6 56E-02         1 10E+03         2 10E-02           syll-loroethane         5 50E+01         2 98E-02         1 06E-05         6 76E-03         1 11E+00           orone         3 16E+01         4 28E-02 <td< td=""><td>72208 Endin</td><td></td><td>1 23E+04</td><td>1 25E-02</td><td>4 74E-06</td><td>2 50E-01</td><td>3 08E-04</td><td>7.51E-06</td><td>25</td><td>718 15</td><td>986 20</td><td>12,000</td><td></td></td<>	72208 Endin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7.51E-06	25	718 15	986 20	12,000	
v/browide         4 00E-06         1 68E-04         4 00E-06         25         639 90         863 77           v/browide         4 00E-06         1 68E-04         2 00E-02         1 68E-04         2 00E-02         2 00E-02         2 00E-03         2 00E-03 </td <td>v/b bromide         1 00E+06         1 68E-02         4 76E-06         9 00E-02         1 66E-04           v/b bromide         1.05E+01         1.26E-02         1 20E-02         1 20E-02         1 56E-04           chlorde (chloroethene)         1.86E+01         1 06E-01         1 26E-03         1 11E+00           ylens chloride         1.77E+01         1.01E-01         1 17E-05         1 56E-01         8 81E-04           on disulfide         4 57E+01         1.01E-01         1 17E-05         1 30E+04         8 98E-02           on disulfide         4 57E+01         1.01E-01         1 00E-05         1 19E+03         1 24E+00           ondichloromethane         5.50E+01         2 98E-02         1 00E-05         3 10E+03         2 19E-02           olichloroethane         5.50E+01         2 98E-02         1 06E-05         5 06E+03         2 30E-01           olichloroethane         5 89E+01         4 00E-05         1 06E-05         5 06E+03         2 19E-02           orderlorocyclopentadiene         2 00E+03         1 12E-02         2 56E-03         1 11E-00           orderlorocyclopentadiene         2 00E+03         1 6E-05         2 00E-05         1 12E-02           orderlorocyclopentadiene         2 00E+03         1 50E-06</td> <td>72435 Methoxychlor</td> <td></td> <td>9 77E+04</td> <td>1 56E-02</td> <td>4 46E-06</td> <td>4 50E-02</td> <td>6 48E-04</td> <td>1 58E-05</td> <td>25</td> <td>651 02</td> <td>848 49</td> <td>14,000</td> <td></td>	v/b bromide         1 00E+06         1 68E-02         4 76E-06         9 00E-02         1 66E-04           v/b bromide         1.05E+01         1.26E-02         1 20E-02         1 20E-02         1 56E-04           chlorde (chloroethene)         1.86E+01         1 06E-01         1 26E-03         1 11E+00           ylens chloride         1.77E+01         1.01E-01         1 17E-05         1 56E-01         8 81E-04           on disulfide         4 57E+01         1.01E-01         1 17E-05         1 30E+04         8 98E-02           on disulfide         4 57E+01         1.01E-01         1 00E-05         1 19E+03         1 24E+00           ondichloromethane         5.50E+01         2 98E-02         1 00E-05         3 10E+03         2 19E-02           olichloroethane         5.50E+01         2 98E-02         1 06E-05         5 06E+03         2 30E-01           olichloroethane         5 89E+01         4 00E-05         1 06E-05         5 06E+03         2 19E-02           orderlorocyclopentadiene         2 00E+03         1 12E-02         2 56E-03         1 11E-00           orderlorocyclopentadiene         2 00E+03         1 6E-05         2 00E-05         1 12E-02           orderlorocyclopentadiene         2 00E+03         1 50E-06	72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	
y bromide         4 / E+U0         1.44E+O2         5 87E+O8         1 20E+O1         2 56E+O1         2 56E+O2	y bromide         4 / E+00         1 / 44E-02         5 8 / F-06         1 / 20E-01         8 6 / F-04           y bromide         1.05E+01         7 28E-02         1 21E-05         1 52E+03         2 56E-01           ylene chlorde         1 17E+01         1.01E-01         1 7 / F-05         2 7 / F-04         2 56E-01           ylene chlorde         4 57E+01         1.01E-01         1 7 / F-05         2 7 / F-04         8 9 / F-05           on disulifide         4 57E+01         1.04E-01         1 00E-05         1 19E+03         1 24E+00           oxidina         8 7 / F-01         1 4 / F-05         1 00E-05         3 10E+03         2 19E-02           oxidino         8 7 / F-01         1 4 / F-05         1 00E-05         3 10E+03         2 19E-02           oxidino chlore         8 55E-01         1 00E-05         3 10E+03         2 30E-01           oxidino chlore         8 55E-01         1 00E-05         5 06E-03         2 30E-01           oxidino chlore         1 2 / E-05         1 00E-05         5 06E-03         2 30E-01           oxidino chlore         2 / 0 / E-05         1 2 / 0 / 0 / 0 / 0 / 0 / 0 / 0 / 0 / 0 /	72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	
orderhols         1.05E+01         7.28E+02         1.28E+04         2.56E+01         6.24E+03         25         276         71         467         70           ordethols         1 (26E+01)         1 (26E+01)         1 (26E+01)         1 (26E+02)         1 (26E+03)         2 (26E+03)	anoethene) 186E-01 (28E-02 121E-05 152E-04 2.56E-01 170E-01 170E-01 172E-05 196E-01 170E-01 170E-01 170E-01 170E-01 170E-01 170E-01 170E-01 170E-01 170E-01 170E-02 196E-02 196E-02 196E-02 170E-01 170E-01 170E-02 196E-02 196E-02 196E-02 196E-02 196E-02 196E-03 19	72059 DUE		4 47E+06	1.44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44	86038	13,000	
Conservations         100E-01         1.23E-06         2.76E-03         2.71E-02         25         259         25         250         25         250         25         250         25         250         25         250         25         250         25         250         25         250         25         250         25         250         25         250         25         25         25         25         25         25         25         25         25         25         25         25         25         20         <	three beautiful and the control of t	74639 Methyl Bromide	1	1.05E+01	7.28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	25	276 71	467 00	5,714	
## 17E+01 1.01E-01 11/E+02 130E+04 8 98E-02 219E-03 25 313 00 510 00 87E-02 100E-02 100E-02 130E-02 25 313 00 510 00 87E-02 100E-02 100E-02 100E-02 100E-02 219E-02 25 319 00 550 00 87E-02 100E-02 100E-02 100E-03 210E-02 25 315 00 55 00E 00 87E-02 100E-03 210E-03	## 1/15=01 1.01E=01 1.17E=05 1.30E=04 8 98E=02 ## 477E=01 1.04E=01 1.01E=05 1.30E=04 8 98E=02 ## 477E=01 1.04E=01 1.00E=05 1.19E=03 1.20E=00 ## 77E=01 1.00E=05 1.00E=05 3.10E=03 1.00E=02 ## 3.16E=01 2.98E=02 1.06E=05 6.74E=03 2.90E=01 ## 5.99E=01 1.20E=02 1.06E=05 6.74E=03 2.90E=01 ## 5.99E=01 1.20E=02 1.04E=05 5.06E=03 1.07E=00 ## 4.70E=02 1.20E=04 1.20E=02 ## 4.70E=02 1.20E=04 1.20E=04 ## 4.70E=02 1.20E=04 1.20E=04 ## 4.70E=02 1.20E=04 1.20E=04 ## 4.70E=02 1.20E=04 1.20E=04 ## 4.70E=02 1.20E=04 1.20E=04 ## 4.70E=02 1.20E=04 1.20E=04 ## 4.70E=02 1.20E=04 1.20E=04 ## 4.70E=02 1.20E=04 1.20E=04 ## 4.70E=02 1.20E=04 1.20E=04 ## 4.70E=02 1.20E=04 1.20E=04 ## 4.70E=02 1.20E=04 1.20E=04 ## 4.70E=02 1.20E=04 1.20E=04 ## 4.70E=02 1.20E=04 1.20E=04 ## 4.70E=02 1.	75002 Mathylone chlorder	(eue	1 86E+01	1 06E-01	1 235-06	2 76E+03	1 11E+00	2 71E-02	25	259 25	432 00	5,250	
## STE+01 1 UNE-01 1 UNE-01 1 UNE-01 1 UNE-01 1 UNE-01 1 UNE-01 1 UNE-01 1 UNE-01 1 UNE-01 1 UNE-01 1 UNE-01 1 UNE-01 1 UNE-01 1 UNE-01 1 UNE-01 1 UNE-02 2 1 UNE-02 2 1 UNE-02 2 1 UNE-02 2 1 UNE-02 2 1 UNE-02 2 1 UNE-02 2 1 UNE-02 2 1 UNE-02 2 1 UNE-02 2	thane 5.50E+01 1046E-01 100E-05 119E+03 124E+00 8 17E+01 1046E-02 103E-05 3 10E+03 2 19E-02  thane 5.50E+01 2 98E-02 106E-05 6 74E+03 6 56E-02  a 16E+01 7 42E-02 105E-05 5 06E+03 2 30E-01  141E+06 1 20E-02 105E-05 5 06E+03 2 30E-01  141E+06 1 12E-02 5 69E-06 1 40TE-00  entadiene 2 00E+06 1 12E-02 5 69E-06 1 20E+00 111E+00  4 68E+01 6 23E-02 6 76E-06 1 20E+00 111E+00  4 68E+01 7 80E-02 6 76E-06 1 20E+00 1 15E-01  ane 501E+01 7 80E-02 8 73E-06 2 80E+03 1 15E-01  1 66E+02 7 90E-02 9 10E-06 1 10E+03 4 22E-01  7 08E+03 4 21E-02 7 69E-06 4 29E+03 1 41E-02  7 08E+03 4 21E-02 7 69E-06 4 24E+00 6 36E-03	75450 Carbon distribution		17/E+01	1.01E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	313 00	510 00	6,706	
thane 5.07E+01 143E-02 105E-05 510E+03 2.19E-02 534E-04 25 422.35 696.00 thane 5.07E+01 143E-02 105E-05 510E+03 2.19E-02 160E-03 2.5 368.15 696.00 than 5.50E+01 742E-02 105E-05 6.05E+03 2.05E-05 160E-03 2.5 36.15 6.03.69 846.31 characteristics and 5.99E+01 9.00E-02 104E-05 2.25E+03 1.07E+00 2.61E-02 2.5 304.75 676.05 characteristics and 5.99E+01 9.00E-02 1.04E-05 2.25E+03 1.07E+00 2.61E-02 2.5 304.75 676.05 characteristics and 5.99E+01 9.00E-02 1.04E-02 2.25E+03 1.07E+00 2.01E-02 2.5 304.75 676.05 characteristics and 5.01E+01 7.22E-04 6.03E-06 2.5 512.15 746.00 characteristics and 5.01E+01 7.22E-04 6.03E-06 2.5 369.52 572.00 characteristics and 5.01E+01 7.22E-04 6.03E-04 2.5 369.52 572.00 characteristics and 5.01E+01 7.22E-04 6.03E-04 2.5 369.52 572.00 characteristics and 5.01E+01 7.22E-04 6.02E-04 2.5 369.52 572.00 characteristics and 5.22E-01 1.03E-02 2.5 369.52 5.00.00 characteristics and 5.22E-01 1.03E-02 2.5 369.52 5.00.00 characteristics and 5.22E-01 1.03E-04 2.5 369.52 5.00.00 characteristics and 5.22E-01 1.03E-04 2.5 360.35 6.02.00 characteristics and 5.22E-01 2.02E-04 2.5 360.35 6.02E-04 2.02E-04 2.5 360.35 6.02E-04 2.02E-04 2.02E-04 2.5 360.35 6.02E-04 2.02E-04 2	thane 5.50E-01 149E-02 105E-05 310E-03 219E-02  thane 5.50E-01 29E-02 106E-05 310E-03 219E-02  and 316E-01 29E-02 106E-05 50EE-03 290E-01  and 589E+01 900E-02 104E-05 25E-03 107E-00  141E+06 112E-02 569E-06 180E-01 447E-02  200E+05 161E-02 721E-06 180E-01 11E+00  488E+01 623E-02 873E-06 120E-04 272E-04  and 437E+01 780E-02 873E-06 290E-03 174E-02  166E+02 790E-02 910E-06 190E-03 141E-02  708E+02 790E-02 790E-06 297E+03 141E-02  708E+03 421E-02 790E-06 36E-03	75252 Domodern		10411704	1045-01	1 005-05	1 19E+03	1 24E+00	3 02E-02	25	319 00	552 00	6,391	
curative         3.50E+01         2.86E+02         1.06E+03         2.5 363 15         585 85           e         3.50E+01         2.86E+02         1.06E+03         2.96E+03         2.76E+04         6.63E+06         2.96E+03         2.76E+04         6.63E+06         2.86E+03         2.76E+04         6.63E+06         2.86E+03         2.76E+04         6.63E+06         2.86E+03         2.76E+04         6.63E+06         2.86E+03         2.72E+04         6.63E+06         2.86E+03         2.72E+04         6.63E+06         2.86E+03         2.72E+04         6.63E+06         2.86E+03         2.72E+04         6.63E+03         2.86E+03         2.72E+04         6.63E+03         2.86E+03         2.72E+04         2.86E+03         2.86E+03         2.72E+04         2.86E+03         2.86E+03         2.86E+03         2.86E+03         2.86E+03<	draftle         3.50E+01         2.88E-02         108E-05         6.48E+03         6.56E-02           e         3.16E+01         7.42E+02         10.5E-05         6.06E+03         2.30E-01           ine         5.98E+01         7.42E+02         10.5E-05         2.56E+03         10.7E+00           entadiene         2.00E+05         1.12E-02         5.99E-06         1.80E+01         4.77E-02           entadiene         2.00E+05         1.61E-02         7.21E-06         1.80E+00         1.11E+00           A 68E+01         6.23E-02         8.73E-06         1.20E+04         2.72E-04           ane         4.37E+01         7.80E-02         8.73E-06         2.80E+03         3.74E-02           ane         5.01E-01         7.90E-02         9.10E-06         1.0E-03         3.74E-02           oethane         9.33E+01         7.10E-02         7.90E-06         2.97E+03         1.41E-02           7.08E+02         4.21E-03         7.69E-06         6.36E-01         6.36E-01	75274 Bromodistionment		8 71F+01	1 495-02	1 03E-05	3 10E+03	2 19E-02	5 346-04	25	422 35	00 969	9,479	
a         3 bE+01         4 AZE-02         1 05E-05         5 06E+03         2 30E-01         5 61E-03         25 330 55         523 00           nne         5 99E+01         9 00E-02         1 04E-05         2 25E+03         1 07E+00         2 61E-02         25 304 75         576 05           entadiene         2 00E+05         1 30E-04         4 70E+00         2 61E-02         2 5 12 15         57 05           entadiene         2 00E+05         1 80E+00         1 11E+00         2 71E-02         2 5 12 15         74 00           ne         4 37E+01         7 82E-02         8 73E-06         2 80E+03         1 15E-01         2 80E-03         25 369.52         572 00           ane         5 01E+01         7 80E-02         8 73E-06         2 80E+03         3 74E-02         9 12E-04         25 369.36         544 20           1 66E+02         7 90E-02         9 10E-06         1 10E+03         4 22E-01         1 103E-02         9 12E-04         25 360.36         544 20           1 66E+02         7 90E-02         9 10E-06         1 10E+03         4 22E-01         1 14E-02         3 44E-04         2 419 60         601 15	a 10E+01 74E+02 105E+05 506E+03 230E-01  14E+06 112E+02 104E+05 509E+03 107E+00  14E+06 112E+02 569E+06 180E+01 11E+00  4 68E+01 6 23E+02 6 76E+06 1 20E+04 2 72E+04  A 37E+01 7 82E+02 8 73E+06 2 80E+04 2 72E+04  ane 501E+01 7 80E+02 8 73E+06 2 80E+03 115E+01  1 66E+02 7 90E+02 9 10E+03 12E+01  7 90E+02 7 90E+02 7 90E+03 14E+02  7 08E+03 7 10E+02 7 90E+06 6 36E+03 6 36E+03	75249 4 Promodichloromethane		5.50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	2,000	
Interest to the control of the contr	inal         5 89E+01         9 00E-02         1 04E-05         1 22EE+03         1 07E+00           Intadiene         1 12E-06         1 5 69E-06         1 80E-01         4 47E-02           entadiene         2 00E+05         1 12E-02         5 69E-06         1 20E+00         1 11E+00           4 68E+01         6 23E-02         6 76E-06         1 20E+04         2 72E-04           ne         4 37E+01         7 82E-02         8 73E-06         2 80E+03         1 15E-01           ane         5 01E+01         7 80E-02         8 80E-06         4 42E+03         3 44E-02           oethane         9 33E+01         7 90E-06         9 10E-06         2 97E+03         4 12E-01           7 08E+02         7 08E+02         7 69E-06         4 24E+00         6 36E-03	70343 1,1-Dichloroethane		3 165-401	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	52	330 22	523 00	6,895	
41E+06         11ZE-02         569E-06         180E-01         447E-02         109E-03         25         603 69         846 31           entadiene         2 00E+05         16E-02         721E-06         180E+00         171E+00         271E-02         25         512 15         746 00           ne         4 58E+01         6 23E-02         6 75E-04         272E-04         6 63E-06         25         488 35         715 00           ane         5 01E+01         7 80E-02         8 78E-03         3 74E-01         2 80E-03         25         369,52         500           ane         5 01E+01         7 80E-02         9 10E-04         4 22E-01         103E-04         25         386 15         602 00           ane         5 01E+01         7 80E-02         9 10E-04         4 22E-01         1 141E-02         3 44E-04         25         380 36         544 20	141E+06 112E-02 5 69E-06 180E-01 447E-02 entadiene 2 00E+05 16E-02 7 21E-06 180E+00 111E+00 4 68E+01 6 23E-02 6 76E-06 120E+04 2 72E-04  ne 4 37E+01 7 82E-02 8 73E-06 2 80E+03 116E-01  ane 5 01E+01 7 80E-02 9 10E-06 110E+03 4 22E-01  oethane 9.33E+01 7 10E-02 7 90E-06 2 97E+03 141E-02  7 08E+02 7 90E-02 7 69E-06 4 24E+00 6 36E-03	75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6,247	
entaction         2 00E+05         1 6HE-02         7 21E-06         1 80E+00         1 11E+00         2 71E-02         2 71E-04         6 63E-06         25         488 35         715 00           ne         4 37E+01         7 22E-02         6 75E-06         2 80E-03         1 75 00         2 80E-03         2 80E-03         3 75 00           ane         5 01E+01         7 80E-02         8 80E-06         4 42E+03         3 74E-02         9 12E-04         25 386 15         602 00           entraine         9 33E+01         7 10E-02         7 90E-02         9 10E+03         4 22E-01         1 03E-02         25 386 38         544 20           coettraine         9 33E+01         7 10E-02         7 90E-02         2 97E+03         1 41E-02         3 44E-04         25 419 60         661 15	entacliene 2 00E+05 1 61E-02 7 21E-06 1 80E+00 111E+00 4 68E+01 6 23E-02 6 76E-06 1 20E+04 2 72E-04  Ane 437E+01 7 82E-02 8 73E-06 1 20E+04 2 72E-04  ane 5 01E+02 7 80E-02 8 73E-03 3 74E-02  1 66E+02 7 90E-02 9 10E-06 1 10E-03 4 22E-01  2 09thane 9.33E+01 7 10E-02 7 90E-06 2 97E+03 1 41E-02  7 08E+03 4 21E-02 7 69E-06 4 24E+00 6 36E-03	7548 Heptachior		1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	
4 56E+01 6 23E-02 6 76E-06 1 20E+04 2 72E-04 6 63E-06 25 488 35 715 00 1    ne 457E+01 7 52E-02 8 73E-05 2 80E+03 1 15E-01 2 80E-03 25 389.52 572 00    ane 501E+01 7 80E-02 8 80E-06 1 10E+03 3 74E-03 2 912E-04 25 386 15 602 00    1 66E+02 7 90E-02 9 10E-06 1 10E+03 4 22E-01 1 03E-02 25 380 38 544 20    southaine 5.3E+01 7 10E-02 7 90E-06 2 97E+03 1 41E-02 3 44E-04 25 419 60 661 15	4 68E+01	77474 Hexachiorocyclopentad	iene	2 005 +05	1 61E-02	7 21E-06	1 80E+00	1 11E+00	2 71E-02	25	512 15	746 00	10,931	
ne         4.3TE+01         7.8ZE-02         8.73E-06         2.80E+03         1.15E-01         2.80E-03         25         369,52         572.00           ane         5.0TE+01         7.80E-02         8.80E-06         4.4ZE+03         3.74E-02         9.12E-04         25         386.15         602.00           contrains         5.0TE+02         7.90E-02         9.10E-03         4.22E-01         1.03E-02         25         360.36         544.20           contrains         9.3ZE+01         7.10E-02         7.90E-06         2.9TE-03         1.4TE-02         3.44E-04         25         4.19.60         661.15	ne     4.3TE+01     7.8ZE-02     8.73E-06     2.80E+03     1.15E-01     2       ane     5.01E+01     7.80E-02     8.80E-06     4.2E+03     3.74E-02     9       1 66E+02     7.90E-06     1.0E+03     4.2E+03     4.1E-02       3.33E+01     7.10E-02     7.90E-06     2.97E+03     1.41E-02       7.08E+03     4.21E-02     7.69E-06     4.24E+00     6.36E-03	/abs/1 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 635-06	22	488 35	715 00	10,271	
ane 5 0'E+01 7 80E-02 8 80E-06 4 42E+03 3 74E-02 9 12E-04 25 386 15 602 00 10 10 10 10 10 10 10 10 10 10 10 10	ane 5.01E+01 7.80E-02 8.80E-06 4.42E+03 3.74E,02 9 1.66E+02 7.90E-02 9.10E-06 1.10E+03 4.22E-01 1 1.00E+02 7.90E-02 7.90E-06 2.97E+03 1.41E-02 3 1.00E+03 4.21E-02 7.69E-06 4.24E+00 6.36E-03 1	788/5 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	52	369,52	572 00	7,590	
1-86E+02 7-90E-02 9-10E-05 1-10E+03 4-22E-01 1-03E-02 25 360-36 544-20 cettrane 9.33E+01 7-10E-02 7-90E-06 2-97E+03 1-41E-02 3-44E-04 25 4-19-60 661-15	1 66E+02 7 9UE-02 9 10E-06 1 10E+03 4 22E-01 1 1 0ethana 9.33E+01 7 10E-02 7 90E-06 2 97E+03 1 41E-02 3 7 09E+03 4 21E-02 7 69E-06 4 24E+00 6 36E-03 1	/9000 1,1,2-Inchloroemane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	22	386 15	602 00	8,322	
MOTORITIAN 9.33 E-01 7 UB-02 7 90 E-06 2 97 E-03 141 E-02 344 E-04 25 419 60 661 15	Moroetriane 9.33E+01 7.10E-02 7.90E-06 2.97E+03 1.41E-02 3 7.08E+03 4.21E-02 7.69E-06 4.24E+00 6.36E-03 1	70045 4 2 0 Total		1 66E+02	7 90E-02	9 105-06	1 10E+03	4 22E-01	1 03E-02	52	360 36	544 20	7,505	
	/ UBE+03 4 Z1E-02 / 69E-06 4 Z4E+00 6 36E-03	19040 1,1,2,2-1 etrachioroema	<b>9</b>	9.33E+01		7 90E-06	2 97E+03	1 415-02	3 44E-04	25	419 60	661 15	8,996	

84682 Trestributed ate	CO TUBO C	00 233 0	oo Lac	V. 20.190	VLOOKUP TABLES	,	į		5	5	9	io, na
84742 Oil a Purth atthough	2 205 104	2 30E-02	1 001 00	1 000103	- 00-1-00	4016-07		20, 13	20.00	2,4,5	0000	2 57 04
85687 Broad beard white date	5.39E+04	4 30E-UZ	/ 80E-06	1725+01	3 60E-46	9 39E-10	3 5	613.15	798 57	LC/41	001100	2000
86306 N. Mitrosodish and amine	1 205103	100 00		2 615±01	2000	90-307		000 000	009 00	200	90 97 .	00000
86737 Ethoraga	1 385+03	3 625.02		1 000100	2 515 03	3.00E-06		032.28	630.45	13,000	00-100	46.00
86748 Carbazde	3 39F+03	3 COE -02	7.03E-06	7.485+00	8 28E-03	4 635.08		570 44	8000	12,000	5 75-06	00-10-0
87683 Hexachlory 1 3-butadlene	5.37F+04	5.615-02	6 165-06	3 235+00	3 34F-01	1 33E-08		021 01 485 15	728.00	10,01	27.00	00000
87855 Pentachlorophenol	5 92E+02	5 60E-02		1 95E+03	1 00 0 0 0	2 44E-08		582.15	813.20	14,000	3 45-05	00+00
88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 785-06		519 15	749 03	12,000	3 15-06	0 0E+00
91203 Naphthalene	2 00E+03	5 905-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04		491 14	748 40	10,373	0 0E+00	1 45-01
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 11E+00	1 64E-07	4 00E-09	52	560 26	754 03	13,000	1 3E-04	0 0E+00
95475 0-Xylene	3 63E+02	8.70E-02	1 00E-05	1 78E+02	2.13E-01	5 20E-03		417 60	630.30	8,661	0 0E+00	7 0E+00
95487 2-Methylphenol (o-cresol)	9 125+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	22	464 19	697 60	10,800	0 0 0	1 8E-01
90001 1,Z-Dichlorobenzena 95578 2-Chlorobenzena	6 17E+02	6 90E-02		1 56E+02	7 79E-02	1 90E-03	% t	453 57	705 00	9,700	001100	2 0E-01
95054 2 4 F. Techlosophenal	3 605+02	2015-02	9 46E-U6	2 20E+04	1 60E-02	3.905-04		525 45	6/5 00	9,5/2	0.05+00	1 8E-02
98953 Nitrobenzene	6.46F+01	7 60F-02		2.09E+03	9 845-04	2405-05	6 %	320 13 483 95	710.00	10,566		2000
100414 Ethylbenzene	3 63E+02	7 50E-02		1 69E+02	3 23E-01	7 88E-03	252	409 34	617 20	8.501	000-00	1.0E+00
100425 Stynene	7 76E+02	7 10E-02		3 10E+02		2 76E-03	52	41831	636 00	8 737	0 OE+00	1 0E+00
105679 2,4-Dimethyfphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	52	484 13	707 60	11,329	0 0E+00	7 0E-02
106423 p-Xylene	3 89€+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03		411 52	616 20	8,525	0 0E+00	7 0E+00
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	52	447 21	684 75	9,271	0 0E+00	8 0E-01
106478 p-Chloroaniline	6 61E+01	4 83E-02	1 015-05	5 30E+03	1 36E-05	3 32E-07	25	503 65	754 00	11,689	0 0E+00	1 45-02
104 002 1,Z-Dichlordemane	1./4E+01	1 24 10 1	9.30E-06	8 52E +03	4 01E-02	9 78E-04		356 65	561 00	7,643	2 6E-05	0 0E+00
100034 VIII)/I BCB(BIB	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04		345 65	519 13	7,800	0 OE+00	2 05-01
100505 III-Aylene	4 U/E+UZ	7 UNE-UZ	/ 60E-00	1615+02	3 01 0-01	/ 34E-03		412.27	617 05	8,523	0 0E+00	7 0E+00
	2 195+02	7 30E-02	8 70 10 8	3 20E+02 4 72E+02	1 575-01	3 71E-03	C K	363 / 6	537.40	0,830	0.05+00	2 2 2
108952 Phenol	2 88E+01	8 20E-02	9 10 5 06	8 28E+04	1 63E-05	3.985-07		455.02	694 20	10,410	00+400	2 1E+00
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92E-02		1 72F+04	7.38F-04	1.805-05		451 15	650 70	0000	3 36 00	00117
115297 Endosulfan	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05		674 43	942 94	14,000	0 OE+00	2 1E-02
117817 Bis(2-ethythexyl)phthalate	1 51E+07	3 51E-02		3 40E-01	4 18E-06	1 02E-07	22	657 15	806 00	15,999	4 0E-06	0 0E+00
117840 Di-n-octyl phthalate	8 32E+07	1 51E-02		2 00E-02	2 74E-03	6 68E-05	25	704 09	862 22	15,000	0 0E+00	7 0E-02
	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03	25	582 55	825 00	14,447	4 6E-04	0 0E+00
	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05	52	615 18	873 00	13,121	0 OE +00	1 1E+00
120621 1,2,4-1 nchlorobenzena	1 /8E+03	3 OUE-UZ		3 00=+02	5 8ZE-0Z	1 42E-03	52	486 15	725 00	10,471	0 0E+00	2 0E-01
12005Z Z,4-Oranoropriendi 1911/2 3 4-Draftstolman	0.555+02	3 405-02	8 / E-CB	4 50E+03	1 30m da	31/5-06	52	482 15	708 17	11,000	0 OE+00	1 1E-02
12.1142 4,4-Dilling Colonial in	9 33E+01	1 065-01	1 050 05	2 / UE+U2	3 315 03	9.2/E-08	9 8	590.00	814 00	13,467	1 9E-04	0.05+00
	1 55E+02	7 205-02	8 20E-06	2.00E+02	7.54E-01	1 84F-02	3 %	394.40	620.20	000,0	2 4E-U3	004400
129000 Pyrene	1 05E+05	2 72E-02		135E-01	4 51E-04	1 10 = 05	2 15	667.95	936.00		0000	1 15.03
156592 cis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03	22	333 65	544 00		00+100	3.5F-02
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03	25		516 50	6,717	0.00	7 0E-02
193395 Indeno(1,2,3-cd)pyrene	3 47 6+06	1 90E-02		2 20E-05	6 56E-05	1 60E-06	22		1078 24		2 1E-04	0 0E+00
	1 23E+06	2 26E-02		1 50E-03	4 55E-03	1115-04			969 27	15,000	2 1E-04	0.05+00
206440 Fluoranthene	1 075+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04				905 00	13,815	0 0E+00	1 4E-01
218019 Charsene	1 435406 3 085405	2 485 02	5 20E-05	8 00E-04	3 401-03	8 29E-07	2 2	753 15 1	1019 70	16,000	2 1E-05	0 OE+00
309002 Aldrin	2 45E+06	1 32F-02		1 80F-01	6 97E-03	1 70E-04		603.01	979.00	10,433	7 JE-00	000000
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02		2 00E+00	4 35E-04	106E-05	22 22	596 55	839.35	200	200	004400
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5 3E-04	001100
542756 1,3-Dichloropropens	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02			587 38	2,000	3 7E-05	2 0E-02
606202 2,6-Duntrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07			770 00	12,938	1 95-04	0 0E+00
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 236-05	2 25E-06	25		746 87	11,000	2 0E-03	0 0E+00
1024573 Heptachlor epoxide	8 325+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	951E-06	25		848 76	13,000	2 6E-03	0.0E+00
/4399/o mercury (elemental)	2 ZUE+U1	3 U/E-UZ	6 30E-06	5 62E-02	46/E-01	1 145-02	22 23	80 :	1750 00	14,127	0.0E+00	3 0E-04
8001332 Toxaphere 44006935 Amdor 1260 (DCB-1260)	2 5/E+05	1 165-02	4 34E-06	/ 40E-01	2 46E-04	6 00E-06	52 6	ر د د	873 31	14,000	3 2E-04	0 0E+00
11090823 Arodor (200 (FCB-1209)	2 00F+05	1 56F-02	4 32E-06	5 705-02	8 20E-01	2005.03	0 % 4 °	402.50	539 37	19,000	1 OE-04	00+300
12674112 Arodor 1016 (PCB-1016)	3.30E+04	2 22E-02	5 42F-06	4 20F-01	1 195-02	2 905-03	3 50	340.50	312.2/	000,61	1 0E-04	00=+00
53469219 Arodor 1242 (PCB-1242)	3 30€+04	2 14E-02	5 31E-06	3 40E-01	2 13E-02	5 20E-04	3 6	345 50	482.20	18,000	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	001200
							i	)	2	335	5	TO VETTOR

VERSION 12 September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

			1		
	ENTER User-defined stratum A soil vapor permability. k, (cm²)				
	. К	_			
	ENTER Soil stratum A SCS Soil type (used to estimate soil vapor permeability)	SI	ENTER Stratum C soil water-filled porosity, $\theta_n^c$ (cm <sup>3</sup> /cm <sup>3</sup> )	03	
	ENTER SCS soil type directly above	S	ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)	0 43	
	ENTER Soil Stratum directly above water table, (Enter A, B, or C)	O	ENTER Stratum C soil dry bulk density, $ ho_b^c$	1.7	ENTER Hodor air exchange rate, ER
hylene	ENTER L <sub>wr</sub> (cell D28) Thickness of soft stratum C, (Enter value or 0) h <sub>C</sub> (cm)	1127 76	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ (cm³/cm³)	0.27	ENTER Floor-wall seam crack width, w (cm)
Chemical cis-1,2-Dichloroethylene	Totals must add up to value of L <sub>wr</sub> (cell D28)  Thickness Thickness Thickness of soil of soil soil stratum C, atum A, (Enter value or 0) (Enter value or 0)  In ha he can be caused as the can be can	96 09	ENTER Stratum B soil total porosity, n <sup>8</sup> (unitiess)	0 42	ENTER Enclosed space helight, He (cm)
	ENTER Totals mu Thickness of soil stratum A, hA	762	ENTER Stratum B soil dry bulk density, p <sub>b</sub> (g/cm³)	17	ENTER Enclosed space floor width, W <sub>B</sub>
	ENTER Depth below grade to water table. Lwr (cm)	1950 72	ENTER Stratum A sod water-filled porosity, $\theta_w^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.2	ENTER Enclosed space floor length, La (cm)
ENTER Initial groundwater cone, Cw (497L)	ENTER Depth below grade to bottom of enclosed space floor, Lr (cm)	15	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	0,43	ENTER Sol-bidg pressure differential, AP (g/cm-s²)
Chemical CAS No (numbers only, no dashes)	ENTER Average soll/ groundwater temperature, Ts (°C)	16	ENTER Stratum A soll dry bulk density, pe^ (g/cm³)	15	ENTER Enclosed space floor thickness, Lank (cm)
_ <del>_</del>	•		• '		• -

ENTER
Target hazard
quotient for
noncarcinogens,

ENTER
Target
risk for
carchogens,
TR
(unitiess)

Exposure frequency, EF (days/yr)

Exposure duration, ED (yrs)

ENTER
Averaging
time for
noncarcinogens,
AT<sub>NC</sub>
(yrs)

ENTER
Averaging
time for
carcinogens,

ENTER

(unitless)

Used to calculate risk-based groundwater concentration

### CHEMICAL PROPERTIES SHEET

	Reference	œuc'	RfC	(mg/m³)
ŧ	¥s⊔	factor,	RF	(mg/m³).1
Pure component	water	solubility,	Ø	(mg/L)
Organic		O		- 1
			r°	
Normal	bouling	Polit,	<b>-</b>	ક્
Enthalpy of vaponzation at	the normal	boiling point,	۵۴٬۰	(cal/mol)
Henry's law constant	reference	temperature,	<del>,</del>	္မ
Henry's law constant	at reference	temperature,	I	(atm-m³/mol)
	Diffusivity	ın water,	₫ '	(cm <sup>2</sup> /s)
	Duffusivity	ın air,	o" '	(cm <sup>2</sup> /s)

	•		
Floor- wall seam perimeter, Xerect	3,844	Driffusion path length, Ld (cm)	
Water-filled porosity in capillary zone, $\theta_{w,cz}$ $(cm^3/cm^3)$	0 294	Total  overall effective effective diffusion coefficient, Deff (cm²/s)	
Air-filled porosity in capillary zone, $\theta_{a,cz}$ $(cm^3/cm^3)$	0 136	Capillary Zone affective diffusion coefficient, Doff (cm²/s) 5.24E-04	
Total porosity in capillary zone, inca (cm³/cm³)	0.43	Stratum C C effective diffusion coefficient, Deff c (cm²/s) 4.56E-04 RfC (mg/m³)	3.5E-02
Thickness of capillary zone,	17 05	Stratum B B effective diffusion coefficient, Defis (cm²/s) 7 60E-04 risk factor, URF (µg/m³)***	ΝA
Stratum A soil effective vapor permeability, k, (cm²)	6 98E-10	Stratum A effective diffusion coefficient, Deff (cm²/s) 2 98E-03 2 98E-03 Custon (ug/m³)	4 48E-04
Stratum A soil refative air permeability, k <sub>to</sub> (cm²)	0.746	Vapor viscosity at ave soil temperature, HTs (g/cm-s) 177E-04 Infinite source indoor attenuation coefficient, a conficient, a co	3 54E-00
Stratum A soil intrinsic permeability, k	9 36E-10	Henry's law constant at we groundwater temperature, H'rs (unitless) 115E-01 115E-01 Exponent of equivalent foundation Peclet number, exp(Pe <sup>5</sup> ) (unitless)	20.10.0
Stratum A effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0 419	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mo!)  2 72E-03  Area of crack, Anack (cm²).	22-12
Stratum C soil air-filled porosity, e <sub>a</sub> <sup>c</sup> (em <sup>3</sup> /cm <sup>3</sup> )	0 130	Enthalpy of vaporization at ave groundwater tamperature, AHv. rs (cal/mol)  Crack effective diffusion coefficient, Danck (cm²/s)  2 98E-03	
Stratum B soil all-filled porosity, $\theta_{n}^{B}$ (cm $^{3}$ /cm <sup>3</sup> )	0 150	Crack depth below grade, Zask (cm)  15  Average vapor flow rate into bldg , Qual (cm³/s)	
Stratum A soil air-filled porosity, $\theta_a^A$ (cm³/cm³)	0 230	Crack- to-total area ratio,  n (unitless) 4.16E-04 Crack radius, frant (cm)	
Source- building separation, Lr (cm)	1935 72	Area of enclosed space below grade,  A <sub>a</sub> (cm²)  Source vapor conc ,  C <sub>cource</sub> (µg/m³)	
Exposure duration,	9 46E+08	Bldg, rate,  Quierra  Quierra  (cm³/s)  5 63E+04  Convection path length, Lp  (cm)	

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INCREMENTAL RISK CALCULATIONS:

Hazard quotient	from vapor	intrusion to	indoor air,	noncarcinogen	(unitless)	AN
Incremental risk from	vapor	intrusion to	indoor air,	carcinogen	(nurdess)	AN
Final	ındoor	exposure	groundwater	conc,	(μg/L)	8 13E+04
Pure	component	water	solubility,	Ø	(µg/L)	3 50E+06
Risk-based	ındoor	exposnre	groundwater	conc.	(µg/L)	8 13E+04
Indoor	exposure	groundwater	conc,	noncarcinogen	(µg/L)	8 13E+04
Indoor	exposure	proundwater	conc,	carcinogen	(µg/L)	ΑN

(DO NOT USE RESULTS IF ERRORS ARE PRESENT) ERROR SUMMARY BELOW

		i i	ترا	Table	1								
	K, (cm/h)	a (1/cm)	N (unitless)	M (unitless)	θ <sub>ε</sub> (cm³/cm³)	θ, (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)						
	0 20	0 008	1 09	0 083	0 38	0 068	0 0092						
	0.26	0 019	131	0 237	0 41	0 095	0 016						
•	5 5	0 036	1 56	0 359	0 43	0 078	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
- (	14 55	0 124	2 28	0 561	041	0 057	0 040						
<b>Y</b>	0,67	5 6	807	0 627	0.43	0.045	0 044						
	7 .	0.05	57.	0.187	38.0	0 100	0 025						
	2 2	0.03	 6 - 6	0.324	0.39	0100	0 029						
	200	5000	2 6	0.270	0.46	4 20 0	0.0046						
	200	0 0 0	1 23	0 187	0.43	000	8500 0						
	0.45	0 020	1,41	0 291	0 45	790 0	0.030						
	4 42	0 075	1 89	0 471	0 4 1	0 065	0 030						
					Č								
		00000				Chemical Properties Lookup 1able	Kup table	:					
		Organic			e n		Henry's	Henry's			Enthalpy of		
		carbon	;		component		law constant	aw constant	Norma		vaporization at	Į D	•
	_	partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	polling	Critical	the normal	, XSL	Reference
	ដ	coefficient,	ın aır,	ın water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	bolling point,	factor	conc
		، <del>پ</del> ر	<b>.</b>	<u>ה</u>	S	Ì	I	Fæ	۳,	L	ΔHν.	URF	Ş
CAS No Chemical		(cm <sup>3</sup> /g)	(cm <sub>2</sub> /s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m³/mot)	ဉ	£	S.	(cat/mol)	(ua/m³) 1	(ma/m³)
100000													
50293 DDI		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25			11,000	9 7E-05	0 0E+00
SUSZO BENZO(a)pyrene 51285 2 4 Duranni		1 021=+06	4 30E-02	90-300 6	1 62E-03	4 63E-05	1 13E-06	25		969 27	15,000	2 15-03	0 0E+00
51285 Z,4-Umirophenol		1 00E-02	2 73E-02	90-390 6	2 79E+03	1 82E-05	4 44E-07	25			15,000	0 0E+00	7 0E-03
55705 Disent(a,n)anunacene 56036 Carbon tetrachlondo		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	52			16,000	2 1E-03	0 0E+00:
56553 Benz/alantheseas		1 /4E+02	7 80E-02	8 80 - 06	7 935 + 02	1 25E+00	3 05E-02	38			7,127	1 5E-05	0 0E+00
ooooo benz(a)anunacene 57749 Chlordene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	137E-04	3 34E-06	25		•	15 000	2 1E-04	00E+00
58899 gamma-HCH (Hndane)		1075+03	1 425-02	7 3/E-06	5 60E-02	1 99E-03	4 85E-05	55			13,000	3 7E-04	00+300
60571 Dialdrin		2 14E+04	1 255-02		1 055 01	0 74 F-C4	1 405-05	25			13,000	3 7E-04	0.010
		6 OUE-01	5 36E-02		10-2051	90-11-04	151E-05	25			13,000	4 6E-03	0 0E+00
67641 Acetone		5 75E-01	1 24E-01	1 145-05	1 00F+06	1 50E-03	3 BBG-06	5 5			10,000	0 0E+00	1 4E+01
67663 Chloroform		3 98E+01	1 04E-01	1 00E-05	7 92F+03	1.50E-01	3 865-03	67	328 20	508 10	888'9 80'0	0.05+00	3.5E-01
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59F-01	3 88 11-03	3 5			0,000	20 10 10	00+100
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	25.05			10.346	00-100	2 500
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25			7.342	30.00	00+100
71556 1,1,1-Trichloroethane		1 10E+02	7.80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	26			7,136	00-400	00+00
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7.51E-06	25			12.000	0 OE+00	1 15-03
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25			14,000	00+400	1 8E-02
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	52			14,000	6 9E-05	0.000
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25			13,000	9 7E-05	000+00
74839 Methyl bromide		1 05E+01	7 28E-02	121E-05	1 52E+04	2 56E-01	6 24 6-03	25			5,714	0 0E+00	5 0E-03
(5014 Vinyl chloride (chloroethene)	_	1 86E+01	106E-01	1 23E-06	2 76E+03	1 11E+00	2 71E-02	25			5,250	8 4E-05	0 0E+00
75092 Methylene chlonde		1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25			6,706	4 7E-07	3 0E+00
Carbon disulfide		4.57E+01	104E-01	1 00E-05	1 19E+03	1 24E+00	3 02€-02	25			6,391	00+300	7 0E-01
75252 Bromotorm		8 71E+01	1 49E-02	1.03E-05	3 10万+03	2 19E-02	5 34E-04	25			9,479	1 1E-06	00E+00
5274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60 = -03	25			7,000	1 8E-05	00000
5343 1,1-Dichloroethane		3.16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61 E-03	25			6,895	0 0E+00	5 0E-01
7 3 3 3 4 1 , 1 - Dichioroethylene		5 89E+01	9 00E-02		2 25E+03	1 07E+00	2 61E-02	25			6,247	5 0E-05	0 0E+00
70445 neptachior		1415+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 095-03	25	603 69	84631	13,000	135-03	00000
7.474 Hexachlorocyclopentadiene		2 00E+05	161E-02	7 21E-06	1 80E+00	1 11 1 + 00	2 71E-02	52	512 15		10,931	0 0E+00	7 0E-05
/east Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2.72E-04	6 63E-06	25			10,271	2 7E-07	0 0E+00
70075 1 ,Z-Uichloropropane		43/2+01	7 82E-02		2 80E+03	1 155-01	2 80E-03	25	369 52		7,590	0 OE+00	4 0E-03
79005 1,1,2-1 richloroethane		2 UTE+UT	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25			8,322	1 6E-05	0 0E+00
79345 1 1 2 2-Tetrachlomethane		936+02	7 405 02	9 10E-09	1 105+03	4 22E-01	1 03E-02	52	360 36		7,505	1 7E-06	00-100
83320 Acenerbithene		9 55E+03	7 10E-02	7 501 00	2 97E+03	1 41E-02	3 44E-04	25	41960		8,996	5 8E-05	0.05+00
SSEW Acendeninens		/ 0812+03	4 21E-02	7 69E-06	4,24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0 0E+00	2 1E-01

84660 Chethylothere		1			VLOOKUP TABLES								
84742 Di-n-buty ohthalate	3 395+04	4 385.03	5 33E-U6	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 8E+00	
85687 Butyl benzyl phthalate	5 75E+04	174E-02	4 83E-06	2.695+00	5 52E-08	9 39E-10	52 t	613 15	798 67	14,751	0 0E+00	3 5E-01	
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05F-04	5 OCE -06	Q H	090,00	639 68	13,000	0.05+00	7 0E-01	
86737 Fluorene	1 38E+04	3 63E-02	7 88E-06	1 98E+00	2 61E-03	6 37E-05	9 %	570 44	870.00	13,000	2 4 - 00	0 05:+00	
00/48 Carbazole	3 39E+03	3 90 0-02		7 48E+00	6 26E-07	1 535-08	22	627.87	89 00	13 077	5 75-06	004100	
87865 Postachiometrical	5 376+04	5 615-02		3 23€+00	3 34E-01	8 15E-03	25	486 15	738 00	10 206	2 25-05	00+100	
88062 2 4 6-Tachlorophenol	5 92E+02	5 60E-02		1 95E+03	1 00E-06	2 44E-08	52	582 15	813 20	14,000	3 4E-05	0 0E+00	
91203 Naphthalene	2 OUF+02	5 905.02	7 505 06	8 00E+02	3 19E-04	7 78E-06	52	519 15	749 03	12,000	3 15-06	0 0 = +00	
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 115+00	1 96E-02	4 83E-04	52	491 14	748 40	10,373	0 0 0 0	14E-01	
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13F-01	4 00E-09	8 8	560 26	754 03	13,000	1 3E-04	0 0E+00	
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 205-03	0 K	417 60	630 30	8,661	001100	7 0E+00	
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02		1 56E+02	7 79E-02	1 90E-03	3 5	464   9	705.00	008,01	000+00	185-01	
95578 2-Chlorophenol	3 88E+02	5 01E-02		2 20E+04	1 60E-02	3 90 E-04	22	447 53	675.00	9,700	00+100	2 UE-01	
93334 Z,4,5-1 richlorophenol	1 60E+03	2 91E-02	7 035-06	1 20E+03	1 785-04	4 34E-06	52	526 15	759 13	13,000	005+00	2 SE O.	
100414 Ethylbenzene	6 465+01	7 60E-02	8 60E-06	2 09E+03	9 845-04	2 40E-05	52	483 95	719 00	10,566	00+30	2 0E-03	
100425 Styrene	3 83E+02 7 76E+02	7 105-02	/ 80E-06	1 69E+02	3 235-01	7 88E-03	52	409 34	617 20	8,50	0.00	1 0E+00	
105679 2,4-Dunethytohenol	2 09E+02	5 84E-02		3 10E+02	1 13E-01	2 76E-03		41831	636 00	8,737	0 0E+00	1 0E+00	
106423 p-Xylene	3 895+02	7 69E-02	8 44E-06	1 85E+02	8 ZUE-U5 3 14F-01	2 00E-06		484 13	707 60	11,329	0 0E+00	7 0E-02	
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	7 00E-03 2 43E-03	8 %	41152	616.20	8,525	00=+00	7 0E+00	
106478 p-Chloroaniine	6 61E+01	4 83E-02		5.30E+03	1 36E-05	3 325-07		503.65	754.00	11,500	00+400	8 OE-01	
10/062 1,2-Dichloroethane	174E+01	1 04E-01	9 90E-06	8 52E+03	4 01E-02	9 785-04		356 65	561.00	7,643	265.05	1 4E-02	
108283 m. Xvano	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	52	345 65	519,13	7.800	0.0F+00	205-03	
108883 Toluene	4 U/E+02	7 005-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03		412 27	617 05	8,523	00=+00	7 0E+00	
108907 Chlombenzene	2 405+02	8 /UE-02	8 50 10 0	5 26E+02	2 72E-01	6 63E-03	23	383 78	591 79	7,930	0 0E+00	4 0E-01	
108952 Phenol	2 18E+02	8 20E-02	8 /UE-06	4 72E+02	1 52E-01	3 71E-03	52	404 87	632 40	8,410	0 0E+00	2 0E-02	
111444 Bis(2-chloroethyl)ether	1.55F±01	6 925-02	7 535.06	4 725 ± 04	1 635-05	3 98E-07	52	455 02	694 20	10,920	0 0E+00	2 1E+00	
115297 Endosulfan	2 14E+03	1 15E-02	4 55F-06	1 / ZE+04	/ 38E-04	1 80E-05	52	451 15	629 79	9,000	3 35-04	0 0E+00	
117817 Bis(2-ethythexyl)phthalate	1 51E+07	3 515-02	3 66E-06	3 40E-01	4 18F-08	125-03	នុខ	67443	942 94	14,000	0.0E+00	2 1E-02	
117840 Di-n-octyl phthalate	8 32E+07	151E-02	3 58E-06	2 00E-02	2 74E-03	6.68F-05	0 K	55/ 15	806 00	15,999	4 OE-06	0 0E+00	
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 416-02	1325-03	3 %	704 US 582 55	825.00	2,000	0 0E+00	7 0E-02	
12012/ Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51 E-05	8	615 18	873 00	13.12	# OU + O	1100	
	1 /8E+U3	3 COE-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03		486 15	725 00	10,471	0 0E+00	2 OF-01	
121142 2.4-Dinitrototuene	0 555+01	3 46E-02	3 7 12-06	4 50E+03	1305-04	3 17E-06		482 15	708 17	11,000	0 0E+00	1 15-02	
124481 Chlorodibromomethane	6 31E+01	1 96E-02	1.05F-05	2 /UE+U2	3 34E-05	9 27 E-08		290 00	814 00	13,467	1 9은 수	0 0E+00	
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7.54F-01	1 8/11/04	2 2	416 14	678 20	8,000	2 4E-05	0.0E+00	
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	1 35E-01	4 51E-04	1 105.05	3 %	034 40	620.20		5 8E-07	0 0€+00	
156592 as-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03	3 %	333.65	536 00 544 00		0.000	1 16-01	
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516.50	1,132 R 717	00+400	3 56-02	
195555 indeficit, c.5-ca)pyrene 205092 Rep2o(h)fluoranthene	347E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06	25	809 15	1078 24	17,000	2 15-04	0 0F+00	
206440 Fluoranthene	1 075+05	2 COE-OZ	3 35E-06	1 50E-03	4 55E-03	1 11E-04		715 90	969 27	15,000	2 1E-04	0 0E+00	
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5.568-06	2 OGE-01	3 40E-04	1 61E-05	52	655 95	905 00		0.05+00	1 4E-01	
218019 Chrysene	3 98E+05	2 48E-02	6.21E-06	1 60E-03	3 88E-03	9 46E-05		753 15 714 15	1019 70	16,000	2 15-05	0 0E+00	
309002 Aldnn	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 705-04	3 %	603.01	979.00	16,455	2 1E-06	0 0E+00	
	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		596 55	839.36	3,000	4 80.03	0.05+00	
	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839.36	13,000	- 0E-03	0000	
5427.30 1,3-Lichioropropene 606302 2 6-Dmitratorings	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02	25	381 15	587 38	2000	37154	205-02	
621647 N-Nitrosodi-n-omovjamine	2 40E+01	3 2/E-U2 5 45E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07		558 00	770 00		196-04	0 0E+00	
	8 32E+04	1325-02	4 23E-06	2 005-03	9 Z3E-05	2 25E-06		209 60	746 87		2 0E-03	0 0E+00	
7439976 Mercury (elemental)	5 20E+01	3 07E-02	4 (17)	5 62F-02	3 30E-04 4 67E-01	9 51E-06			848 76		2 6E-03	0 0E+00	
8001352 Toxaphene	2 57E+05	1 16E-02	ň	7 40E-01	2 46E-04	6 00E-06	9 4	667.46	1750 00		0 0E+00	3 0E-04	
	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1895-01	4 60E-03	25.	402 50	539.37	14,000		0 0E+00	
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02		5 70E-02	8 20E-02	2 00E-03	25	377 50	512.27	19,000		0.05+00	_
126/4112 Arodor 1016 (FCB-1016) 53469219 Arodor 1242 (PCB-1242)	3 30F+04	2 22E-02 2 14E-02	5 42E-06 5 31E-06	4 20E-01	1 19E-02	2 90E-04	25 3	340 50	475 22	18,000		00+00	-
1-1-1-3-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	1	70-341 7		3 40E-U	2 13E-02	5 20E-04	25	45 50	482 20	18,000	1 0E-04	0 0E+00	

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

		ENTER User-defined stratum A soil vapor permeability, K, (cm²)
		<b>, ,</b> ,
		ENTER Sol Stratum A SCS Sol SCS Sol byte (used to estimate soll vapor permeability) Si ENTER Stratum C Str
		SCS soil type water table  S  ENTER Stratum C soil total porosity, n <sup>c</sup> (untitless)
		Soil stratum directly above water table, (Enter A, B, or C)  C  ENTER Stratum C soil dry bulk density, pc c (g/cm³)
	oride	ENTER  of Lyr (cell D28)  Thickness of soil stratum C, ) (Enter value or 0) hc (cm)  1127 76  ENTER Stratum B soil water-filled porosity, $\theta_w^8$ (cm³/cm³)
СРепіса	Carbon tetrachloride	NTER         ENTER         ENTER           Totals must add up to value of L <sub>WY</sub> (cell D28)         Thickness         Thickness           Inckness         of soil         of soil         of soil           of soil         of soil         of soil         of soil           of soil         of soil         of soil         of soil           oth         (Em)         (Em)         (Em)           cm)         (Cm)         (Cm)         (Cm)           cm)         (Cm)         (Cm)         (Cm)           returne         Stratum B         Stratum B         Stratum B           cdensity,         porosity,         porosity,         porosity,           pc         n         0,8         0,8           g/cm³)         (cm³/cm³)         (cm³/cm³)
		ENTER Totals mu Thickness of soil stratum A. (cm) 762 ENTER Stratum B soil dry bulk density, P <sub>B</sub> (g/cm³)
		Depth below grade to water table, Lwr (cm) 1950 72 ENTER Stratum A soil water-filled porosity, $\theta_w^A$ (cm <sup>3</sup> /cm <sup>3</sup> )
ENTER Intital groundwater conc , Cw (µg/L)	28 37692308	ENTER Depth below grade to bottom of enclosed space floor, LF (cm) 15 15 ENTER Stratum A soil total porosity, n^A (unitless)
ENTER Chemical CAS No (numbers only,	56235	Average soil groundwater temperature.  T T T T T T T T T T T T T T T T T T T

15	0.43	0.2	17	0 42	0.27	1.7	0.43	03
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
Enclosed		Enclosed	Enclosed					
space	Soil-bldg	space	space	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
thickness,	differential,	length,	width,	height,	width,	rate,		
Lorack	ΔA	Į,	WB	f	≱	8		
(EB)	(g/cm-s <sup>2</sup> )	(ca)	(ш)	(E3)	(ca)	(1/h)		

### 2 of 7

CHEMICAL PROPERTIES SHEET

	Reference	Ric,	(mg/m³)
Unit	AST .	ractor, URF	(µg/m³) <sup>-1</sup>
Pure component	water	So upility.	(mg/L)
Organic	partition	coellicient,	(cm <sub>3</sub> /g)
	Critical	temperature, To	( <del>,</del>
Normal	boding	j pod	(K)
Entha'py of vaponzation at	the normal	AH.	(cal/mol)
Henry's law constant	reference	remperature, Ta	(2)
Henry's law constant	at reference	T H	(atm-m³/mot)
	Diffusivity	D	(cm²/s)
	Diffusivity	֓֞֞֞֜֞֓֓֓֓֓֓֓֓֓֓֓֟֓֓֓֟֓֟֓֟ ֓֓֞֞֓֓֞֓֓֓֓֞֩֓֓֓֓֓֓֡֓֓֩֩֓֡֓֓֓֩֡֩	(cm <sup>2</sup> /s)

## INTERMEDIATE CALCULATIONS SHEET

Floor- wall seam perimeter, X <sub>eack</sub>	3,844	Diffusion path length, L <sub>4</sub> (cm)	1935 72	
_		_	19	
Water-filled porosity in capillary zone, $\theta_{w,cz}$ $(cm^3/cm^3)$	0 294	Total overall effective diffusion coefficient, $D^{eff}$ $(cm^2/s)$	7 20E-04	
Alr-filled porosity in capillary zone, $\theta_{a}$ $\alpha$ $(cm^3/cm^3)$	0 136	Capillary zone effective diffusion coefficient, Deff (cm²/s)	5 46E-04	
Fotal porosity in capillary zone, inc. (cm <sup>3</sup> /cm <sup>3</sup> )	0.43	Stratum C effective diffusion coefficient, D <sup>eff</sup> <sub>C</sub> (cm <sup>2</sup> /s)	4 74E-04	Reference conc , RfC (mg/m³)
Thickness of capillary zone,	17 05	Stratum B B effective diffusion coefficient, Deff (cm²/s)	7 99E-04	Unit risk factor, URF (µg/m³) ¹
Stratum A soil effective vapor permeability, k,	6 98E-10	Stratum A A effective dirfusion coefficient, D** (cm²/s)	3.16E-03	Infinite source bldg conc , Cuasing (µg/m²)
Stratum A soil relative air permeability. Ka (cm²)	0 746	Vapor viscosity at ave soil temperature, Hrs (g/cm-s)	1 77E-04	Infinite source indoor attenuation coefficient, α (unitiess)
Stratum A soil intrinsic permeability, k <sub>t</sub> (cm²)	9.36E-10	Henry's law constant at ave groundwater temperature, H'rs (unritless)	8 53E-01	Exponent of equivalent foundation Peclet number, exp(Pe) (unitiess)
Stratum A effective total fluid saturation, S <sub>ie</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0 419	Henry's law constant at ave groundwater temperature, Hrs (attm-m³/mol)	2 02E-02	Area of crack, Annex (cm²)
Stratum C soil air-filled porosity, e.c. (cm²/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, bHv, rs (cal/mol)	7,798	Crack effective diffusion coefficient, Drack (cm²/s)
Stratum B soil air-filled porosity, $\theta_n^8$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zosck (cm)	15	Average vapor flow rate into bldg.,  Q <sub>rost</sub> (cm <sup>3</sup> /s)
Stratum A soil alr-filled porosity, $\theta_n^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratlo, n (unitless)	4 16 <b>E</b> -04	Crack radius, fenek (cm)
Source- bullding separation, Lr (cm)	1935.72	Area of enctosed space below grade.  A <sub>B</sub> (cm <sup>2</sup> )	9 24 <b>E</b> +05	Source vapor conc , Casuce (ug/m³)
Exposure duration, t	9 46 <b>E</b> +08	Bidg ventilation rate, Gesterna (cm <sup>3</sup> /s)	5 63E+04	Convection path length, L <sub>p</sub> (cm)

NCENTRATION CALCULATIONS
Ś
D GROUNDWATER
RISK-BASE

INCREMENTAL RISK CALCULATIONS	Hazard quotient from vapor intusion to indoor air, noncarcinogen (unitiess)	
INCREMENTAL	incremental nsk from vapor intrusion to indoor air, carcinogen (untiless)	V.
ULATIONS	Final indoor exposure groundwater conc, (ug/L)	4 72E+01
ATION CALCI	Pure component water solubility, S (µg/L)	7 93E+05
ER CONCENTR	Risk-based indoor exposure groundwater conc, (ug/L)	4 72E+01
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	Indoor exposure groundwater conc , noncarcinogen (Hg/L)	AN
RISK-BASE	Indoor exposure groundwater conc, carcinogen (µg/L)	4 72E+01

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

					,	VLOOKUP TABLES	ES					
		Φ	ž		÷	£	i					
SCS Soil Type	K, (cm/h)				- 1	9, (cm²/cm²)	Mean Grain Diameter (cm)					
ψ i	0.20	0 008	1 09	0 083	0.38	0 068	0 0092					
<u>. 5</u>	0.26	0 019	131	0 237	041	0.095	0.016					
. ب	40 5	0 038	96.	0.359	540	00/8	0200					
ט מ	90 4 C	0 124	977	0.00	4 4	0037	240					
, w	0,87	0 027	23	0 027	24.0	0 0	5000					
SCL	131	0 059	4 48	0 324	0 39	0 100	0 029					
IS	0 25	0 016	1 37	0 270	0.46	0.034	0 0046					
SIC	0 02	0 005	1 09	0 083	0.26	0.070	6600 0					
SICL	0 0	0 010	1 23	0 187	0 43	0 088	0 0026					
18 E	0 45 4 42	0 020	1 41	0 291	0.45	0.065	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0					
						:			ļ			
					Chemic	Chemical Properties Lookup Table	ikup Table	1			t	
		Organic			Pure		Henry's	Henry's	Normal		Enthalpy of	***
		carbon	Officeion	Diffusivity	water	Hanry's	at reference	reference	i colloc	Catinal	the normat	1
		coefficient	tn alf	in water.		law constant	temperature	temperature		temperature	boiling point	
				o o		Ī	I	T	E	٦٠	ΔH, h	URF
CAS No	Chemicat	(cm³/g)	(cm²/s)	(cm <sup>2</sup> /s)	(mg/L)	(nuitless)	(atm-m³/mol)	(၃)	( <del>)</del>	(gK)		) (m/br/)
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75		9 7E-05
50328 Benzo(a)pyrene	ene	1 02E+06	4 30E-02	90-300 G	1 62E-03	4 63E-05	1 13E-06	25	715 90	969 27	15,000	2 1E-03
51285 2,4-Dinitrophenol	ienol	1 00E-02	2 73E-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0E+00
53703 Dibenz(a,h)anthracene	inthracene	3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	52	743 24	990 41	16,000	2 1E-03
56235 Carbon tetrachloride	chloride	1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	1 5E-05
56553 Benz(a)anthracene	racene	3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3.34E-06	25	708 15	1004 79	15,000	2 1E-04
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	9 22	624 24	885 73	13,000	3 7E-04
58899 gamma-HCH (Lindane)	(Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04
605/1 Dielann		2,145+04	1 25E-02	4 /4E-06	1 95E-01	6 19E-04	151E-05	2 5	41332	842.25	13,000	4 00 00 00 00 00 00 00 00 00 00 00 00 00
67641 Acatona		6.75E-01	1 24E-02	1 14 1 15	3 50E+03	1 595-03	3 881-05	24 C	329.20	508.10	000,0°	0.00
67863 Chloroform		3 98E+01	104E-01	1 00 E-05	7 92E+03	150E-01	3.666-03	25	334 32	536 40	888.9	2 3E-05
67721 Hexachloroethane	thane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00	695 00	9,510	4 0E-06
71363 Butanol		6 92E+00	8,00E-02	9 30E-06	7 40E+04	3 61E-04	8 805-06	25	390 88	563 05	10,346	0 0E+00
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 285-01	5 56E-03	25	353 24	562 16	7,342	8 3E-06
71556 1,1,1-Trichtoroethane	roethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1725-02	25	347 24	545 00	7,136	001100
72208 Endrin	•	123E+04	1 255-02	4 /45-06	2 50E-U1	3 USE-U4	/ 51E-U6	52.52	01817	07 986	12,000	0.06+00
72548 DDD	<b>.</b>	9 / / E+04 1 00 E+06	1 695-02	4 46E-06	4 50E-02	1 84F-04	4 ODE-08	0 K	839 90	863.77	14,000	6 9F-05
72559 DDE		4 47 E+06	1 44E-02	5 87E-06	1 205-01	8 61E-04	2 10E-05	52	636 44	86038	13,000	9 7E-05
74839 Methyl bromide	ide	1 05E+01	7 28E-02	121E-05	1 52E+04	2 56E-01	6 24 E-03	25	276 71	467 00	5,714	0.000
75014 Vinyl chloride (chloroethene)	e (chloroethene)	186E+01	1 06E-01	1 23E-06	2 76E+03	111E+00	2 716-02	25	259 25	432 00	5,250	8 4E-05
75092 Methylene chloride	hloride	1 17E+01	1016-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	313 00	510.00	902'9	4 7E-07
75150 Carbon disuffide	fide	4 57E+01	104E-01	1 00E-05	1 195 +03	1 24E+00	3.02E-02	25	319 00	552 00	6,391	005+00
75274 Bromodoblomes	de de	1041044	2 495-02	50-130 F	27401403	20-261 2 6 665-02	40-11-00 c	52	362 15	030 00 435 85	1 000	יין אררים אררים אררים אררים אררים אררים אררים אררים אררים אררים אררים אררים אררים אררים אררים אררים אררים אררים
75343 1 1-Dichlomethane	roneulane	3 168+01	7 42E-02	1.05E-05	5.06E+03	2305-02	5.615-03	5,5	330.55	523.00	6.895	0.05+00
75354 1.1-Dichloroethylene	ethylene	5 89E+01	9 00 5-02	1.04E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6.247	5 0E-05
76448 Heptachlor	•	1 41 €+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	1 3E-03
77474 Hexachlorocyclopentadiene	cyclopentadiene	2 00E+05	1 61E-02	7 21E-06	1,80E+00	111E+00	271E-02	25	512 15	746 00	10,931	0.000
78591 isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	52	488 35	715 00	10,271	2 7E-07
78875 1,2-Dichloropropane	propane	437E+01	7 82E-02	8 73E-06	2 80E+03	115E-01	2 80E-03	22	369 52	572 00	7,590	00=+00
70015 Tacklomothycon	proemane	1 555+01	7 805-02	8 80E-05	4 425+03	3 74E-02	9 12E-04	2 1	366 15	644 20	8,322 7,505	1 75-05
79345 1 1 2 2-Tetrachlomethane	yidild achloroethane	9 33 F +01	7 10E-02	2 10E-00	2 97F±03	1 41F-02	3.446-04	3,50	419.60	661 15	8 996	5 8E-05
83329 Acenaphthene	ne ne comment	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6.36E-03	1 55E-04	22 22	550 54	803 15	12,155	0 0E+00
-												

6 0/7

84682 Diethylandaria					VLOOKUP TABLES							
84742 District options	2 88E+02	2 56E-02	6 35E-06	1 08E+03		4 51E-07	83	567 15	757 00	13.733	0 0E+00	2 RF+00
85687 Buty benzyl phthalate	5 75F+04	1 745-02	/ 86E-06	1 12E+01	3 855-08	9 39E-10	52	613 15	798 67	14,751	0 0E+00	3 5E-01
86306 N-Nitrosodiphenylamine	1 29 1 103	3 12E-02	90 136 4	2 695 +00	5 17 E-05	1 265-06	52	09 099	839 68	13,000	0.0E+00	7 0E-01
86737 Fittorene	1 38E+04	3 635.02	7 885 06	3 3 1 5 4 0 1	2 05E-04	5 00E-06	52	632 28	890 45	13,000	1 4E-06	0 0E+00
86748 Carbazole	3 39E+03	3 90E-02	7 035-06	7.485+00	Z 51E-03	6 37E-05	52	570 44	870 00	12,666	0 0E+00	1 4E-01
87683 Hexachloro-1,3-butadiene	537E+04	5 61E-02	6 16E-06	3 23E+00	3 34 F-01	1 535-58	53 5	627 87	899 00	13,977	5 7E-06	00±00
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00 1 06	2 446-08	2 2	480 13 582 15	738 00	10,206	2.2E-05	000
91203 Narbthalene	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	22	519 15	749 03	12,000	3 15-06	00+100
91941 3,3-Dichlorobenzidine	Z 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	22	491 14	748 40	10,373	0 0E+00	146-01
95476 o-Xylene	3 63E+02	8 70E-02	1 005-05	3 1 1E+00	1 64E-07	4 00E-09	52	560 26	754 03	13,000	13E-04	0 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92F-05	5 20E-03	52 52	417 60	630 30	8,661	00E+00	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02		1905-03	8 %	464 19 453 57	597 60	10,800	00100	1 8F G
955/8 2-Chlorophenol	3 88E+02	501E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	3 42	453 57	675.00	00/8	0 0E+00	2 05-01
93934 Z,4,5- Frichlorophanol	1 60E+03	291E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	25.	526 15	759 13	3,0,6	001100	1 85-62
100414 Frhylbensese	6 46E+01	7,60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	25	483 95	719 00	10.566	001100	ברים היים היים היים היים היים היים היים ה
100425 Styrene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03		409 34	617 20	8,501	00+00	1 00+00
105679 2.4-Dimethylphenol	2005-102	20-00-7	90000	3 10 = +02	1 13E-01	2 76E-03		418 31	636 00	8.737	0 0E+00	1 0E+00
	3 89E+02	7 69F-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06		484 13	707 60	11,329	0 0E+00	7 0E-02
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 385+01	0 06E-01	7 66E-03	9 !	411 52	616 20		0.00	7 0E+00
а	6 61E+01	4 83E-02	1 01E-05	5.30E+03	1 365.05	2 435-03		447 21	684 75		0 0E+00	8 0E-01
107062 1,2-Dichloroethane	174E+01	1 04E-01	90E-06	8 52E+03	4 01F-02	3 32E-0/ 9 78E-04	2 %	503 65	754 00	11,689	0 0E+00	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 125-04		330 63 345 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xylene	4 07E+02	7 005-02	7 80E-06	1 61E+02	3 01E-01	7.345-03		343 93	51913	008'/	0.05+00	2 0E-01
	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63 F-03		783 78	501.70		0.05+00	7 OE+00
10890/ Uniorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3715-03	22	404 87	632.40	056,4	0.05.00	4 UF-01
111444 Ris(2-chlomath dathar	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07		455 02	694.20		00+100	2 UE-02
	2 44E±03	6 92E-02	7 53E-06	1 72E+04	7 38E-04	180E-05	52	451 15	659 79		3.35-04	00+400
	1.516+07	3 51E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05		674 43	942 94		0 0E+00	2 1E-02
117840 Di-n-octyl phthalate	8 32E+07	1.51E.02	3 58E-06	3 40 50 5	4 18E-06	1 02E-07		657 15	806 00		4 0E-06	0 0E+00
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5.917-06	\$ 20E+00	2 /4E-03	6 68E-05		704 09	862 22			7 0E-02
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 57E-03	1 32E-03	8 8	582 55	825 00			0 0E+00
120821 1,2,4-Trichlorobenzane	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1.42F-03		613 IS	8/3 00		0 0E+00	1 1E+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06		460 13	708 17			2 0E-01
121142 Z,4-Uinitrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	2 22	00 00	814 00			1 1E-02
1274901 Chiorogipromormethane	6 31 E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 835-04		116.14	678 20	, 6 , 6 , 6 , 6	- 5 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	0.05+00
129000 Pyrana	1 55 = +02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02		394 40	620 20			004900
156592 cis-1.2-Dichloroethylene	3.55E±01	7 36E-02	7.24E-06	135E-01	4 51E-04	1 10E-05	25	667 95	936 00			11501
156605 trans-1,2-Dichlomethylene	5.25E+01	7 07E-02	1 195-03	3 30E+03	26/E-01	4 07E-03		333 65	544 00		0 0E+00	3 SE-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20F-05	3 53E-01	9 39E-03		20 85	516 50			7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02		1 50E-03	4 55F-03	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	52	109 15	1078 24			0 0E+00
	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1615-05		73.90 656.06	969.27			0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07		753 15	905 00 1019 70			14E01
210019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05		714 15	00 626	16,455		00=+00
319846 alpha.HCH (alpha.BUC)	4 225+05	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04		603 01	839 37		4 95-53	00400
319857 beta-HCH (beta-BHC)	1.255+03	1 4ZE-0Z	7 34E-06	2 005+00	4 35E-04	1 06E-05		596 55	839 36			001100
542756 1,3-Dichloropropene	4 57F+01	6 255-02	1 000,00	2 40E-01	3 05E-05	7 44E-07		96 55	839 36			0 0 = +00
606202 2,6-Dinitrotoluene	6 92E+01	3 27F-02	7 285.06	1 825+03	7 20E-01	177E-02	25	381 15	587 38			2 0E-02
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17F-06	9 R9F+03	3 00=-03	7 46E-07		558 00	770 00			0 0E+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02		2 00E-01	3905-04	2 255-06		509 60	746 87			0 0E+00
	5 20E+01	3 07E-02	6 305-06	5 62E-02	4 67E-01	1 146.00	9 6		848 76			0000
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6005-06	3 %	657 15	1/50 00	_	_	3 0E-04
11096825 Arador 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1895-01	4 60E-03	25	402 50	539.37	000,41		000
1109/691 Aroctor 1254 (PCB-1254) 12674112 Amelor 1016 (PCB-1016)	2 00E+05	1 56E-02	•	5 70E-02	8 20E-02	2 00E-03	25 3	377 50	512 27	19,000	40.00	0 0E+00
53469219 Aradar 1242 (PCB-1242)	3 30E+04	2 22E-02 2 14F-02	5 42E-06 5 31E-06	4 20E-01	119E-02	2 90E-04	25	340 50	475 22	18,000		20±30
7		70-341 7	٠,	3 40E-01	2 13E-02	5 20E-04	52 35	15.50	482 20	18,000		00=+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 1 2 September, 1998

User-defined stratum A soil vapor permeability, ENTER (cm<sub>3</sub>) 8 ENTER
Soil
Stratum A
SCS
soil type
(used to estimate C
soil vapor permeability) CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below) SCS soil type directly above water table ENTER Soil stratum directly above water table, (Enter A, B, or C) ENTER Totals must add up to value of L<sub>wr</sub> (cell D28)

Thickness Thickness of soil of soil stratum B, stratum C, return A, (Enter value or 0) (Enter value or 0)

An he (E) Chloroform Chemical 152 4 (CIII) Thickness of soil stratum A, ENTER (cm) below grade to water table, ENTER Depth Ĭ (cm) below grade to bottom of enclosed space floor, groundwater conc., 11 84857143 ENTER ENTER \_ა ექ Depth YES (CII) 15 (numbers only, groundwater temperature, Chemical CAS No no dashes) 67663 Average ENTER soil/ 9

ER m C rr-filled ntty. :						
ENTER Stratum C soit water-filled porosity, $\theta_w^c$ $(cm^3/cm^3)$	0					
ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)	0.43					
ENTER Stratum C soll dry bulk density, p <sub>b</sub> (g/cm³)	17	ENTER	air exchange rate,	Ä	(1/h)	0.45
ENTER Stratum B soil water-filled porosity, $\theta_w^8$ $(cm^3/cm^3)$	0.27	ENTER	seam crack width,	*	(cm)	0.1
ENTER Stratum B soil total porosity, n <sup>6</sup> (unilless)	0 42	ENTER	space height,	£	(cm)	488
ENTER Stratum B soil dry bulk density, p <sub>b</sub> (g/cm³)	17	ENTER Enclosed	floor width,	₩	(cm)	961
ENTER Stratum A soli water-filled porosity. 6,^^ (cm³/cm³)	0.2	ENTER Enclosed	floor floor floor	נ"י	(cm)	961
ENTER Stratum A soil total porosity. n^ (unitless)	0 43	Soil-bldo	pressure differential,	ΔP	(g/cm-s²)	40
ENTER Stratum A soil dry bulk density, p <sub>b</sub> (g/cm³)	15	ENTER Enclosed	floor thickness,	Lorack	(сш)	15

01	ENTER Target hazard	quotient for	noncarcinogens,	돧	(unitless)		-	Jsed to calculate risk-based
488	ENTER	risk for	carcinogens,	Œ	(unitless)		1 05-06	Used to calcu
961	ENTER	Exposure	frequency,	ᇤ	(days/yr)		350	
961	ENTER	Exposure	duration,	유	(yrs)		30	
40	ENTER	time for	noncarcinogens,	AT	(yrs)		30	
15	ENTER	time for	carcinogens,	ATc	(yrs)	-	70	

groundwater concentration

						_	_
		Reference	conc.,	S.C	(mg/m³)		
	5	ASI	factor,	LR.	(µq/m³)-1		
Pure	component	water	solubility,	S	(mg/L)	1	
Organic	carbon	partition	coefficient,	ኧ	(cm <sub>3</sub> /g)		
		Critical	temperature,	ပို	( <del>)</del>		4,007
	Normal	poling	point,	<b>1</b>	( <del>K</del> )		
Enthalpy of	vaporization at	the normal	boiling point,	ΔHν	(cal/mol)		0000
Henrys	law constant	reference	temperature,	F.	(၁)		36
Henry's	law constant	at reference	temperature,	I,	(atm-m³/mot)		104F.01 100F.05 3.66E.03
					(cm <sup>2</sup> /s)		1 005.05
		Deffusivity	in air,	ດ້	(cm <sup>2</sup> /s)		1 04F-01

	ć	Stratum A	Str	Stratum C	Stratum A	Stratum A	Stratum A	Stratum A		Total	Air-filled	Water-filled	Floor
Exposure	-sontce-	sos arr-filled	son air-filled	soil air-filled	enective total fluid	soil intrinsic	soil relative air	soil effective vapor	Thickness of capillary	porosity in capillary	porosity in capillary	porosity in capillary	wall
duration,	separation,	porosity.	porosity,	porosity,	saturation,	permeability,	permeability,	permeability,	zone,	zone,	zone,	zone,	penmeter,
t (sec)	(G)	(cm³/cm³)	θ* (cm 3/cm 3)	(cm³/cm³)	S <sub>6</sub> (cm³/cm³)	(cm²)	(C <sub>M</sub> 2,	(cm²)	<u>(</u> ال	n <sub>ez</sub> (cm³/cm³)	θ, α. (cm³/cm³)	θ <sub>w αz</sub> (cm <sup>3</sup> /cm³)	X Annot
9 46E+08	2057 64	0 230	0 150	0 130	0 365	7 49E-10	0.797	5 97E-10	17.05	0.43	0 136	0.294	3,844
	Area of							Strategy	Stratum	Enterto	o de la constante de la consta	Ş	
i	enclosed	Crack-	Crack	Enthalpy of	Henry's law	Henry's faw	Vapor	<	8	Ü	Zone	overall	
Bldg.	space	to-total	depth	vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
ventilation rate.	perow grade.	area ratio.	orade.	ave groundwater temperature	ave groundwater	ave groundwater	ave soil	diffusion	diffusion	diffusion	diffusion	diffusion	path
Q.	4	F	Zonek	ΔH,τs	I	Ţ	in suff	D	ם ""	,	ייים וויי		יוולקוון. -
(cm <sub>3</sub> /s)	(cm <sup>2</sup> )	(unitless)	(cm)	(cal/mol)	(atm-m³/mol)	(unitless)	(s-mɔ/5)	(cm²/s)	(cm²/s)	(cm²/s)	(cm²/s)	(cm²/s)	] (E)
5 63E+04	9 24E+05	4 16E-04	15	7,492	2 47E-03	1 04E-01	1 77E-04	4 22E-03	1 07E-03	6 40E-04	7 36E-04	1 07E-03	2057 64
						Exponent of	Infinite						
Convection	Source		Average	Crack		equivalent	source	Infinite	15				
path	vapor	Crack	flow rate	diffusion	Area of	Peclet	attenuation	plda	i i	Reference			
length,	conc.	radius,	into bldg,	coefficient,	crack,	number,	coefficient,	COLIC	factor,	conc.,			
<b>ئ</b> ـ	Cicouros	rack	ď	O Compa	Acrack	exp(Pe <sup>f</sup> )	ಶ	Chulding	URF	RfC			
(cm)	(µg/m³)	(cm)	(cm <sub>3</sub> /s)	(cm²/s)	(cm²)	(unitless)	(unitless)	(µg/m³)	(µg/m³)-1	(mg/m <sub>3</sub> )			
15	1 04E+02	0 10	5 70E-01	4 22E-03	3 84E+02	1 96E+02	4 64F-06	4 835-04	2.3 <b>F.</b> 05	δΩ			

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS INCREMENTAL RISK CALCULATIONS	Risk-based Pure Final risk from quotlent mdoor component indoor exposure water exposure intrusion to intrusion to groundwater solubility, groundwater conc., S conc., carcinogen noncarcinogen (ug/L) (ug/L) (unitless) (unitless)
CONCENTRATION CALC	
D GROUNDWATER C	Indoor Ri exposure groundwater e conc, gro noncarcinogen (ug/L)
RISK-BASE	Indoor exposure groundwater conc., carcinogen (ug/L)

VLOOKUP TABLES

SCS Soil Type	К, (сп/h)	α (1/cm)	N (unitless) M (ur	M (unitless)	9. (cm³/cm³)	θ, (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)						
		ő	1 09	0.083	95.0	l,	0,000						
ರ	0.26	0.019	133	0.237	0.00	9000	0.018						
	104	9800		0250	. 6	0000							
, <u>~</u>	5 5	0.030	- 0	665.0	3 4	8/00	0.020						
3 0	4 00 2 4 00	0 124	87.78	0.561	0.41	0 057	0 040						
c w	5 5	0 6	7 7	0 027	9 0	0.045	0.044						
108	2 5	0020	7 - 1	78.0	200	96.6	0.025						
- W	- 6	9 6		0.024	) (	0010	670.0						
	3 6	900	90	0.70	040	4500	0.0046						
10 S	200	0000	1 23	0.083	070	0/00	8500 0						
าเร	0.45	0 0 0 0	4 1	0.291		0.067	0.000						
SL	4 42	0 075	189	0 471	0.41	0 065	0000						
!													
					Chemic	Chemical Properties Lookiin Table	in Table						ſ
	•	Organic			Pure		s,/coeH	Honnye			Tartholism of		
		carbon			component		law constant	law constant	Norma	-	contains of	1	
	_	partition	Diffusivity	Diffusivity	water	Hency's	e constant	roforonce	o de la contraction de la cont	, .	Appendance at	E 1	
	8	coefficient	in air.	in water	solubility	law constant	temporahire	tomoratura	5		me normal	JSK	Katerence
	i	Ϋ́,	_ _ _	0	5	, I	rempetatule,	telisperature,	Ē	temperature,	polling point,	Tactor,	conc
CAS No Chemical		(cm <sup>3</sup> /g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(ma/l)	(inditions)	(atm-m³/mol)	¥ ()	- §	် ရိ		UAP 1.1.3.1.3	ָר אַנר ער אַנר
									1	2	(calinoi)	( m/sH)	(mgm)
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 105-06	2	533 15		11 000	9 75.05	00+100
50328 Benzo(a)pyrene		1 02E+06	4 30E-02		1 62E-03	4 63E-05	1 13E-06	, , ,	715.00	060 27	000	2 c	00+100
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 OSE-06	2 79E+03	1 82E-05	4 44E-07	5	605.28		15,000	201100	7 05-03
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25		066	00,8	2 TE-03	00400
56235 Carbon tetrachlonde		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3.055-02	25			7 127	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	00+400
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-08	9 40E-03	1 37E-04	3 34€-06	25		-	15,000	2 1 1 0 4	0000
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25			13,000	3 7E-04	0 0E+00
58899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25			13,000	3 7E-04	0 0E+00
Sept Dielaria		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	25			13,000	4 6E-03	0 0E+00
62630 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25			10,000	0 0E+00	1 4E+01
67669 (1)		3 /3E-01	1245-01	1 14E-05	1 00E+06	1 595-03	3 88E-05	25			6,955	0 0E+00	3 SE-01
67724 Konseklander		1000000	1046	1 00E-05	7 926+03	1 505-01	3 66E-03	. 25 25			6,988	2 3E-05	0.00
71363 Butanol		1 78E+U3	2 50E-03	6 80E-05	5 00E+01	1 59E-01	3 88E-03	24 3			9,510	4 0E-06	0 0E+00
71432 Benzene		6 80E+01	8 80E-02	90-1108 B	4000404	3 0 1 0 C	8 80E-08	25			10,346	00+00	3 56-01
71556 1.1.1-Trichloroethane		1 10E+02	7 80F-02	8 80F-06	1 336+03	7 05E-01	5 50E-03	<b>5</b> 7	303 24		7,342	8 3E-06	00+00
72208 Endnn		1 23E+04	1 25E-02		2 50E-01	3.08F-04	7.515-06	2,5		24 242 00 15 986 20	7,136	00+100	1 05 +00
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1.58F-05	3.52			14 000		20-118
72548 DDD		1 00E+06	1 695-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	22			14,000	69F-05	00+00
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25			13,000	9 7E-05	0000
74839 Methyl bromide		1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24 6-03	25			5,714	0 OE+00	5 0E-03
75014 Vinyl chlorida (chloroethene)	Je)	1 86E+01	1.06E-01	1 23E-06	2 76E+03	111月+00	2 71E-02	22			5,250	8 45-05	000+00
75.50 Cata Januar		1.17E+01	101E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25			90,706	4 7E-07	3 0E+00
applinging undured to care		4 5/E+01	1046-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	35		00 552 00	6,391	0 0E+00	7 0E-01
75274 Bromodichlormathons		8 /1E+01	7,491-02	1 03E-05	3 105+03	2 19E-02	5 345-04	či i			9,479	115-06	0 0E+00
75343 4 1-Dichlossophase		3 465+01	2 98E-02	1 065-03	6 /4E+U3	6 56E-02	1 60E-03	25		15 585 85	7,000	185-05	0 0 0 0
75254 4 4-Dichlorobelliane		2 1001101	7 4455-02	1 03E-03	5 USE+U3	2 305-01	5 61E-03	22			6,895	0.01100	5 0E-01
76448 Hentschlor		1 445+01	9 00 5-02	1 04 E-U5	2 25E+03	1 U/E+00	2 61E-02	25			6.247	5 OE 05	00=+00
77474 Loccophosocial		901100	1 647 00	00-150-6	1 805-01	4 47 E-02	1 09E-03	52			13,000	1 3E-03	00+00
78501 Isonboros	Þ	4 685403	20101	7 215-00	1.80E+00	1115400	2 /1E-02	25			10,931	005+00	7 0E-05
78875 1 2-Dichlomoropane		4 375+01	7 62 6 62	0 705-00	- ZUE+U4	4 171 24	90-389 9	2,5			10,271	2 7E-07	0 0E+00
79005 1 1 2. Trichloroethere		10,000	7 805 00	00-100	4 425.00	10-10-1	2 80E-03	2			7,590	0 0E+00	4 0E-03
79016 Trichloroethylene		1 665+01	7 90F-02	8 60E-06	4 42E+U3	3 /4E-02	9 12E-04	25			8,322	1 66-05	00+400
79345 1 1 2 - Tetrachloroethana		0 33E+01	7 105-02	7 005 06	2 625+03	4 225-01	70-1150 1	67 6			505,0	1 / E-06	0.00+00
83329 Acenaphthene		7 OSE+03	4.21E-02	7.695-06	4 24E±00	1 4 1E-02 6 36E-03	45-044	67	41960	51 F00 00	8,896	00.100	001100
-		***	!	1	3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	J.)	í	3		12,135	201100	1.50

846E2 Contraction		1			VLOOKUP TABLES							
84742 Din-buty obthalate	2 30E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	55	567 15	757 00	13,733	0 0E+00	2 8€+00
85687 Butyl benzyl phthalate	5 75E+04	1 74E-02	4 835-06	2 695+00	3 835-08	9395-10	52	613 15	798 67	14,751	0 0E+00	3 5E-01
	1 29E+03	3 12E-02	6 35E-06	3.51E+01	2.05E-04	1 20E-05	នុះ	660 60	839 68	13,000	0 0 0	7 0E-01
86737 Fluorene	1 38E+04	3 63E-02	7 88E-06	1 98E+00	2 61E-03	37F-05	9 %	632.28	890 45	13,000	145-06	20 10 10 10 10
ob/48 Carbazole	3 395+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	25	627.87		13 977	5 75.06	0.05400
e/ess nexachloro-1,3-butadiene 87865 Pentachloronhenel	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	33	486 15	738 00	10,206	2 2E-05	00+300
88062 2,4,6-Trichlorophenol	3.816+02	3 18F-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	25	582 15	813 20	14,000	3 4E-05	0 0E+00
91203 Naphthatene	2 00E+03		7.505-06	3 10E+01	1 085.02	7 78E-06	52	519 15	749 03	12,000	3 15-06	0 0E+00
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 11E+00	1 64E-07	4 00E-04	0 K	491 14 560 26	748 40	10,373	00=+00	1 4E-01
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	22 22	417 60	630.30	3,000	001100	7 05 +00
93487 Z-Methylphenol (o-cresol) 95501 1 2-Dichlomborgsol	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	52	464 19	697 60	10.800	00000	18F-01
	6 17E+02	6 90E-02	7 905-06	1 56E+02	7 79E-02	1 90E-03	25	453 57	705 00	9,700	0.0100	2 0E-01
95954 2.4.5-Trichloraphenol	3 88E+02	2 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9,572	0 0E+00	1 8E-02
98953 Nitrobenzene	6 465+01	7 50F-02	8 60E-06	1 20E+U3	1 /85-04	4 34E-06	52	526 15	759 13	13,000	0 0E+00	3 5E-01
	3 63E+02	7 50E-02	7 80E-06	1 69F+03	3 23E-04	2 40E-05	52	483 95	719 00	10,566	0 0E+00	2 0E-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 135-01	7 76 12-03	0 X	418 34	617 20	8,501	00+00	1 OF +00
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02		7 87E+03	8 20E-05	2 00E-06	3 2	484 13	707 60	11 220	00+400	1 01+00
106467 14-Dichlombergene	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	56	411 52	616 20		0 DE+00	7 0F+00
-	01/6+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	52	447 21	684 75		0 0E+00	8 OF-01
107062 1.2-Dichloroethane	1 745+01	4 83E-02	1 01E-05	5 30E+03	136E-05	3 32E-07	22	503 65	754 00		0 0E+00	1 4E-02
108054 Vinyl acetate	5.25E+00	8 50F-02		8 52E+03	2 10E-02	9 78E-04	52	356 65	561 00		2 6E-05	00+300
108383 m-Xytene	4 07E+02	7 00E-02	7 80E-06	1616+02	2 IVE-02 3 01E-03	5 12E-04	52	345 65	519 13		0 0E+00	2 0E-01
	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 22 E-01	7.34E-U3	8 8	412.27	617.05	8,523	0 0E+00	7 0E+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 715-03	0 4	383 /8 404 97	97 160		00440	4 OE-01
	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	3 %	455.02	622 40		001400	2.0E-02
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	22	451 15	659 79	026,0	2 25 24	2 15+00
11029/ Endosuitan 117817 Re(2-ethylbox/labelata	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	55	674 43	942.94		0.05-04	2 18-02
117840 Decoded antibalate	1516+0/	3515-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	25	657 15	806 00		4 0E-06	0 0F+00
118741 Hexachlorobenzene	5 50E+04	5 425.02	3.58E-U6	2 00E-02	2 74E-03	6 68E-05	22	704 09	862 22		0 OE+00	7 0E-02
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	0 ZUE+00 4 34F-02	3 47E-02	1 32E-03		582 55	825 00		4 6E-04	0 0E+00
120821 1,2,4-Tnchlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00F+02	5.825-03	6 515-05		615 18	873 00		0 OE+00	1 1E+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1305-04	3 175-06	0 1	485 15	725 00		0.00	2 0E-01
	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9.27F-08	S K	500.00	108 17		0 0E+00	1 1E-02
124481 Chlorodibromomethane	631E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04		416 14	678.20	79,46	25.04 20.04	0.05+00
12/184 letrachioroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02		394 40	620 20	288	4 4E-U5	000000
15500 rytens 156592 cs-1 2-Dichlomethylene	3 550+05	272E-02	7 24E-06	135E-01	4 51E-04	1 10E-05		667 95	936 00		0000	1 1 1 1 1 1 1 1
156605 trans-1.2-Dichloroethylene	5.256+01	7.075-02	1 135-03	3 50E+03	1 67E-01	4 07E-03		333 65	544 00		0 05-00	3 5E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1905-02	5.66F-06	2 20E-03	3 83E-U1	9 39E-03		320 85	516 50			7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02		1 50E-03	4 55E-03	1 11508	5 6	809 15	1078 24	17,000		0 0E+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 61E-05		655.95	909.27			00+300
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07			1019 70		0.0E+00	14E-01
200000 Alden	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05	52	714 15	979 00			0.05+00
319846 aloha-HCH (aloha-RHC)	1 235+05	1 325-02	4 86E-06	180E-01	6 97E-03	1 70E-04			839 37			0 0E+00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42F-02	7 345-06	2 40E-01	4 35E-04	1 065-05	52	596 55	839 36			0 0E+00
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	2 CSE-03	/ 44E-U/	22	596 55	839 36	13,000		0 0E+00
	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06F-05	7.485.07	g y	201.13	587.38			2 0E-02
621647 N-Ntrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 235-05	2.25E-06	3 %	338 00 508 50	746.97			0 0E+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9515-06	22	613.96	848 76	2 5	2 UE-03	0.0E+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02	52		1750 00	_		0.05+00
11096825 Amelor 1260 (DCB.1260)	2 5/11/05	1 165-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	25 e	15	873 31		3.2F-04	005
11097691 Araclor 1254 (PCB-1254)	2.005+05	1 565.02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	25 4	20	539 37			000+00
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2 22E-02		3 / UE-UZ 4 20F-01	8 20E-02 1 19E-02	2 00E-03	52	20 1	512 27	19,000		00±00
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02	5 31E-06	3 40E-01	2 13E-02	2 90E-04	S 1	340 50	475 22	18,000		00E+00
				:	<i>t</i> }	FF-107 0	3	2	482 20	18,000	10E-04	.  00+30 C

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

ENTER Initial groundwater conc , C<sub>W</sub> (µg/L)

Chemical CAS No (numbers only, no dashes)

YES

ENTER

VERSION 1 2 September, 1998

	ENTER	User-defined stratum A soil vapor permeability, K <sub>v</sub> (cm²)	
		g K	
	ENTER	stratum A SCS SCS soil type (used to estimate soil vapor permeability)	ENTER Stratum C soil water-filled porosity, $\theta_w^c$ $(cm^3/cm^3)$
	ENTER	abo abo	ENTER Stratum C soit total porosity, n <sup>c</sup> (unitless)
	ENTER	Soli stratum directly above water table, (Enter A, B, or C)	ENTER Stratum C soil dry bulk density, p.c (g/cm³)
пе	ENTER Lwr (cell D28)	Thickness of soil stratum C, (Enter value or 0) hc (cm)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ $(cm^3/cm^3)$
Trichloroethylene	NTER ENTER Totals must add up to value of L	3, or 0)	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitess)
	ENTER Totals mus	Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Stratum B soil dry bulk density, Pe (g/cm³)
	ENTER	Depth below grade to water table, Lwr (cm)	ENTER Stratum A soll water-filled porosity, t 0,^A (cm³/cm³)
261 8071429	ENTER Depth	below grade to bottom of enclosed space floor, Le (cm)	ENTER Stratum A sol total porosity, n^ (unitless)
79016	ENTER	Average soil/ groundwater temperature, T <sub>\$</sub> (°C)	ENTER Stratum A Soll dry bulk density, p <sub>k</sub> (g/cm³)

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	
space	Soil-bldg	space	space	Enclosed	Floor-wall	Indoor	
floor	pressure	floor	floor	space	seam crack	air exchange	
thickness,	differential,	length,	width,	height,	width,	rate,	
Lorack	٩v	r. B	WB	ī	*	<b>E</b>	
(cm)	(g/cm-s²)	(cm)	(cm)	(cm)	(cm)	(1/h)	
15	40	961	961	488	0.1	0.45	
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
Averaging	Averaging			Target	Target hazard		
time for	time for	Exposure	Exposure	nsk for	quotient for		
carcinogens,	noncarcinogens,	duration,	frequency,	cardinogens,	noncardnogens,		
ATc	ATNC	<b>a</b>	Ħ	፳	된		
(yrs)	(yrs)	(yrs)	(days/yr)	(unitless)	(unitless)		
2	30	30	350	1 0E-06	1		
				Used to calcu	Used to calculate risk-based		

Reference conc , RfC	(mg/m³)
Unit risk factor, URF	(mg/m³)
Pure component water solubility, S	(mg/L)
Organic carbon partition coefficient,	(cm <sub>3</sub> /g)
Critical temperature, To	
Normal boiling point,	ह्य
Enthalpy of vaporization at the normal boiling point, $\Delta H_{\nu,b}$	(cal/mol)
Henry's law constant reference temperature,	(၃)
Henry's law constant at reference temperature, H	(atm-m²/mol)
Diffusivity in water, D.,	(cm-//s)
Diffusivity in air, D.	(cm²/s)

Floor- wall seam perimeter, Xeack	3,844	Diffusion path length, Le	2057 64	
Water-filled porosity in capillary zone, $\theta_{w,cz}$	0 294	Total overall effective diffusion coefficient, $D^{eff}_{r}$ $(cm^2/s)$	8 07E-04	
Air-filled porosity in capillary zone, $\theta_{a,cz}$	0 136	Capillary zone effective diffusion coefficient, D°ff_c (cm²/s)	5 55E-04	
Total porosity in capillary zone, $n_{cz}$	043	Stratum C effective diffusion coefficient, D''' (cm²/s)	4 82E-04	Reference conc., RfC (mg/m³)
Thickness of capillary zone, Lz (cm)	17 05	Stratum B B effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	8 11E-04	Unit risk fædor, URF (µg/m³) <sup>-1</sup>
Stratum A soil effective vapor permeability, k, (cm²)	5 97E-10	Stratum A effective diffusion coefficient, D <sup>off</sup> (cm²/s)	3 20E-03	Infinite source bldg conc , Coudeing (µg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub>	0.797	Vapor viscosity at ave. soil temperature, µrs	1.77E-04	Infinite source indoor attenuation coefficient, a (unitless)
Stratum A soil intrinsic permeability, k	7,49E-10	Henry's faw constant at ave groundwater temperature, H'rs (unitless)	2 78E-01	Exponent of equivalent foundation Peciet number, exp(Pe <sup>f</sup> ) (unitiess)
Stratum A effective total fluid saturation,  Sie  (cm²/cm²)	0 365	Henry's law constant at ave groundwater temperature, H <sub>18</sub>	6 60E-03	Area of crack, Areack (cm²)
Stratum C soul air-filled porosity, $\theta_a^c$ (cm³/cm³)	0 130	Enthalpy of vaportzation at ave groundwater temperature, ΔΗ <sub>ν,τs</sub> (cal/mol)	8,483	Crack effective diffusion coefficient, Deset (cm²/s)
Stratum B soil soil aur-filled porosity, $\theta_{\bullet}^{a}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Z <sub>omek</sub>	15	Average vapor flow rate into bldg , Quel (cm³/s)
Stratum A soil air-filled porosity, $\theta_{\bullet}^{A}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitless)	4 16E-04	Crack radius, r <sub>cra</sub> ck (cm)
Source- building separation, L <sub>T</sub>	2057 64	Area of enclosed space below grade, As (cm²)	9 24E+05	Source vapor conc, C <sub>Extree</sub> (µg/m³)
Exposure duration,	9 46E+08	Bidg ventilation rate, Q <sub>buldon</sub> (cm <sup>3</sup> /s)	5 63E+04	Convection path length, L. (cm)

RESULTS SHEET

NCREMENTAL RISK CALCULATIONS		from vapor			ž	
INCREMEN	Incremental risk from	vapor	intrusion to	indoor a	carcinogen	(unitless)
ULATIONS	Fınal	indoor		groundwater		(μg/L)
ATION CALCI	Pure	component	water	solubi ity,	တ	(µg/L)
R CONCENTR	Risk-based	indoor	exposnre	groundwater	couc,	(µg/L)
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	Indoor	exposure	groundwater	conc.,	noncarcinogen	(μg/L)
RISK-BASEI	Indoor	eunsodxe	groundwater	couc,	carcinogen	(µg/L)

(DO NOT USE RESULTS IF ERRORS ARE PRESENT)	
ERROR SUMMARY BELOW	

131E+03

						VLOOKUP TABLES	ES						
ومنزا ليمو دركو			يد	Table	,	,							
edt lococo	1	- 1			θ <sub>s</sub> (cm²/cm²)	θ, (cm³/cm²)	Mean Grain Diameter (cm)						
<u>, ರ</u>	0.20	8000	109	0 083	0 38	0 068	0 0005						
<u> </u>	200	8100	1.51	0.237	041	0 032	0 0 16						
υ <u>ν</u>	- 4	0 030	1 26	0.359	0,43	0.078	0 020						
	20 4 00	0 145	877	1967	0.41	0 057	0 040						
ာင္က	5.0	0 0 0	1 23	0.627	0 C	0.045	0 044						
SCL	131	0 059	148	0.324	9 6	9 5	0.020						
<u>.</u>	0 25	0.016	1 37	0.270	0.46	0 0 2 2 2	0.0046						
<u> </u>	0 02	0 002	1 09	0 083	0.26	0 0 0 0 0 0	60000						
ָּבָר בּ מַּכֵּר	000	0010	1 23	0 187	0 43	0 089	0 0028						
SL SL	0 4 4 4 5 4 5	0 020	14.	0 291	0 45	0 067	0.011						
			3		7	600.0	0 030						
					Сћетис	Chemical Properties Lookup Table	kup Table						
		Organic			Pure		Henry's	Henry's			Cothology		
		carbon			component		law constant	law constant	Normat		cindialpy of vanorization at	1	
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	polling	Critical	the normal	E 2	- Optorous
	៥	coefficient,	in air,	in water,	ilty,	law constant	temperature,	temperature,		temperature,	boiling point.		CONC
		8 .	<b>.</b>	₫ .	ဟ	i	Ŧ,	Ļ	T <sub>B</sub>	۲۵	ΔH,	J.	Å.
CAS NO		(cm./g)	(cm²/s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/mol)	(၁)	(%)	( <sup>2</sup> K)	_	(µa/m³)	(mg/m <sub>3</sub> )
50293 DDT		2 635+08	1 375.03	4 05E 06	200	1							
50328 Banzo(a)pyrene		1 02E+06	4 30E-02	9 00E-06	2 30E-02 1 62E-03	3 32E-04 4 63E-05	8 10E-06	52 3£	533 45	720 75	11,000	9 7E-05	0 0E+00
51285 2,4-Dinitrophenol		1 00 <b>E-</b> 02	2 73E-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	5 K	7 13 90 605 28	969.27	15.000	2 1E-03	0 0 0 0
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1475-08	32.	743.24	007 00	13,000	0.0=+00	7 05-03
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	305E-02	3 5	340.00	556 60	15,000	2 1E-03	00=+00
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3346-06	3 %	708 15	326 00	121,1	는 6 다 년	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	2 1E-04	000
58899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	52	596 55	839 36	13,000	3 7F-04	00+1000
ASSECT DISIGNAL		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	151E-05	25	613 32	842 25	13,000	4 66-03	00+00
67641 Applica		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10,000	00+00	1 4E+01
67663 Chloroform		3 ORE-01	1245-01	1 14E-05	1.00E+06	1 59E-03	3 88E-05	25	329 20	508 10	6,955	0 0E+00	3 5E-01
67721 Hexachloroethane		1 78 1 + 0.3	2 505-03	- 00m	6 92E+03	1 50E-01	3 66E-03	52	334 32	536 40	6,988	2 3E-05	0 0E+00
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40F+04	3.615-04	3 88E-U3	522	458 00	695 00	9,510	4 0E-06	0 0E+00
71432 Benzene		5 89E+01	8 BOE-02	9 80E-06	1 75E+03	2 28E-01	55 55 17 13	5 42 24 24	350.00	563.05	10,346	0.0E+00	3 5E-01
71556 1,1,1-Trichloroethane		1 10E+02	7.80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347,24	545 00	7 136	0.05+0.0	00+400
72436 Motherschie		1.23E+04	1 25E-02	4 74E-06	2 50E-01	3 085-04	7 51E-06	25	718 15	986 20	12.000	0 0E+00	1 15-03
72548 DDD		9 //E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0 0E+00	1 8E-02
72559 DDE		4 47 E±06	1 44E-02	4 /0E-00	9 00E-02	164E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05	0 0 0 0
74839 Methyl bromide		1 05E+01	7 28F-02	1216-05	1 52F±04	2 55E-04	2 10E-05	25	636 44	860 38	13,000	9 7E-05	0 0E+00
75014 Vinyl chloride (chloroethene)	ane)	1 86E+01	1,06E-01	1 23E-06	2 76E+03	1115+00	0.4E-U3	3 2	2/6/1	467 00	5,714	0 0E+00	5 0E-03
75092 Methylene chloride		1 17E+01	1016-01	1 17E-05	1 30E+04	8 98E-02	2 1 15-02	C7 K	113 00	432.00	5,250	8 4E-05	00+300
75150 Carbon disulfide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	3 2	319 00	552 00	9,700	) OH 10 C	3 0E+00
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422 35	00 969	9.479	115-06	00000
75279 4 4 P. C. C. C. C. C. C. C. C. C. C. C. C. C.		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 8E-05	001100
75354 1 1 Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61 6-03	52	330 55	523 00	6,895	0 0E+00	5 0E-01
76448 Hentachlor		1 41E+06	9 00E-02	1 045-05	2 25E+03	1 07 E+00	2615-02	25	304 75	576 05	6,247	5 0E-05	0 0E+00
77474 Hexachlorocyclopentadiene	ec	2.00F±05	1615.02	7 215 05	1 005-01	4 4/6-02	1 09E-03	52	603 69	846 31	13,000	2 3 3 4 4 3	0 0E+00
78591 Isophorone	•	4 68E+01	6 23E-02	6.765-06	1 20F+04	2 72E-04	2715-02	52	512 15	746 00	10,931	0 0E+00	7 0E-05
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	115E-01	2 80 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	67 6	360 50	715 00	10,271	2 7E-07	0.05+00
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9,12E-04	52 52 52	386 15	602.00	7,530 8,322	1 6F-05	4 UE-U3
79016 Trichloroethylene		1 66E+02	7 906-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25	36036	544 20	7,505	1 7E-06	00+00
83329 Acenaphthene	20	4 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	25	419 60	661 15	8,996	5 8E-05	0 0E+00
2122		50FE00 /	4 4 15-02	07=100 /	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0.00	2.1E-01

84662 Diethythphalate	2 88 E+02	2 5,55,02	8 34E-08	1.08E±03	VLOOKUP TABLES	A 6.07		667 46	267.00	13 733	000	004386
84742 Di-n-butyl phthalate	3 39E+04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 395-10	3 15	513 15	798.67	14 751	00+100	3.5E-01
85687 Butyf benzyl phthalate	5 75E+04	1 74E-02	4 83E-06	2 69E+00	5 17E-05	1.26E-06		09 099	839 68	13.000	005+00	7 0E-01
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 00 5-06		632 28	890 45	13.000	1 4E-06	0 0 0 0
86737 Fluorene	1 38E+04	3 63E-02	7 88E-06	1 98E+00	2 61E-03	6 37E-05	32	570 44	870 00	12,666	0 0E+00	1 4E-01
86748 Carbazole	3 39E+03	3 905-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08		627 87	00 668	13,977	5 7E-06	0 0E+00
87683 Hexachtoro-1,3-butadiene	5 37E+04	561E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03		486 15	738 00	10,206	2 2E-05	0 0E+00
67855 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08		582 15	813 20	14,000	3.4E-05	0 0E+00
99052 2,4,6-Trichlorophenol	3 81 E+02	3 18E-02	6 25E-06	8 00E+02	3 195-04	7 78E-06		519 15	749 03	12,000	3 1E-06	0 0E+00
91503 Napriulaierie 91941 3.3-Dichlorobenzidine	2 00E+03	3 90E-02	/ 50E-06 6 74E-06	3116+00	1 98E-02 1 64E-07	4 835-04	8 X	491 14 560 26	754.03	10,373	0 0E+00	1 4 1 - 0 1
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 135-01	5.20E-03		417.60	630 30	8,661	0.05+00	7 05 +00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	22	464 19	697 60	10,800	00+00	186.01
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	25	453 57	705 00	9,700	0.0E+00	2 0E-01
95578 2-Chlorophenal	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	25	447 53	675 00	9,572	0 0E+00	1 8E-02
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02		1 20E+03	1 78E-04	4 34E-06	52	526 15	759 13	13,000	00=+00	3 56-01
100414 Ethishopson	5 45E+U1	7 605-02	8 50E-06	2 09E+03	9846-04	2 40E-05	52 t	483 95	719 00	10,566	00=+00	2 0E-03
100425 Styrene	3 63E+02	7 10F-02	8 00 1 06	3 10F+02	3 23E-01 1 13E-01	7 88E-U3	5 K	409 34	617.20	8,501 747	0 0 1 1 0 0	1 05+00
	2 09 0 + 02	5 84E-02		7 87E+03	8 20E-05	2 00 1-08	3 %	415.51	20.202	11,329	00+100	7 OF -02
106423 p-Xytane	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	26.	411 52	616 20	8.525	00=+00	7 OE+00
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	25	447 21	684 75	9,271	0 0E+00	8 0E-01
	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07		503 65	754 00	11,689	0 0E+00	1 4E-02
	1 74E+01	1046-01	9 30E-06	8 52E+03	4 01E-02	9 78E-04	22	356 65	561 00	7,643	2 6E-05	0 0E+00
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 t0E-02	5 12E-04		345 65	519 13	7,800	0 05+00	2 0E-01
108883 Tollison	4 U/E+02	7 00E-02	/ 80E-06	1615+02	3 01E-01	7.34E-03	8 5 4 6	412 27	617 05	8,523	00000	7 0E+00
10897 Chlombarzana	2 19E+02	2 30F-02	8 705-06	3 20E+UZ	1 525-01	2 110 02		383 /8	97 189	064,	00=+00	4 UE-01
	2 88E+01	8 20E-02	9 105-06	8 28E+04	1 635-05	3 98 1-07	3 %	455.02	694 20	10.4.0	00=+00	2 15+00
	155E+01	6 925-02	7.53E-06	1 72F+04	7 385-04	1.805.05	3 %	453.02	659 70	0.00	3 3 5 0 0	200
115297 Endosulfan	2 14E+03	1 156-02	4 55E-06	5 10E-01	4 590-04	1 12E-05	22	674 43	942 94	14.000	0 0E+00	2 15-02
117817 Bis(2-ethythexyl)phthalate	1 51E+07	351E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07		657 15	806 00	15,999	4 0E-06	0 0E+00
117840 Di-n-octyl phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05		704 09	862 22	15,000	0 0E+00	7 0E-02
118/41 Hexachiorobenzene	5 505 +04	5 42E-02	5.91E-06	6 20E+00	5 416-02	1 32E-03		582 55	825 00	14,447	4 6E-04	0 0E+00
12012/ Anthracene 120821 1 2 4. Trichlombenzese	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05		615 18	873 00	13,121	0 0E+00	1 1E+00
120832 2 4-Dichlomphenol	1475+02	3 46E-02	8 775.08	3 00E+02	1 305 04	1 425-03		486 15	00 627	10,471	0.0E+00	2 GE-01
121142 2.4-Dinitrotoluene	9.55E+01	2 035-01	7.06F-06	2 70F+02	3 80F-04	9 275-08	0 K	500.00	708 17 844 00	13,467	0.0E+00	70-31 -
124481 Chtorodibromomethane	631E+01	1 96E-02	1 05E-05	2 60E+03	3 21 E-02	7 83E-04	25	250 00 416 14	678.20	000	2 4F-05	00+400
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02		394 40	620 20	8,288	5 8E-07	00+00
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	1 35E-01	4 51E-04	1 10E-05		667 95	936 00	14,370	0 0E+00	1 1E-01
156592 cis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 136-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00	7,192	0 0E+00	3 5E-02
10600 dans-1,z-Dichorosthylene	3 25E+01	7 07E-02	1 19E-05	6 305+03	3 855-01	9 395-03	52	320.85	516 50	6,717	00=+00	7 0E-02
205992 Benzo(b)fluoranthene	123F+06	2 26F-02	5.56 1.06	1.505-03	4 555.03	1118-08		809 15 715 00	1078 24	17,000	2 1E-04	0000
	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	161E-05		655 95	905 00	13,845	0.01	141-01
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07		753 15	1019 70	16,000	2 1E-05	0 0E+00
218019 Chrysene		2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05		714 15	979 00	16,455	2 1E-06	0 0E+00
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04		603 01	839 37	13,000	4 9E-03	0 0E+00
319957 beta-HCH (beta-BHC)	1 26F±03	1 42F-02	7.345-06	2 40E+00	4 35E-04 3 05E-05	7 445-07	57 K	596 55 608 68	839.36	13,000	1 8E-03	00E+00
	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	587.38	200	2 7 7 6 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	2 OE-03
	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07		558 00	770 00	12,938	195-04	00E+00
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23 6-05	2 255-06		909 60	746 87	11,000	2 0E-03	0 0E+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02		2 00E-01	3 90E-04	9 51E-06		613 96	848 76	13,000	2 6E-03	0 0E+00
/4399/o Mercury (etemental)	5 ZUE+01	3 0/E-02	6 305-06	5 62E-02	4 67E-01	1 14E-02	52	629 88	1750 00	14,127	0 0 0 0	3 0E-04
11096825 Amdor 1260 (PCB-1260)	2 37 E+03	1 385-02	4,34E-00	8 OOF-03	2 40E-04 1 89E-01	6 UUE-U6	3 %	657 15 402 60	873 31	14,000	32504	00+00
11097691 Arador 1254 (PCB-1254)	2 00E+05	1 56E-02		5 70E-02	8 20E-02	2 005-03	3 2	402 50 377 50	519 27	000 00	10 to 10 to	00+100
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2 22E-02		4 20E-01	1 19E-02	2 90E-04	32	40 50	475 22	18,000	10F0	0.01100
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02		3 40E-01	2 13 <b>E-</b> 02	5 20E-04	25 3	345 50	482 20	18,000	1 0E-04	0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" In "YES" box)

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

		ENTER	User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm²)	
			8	٦
		ENTER	stratum A SCS Sol type (used to estimate OR soil vapor permeability)	O
		ENTER	SCS soil type directly above water table	S
		ENTER	Soil stratum directly above water table, (Enter A, B, or C)	0
	hane	ENTER Lwr (cell D28)	Thickness of soil stratum C. (Enter value or 0) hc (cm)	1005 84
Chemical	1,1,2-Trichloroethane	INTER ENTER ENTER Totals must add up to value of L <sub>wt</sub> (cell D28)	Thickness of soil stratum B, (Enter value or 0) the (cm)	152.4
		ENTER Totals mu	Thickness of soil stratum A,	914 4
•	_	ENTER	Depth below grade to water table, Lwr (cm)	2072 64
ENTER Initial groundwater conc , Cw (μg/L)	3 784285714	ENTER Depth	below grade to bottom of enclosed space floor, Le (cm)	15
ENTER Chemical CAS No (numbers only, no dashes)	79005	ENTER	Average soil/ groundwater temperature, T <sub>s</sub>	16

_ 1	П	
ENTER Stratum C soil water-filled porosity, e,c (cm³/cm³)	03	
ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)	0 43	
ENTER Stratum C soil dry bulk density, $\rho_c$ (g/cm³)	17	ENTER Indoor air exchange rate, ER
ENTER Stratum B soil water-filled porrosily, $\theta_{w}^{B}$ (cm³/cm³)	0 27	ENTER Floor-wall seam crack wdth, w
ENTER Stratum B soil total porosity, n <sup>B</sup> (unilless)	0.42	ENTER Enclosed space height, H <sub>s</sub> (cm)
ENTER Stratum B soil dry bulk density, $ ho_b^8$ (g/cm³)	1.7	ENTER Enclosed space floor width, Wa (cm)
ENTER Stratum A soil water-filled porosity, $\theta_{\omega}^{A}$ (cm³/cm³)	0.2	ENTER Enclosed space floor length, L <sub>B</sub>
ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	0 43	ENTER Soil-bidg pressure differential, AP (g/cm-s²)
ENTER Stratum A soli dry bulk density, Pb <sup>A</sup> (g/cm³)	1.5	ENTER Enclosed space floor thickness, Lend (cm)

Used to calculate risk-based groundwater concentration	Used to calcul			ì
-	1 0E-06	350	30	
(unitless)	(unitless)	(days/yr)	(yrs)	
Ā	፰	Ħ	급	
noncardnogen	carcinogens,	frequency,	duration,	
Target hazard quotient for	Target risk for	Exposure	Exposure	
ENTER	ENTER	ENTER	ENTER	
0.1	488	5	- 100	F

	rence	5	RfC	ηm³)		8
	Refe	8	iz.	Ĕ	l	00
i E	nsk	factor	URF	(mg/m³)		1 6E-05
Pure component	water	solubility,	Ø	(mg/L)		4,42E+03
Organic				(cm <sup>3</sup> /g)		5 01E+01
	Critical	temperature,	T <sub>o</sub>	(°K)		602 00
Normal	borling			(k)		386 15
Enthalpy of vaporization at	the normal	boiling point,	۵H٬۶	(cal/mol)		8,322
Henry's law constant	reference	temperature,	<b>-</b>	(°C)		25
Henry's law constant	at reference	temperature,	I	(atm-m³/mol)		9 12E-04
	Diffusivity	in water,	٥	(cm <sup>2</sup> /s)		8 80E-06
	Diffusivity	in air,	o <b>°</b>	(cm <sup>2</sup> /s)		7 80E-02

Floor- wall seam perimeter, X <sub>resck</sub> (cm)	3,844	Diffusion path length, La	2057 64	
Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.294	Total overall effective diffusion coefficient, Doff (cm²/s)	8 44E-04	
Air-filed porosity in capillary zone, $\theta_{e,ex}$ $(cm^3/cm^3)$	0 136	Capullary zone effective diffusion coefficient, Deff cm²(s)	5 80E-04	
Total porosity in capillary zone, na na (cm³/cm³/cm³/cm³/cm³/cm³/cm³/cm³/cm³/cm³/	0.43	Stratum C effective diffusion coefficient, Doff c (cm²/s)	5.10E-04	Reference conc , RfC (mg/m³)
Thickness of capillary zone, L <sub>cz</sub> ( <u>cm</u>	17 05	Stratum B B effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	8.25E-04	Unit nsk factor, URF (µg/m³)-1
Stratum A soil effective vapor permeability, k,	5 97E-10	Stratum A A effective diffusion coefficient, D <sup>off</sup> (cm <sup>2</sup> /s)	3 17E-03	Infinite source bldg conc, Couding (µg/m³)
Stratum A soil relative air permeability. k <sub>ry</sub> (cm²)	0 797	Vapor viscosity at ave soil temperature, #rs (g/cm-s)	1 77E-04	Infinite source indoor attenuation coefficient, $\alpha$
Stratum A soil intrinsic permeability, k	7 49E-10	Henry's law constant at ave groundwater temperature, Hrs (untiless)	2 33E-02	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> )
Stratum A effective total fluid saturation, S.e (cm³/cm³)	0 365	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol)	5 53E-04	Area of crack, Area (cm²)
Stratum C soil au-filled porosity, e <sub>a</sub> c (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, $\Delta H_{\star, TS}$ (cal/mol).	9,507	Crack effective diffusion coefficient, D <sup>enck</sup> (cm <sup>2</sup> /s)
Stratum B soil air-filled porosity, $\theta_a^{\ B}$ (cm³/cm³)	0 150	Crack depth below grade, 2 and	15	Average vapor flow rate into bldg ,  Q <sub>eol</sub> (cm <sup>3</sup> /s)
Stratum A soil alr-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.230	Crack- to-total area ratio,  n (unittess)	4 16E-04	Crack radius, fond (cm)
Source- building separation, L <sub>T</sub>	2057 64	Area of enclosed space below grade, A <sub>B</sub>	9 24E+05	Source vapor conc , C <sub>tource</sub> (µg/m³)
Exposure duration, t	9 46E+08	Bidg ventilation rate, Q <sub>balding</sub> (cm <sup>3</sup> /s)	5 63E+04	Convection path iength, Le

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RISK-8ASE	RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	ER CONCENTR	ATION CALCI	ULATIONS	INCREMENTAL	INCREMENTAL RISK CALCULATIONS	
a copia	, cope	300	1	ï	Incremental	Hazard	
3	JODE!	Nisk-Dased	9	ECIL	nsk from	quotient	
exposure	exposare	indoor	component	indoor	vapor	from vapor	
poundwater	groundwater	exposare	water	exposare	ot usion to	intrusion to	
conc,	conc,	groundwater	solubility,	groundwater	indoor arr,	indoor air,	
carcinogen	noncarcinogen	conc.,	ဟ	conc.	carcinogen	noncarcinogen	
(µg/L)	(ug/L)	(µg/L)	(μg/L)	(µg/L)	(unitless)	(unitless)	
				<b>!</b>			
1 61E+03	NA	1 61E+03	161E+03 4 42E+06	1 61E+03	≨	ΨX	

Common   C	Columb			N (unition)	M (unitless)	θ, (cm³/cm³)	9, (cm³/cm³)	Mean Grain Diameter (cm)						
100   101   102	0.22 0.009 1109 0.083 0.089 0.008 0.008 0.008 1509 0.009 1509 0.009 1509 0.009 1509 0.009 1509 0.009 1509 0.009	K, (cm					0000	0000						
1.0   1.0	10	0			0 083	0 38	2000	17,19137.1						
198   0.128   2.58   0.58   0.58   0.018   0.018   0.008   0.000   0	150   0.026   158   0.659   0.44   0.076   0.076   0.025     237	0		131	0 237	0 41	0 095	0 0 0						
29.77 12.2 2.8 0.857 0.147 0.059 0.000 0.0	29.75 0.124 2.25 0.65 0.64 0.005 0.004 0.002 0.004 0.002 0.002 0.002 0.002 0.002 0.003 0.0	Ē		1.56	0.359	0.43	0.078	060 0						
13   10   15   15   15   15   15   15   15	13   10   145   12   18   18   18   18   18   18   18	4		2.28	0.561	0.41	0.057	0700						
13   10   10   10   10   10   10   10	131   0.027   123   0.197   0.39   0.100   0.029     131   0.029   1.48   0.124   0.039   0.100   0.029     132   0.035   1.49   0.270   0.48   0.007   0.0039     133   0.030   1.41   0.270   0.48   0.007   0.0039     144   0.025   1.99   0.471   0.41   0.005   0.0039     145   0.025   1.99   0.471   0.44   0.005   0.0039     145   0.025   1.99   0.471   0.44   0.005   0.0039     145   0.025   1.99   0.471   0.44   0.005   0.0039     145   0.025   1.99   0.471   0.44   0.005   0.0039     145   0.025   1.99   0.471   0.44   0.005   0.0039     145   0.025   1.99   0.471   0.44   0.005   0.0039     145   0.025   1.99   0.471   0.44   0.005   0.0039     145   0.025   1.99   0.471   0.44   0.005   0.005   0.0039     145   0.025   1.99   0.471   0.44   0.005   0.005   0.0039     145   0.025   1.99   0.471   0.44   0.005   0.005   0.0039     145   0.025   0.025   0.025   0.025   0.005   0.005   0.005   0.005     145   0.025   0.025   0.025   0.025   0.005   0.005   0.005   0.005   0.005     145   0.025   0.025   0.025   0.025   0.005   0.005   0.005   0.005   0.005     145   0.025   0.025   0.025   0.005	29.		2.68	0.827	. 6	4700	7700						
1	131   0.055   1.45   0.022   0.022   0.022   0.022   0.022   0.022   0.023	C		1 23	187	38	9 6	1000						
Committee   Comm	Control   Cont	· <del>-</del>		1 48	12.0	8 6	2 5	0000						
Comparison   Com	Continue   Continue	c		1.37	0.520	970	200	0.000						
Channes  Properties Leckup Table   Copy	Companies   Comp			5	200	900	1200	00000						
Common   C	Continue   Continue					2 6	2000	55000						
Companies   Comp	Comparison	5 6		3 :	/010	0.43	6800	9900 0						
Comparison   Com	Organic         Chamical Properties Lookup Table         Henry's and component         Chamical Properties Lookup Table         Henry's and reference	70		141	0.291	0.45	290 0	0 011						
Committee   Comm	Chemical Properties Lookup Table   Chemical Properties Lookup Table   Confidence   Chemical Properties Lookup Table   Carbon	4 /		189	0 471	0 41	0 065	0 030						
Organic         Particular         Propertions (Conting) Table         Herry's profession         Herry's professi	Organic         Chemical Propertes Lookup Table         Henry's at reference         Henry's at													
Common	Organic         Chemical Properties Lockup Table         Henry's carbon													
Particular   Controller   Con	Organic         Pure (controlled)         Pure (controlled)         Pure (controlled)         Henry's partition         Henry's partition         Henry's partition         Henry's controlled         Henry's partition         Henry's controlled					Chemic	al Properties Look	up Table						
Particular   Par	Completion   Diffusivity   D		Organic			eme.		Henry's	Henry's			Enthainy of		
Particular   Printally   Pri	Confident		carbon			component		law constant	law constant	Normal		o deligation of	1	
Configured Configure	Coefficient, Institution, Transcription, Execution, Transcription, Execution, Transcription, Execution, Execu		Dartition	Diffusivity	Differentia	ratem	Tono,		The constant			vaponzauon at	Ę.	
Company   Comp	Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup>3</sup> (g)   Cam <sup></sup>			i - i-	Cilidaivity		neury s	at reference	reterence	polling	Critical	the normal	ris <del>k</del>	Reference
(cm/g)         (cm/g)<	Ka         Da         S         H         H         Ta           265E-06         177E-02         495E-06         150E-03         332E-04         8 10E-06         25           102E-06         177E-02         495E-06         150E-03         332E-04         8 10E-06         25           102E-06         275E-02         90E-06         177E-03         182E-05         444E-07         25           102E-06         275E-02         90E-06         175E-03         135E-06         25         25           174E-02         276E-03         176E-04         175E-04         175E-06         25         25           170E-03         116E-02         90E-06         79E-03         176E-04         144E-07         25         25           170E-03         116E-02         90E-06         79E-03         176E-04         151E-06         25         <		coemicient,	ın air,	in water,		law constant	temperature,	femperature,	point,	temperature,	boiling point,	factor,	conc
Campign   Camp	(cm <sup>3</sup> /g)         (cm <sup>3</sup> /s)         (cm <sup>3</sup> /s) <t< td=""><td></td><td>چ ق</td><td><b>_</b></td><td>מֿ</td><td>တ</td><td>Ì</td><td>I</td><td>۳</td><td>卢</td><td>Ļ</td><td>ΔH,</td><td>JAR</td><td>Ž,</td></t<>		چ ق	<b>_</b>	מֿ	တ	Ì	I	۳	卢	Ļ	ΔH,	JAR	Ž,
2. 50E-06         137E-02         4.86E-06         13.0E-04         8.10E-06         25.51E-04         11.9E-09         25.31E-04         11.9E-09         25.71E-04         11.9E-09         25.71E-09         11.9E-09         25.71E-09         11.9E-09         25.71E-09         11.9E-09         25.71E-09         11.9E-09         25.71E-09         11.9E-09	2 636E+06         137E-02         4 95E-06         2 50E-02         3 22E-04         8 10E-06         25           1 00E-02         2 73E-02         9 00E-06         1 73E-04         4 63E-03         4 44E-07         25           3 90E-06         2 73E-02         9 00E-06         2 73E-03         1 67E-03         1 47E-06         2 5           3 90E-06         2 90E-06         7 92E-03         1 25E-00         3 34E-06         2 5           1 76E-03         1 18E-02         3 00E-06         3 40E-03         1 77E-04         3 34E-06         2 5           1 70E-03         1 18E-02         3 74E-04         3 74E-04         3 34E-06         2 5           1 70E-03         1 74E-04         1 77E-04         3 74E-04         3 74E-06	Chemical	(cm³/g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m³/mol)	ဉ်	ξ.	, ξ.	(cal/mol)	(ma/m³)	(ma/m <sup>3</sup> )
2.66E+06         3.26E-04	26EE+06         137E-02         98E5-06         5 50E-02         3 32E-04         8 10E-06         2 50E-02         3 10E-06         2 50E-02         3 10E-06         2 11E-06         2 50E-02         1 13E-06         2 11E-06         3 11E-06 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2</td><td></td></t<>												2	
100E-06         4 30E-06         1 6E-03         4 63E-05         4 18E-03         4 63E-05         1 18E-03         25 715 90         9 99 74         1 500         0 1 E-03           3 00E-06         2 08E-03         2 48E-03         2 48E-03         1 60E-03         3 99 04         1 500         0 1 E-03           3 00E-05         5 18E-06         2 48E-03         1 50E-03         3 49 09         1 500         0 1 E-03           3 00E-05         5 10E-02         3 10E-03         3 40E-03         3 49 09         1 500         2 1 E-03           3 00E-05         5 10E-03         3 40E-03	100E-06         408E-05         408E-05         408E-05         408E-05         413E-05         413E-07         413E-07 <t< td=""><td></td><td>2 63E+06</td><td>1 37E-02</td><td>4 95E-06</td><td>2 50E-02</td><td>3 32E-04</td><td>8 10E-06</td><td>25</td><td>533 15</td><td>720 75</td><td>11,000</td><td>9.7E-05</td><td>0.00</td></t<>		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9.7E-05	0.00
100E-02         273E-02         90E-06         274E-03         182E-04         44E-07         25 602         26 73 73         15000         06-06           100E-02         20E-05         240E-03         182E-04         187E-04         26 743 24         26 743 24         16000         1777         1777         1870         1777         1870         1777         1870         <	100E-02 273E-02 9 08E-06 279E-03 182E-05 444E-07 25 308E-06 278E-03 180E-06 174Fe-03 108E-06 278E-03 180E-06 174Fe-03 180E-06 174Fe-03 180E-06 174Fe-03 180E-06 174Fe-03 180E-06 174Fe-03 180E-06 180E-06 180E-06 180E-03 187E-04 384E-06 25 384E-06 25 384E-06 180E-03 180E-0	rene	1 02E+06	4 30E-02	90E-06	1 62E-03	4 63E-05	1 13E-06	25	715 90	969 27	15,000	2 1E-03	0 OE+0
30BC+06         COZE-CZ         SIBE-06         SOBE-06         STRE-06         SOBE-06         STRE-06         SOBE-06         STRE-06         SOBE-06         STRE-06         SOBE-06         SOBE-06 <t< td=""><td>3 90E+06         2 02E-02         5 18E-06         2 48E-03         6 03E-07         1 47E-09         2 5           1 74E+05         2 18E-05         1 39E-03         1 37E-04         3 05E-05         2 5           3 98E+05         5 18E-02         1 37E-04         1 47E-06         2 5         2 5           1 07E+05         1 18E-02         4 37E-06         5 60E-02         1 99E-03         4 85E-05         2 5           2 14E-04         1 25E-02         4 74E-06         6 9E-04         5 15E-05         1 56E-05         2 5           2 14E-04         1 25E-02         7 37E-06         6 9E-03         1 56E-03         6 56E-03<!--</td--><td>phenol</td><td>1 00E-02</td><td>2 735-02</td><td>90-390 6</td><td>2 79E+03</td><td>1 82E-05</td><td>4 44E-07</td><td>25</td><td>605 28</td><td>827 85</td><td>15 000</td><td>0.04400</td><td>7.05.0</td></td></t<>	3 90E+06         2 02E-02         5 18E-06         2 48E-03         6 03E-07         1 47E-09         2 5           1 74E+05         2 18E-05         1 39E-03         1 37E-04         3 05E-05         2 5           3 98E+05         5 18E-02         1 37E-04         1 47E-06         2 5         2 5           1 07E+05         1 18E-02         4 37E-06         5 60E-02         1 99E-03         4 85E-05         2 5           2 14E-04         1 25E-02         4 74E-06         6 9E-04         5 15E-05         1 56E-05         2 5           2 14E-04         1 25E-02         7 37E-06         6 9E-03         1 56E-03         6 56E-03 </td <td>phenol</td> <td>1 00E-02</td> <td>2 735-02</td> <td>90-390 6</td> <td>2 79E+03</td> <td>1 82E-05</td> <td>4 44E-07</td> <td>25</td> <td>605 28</td> <td>827 85</td> <td>15 000</td> <td>0.04400</td> <td>7.05.0</td>	phenol	1 00E-02	2 735-02	90-390 6	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15 000	0.04400	7.05.0
1786-02   1866-02   1866-04   1866	1744+02         7 80E-02         8 80E-06         7 33E+00         3 05E-05         2 5           176E+03         171E-04         3 05E-05         3 05E-05         3 05E-05         3 05E-05         2 5           177E+03         147E-06         3 05E-03         1 37E-04         3 34E-06         2 5           176E+03         147E-02         7 34E-06         1 95E-01         1 95E-03         4 86E-05         2 5           176E+03         147E-02         7 34E-06         1 95E-01         1 96E-04         1 51E-05         2 5           176E-01         1 24E-01         1 44E-05         1 00E+06         1 59E-01         1 59E-03         3 86E-03         2 5           1 86E-01         1 50E-01         1 50E-01         1 50E-01         3 86E-03         2 5         2 5           1 98E-01         1 60E-05         7 26E-03         1 60E-03         3 66E-03         3 86E-03	anthracene	3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03 -07	1 476-08	25	743 24	990 41	000,84	0 11 0	
98E+05         10E-03         90E+06         9 40E-03         13TE-04         13E-03         25E-04         25E-	398E+05         5 10E-02         9 00E-06         9 40E-03         137E-04         3 34E-06         25           107E+03         148E-04         15E-05         137E-04         15E-05         140E-05         25           107E+03         148E-04         15E-06         3 60E-02         199E-03         4 66E-05         25           2 14E-04         126E-03         4 74E-06         3 60E-03         6 19E-04         1 51E-05         25           5 76E-01         104E-05         176E-06         3 60E-03         6 19E-04         1 51E-05         25           1 78E+03         2 50E-03         6 80E-06         1 70E-04         1 50E-04         1 50E-03         3 60E-03         2 50E-03         3 60E-03         2 50E-03         3 60E-03	rachloride	1 74E+02	7 80E-02	8 80F-06	7 93F+02	1.25E+00	3050.00	2 4	0000	1000	5,5	20-11-7	
120E+06   118E-02   137E-06   500E-02   139E-03   145E-04   140E-05   25 506 52   13000   17E-04   140E-05   136E-02   13000   17E-04   140E-05   136E-02   13000   17E-04   140E-05   136E-02   13000   17E-04   140E-05   130E-02   13000   17E-04   140E-05   130E-02   130E-02   13000   17E-04   130E-02	1.20E+05	hracene	3 98F+05	5 10E-02	80.300	0.40E-03	1 375.04	30 170 c	3 2	0000	00000	121,1	00-10	0.01
17E+03   17E+04   17E+05   17E+04   17E+05   17E+04   17E+05   17E+04   17E+05   17E+04   17E+05   17E+04   17E+05   17E+04   17E+05   17E+04   17E+05   17E+05   17E+04   17E+05   1	107E+03 142E+02 73E+06 195E+04 140E+05 146E+03 25 14E+04 125E+02 73E+06 195E+04 151E+05 25 14E+04 125E+02 73E+06 195E+04 151E+05 25 14E+04 125E+02 73E+06 195E+03 63E+03 36E+05 25 14E+04 125E+02 797E+06 195E+03 63E+03 36E+05 25 14E+04 104E+01 100E+05 797E+03 100E+06 195E+03 36E+03 36E+03 25 136E+03 100E+06 190E+06 190		1 2011-05	1 100.02	4 376 06	2000	100	3,340,00	9 1	CL 807	1004 /9	15,000	2 1E-04	000
1/15-03         1/15-04 <t< td=""><td>10E+03 14E+04 125E-02 474E-06 195E-01 619E-04 151E-05 25 196E-01 124E-04 125E-02 474E-06 195E-01 619E-04 151E-05 25 196E-01 124E-04 125E-02 474E-06 195E-01 619E-04 151E-05 25 196E-01 124E-01 10E-05 100E+06 159E-03 38E-05 25 196E-01 104E-01 100E-05 100E+06 159E-01 38E-05 25 196E-01 104E-01 100E-05 100E+06 159E-01 38E-05 25 196E-01 250E-03 68E-01 159E-01 38E-01 38E-05 25 100E-02 930E-06 175E+03 22E-01 38E-02 25 110E+02 786E-02 98C-06 175E+03 22E-01 556E-03 25 110E+02 786E-02 446E-06 450E-02 648E-04 175E-02 25 110E+02 78E-02 47E-06 150E-02 648E-04 175E-02 25 110E+03 106E-01 125E-06 276E-01 38E-04 256E-01 166E-05 276E-02 25 117E+01 106E-01 125E-06 276E-03 111E+00 271E-02 25 117E+01 106E-01 100E-03 119E-03 111E+00 271E-02 25 117E+01 106E-01 100E-05 110E-03 256E-01 29E-02 256E-01 20E-02 256E-01 2</td><td>( )                                    </td><td>00-1107</td><td>70-2011</td><td>00-11/04</td><td>20-30e c</td><td>20-1-03</td><td>4 85E-05</td><td>52</td><td>624 24</td><td>885 73</td><td>13,000</td><td>3 7E-04</td><td>0 0E+0</td></t<>	10E+03 14E+04 125E-02 474E-06 195E-01 619E-04 151E-05 25 196E-01 124E-04 125E-02 474E-06 195E-01 619E-04 151E-05 25 196E-01 124E-04 125E-02 474E-06 195E-01 619E-04 151E-05 25 196E-01 124E-01 10E-05 100E+06 159E-03 38E-05 25 196E-01 104E-01 100E-05 100E+06 159E-01 38E-05 25 196E-01 104E-01 100E-05 100E+06 159E-01 38E-05 25 196E-01 250E-03 68E-01 159E-01 38E-01 38E-05 25 100E-02 930E-06 175E+03 22E-01 38E-02 25 110E+02 786E-02 98C-06 175E+03 22E-01 556E-03 25 110E+02 786E-02 446E-06 450E-02 648E-04 175E-02 25 110E+02 78E-02 47E-06 150E-02 648E-04 175E-02 25 110E+03 106E-01 125E-06 276E-01 38E-04 256E-01 166E-05 276E-02 25 117E+01 106E-01 125E-06 276E-03 111E+00 271E-02 25 117E+01 106E-01 100E-03 119E-03 111E+00 271E-02 25 117E+01 106E-01 100E-05 110E-03 256E-01 29E-02 256E-01 20E-02 256E-01 2	( )	00-1107	70-2011	00-11/04	20-30e c	20-1-03	4 85E-05	52	624 24	885 73	13,000	3 7E-04	0 0E+0
14E-04         12EE-04         14E-05         19E-04         15E-05         15E-05         26 4132         842.5         13000         4E-05           57E-01         12EE-04         19E-04         19E-04         19E-05         25 320         25 000         10000         0E-00           57E-01         12E-01         114E-05         10E-05         19E-03         25 320         25 340         60E-00         69E-00	2.14E+04         12E-02         474E-06         195E-01         6 19E-04         151E-05         25E-05           6.00E-01         5.36E-02         797E-06         350E+03         6 31E-05         154E-06         25           5.75E-01         1.24E-01         1.00E-05         792E+03         150E-01         36EE03         25           3.88E+01         1.04E-01         1.00E-05         7.92E+03         1.50E-01         36EE03         25           3.88E+01         1.04E-01         1.00E-05         7.02E+03         1.50E-01         3.60E-03         25           6.92E+00         8.00E-02         9.00E-05         1.75E-04         3.61E-04         8.00E-06         25           1.00E+02         7.80E-02         1.76E-01         3.00E-01         3.00E-01         1.72E-01         1.72E-01         1.72E-02         25           1.00E+04         1.25E-02         4.76E-06         3.00E-02         1.80E-04         4.50E-02         2.50E-01         3.00E-04         4.50E-02         2.50E-03         3.00E-03         3.00E-03	(Fluggue)	204170	1 42E-02	7.34E-06	6,80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04	000
6 ODE-01         5 SABE-22         7 SPE-06         5 SUE-02         7 SPE-06         6 SUE-02         7 SPE-06         6 SUE-02         7 SPE-06         6 SUE-02         7 SPE-06         6 SUE-02         6 SUE-02         6 SUE-02         6 SUE-02         7 SUE-02	6 00E-01         5 36E-02         7 97E-06         3 50E-03         6 31E-05         1 54E-06         1 54E-06         1 54E-06         1 54E-06         1 54E-07         1 54E-06         3 56E-07         3 56E-03         2 57E-06         3 56E-03         3 56E-03         2 58E-03         3 56E-03         2 55E-03         3 56E-03         2 56E-03         3 56E-03         2 56E-03		2 14E+04	1 25E-02	4 74E-06	195E-01	6 19E-04	1 515-05	25	613 32	842 25	13,000	4 6E-03	0+30 0
57E-01         14E-02         100E+06         159E-03         38E-05         25.32.2         509 10         6,935         0E+06           17E-01         14AE-01         100E-06         150E-01         38E-03         25.32.2         509 10         6,935         0E+06           17EE+03         26DE-03         100E-06         50DE-04         150E-01         38E-04         6,938         25E-05           17EE+03         26DE-07         30DE-06         50DE-07         30DE-06         30DE-07         60DE-07         40DE-07         40DE-07         60DE-07         40DE-07         60DE-07         40DE-07         60DE-07         40DE-07         60DE-07         60DE-07         40DE-07         60DE-07         60DE-07         40DE-07         60DE-07         60DE-07         60DE-07         60DE-07         60DE-07         60DE-07 <td>575E-01         124E-01         114E-05         100E+06         159E-03         388E-05         25           388E+01         100E-05         792E-03         150E-01         368E-03         25           138E+02         250E-03         60E-04         150E-01         368E-03         25           692E+00         800E-02         930E-06         740E+04         361E-04         800E-06         25           100E+02         800E-02         930E-06         175E+03         228E-01         172E-02         25           110E+02         780E-02         930E-06         133E+03         706E-01         172E-02         25           110E+02         780E-02         476E-06         130E-04         400E-06         156E-03         256E-03         25           110E+02         180E-02         476E-06         900E-02         164E-04         400E-06         25         25           110G+03         172E-04         450E-02         164E-04         400E-06         25         25           110G+04         172E-02         176E-04         176E-04         166E-04         166E-04         166E-04         166E-04         166E-04         166E-04         166E-04         166E-04         166E-04         166E-04&lt;</td> <td><del>2</del></td> <td>6 00E-01</td> <td>5 36E-02</td> <td>7 97E-06</td> <td>3 50E+03</td> <td>6 31E-05</td> <td>1 54E-06</td> <td>25</td> <td>720 00</td> <td>751 00</td> <td>10.000</td> <td>0.05+00</td> <td>145+0</td>	575E-01         124E-01         114E-05         100E+06         159E-03         388E-05         25           388E+01         100E-05         792E-03         150E-01         368E-03         25           138E+02         250E-03         60E-04         150E-01         368E-03         25           692E+00         800E-02         930E-06         740E+04         361E-04         800E-06         25           100E+02         800E-02         930E-06         175E+03         228E-01         172E-02         25           110E+02         780E-02         930E-06         133E+03         706E-01         172E-02         25           110E+02         780E-02         476E-06         130E-04         400E-06         156E-03         256E-03         25           110E+02         180E-02         476E-06         900E-02         164E-04         400E-06         25         25           110G+03         172E-04         450E-02         164E-04         400E-06         25         25           110G+04         172E-02         176E-04         176E-04         166E-04         166E-04         166E-04         166E-04         166E-04         166E-04         166E-04         166E-04         166E-04         166E-04<	<del>2</del>	6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10.000	0.05+00	145+0
38E+01         104E-01         100E-05         792E+03         150E-01         36E-03         23.32         53.32         53.45	3 98E+01         1 04E-01         1 00E-05         7 92E+03         1 50E-01         3 66E-03         25           5 92E+00         8 00E-02         5 00E+01         1 59E-01         3 66E-03         25           6 92E+00         8 00E-02         9 30E-06         7 76E-04         3 61E-04         8 80E-03         25           1 00E+02         8 00E-02         9 30E-06         7 70E-04         1 75E-02         2 76E-03         25           1 1 00E+02         1 25E-02         4 74E-06         2 50E-01         3 08E-04         7 51E-02         25           1 7 00E+04         1 56E-02         4 76E-06         2 50E-01         3 08E-04         7 51E-02         25           1 00E+05         1 66E-02         4 76E-06         2 50E-01         3 08E-04         7 51E-02         25           1 00E+06         1 69E-01         3 08E-04         7 51E-02         2 50E-01         2 50E-03         2 50		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3.885-05	25.	329.20	508 10	200'S	00100	ָרָבְייִבְייִבְייִבְייִבְייִבְייִבְייִבְיי
178E+03         2 50E-03         6 80E-06         5 00E+01         1 59E-01         3 80E-02         2 50E-03         6 80E-06         5 00E+01         1 59E-01         3 80E-06         2 5 488         6 80E-06         5 50E-01         4 50E-02         5 50E-03         2 5 488         5 50E-03         5 50E-03         2 5 488         5 50E-03         5 50E-03         2 5 50E-03 <th< td=""><td>178E+03         250E-03         680E-06         500E-01         159E-01         38E-03         25           6 92E+00         8 00E-02         9 30E-06         7 40E+04         3 61E-04         8 80E-02         25           1 10E+02         7 80E-02         9 30E-06         1 75E+03         2 28E-01         5 56E-03         25           1 23E+04         1 56E-02         4 46E-06         4 50E-02         6 48E-04         7 51E-06         25           9 77E+04         1 56E-02         4 46E-06         4 50E-02         6 48E-04         4 00E-05         15E-06         25           1 00E+06         1 58E-01         1 50E-01         1 56E-02         2 56E-01         6 24E-03         25           4 7E+06         1 44E-02         5 8F-06         1 50E-01         8 61E-04         4 00E-05         25           1 05E+01         1 28E-02         1 72E-04         2 56E-01         6 24E-03         25         25           1 17E+01         1 01E-01         1 17E-05         1 30E+04         8 98E-02         2 16E-03         25           1 17E+01         1 01E-01         1 17E-05         1 30E+04         8 98E-02         2 16E-03         2 25E-03         2 16E-03         2 16E-03         2 16E-03         <td< td=""><td></td><td>3 98 01</td><td>1 04E-01</td><td>1 DOE-05</td><td>7 92E+03</td><td>1.50E-01</td><td>3.66E-03</td><td>40</td><td>334 30</td><td>526 40</td><td>0000</td><td>מסיונים כ</td><td>2000</td></td<></td></th<>	178E+03         250E-03         680E-06         500E-01         159E-01         38E-03         25           6 92E+00         8 00E-02         9 30E-06         7 40E+04         3 61E-04         8 80E-02         25           1 10E+02         7 80E-02         9 30E-06         1 75E+03         2 28E-01         5 56E-03         25           1 23E+04         1 56E-02         4 46E-06         4 50E-02         6 48E-04         7 51E-06         25           9 77E+04         1 56E-02         4 46E-06         4 50E-02         6 48E-04         4 00E-05         15E-06         25           1 00E+06         1 58E-01         1 50E-01         1 56E-02         2 56E-01         6 24E-03         25           4 7E+06         1 44E-02         5 8F-06         1 50E-01         8 61E-04         4 00E-05         25           1 05E+01         1 28E-02         1 72E-04         2 56E-01         6 24E-03         25         25           1 17E+01         1 01E-01         1 17E-05         1 30E+04         8 98E-02         2 16E-03         25           1 17E+01         1 01E-01         1 17E-05         1 30E+04         8 98E-02         2 16E-03         2 25E-03         2 16E-03         2 16E-03         2 16E-03 <td< td=""><td></td><td>3 98 01</td><td>1 04E-01</td><td>1 DOE-05</td><td>7 92E+03</td><td>1.50E-01</td><td>3.66E-03</td><td>40</td><td>334 30</td><td>526 40</td><td>0000</td><td>מסיונים כ</td><td>2000</td></td<>		3 98 01	1 04E-01	1 DOE-05	7 92E+03	1.50E-01	3.66E-03	40	334 30	526 40	0000	מסיונים כ	2000
6 92E+00         8 00E-02         9 00E-03	6 92E+00 8 00E-02 9 30E-06 1 75E+04 9 15E-04 8 00E-05 25 8 00E-02 9 30E-06 1 75E+04 9 15E-04 5 60E-03 25 8 00E-02 9 30E-06 1 75E+03 2 28E-01 1 72E-02 2 8 00E-05 1 75E+03 2 28E-01 1 72E-02 2 8 00E-05 1 75E+03 2 28E-04 1 72E-02 2 8 00E-05 1 75E+03 2 28E-04 1 72E-02 2 8 00E-05 1 75E-05 1 70E-04 1 75E-05 2 8 00E-05 1 70E-04 1 75E-05 1 70E-04 1 70E-05 1 70E-05 1 70E-04 1 70E-05 1 70E-05 1 70E-04 1 70E-05 1 70E-04 1 70E-05 1 70E-04 1 70E-05 1 70E-04 2 70E-05 2 70E-05 2 70E-05 1 70E-04 1 70E-04 1 70E-05 1 70E-04 2 70E-05 2 70E-05 2 70E-05 1 70E-04 1 70E-05 1 70E-04 2 70E-05 2 70E-05 2 70E-05 2 70E-05 2 70E-05 1 70E-04 2 70E-05 2 70E	ethane	1 78F+03	2 50E.03	80-H08 &	5 00 1104	1000	2001	3 6	700	00000	008'0	20-35 7 10 10 1	
99E-00         90E-00         178E-00	9 SE-01         8 ODE-02         9 SIGE-04         3 DIE-04         8 DIE-04         8 DIE-04         8 DIE-04         8 DIE-04         8 DIE-04         9 DIE-04         9 DIE-04         9 DIE-04         1 TZE-02         25           1 10E+02         7 80E-02         8 DIE-06         1 33E+03         7 05E-01         1 75E+03         2 5BE-03         25           1 10E+02         7 80E-02         4 76E-06         2 50E-01         3 08E-04         7 51E-06         2 56E-03         25           1 00E+04         1 25E-02         4 76E-06         9 00E-02         1 64E-04         4 00E-06         2 56E-03	2	00.100.0	0000	2000	0.00	0 100	50-00 S	Q ;	458 00	00 069	9,510	4 0E-06	0.00
135E-04         135E-04         3 08E-04         3 08E-04         2 58E-04         3 583.24         562 16         7,336         0 0E+00           123E+04         123E+04         1 25E-02         4 74E-06         2 50E-01         3 08E-04         7 51E-02         2 543.24         562 16         7 7136         0 0E+00           123E+04         1 25E-02         4 74E-06         2 50E-01         3 08E-04         1 56E-05         2 51102         848.49         1 7,000         0 0E+00           1 00E+04         4 76E-06         4 76E-06         4 76E-06         4 76E-06         4 76E-06         6 50E-02         6 48E-04         1 60E-03         2 509.00         6 50         6	108-67         308-67         178-76         2 288-71         5 568-73         25           123E+04         158-02         4 60-06         138-43         2 288-71         5 568-72         2 568-71         172-02         25           123E+04         156-02         4 460-06         2 500-01         6 460-04         7 516-06         25           100E+06         158E-02         4 460-06         4 500-02         6 460-04         7 516-06         25           477E+04         156E-02         4 76E-06         9 000-02         1 64E-04         4 000-06         25           477E+04         1 66E-01         1 23E-06         2 56E-01         2 64E-03         2 56           1 17E+01         1 01E-01         1 17E-05         1 30E+04         8 96E-02         2 19E-03         2 5           4 57E+01         1 04E-01         1 07E-03         1 30E+03         2 19E-03         2 19E-03         2 5           4 57E+01         1 04E-01         1 07E-03         1 30E+03         2 30E-01         2 96E-03         2 56E-03         2 19E-02         2 19E-03         2 56E-03         2 19E-03         2 56E-03         2 19E-03         2 56E-03         2 19E-03         2 19E-03         2 19E-03         2 19E-03         2 19E-03		201100	20-00-0	00-100	#0+U0+	\$ 1000 1000	8 80=78	\$2 22	390.88	563 05	10,346	0 OE+00	3.550
10E+02   80E-06   133E+03   705E-01   172E-02   8470   7,136   0.0E+00   170E-02   80E-06   133E+03   705E-01   170E-02   80E-06   135E+04   125E-02   474E-06   250E-01   30E-04   150E-05   25 E39 90   863 77   14,000   0.EE+00   100E+00   100E+00   150E-02   476E-06   900E-02   164E-04   400E-06   25 E39 90   863 77   14,000   0.EE+00   100E+00   150E-02   170E-01   150E-02   170E-01   150E-03   170E-03   170E	110E+02 7 80E-02 8 80E-06 133E+03 7 05E-01 172E-02 25 123E+04 126E-02 8 80E-06 133E+03 7 05E-01 7 05E-04 7 05E-02 0 123E-04 126E-02 4 74E-06 2 50E-01 3 08E-04 7 05E-04 7 05E-05 1 05E-04 1 05E-02 4 74E-06 9 00E-02 1 64E-04 4 00E-06 25 1 00E-06 1 20E-03 1 00E-06 1 120E-01 8 61E-04 4 00E-06 25 1 00E-05 1 12E-05 1 52E+04 2 56E-01 6 24E-03 25 1 10E-01 1 17E-05 1 10E-04 2 56E-01 6 24E-03 2 1 10E-01 1 17E-05 1 10E-04 2 56E-01 6 24E-03 2 1 10E-03 1 10E-03 1 10E-03 1 10E-03 2 1 10E-03 1 10E-03 1 10E-03 1 10E-03 2 1 10E-0	=	0 43E+01	8 805-02	9 80E-06	1 /5E+03	2 28E-01	5 56E-03	25	353.24	562 16	7,342	8 35-06	0 OE+0
125E-04   125E-02   474E-06   250E-01   308E-04   751E-06   25 718 15   986 20   12,000   0E+00     9.77E+04   156E-02   446E-06   450E-02   648E-04   168E-05   25 651 02   848 49   14,000   0E+00     9.77E+04   166E-02   446E-06   450E-02   164E-04   400E-05   25 651 02   848 49   14,000   0E+00     4.77E+04   166E-02   121E-05   152E+04   256E-01   271E-05   25 639 90   863.77   14,000   0E+00     105E-01   728E-02   121E-05   152E+04   256E-01   271E-02   271E-03   2	123E+04         125E+04         125E+04         125E+04         125E+04         125E+06         47E-06         250E-01         308E-04         751E-06         25           977E+04         168E-02         446E-06         450E-02         6.48E-04         168E-05         25           1 00E+06         144E-06         120E-01         861E-04         210E-05         25           1 05E+01         728E-02         121E-05         152E-04         26E-01         624E-03         27           1 05E+01         1 06E-01         123E-06         276E+03         111E+00         271E-03         25           1 17E+01         1 01E-01         1 17E-05         130E+04         8 98E-02         271E-03         25           4 57E+01         1 04E-01         1 00E-05         1 10E+03         2 19E-02         2 19E-03         25           5 50E+01         2 98E-02         1 06E-05         6 74E+03         2 19E-02         2 19E-03         25           5 50E+01         2 98E-02         1 06E-05         6 74E+03         2 30E-01         5 61E-03         2 51E-03         2	roethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7.136	0 0E+00	1.0E+0
977E+04 156E-02 446E-06 450E-02 6.48E-04 158E-05 25 65102 848.49 14,000 0E+00 100E+00	9 77E+04 1 56E-02 4 46E-06 4 50E-02 6.48E-04 1 56E-05 25 100E-05 1 64E-04 400E-06 25 47E+06 1 68E-02 4 76E-06 9 00E-02 1 64E-04 4 00E-06 25 47E+06 1 44E-02 5 87E-06 1 20E-01 8 61E-04 2 60E-01 2 10E-05 25 10E-05 25 10E-01 1 23E-06 2 78E-03 1 11E+04 2 66E-01 2 62E-03 2 71E-02 1 17E+01 1 01E-01 1 17E-05 1 30E+04 2 66E-01 2 71E-02 2 71E-02 2 71E-02 1 30E+04 2 60E-02 2 19E-03 2 71E-03 1 10E+01 1 10E-01 1 17E-05 1 30E+04 2 71E-05 2 71E-02 2 71E-02 2 71E-02 2 71E-02 2 71E-02 1 30E+03 2 71E-02 2 70E-01 2 80E-02 1 06E-03 2 70E-03 2 70E-02 2 70E-03 2 70E-0		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 085-04	7 51E-06	25	718 15	986 20	12 000	0 0H+00	4 1F.0
100E+06         169E-02         4 76E-06         9 00E-02         1 64E-04         4 00E-05         25         639 40         6377         14,000         6 9E-05           4 4/F+06         1 44E-02         5 87E-06         1 20E-01         8 61E-04         2 10E-05         25         636 44         860 38         13,000         9 7E-05           1 08E+01         7 28E-02         1 21E-05         1 52E-04         2 66E-01         2 71E-02         25         236 71         467 00         5714         0 0E+05           1 08E+01         1 23E-04         2 66E-01         2 71E-02         25         236 71         467 00         5714         0 0E+05           1 17E+01         1 01E-01         1 77E+01         1 01E-01         1 77E+02         25         236 20         6,69	1 00E+06 1 69E-02 4 76E-06 9 00E-02 164E-04 4 00E-06 25 4 77E+06 144E-02 5 87E-06 1 20E-01 8 61E-04 2 10E-05 25 1 62E-01 1 20E-02 1 21E-05 1 52E+04 2 56E-01 2 62E-03 2 5 62E-03 1 62E-03 2 76E+03 1 11E-06 2 76E+03 1 11E-00 2 71E-02 2 76E+03 1 11E-00 2 71E-02 2 76E+03 1 11E-00 2 71E-02 2 76E+03 1 11E-00 2 71E-02 2 76E+03 1 12E-02 2 19E-03 2 76E+03 1 10E-04 2 76E+03 2 76E+03 2 76E+03 2 76E-	<b>×</b>	9 77 E+04	1 56E-02	4 46E-06	4 50E-02	6.48E-04	1.585-05	25	651.02	848 49	14,000	001100	 
477E+06         14E-02         58E-06         120E-01         86E-04         210E-05         25         203-05         003-17         14,000         03-17           105E+01         7.28E-02         121E-05         152E+04         2.56E-01         2.10E-03         25         276.71         467 00         3.714         0.0E-05           1 05E+01         1.0EE+01         1.28E-05         2.76E+03         1.11E+00         2.71E-02         25         239.25         432 00         5,250         84E-05           1 17E+01         1.01E-01         1.77E-05         1.30E-04         8.88E-02         2.19E-03         25         239.25         432 00         5,250         84E-05           4.77E+01         1.01E-01         1.77E-05         1.30E-04         8.88E-02         2.19E-03         25         310         6.70E-05         8.70         6.70E-03         8.70         6.70         8.70         6.70         8.70         6.70         8.70         6.70         8.70         6.70         8.70         6.70         8.70         6.70         8.70         6.70         8.70         6.70         8.70         6.70         8.70         6.70         8.70         6.70         8.70         7.70         7.70         7.70	4.7F±06         144E-02         587E-06         120E-01         26E-03         27E-03         25           105E+01         7.28E-02         121E-05         152E+04         26E-03         27E-03         27E-03         27E-03         27E-03         27E-03         27E-03         25           17E+01         101E-01         171E-05         130E-04         8 98E-02         271E-02         25           4 57E+01         104E-01         107E-03         119E+03         124E+00         271E-02         25           8 71E+01         104E-01         100E-05         119E+03         124E+00         271E-02         25           8 71E+01         149E-02         106E-05         674E+03         216E-02         276E-03         25           8 50E+01         298E-02         106E-05         674E+03         230E-03         25         26E-04         26E-03         26E-04         26E-04         26E-04         26E-03         276E-04         26E-03         26         276E-04         26E-03         26E-03         276E-04         26E-03         26E-03         276E-03		1 005+06	1 69E-02	4 76E-06	9 00E-02	1 84E-04	4 005 06	3 %	20000	Et 040	900'4	00100	200
105E-01   128E-02   121E-05   152E-04   2 65E-01   2 65E-03   2 624E-03   2 5 259.55   2 620.44   2 600.38   13,000   9 7E-05   126E-01   105E-01   105E-02   105E-03   105E-02   105E-02   105E-05   105E-0	105E+01   7.28E-05   7.2E-05   7.2		4 47F+06	1 44E-02	5.87E.08	1 20E-01	9.61E.04	2 405 05	3 6	0000	2 000	000,41		200
10   10   10   10   10   10   10   10	106E-01   106E-01   117E-05   130E-04   206E-01   024E-03   25     106E-01   106E-01   117E-05   130E-04   896E-02   216E-02   216E-02     107E-01   104E-01   117E-05   130E-04   896E-02   219E-03   25     107E-01   104E-01   100E-05   119E+03   124E+00   302E-02   25     107E-01   104E-01   100E-05   109E-03   219E-03   219E-03   25     107E-01   298E-02   106E-05   206E-03   206E	100	1055401	7 295 02	1 24 11 00	1 505.04	לים ביים ביים ביים ביים ביים	CO-101 2	3 2	000	9000	000,81	C - 1	0.00
176E-01   106E-01   125E-06   2 70E+03   111E+00   2 71E-02   25 259.25   432 00   5,250   8 4E-05   176E-01   106E-05   130E+04   8 98E-02   2 19E-03   25 319 00   5,520   8 4E-05   176E-01   100E-05   119E+03   124E+00   302E-02   25 319 00   5,520   6,391   0 6E-05   196E-05   196E-03   124E-04   25 315   25 305   6 600   6,706   4 7E-07   126E-01   100E-05   106E-05   106E-05   106E-05   106E-05   106E-05   106E-05   106E-05   106E-03   25 315   2 25 315   2	17E+01   100E-01   123E-06	(opplomostrono)	100	70-100	200	10725	7 - DOC -0.1	0.24E-03	22	7/0/7	467.00	5,714	0.00	5 05-0
1/E+01   101E-01   17E-05   130E+04   8 98E-02   2 19E-03   25 313 00   510 00   6,706   47E-07     1/E+01   101E-01   17E-05   130E+04   8 98E-02   3 02E-02   25 319 00   552 00   6,391   0 0E+00     1/E+01   149E-02   103E-03   3 10E+03   2 19E-02   2 19E-03   2 19E-03   2 19E-03   3 19E-03	1/E+V1   101E-V1   117E-V5   130E-V4   8 98E-V2   2 19E-V3   2 19E-V3   3 02E-V2   2 19E-V3   3 02E-V4   3 0	ים (היווסו ספונוסו ופי) הוהיקים	10-100	200	1 235-06	2 /0E+03	1 115+00	2715-02	52	259,25	432 00	5,250	8 4E-05	0000
4 5/E+U1         1 04E-U1         1 04E-U1         1 00E-05         1 19E+00         3 02E-02         25 319 00         552 00         6,391         0 0E+00           8 7/E+U1         1 49E-02         1 06E-05         3 10E+02         2 34E-04         25         325         696 00         9,479         1 1E-06           8 06E+01         1 49E-02         1 06E-05         3 10E+02         2 58E-02         6 660         3 675         5 68         7,000         1 1E-06           8 06E+01         1 06E-05         6 06E+03         2 30E-01         2 61E-02         25 303 55         5 23 00         6,895         0 0E+05           8 08E+01         9 00E-02         1 04E-05         2 25E+03         1 07E+00         2 61E-02         25 304 75         576 05         6,247         6 0E-05           1 06E-02         1 06E-05         1 06E-05         1 07E+00         2 07E+02         2 07E+02         2 07E+02         2 07E+02         2 07E+03         1 06E-05         <	45/E+U1         104E-U1         100E-U5         119E+U3         124E+00         3 02E-02         25           87/E+U1         149E-02         100E-05         3 10E+03         2 19E-02         5 34E-04         25           8 50E+U1         2 98E-02         106E-03         6 74E+03         2 10E-02         5 34E-04         25           3 16E+01         7 42E-02         105E-05         5 06E+03         2 30E-01         5 61E-03         25           1 16E+01         7 42E-02         1 06E-05         2 25E+03         1 07E+00         2 61E-02         2 5           1 16E+01         9 00E-02         1 04E-05         2 25E+03         1 07E+00         2 61E-02         2 51E-02         2 51E-03	מייי		5 10 10 10 10 10 10 10 10 10 10 10 10 10	00 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 30=+04	8 98E-UZ	2 195-03	25	313 00	510 00	6,706	4 7E-07	305
8 71E+01         149E-02         108E-05         3 10E+03         2 34E-04         25         422 35         696 00         9,479         11E-06           5 05E+01         2 98E-02         106E-05         6 74E+03         6 58E-02         166E-03         2 331 5         585 85         7,000         18E-05           3 16E+01         2 98E-02         106E-05         5 06E-02         107E-03         2 561E-03         2 531 5         585 85         7,000         18E-05           5 89E+01         9 00E-02         104E-05         2 22E+03         107E-00         2 61E-03         25         304 75         576 05         6,295         0 0E-05           1 41E+06         1 12E-02         5 69E-06         1 80E-01         1 11E+00         2 71E-02         2 5 612 15         746 00         10,331         0 0E+00           4 59E+01         6 23E-02         1 20E+04         2 72E-04         6 63E-06         2 5 12 15         746 00         10,331         0 0E+00           4 59E+01         6 23E-02         1 20E+04         2 72E-04         6 63E-06         2 5 12 15         746 00         10,331         0 0E+00           4 59E+01         7 80E-02         8 80E-06         1 20E+04         2 72E-04         6 63E-06         2 5	8 71E+01         1 48E-02         1 03E-05         3 10E+03         2 19E-02         5 34E-04         25           5 50E+01         2 98E-02         1 06E-05         6 74E+03         6 56E-02         1 60E-03         25           3 16E+01         7 42E-02         1 06E-05         5 06E+03         2 30E-01         1 60E-03         25           5 89E+01         9 00E-02         1 04E-05         5 06E+03         2 30E-01         2 61E-03         25           1 41E+06         1 12E-02         1 60E-03         1 60E-03         2 56         2 56           2 00E+05         1 61E-02         7 21E-06         1 80E-01         4 76E-02         2 71E-02         2 72E-04         6 63E-06         2 56           4 58E+01         6 23E-06         2 72E-04         2 72E-04         6 63E-06         2 56         2 56           4 57E+01         7 80E-02         8 76E-03         3 74E-03         3 74E-03         2 56         2 56           5 01E+01         7 80E-02         8 76E-03         3 74E-03         3 44E-04         2 56         3 44E-04         2 56           9 33E+01         7 10E-02         7 99E-06         1 06E+03         3 14E-04         3 44E-04         2 56           7 08E+03 <td< td=""><td>an an an an an an an an an an an an an a</td><td>4 3/E+C1</td><td>104E-C1</td><td>1 000-03</td><td>1 19E+03</td><td>1 24E+00</td><td>3 02<b>E-02</b></td><td>25</td><td>319 00</td><td>552 00</td><td>6,391</td><td>00+300</td><td>7 05-0</td></td<>	an an an an an an an an an an an an an a	4 3/E+C1	104E-C1	1 000-03	1 19E+03	1 24E+00	3 02 <b>E-02</b>	25	319 00	552 00	6,391	00+300	7 05-0
5 50E+01         2 98E-02         1 06E-05         6 74E+03         6 56E-02         1 60E-03         25         363 15         585 85         7,000         1 8E-05           3 16E+01         7 42E-02         1 06E-05         5 06E+03         2 30E-01         5 61E-03         25         330 55         523 00         6,895         0 0E+00           5 89E+01         9 00E-02         1 06E-05         5 00E+03         2 30E-01         2 61E-02         25         330 55         523 00         6,895         0 0E+00           1 41E+05         1 12E-02         5 69E-06         1 80E-01         4 47E-02         1 09E-03         2 6 512 15         7 46 00         1 0,247         5 0E-05           2 00E+05         1 12E-02         5 69E-06         1 20E-04         2 71E-06         1 20E-04         2 71E-02         1 0 E+00         1 0 E+00           4 68E+01         6 23E-02         6 76E-06         1 20E-04         2 71E-04         2 71E-04         2 71E-07         2 71E-07         1 0 E+03           4 58E+01         7 82E-02         8 80E-06         4 42E+03         3 74E-04         2 80E-03         5 72 00         7,590         0 GE+03           5 01E+01         7 80E-02         9 10E-03         3 74E-04         2 80E-03	50E+01         2 98E-02         106E-05         6 74E+03         6 56E-02         160E-03         25           3 16E+01         7 42E-02         105E-05         5 06E+03         2 30E-01         5 61E-03         25           5 89E+01         9 00E-02         1 04E-05         2 25E+03         1 07E+00         5 61E-02         25           1 41E+06         1 12E-02         5 69E-06         1 80E-01         1 47E-02         1 09E-03         25           2 00E+05         1 61E-02         7 21E-06         1 20E+04         2 72E-04         6 63E-06         2           4 68E+01         6 23E-02         6 75E-06         2 80E+03         1 15E-01         2 80E-03         25           4 50E+01         7 82E-02         8 73E-06         2 80E+03         1 15E-01         2 80E-03         25           5 01E+01         7 80E-02         8 80E-06         4 42E+03         3 74E-02         8 12E-04         25           1 66E+02         7 90E-02         9 10E-04         1 15E-01         1 03E-04         25           9 33E+01         7 10E-02         7 90E-06         2 97E+03         1 41E-02         3 44E-04         25           7 08E+03         4 21E-02         7 89E-06         8 97E+03         1		8 71E+01	1 49E-02	1 035-05	3 10E+03	2 19E-02	5 34E-04	25	422 35	00 969	9.479	1 15-06	0.0E+0
3 16E+01         7 42E-02         1 05E-05         5 06E+03         2 30E-01         5 6E-03         2 5 305         5 53 00         6 389         0 0E-00           5 89E+01         9 00E-02         1 04E-05         2 25E+03         1 07E+00         2 61E-02         25         304 75         576 05         6 3247         6 0E-05           1 01E-02         1 02E-05         1 00E-01         1 07E+00         2 61E-02         25         304 75         576 05         6 247         6 0E-05           2 00E-05         1 10E-02         7 21E-02         2 71E-02         2 5 115         7 46 00         1 0.84-0         1 3E-03           4 68E-01         6 51E-02         7 71E-06         1 20E+04         2 71E-02         2 5 115         7 46 00         1 0.84-0           4 68E-01         7 31E-03         1 31E-03         2 80E-06         1 30E-04         2 72E-04         6 63E-06         2 71E-00	3 16E+01 7 42E-02 105E-05 5 06E+03 2 30E-01 5 61E-03 25 5 5 68E+01 9 00E-02 104E-05 2 25E+03 107E+00 2 61E-02 25 141E+06 112E-02 5 69E-06 100E-01 47E-02 171E-02 2 61E-02 2 61E-03 2 61E-04 2 61E-03 2 61E-04 2 61	romethane	5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 605-03	25	363 15	585 85	7 000	1 AE 0.5	0.480
5 89E+01         9 00E-02         1 0AE-05         2 25E+03         1 07E-00         2 61E-02         25         304 75         576 05         6,335         0 0E-05           1 41E+06         1 12E-02         5 69E-06         1 80E-01         4 47E-02         1 09E-03         25         304 75         576 05         6,250           2 00E-05         1 61E-02         7 21E-06         1 80E-00         1 11E+00         2 71E-02         25         512 15         746 00         10,331         0 0E+00           4 60E+01         6 23E-02         7 76E-04         2 72E-04         2 72E-04         6 63E-06         2 883 5         7 15 00         10,271         2 7E-07           4 37E-01         7 80E-02         8 76E-06         1 20E-04         2 72E-04         8 80E-06         2 80E-06         1 0E-04         2 80E-06         1 0E-04         2 80E-06         1 0E-05         1 0E-04         2 80E-06         1 0E-05	5 89E+01         9 00E-02         1 04E-05         2 55E-03         1 07E-00         2 61E-02         2           1 41E+06         1 12E-02         5 69E-06         1 80E-01         4 47E-02         1 09E-03         2           2 00E+05         1 61E-02         7 21E-06         1 80E+00         1 11E+00         2 71E-02         2           4 68E+01         6 23E-02         6,76E-06         1 20E+04         2 72E-04         6 63E-06         2           4 37E-01         7 82E-02         6,76E-06         1 20E+04         2 72E-04         6 63E-06         2           5 01E+01         7 80E-02         8 73E-06         2 80E-03         3 74E-02         2         9 12E-04         2           1 66E+02         7 90E-02         9,10E-06         1 10E+03         4 22E-01         1 03E-04         2           9 33E+01         7 10E-02         7 90E-06         2 97E+03         1 41E-02         3 44E-04         2           7 08E+03         4 21E-02         7 69E-06         6 33E-01         1 55E-01         2	ethane	3 16E+01	7 42E-02	1 05E-05	5.06E+03	2.30E-01	A R4E-03	46	330 55	62200	200,	00110	
141E+06         12E-02         508-05         374.75         508-05         376.03	141E+06 172E-02 568E-06 180E-01 47E-02 109E-03 25 200E+05 161E-02 721E-06 180E-01 171E+00 271E-02 25 200E+05 161E-02 721E-06 180E+01 47E-02 271E-04 272E-04 683E-06 271E-02 271E-02 271E-02 271E-02 271E-02 271E-02 271E-02 271E-03 27	ethylene	5 89E+01	9 00F-02	\$ 04E-05	2.25E+03	1.075.400	263503	3 4	200	323 00	660'0	00100	ביי ביי ביי ביי
2 00E+05 161E-02 201E-05 150E+06 1180E+00 111E-00 271E-02 25 512 15 746 00 178-03 100E+00 468E+01 623E-02 6.76E-06 120E+03 175E-04 63E-06 63E-06 25 488 35 775 00 10,271 2 TE-07 63E-07 7,590 00E+00 57E-07 7,	2 00E+05 16E-02 72E-06 1.80E+00 1.11E+00 2.71E-02 2.6 4 68E+01 6.23E-02 6.76E-06 1.20E+04 2.72E-04 6.63E-06 6.3E-02 8.76E+03 1.15E-01 2.80E+03 2.72E-04 6.82E+01 7.82E-02 8.73E-06 2.80E+03 1.15E-01 2.80E-03 2.80E+03 1.15E-01 2.80E-03 2.80E+03 1.15E-01 2.80E-03 3.74E-02 3.74E-02 3.74E-02 3.74E-02 3.74E-02 3.74E-02 3.74E-03 3.74E-02 2.80E-03 1.10E+03 1.10	•	1415+06	1 12E.02	5 80 E US	1 BOE-01	20 377 7	1 000 03	3 6	100	0000	747'0	000	
20E-70 101-201	4 37E+01 782E-02 6.76E-06 1.00E+04 2.72E-04 6.63E-06 25 4.37E+01 7.82E-02 8.73E-06 2.80E+03 3.74E-02 8.80E-05 8.72E-03 3.74E-02 8.90E-03 3.74E-02 8.72E-01 1.65E-02 8.90E-03 3.74E-02 8.72E-01 1.65E-02 8.90E-05 4.72E+03 3.74E-02 9.12E-04 2.5 9.13E+02 7.90E-02 7.90E-06 2.97E+03 4.74E-02 3.44E-04 2.5 7.90E+03 4.21E-02 7.80E-06 4.24E+00 8.36E-03 1.64E-04 2.5 7.80E-05 4.24E+00 8.36E-03 1.64E-04 2.5 7.80E-05 4.24E+00 8.36E-03 1.64E-04 2.5 7.80E-05 4.24E+00 8.36E-03 1.64E-04 2.5 7.80E-05 4.24E+00 8.36E-03 1.64E-04 2.80E-05 4.24E-04 4.24	votonentadiene	2005105	1815.00	7 245 06	1 905,00	147.00	20.00	07	60 000	2000	13,000	20-12	100
4 37E-01         2 00E-02         1,00E-03         1,00E-03         1,00E-03         25 488 35         715 00         10,271         2 7E-07           4 37E-01         2 00E-02         2 00E-03         2 5 369 52         572 00         7,590         0 0E+00           5 01E-01         7 80E-02         8 80E-06         4 42E+02         3 74E-02         2 5 380 36         544 20         7,505         1 7E-05           1 66E+02         7 90E-02         9 10E-06         2 97E+03         4 41E-02         3 44E-04         2 5 380 36         544 20         7,505         1 7E-05           2 33E-01         7 10E-02         7 90E-06         2 97E+03         4 41E-02         3 44E-04         2 5 419 60         661 15         8,996         5 8E-05	4 90E-01     0.70E-02     1.20E+04     6.55E-06     2.5       4 37E+01     7.82E-02     8.73E-06     2.90E+03     1.15E-01     2.80E-03     2.5       5 01E+01     7.80E-02     8.00E-06     4.42E+03     3.74E-02     2.5       1 66E+02     7.90E-06     1.00E-03     4.22E-01     1.03E-02     2.5       9 33E+01     7.10E-02     7.90E-06     4.24E+03     3.44E-04     2.5       7 08E+03     4.21E-02     7.69E-06     4.24E+03     3.74E-03     1.54E-04     2.5		CO. 100 4	20100	2251.00	00-100-1	00+01-0	2 / 1 = -02	27	512 15	746 00	10,931	0 0E+00	7 OE-0
4 3/E+01         7 82E-02         8 72E-04         2 80E-03         25         369 52         572 00         7,590         0 0E+00           5 01E+01         7 80E-02         8 80E-06         4 42E+03         3 74E-02         9 12E-04         25         386.15         602 00         8,322         1 6E-05           1 60E+02         7 80E-02         9 40E-05         9 10E-01         1 03E-02         25         360 36         544 20         7,505         1 7E-06           9 33E+01         7 10E-02         7 50E-05         2 97E-03         3 44E-04         25         419 60         661 15         8,996         5 8E-05	4 3/E+01 / 8ZE-02 8 /3E-06 2 80E+03 1 15E-01 2 80E-03 25 50E+01 7 80E-02 8 80E-06 4 4ZE+03 3 74E-02 9 12E-04 25 1 60E+02 7 90E-05 1 10E+03 4 2ZE-01 1 03E-02 25 9 33E+01 7 10E-02 7 90E-06 2 97E+03 1 41E-02 3 44E-04 25 7 08E+03 4 ZE-04 7 69E-06 4 24E+01 6 30E-03 1 54E-04 25		10-10-6	20-25-02	0.705-06	1 20E+04	2 /2E-04	6 63E-06	25	488 35	715 00	10,271	2 7E-07	0.00
5 01E+01 7 80E-02 8 80E-06 4 42E+03 374E-02 9 12E-04 25 386.15 602 00 8,322 1 6E-05 1 66E+02 7 90E-02 9,10E-06 1 10E+03 4 22E-01 1 03E-02 25 360 36 544 20 7,505 1 7E-06 9 33E+01 7 10E-02 7 90E-06 2 97E+03 1 41E-02 3 44E-04 25 419 60 661 15 8,996 5 8E-05 1 7 10E-02 7 10E-02 7 10E-02 7 7 10E-02	5 01E+01 7 80E-02 8 80E-06 4 42E+03 3 74E-02 9 12E-04 25 1 68E+02 7 90E-02 9 10E-06 1 10E+03 4 22E-01 103E-02 25 9 33E+01 7 10E-02 7 90E-06 2 97E+03 141E-02 3 44E-04 25 7 08E-03 4 21E-02 7 69E-06 4 24E+01 6 33E-03 1 54E-04 55	propane	4 3/E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	22	369 52	572 00	7,590	00+300	4 0E-03
166E+02 790E-02 9.10E-06 110E+03 4.22E-01 103E-02 25 360.36 544.20 7,505 17E-06 9.33E+01 710E-02 7.90E-06 2.91E+03 141E-02 344E-04 25 419.60 66.115 8.996 5.8E-05	166E+02 790E-02 9.10E-06 110E+03 4.22E-01 103E-02 25 9.33E+01 7.10E-02 790E-06 2.97E+03 141E-02 3.44E-04 26 7.08E+03 4.21E-02 7.69E-06 4.24E+00 6.36E-03 1.54E-04 28	roethane	5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386,15	602 00	8,322	1 6E-05	0 0E+0
9.33E+01 7.10E-02 7.90E-06 2.97E+03 1.41E-02 3.44E-04 2.5 419.60 661.15 8,996 5.8E-05	9 33E+01 7 10E-02 7 90E-06 2 97E+03 1 41E-02 3 44E-04 26 7 08E+03 4 21E-02 7 69E-06 4 24E+00 6 38E-03 1 54E-04 25	/lene	1 66E+02	7 90E-02	9.10E-06	1 10E+03	4 22E-01	1 03E-02	25	360 36	544 20	7.505	1 7E-06	0.00
100 0 100 0	7 08E+03 4 21E-02 7 69E-06 4 24E+00 3 0 3 6E-03 1 6 4E-04	achloroethane	9 33 = +01	7 10F-02	7 90F-06	2 97F±03	1 41E.03	10 10 10 10 10 10 10 10 10 10 10 10 10 1	9 6	00000	27 740	200	) L	
	25 4 25 4 25 4 25 4 25 4 25 4 25 4 25 4		1 00000	10.1	1 505 06	20.71.01	70-11-0	3 44 E-04	C7 :	419 00	C 100	988'9	2 24-03	0.0=+00

84662 Diethylphthalate	2 88 5 +03	2 66 0.00	30 336 9	_	VLOOKUP TABLES	!	1	:	;			•
84742 Di-n-butyl phthalate	3.39E+04	4 38F-02		1 125±01	1 83E-43	4 51E-07	8 8	567 15	757 00	13,733	84.0	2 8E+00
85687 Butyl benzyl phthalate	5 75E+04	1 74E-02	4 83E-06	2 69F+00	5 175.05	1 266-16	9 %	61315	1986/	0.00	0 0E+00	3 56 01
	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 00E-06	7,	632.28	890.45	2,5	90.17	00-00
86737 Fluorene	1 38E+04		7 88E-06	1 98E+00	2 61E-03	6 37E-05	52	570 44	870 00	12.666	0 0F+00	145.01
00/48 Carbazole	3 39E+03	3 905-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	22	627.87	899 00	13.977	5 7E-06	0.05+00
87865 Octobridge - Londadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	25	486 15	738.00	10,206	2 2E-05	0 OE+00
88062 2 4 & Trichlorophysical	5 9ZE+0Z	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	52	582 15	813 20	14,000	3 4E-05	0 0E+00
91203 Naphthalene	2 00F+02	3 18E-02	0 25E-06	8 00E+02	3 19E-04	7 78E-06	52	519 15	749 03	12,000	3 1E-06	0 0E+00
91941 3,3-Dichlorobenzidine	7 24E+02		6 74F-06	3 115+00	1 54E-02	4 835-04	8 8	491 14	748 40	10,373	0.05+00	1 4E-01
	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2.13F-01	4 000-03 5 20E-03		550 25 447 50	74 03	000,51	1 3E-Q4	001100
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 205-08		417 00	607 60	20,00	204.00	/ OE+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 905-03	3 5	453.57	705.00	002'01	00=+00	2000
95578 2-Chlorophenoi	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04		447 53	675.00	9,100	20+400	1 8 5 0 2
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	25	526 15	759 13	13.000	0.00+00	35501
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05		483 95	719 00	10,566	0 0E+00	2 OE 03
100414 Emylpenzene 100425 Shirena	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03		409 34	617 20	8,501	0 0E+00	1 0E+00
105679 2 4-Dimethydahana	70-100	7.30E-02	8 00E-06	3 10E+02	1 13E-01	2.76E-03		41831	636 00	8,737	0 0E+00	1 0E+00
106423 p-Xvlene	2 USE+U2 3 ROE+U2	3 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06		484 13	707 60	11,329	0 0E+00	7 0E-02
	3 03E+02	A 90E-02	7 000.08	1 85E+02	3 14 E-01	7 66E-03		411 52	616 20		0 0E+00	7 OE+00
106478 p-Chloroaniline	6 61F+01	4 83F-02	1015-05	5 305 403	2 30E-02	2 43E-03		447.21	684 75		0 0E+00	8 0E-01
107062 1,2-Dichloroethane	174E+01	104E-01	90F-06	8 57F+03	1 30E-03	3 32E-U/ 0 70E 04	8 8	503 65	754 00	11,689	0.0E+00	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10F-02	5 125-04		330 03	20100	.643	2 6E-05	00E+00
108383 m-Xytene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 016-01	7 34F-03		343 93	519 13	208,	0.05+00	2 UE-01
	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72F-01	6 635-03	3 %	303.70	01/03	8,523	0.05+00	7 UE+00
	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3.715-03		404 87	531 /5	056,	U UE+00	4 0E-01
	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07		455.02	694.20	0,410	00+100	2 UE-U2
	1 55E+01	6 92 <b>E-</b> 02	7 53E-06	1 72E+04	7 38E-04	1 805-05	32	451 15	659 70	25.0	3 35 04	200120
115297 Endosulfan 447647 Barthaman	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	25	674 43	942 94	14,000	0.0E+00	2 TF 03
117017 DIS(Z-Burymexy)prunatate	151E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	25	657 15	806 00	15,999	4 0E-06	0 0E+00
118741 Hexachlorohenzone	8 32E+0/	1515-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05	25	704 09	862 22		00+300	7 0E-02
120127 Anthracene	2 95E±04	3 24E-02	2 91E-06	6 205+00	5 41E-02	1 32E-03		582,55	825 00	_	4 6E-04	0 0E+00
120821 1.2.4-Trichlorobenzene	1 785+03	3 24E-02	A 22E OB	4 34E-02	2 6/ E-03	6 51E-05		615 18	873 00		0 OE+00	1 1E+00
120832 2,4-Dichlorophenol	147E+02	3 465-02	8 77E-06	3 00E+02	305E-02	1 42E-03	8	486 15	725 00		0 0E+00	2 0E-01
121142 2,4-Dinitrotoluene	9 55E+01	2 03F-01	7.06F-06	2 70E+02	20 E00 5	3 1/E-06		482 15	708 17		0 0E+00	1 1E-02
124481 Chlorodibromomethane	631E+01	1 96E-02	1 05E-05	2 60E+03	3 21F-02	3 27E-06	9 6	590 00	814 00		1 96-04	001
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7.540-01	1 845-02	3 5	304.40	678 ZU	000'8	2 46-05	001100
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 105-05		667.95	036.00		0 0E-07	00+100
156592 ds-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00		201-110-0	- C
100005 trans-1,Z-Dichloroethylene	5 255+01	7 07E-02	1 19E-05	6 30€+03	3 85E-01	9 39E-03	25 3		516 50		0 0E+00	7 0F-02
205992 Renzo(h)flioranthene	34/E+06	1 90E-02	5 55E-06	2 20E-05	6 56E-05	1 60 = -06		·	1078 24		2 15-04	00+300
206440 Fluoranthene	1 075405	3.025.02	3 36E-06	1 90 0 0 0	4 55E-03	1115.04		715 90	969 27		2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1235+06	2 28F-02		2 005-01	9 50E-04	1 61E-05			905 00		0 0E+00	14E-01
218019 Chrysene	3 98E+05	2 48E-02		1 605-03	3.88E-03	8 29E-07		•	1019 70		2 1E-05	0 0E+00
309002 Aktrin	2 45E+06	1 32E-02	4 86E-06	1805-01	6 97E-03	4 40E-03	9 6	CL 417	006/6			0 OE+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02		2 00E+00	4 35E-04	1 06 12-05		505 5E	36 36			00=+00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3.05E-05	7 44E-02		390 33	839 3b			0 0 0 0 0
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	587.28			0 0E+00
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07		558 00	720.00	000,2	4 7 F-U5	2 0E-02
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06		209 60	746.87			00+000
1024573 Heptachlor epoxide	8 32E+04	1 32E-02		2 00E-01	3 90E-04	9 51E-06		613.96	848 76			00+00
/4399/b Mercury (elemental)	5 20E+01	3 07E-02		5 62E-02	4 67E-01	1 14E-02			1750 00	Ī	_	3 0E-04
0001332 10Xapnene 11006925 Amolo: 1260 (DCB 1260)	25/6+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	25 6		873 31		3 2E-04	005+00
11090523 Acodol (200 (FCB-1200) 11097691 Amodor 1254 (BCB-1254)	2 300000	1 38E-02	4 325-06	8 00E-02	1 89E-01	4 60E-03	25 4		539 37			0.000
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2 22E-02		5 /UE-02 4 20E-03	8 20E-02	2 00E-03	52	<u>چ</u> د	512 27	19,000		0 0E+00
53469219 Aroclor 1242 (PCB-1242)	3 30E+04	2146-02		3 40E-01	1 19E-02 2 13E-02	2 90E-04 5 20E-04	25 25 25	340 50 346 50	475 22	18,000	1 OE 04	0 0E+00
		l •	1		******	t-10107 0	G	3	482.20	18,000		0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" In "YES" box)

S

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YES

September, 1998 VERSION 1.2

User-defined stratum A soil vapor permeability, ENTER (cm<sup>2</sup>) e e soil type (used to estimate stratum A SCS permeability) soil vapor CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below) SCS soil type directly above water table ENTER တ Soil stratum directly above water table, (Enter A, B, or C) ENTER of soil of soil stratum B, stratum C, (Enter value or 0) NTER ENTER ENTER
Totals must add up to value of L<sub>wr</sub> (cell D28)
Thickness 1005 84 (E) Tetrachloroethylene Chemical Thickness of soil 152 4 Ę (E) Thickness of soil stratum A, 9144 (E) ځ Depth below grade to water table, 2072 64 ENTER ן אַ Ê below grade to bottom of enclosed space floor, groundwater conc , 33 08642857 ENTER Depth ENTER С<sub>W</sub> YES Initial (E) ٿ groundwater temperature, (numbers only, no dashes) 127184 Chemical CAS No ENTER Average /los 16

ENTER Stratum C	soil water-filled porosity,	θ <sub>w</sub> ς (cm³/cm³)	0.3	
ENTER Stratum C	soil total porosity,	n (unitiess)	0.43	
ENTER Stratum C	soil dry bulk density,	გა <sup>°</sup> (g/cm³)	17	ENTER
ENTER Stratum B	soit water-filled porosity,	ew <sup>r</sup> (cm³/cm³)	0.27	ENTER
ENTER Stratum B	soil total porosity,	n- (unitless)	0 42	ENTER
ENTER Stratum B	soil dry bulk density,	P <sub>b</sub> <sup>2</sup> (g/cm³)	17	ENTER
ENTER Stratum A	soil water-filled porosity,	(cm <sub>3</sub> /cm <sub>3</sub> )	0.2	ENTER
ENTER Stratum A	soil total porosity,	n (unitless)	0 43	ENTER
ENTER Stratum A	soil dry bulk density,	9ه (g/cm³)	15	ENTER

ENTER Stratum A soil water-filled porosity,  $\theta_w^A$ 

, ,									
0 43									
$\dashv$				ı	П				
17	ENTER	Indoor air exchange	rate,	(1/L)	0.45				
┥					Н			_	
0.27	ENTER	Floor-wall seam crack	width,	(cm)	0.1	ENTER	I arget hazard quotlent for	noncardnogens	Ē
7		_			П			φĵ	
0 42	ENTER	Enclosed	height,	(cm)	488	ENTER	langet risk for	carcinoger	ĸ
$\dashv$					Н		_		
	ENTER	space	width,	(cm)	961	ENTER	Exposure	frequency,	Į.
1					H				
70	ENTER	space	length,	(cm)	961	ENTER	Exposure	duration,	3
1					H			Ę	
0.43	ENTER	Soil-bidg pressure	differential AP	(g/cm-s²)	40	ENTER	Averaging time for	noncarcinoge	N-NC
2	ENTER	space	thickness,	(cm)	15	ENTER	Averaging time for	carcinogens,	٠ <b>١</b>
_					ш				

(yrrs)	(yrs)	(yrs)	(days/yr)	(unitless)	(unitless)
9	30	30	350	1 0E-06	-
				Used to calcu groundwater	Jsed to calculate risk-based groundwater concentration

					(mg/m <sub>3</sub> )	
	ž	пsk	factor,	R R	(ug/m³).1	
Pure	component	water	solubility,	S	(mg/L)	
Organic	carbon		~			
		Critical	temperature,	Tc	( <sup>K</sup> )	
	Normal	Souling	point,	-=	(%)	
Enthalpy of	vaporization at	the normal	boiling point,	ΔH <sub>v,b</sub>	(cal/mol)	07 700
Henry's	law constant	reference	temperature,	۳ <u>.</u>	(၁)	36
Henry's	aw constant	at reference	temperature,	I	(atm-m³/mol)	TOUR A SOFT OF A BAR OF
		Diffusivity	ın water,	៤	(cm <sup>2</sup> /s)	S SOF OR
				ດ້ ່	- 1	7 20E.02

		Stratum A	Stratum B	Stratum	Stratter A	Stratum	Stratum A	Stratum A					i
	Source-	soil	soil	los	effective	soil	soil	llos	Thickness of	porosity in	porosity in	porosity in	- Iloon
Exposure	building	air-filled	ar-filled	air-filled	total fluid	intrinsic	relative air	effective vapor	capillary	capillary	capillary	capillary	mees
duration,	separation,	porosity,	porosity,	porosity,	saturation,	permeability,	permeability,	permeability,	zone,	zone,	ZONB	2008	penmeter.
٢	ٹ	<b>€</b> *0	8 <b>8</b>	ນ <b>ູ້</b> 6	ซื้	Z	æ	¥	<u>ر</u>	L.	6		×
(sec)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm³/cm³)	(cm <sup>2</sup> )	(cm²)	(cm²)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm <sup>3</sup> /cm <sup>3</sup> )	(cus)
9 46E+08	2057 64	0 230	0 150	0 130	0 365	7 49E-10	0 797	5 97E-10	17 05	0.43	0 136	0 294	3,844
	Area of							Stratum	Stratum	Stratum	Capillary	Total	
11	enclosed	Crack-	Crack	Enthalpy of	Henry's law	Henry's law	Vapor	Ā	æ	ပ <sup>'</sup>	ZODB	overall	1
Bidg.	space	to-tofa	depth	vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
ventilation	pelow	area	pelow	ave groundwater	ave groundwater	ave, groundwater	ave soil	diffusion	diffusion		diffusion	diffusion	path
rate,	grade,	ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,		coefficient,	coefficient	length,
Obulbiling	ð	F	Zonack	ΔH <sub>v,TS</sub>	Hrs	H' <sub>T3</sub>	μτs	<u>م</u> م	م و ا	<b>ں</b> "ا	ں ا	ב ב	Ţ
(cm <sub>3</sub> /s)	(cm²)	(nnitless)	(cm)	(cal/mol)	(atm-m³/moi)	(unitless)	(g/cm-s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)		(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(EJ)
100			<u></u>										
5 63E+04	9 24E+05	4 16E-04	15	9,492	1 12E-02	4 71E-01	1 77E-04	2 92E-03	7.38E-04	4 38E-04	5 05E-04	7 33E-04	2057 64
						Exponent of	Infinite						
			Average	Crack		equivalent	source	Infinite					
Convection	Source		vapor	effective		foundation	indoor	source	- E				
path	vapor	Crack	flow rate	diffusion	Area of	Peclet	attennation	pldg	nsk	Reference			
length,	conc.,	radius,	into bldg	coefficient,	crack,	number,	coefficient,	conc,	factor,	conc,			
ٿـ	Caouros	Forbok	đ	Dank	Acreck	exp(Pe <sup>f</sup> )	ಕ	Chulding	UR.	RfC			
(cm)	(µg/m³)	(cm)	(cm³/s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> )	(unifless)	(nuittess)	(mg/m³)	(µg/m³) <sup>-1</sup>	(mg/m <sub>3</sub> )			
15	4 747		1 20 100	2000		1							
cl	4 /1E+02	0.10	2/05-01	2 92E-03	3 84E+02	2 06E+03	3 71E-06	1 75E-03	5.8E-07	≨			

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INCREMENTAL RISK CALCULATIONS

Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unifless)	ΨN
Incremental risk from vapor intrusion to indoor afr, carcinogen (unitless)	ΨN
Funal indoor exposure groundwater conc, (tig/L)	2 40E+03
Pure component water solubility, S S (μg/L)	2 00E+05
Risk-based indoor exposure groundwater conc, (µg/L)	2 40E+03
Indoor exposure groundwater conc, noncarcinogen (µg/L)	νV
Indoor exposure groundwater conc, carcinogen (µg/L)	2 40E+03

		3	The Total Control of the Control of	And Tolks		VLOOKUP TABLES	S	_					
SCS Soil Type	K, (cm/h)	α (1/cm) N	N (unitiess)		0, (cm³/cm³)	в, (ст³/ст³)	Mean Grain Diameter (cm)						
O	0.20	0 008	1 09		0 38	0 068	0 0082						
ರ .	0.26	0.019	131	0 237	041	0 095	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
 	2 2	0 036	156	0 359	0 43	0 078	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
ນິ ທ	29 70	0 145	2 79	0.057	140	0.057	0.040						
SC	0 12	0 027	128	0 187	0 38	0 100	0 025						
SCL	<u>ه</u>	0 059	1 48	0 324	0 39	0 100	0.029						
<u> </u>	0 52	0 016	137	0.270	0 46	0 034	0 0046						
200	0 0 0	0.000	123	0.063	0.20	0/00	0.0039						
18	0.45	0 020	14 6	0 291	0 45	1900	0011						
	74.	1	8	1	40	can n		_					
·	-					 		 	 	! ! !	· · ·		; ;
					Chemica	Chemical Properties Lookup Table	up Table						
		Organic			Pure		Henry's	Henry's			Enthatpy of		
				:	component		law constant	law constant	Normal		vaporization at	ž	•
	•		Diffusivity	Diffusivity		Henry's	at reference	reference	Bulliod	Critical	the normal	ПSК	Reference
		coemicaent, K.:	, d	n water,	solubling,	iaw constant H'	temperature, H	temperature,	point,	temperature,	botting point,	factor,	conc ,
CAS No Chemical		(cm <sup>3</sup> /a)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	( Jour)	(smithess)	(atm-m³/mol)	¥ (2)	e &	- é	Onvb (collme)	ORP.	νων <sub>3</sub> ,
		3)	,	(2)	(16)(1)	(DEGINIA)	(Surrian)	6	2	(V)	(cavmol)	( LLI/OH)	( m/6m)
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 505-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05	0 0E+00
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	90E-06	1 62E-03	4 63E-05	1 13E-06		715 90		15,000	2 1E-03	0 0E+00
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	25		827 85	15 000	0 OE+00	7 0E-03
58235 Carbon tetrackloods		3 805 + 06	2 025-02	5 18E-05	2.495-03	6 03E-07	147E-08	25			16,000	2 1E-03	00-300
56553 Rent/a)anthracens		3 08E±02	7 80E-02	8 80 50 0	7 93E+02	1 25E+00	3 055-02				7,127	- 5E-05	0 0E+00
57749 Chlordane		1.20E+05	1 18E-02	4 37F-06	9 40E-03	1 99 -0.4	3.34E-U0		624 24	1004 79	000,61	2 15-04	000000
58899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25.25			13,000	375.04	00+100
60571 Dieldrin		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05		613 32		13,000	4 6E-03	00+00
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31 6-05	1 545-06				10,000	0 0E+00	1 4E+01
67641 Acetone		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88 E-05	25		508 10	6,955	0 0E+00	3 5E-01
67724 Hexachloroethana		3 98E+01	2 500.03	1 00E-05	7 92E-+03	1 505-01	3 66E-03	25			6,988	2 36-05	0 0 0 0
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3.61F-04	5 90E-05	6 K	390 88	583 00	9,510	4 C	0 UE+00
71432 Benzene		5 89E+01	8 80E-02	9,80⊑-06	1 75E+03	2 28E-01	5 56E-03	25			7.342	8 35-06	0.05+00
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02				7,136	0 OE+00	1 0 = +00
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06			986 20	12,000	0 0E+00	1.1E-03
72548 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	52			14,000	0 0E+00	1 8E-02
72559 DDE		4 47E+06	1 44E-02	5 87F-06	1 20E-01	8 61E-04	4 00E-06		039 90 836 44	803 / / REU 3B	14,000	0 75.05	00+00
74839 Methyl bromide		1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03				5.714	00+300	5 0E-03
75014 Vinyl chloride (chloroethene)	eue)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2 71E-02				5,250	8 4E-05	0 0E+00
75092 Methylene chloride		1 17E+01	1.01E-01	1 17E-05	1 30E+04	8 98E-02	2.19E-03				6,706	4 7E-07	3 0€+00
75252 Bromoform		4 57E+01	1 04E-01	1 00E-05	1 195 +03	1 24E+00	3 02E-02	25			6,391	0.05+00	7 0E-01
75274 Bromodichloromethane		5.50F+01	2 98F-02	1.06F-05	5 74F+03	6 56E-02	90-H04 +	2, 20	363 15	090 000	9,4,0 0,00	2 10	00+100
75343 1,1-Dichloroethane		3 16E+01	7.42E-02	1 05E-05	5 06E+03	2 305-01	5 61E-03	25			6.895	0 0E+00	5 0E-01
75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1.07E+00	2 61E-02	25			6,247	5 OE-05	0 0E+00
76448 Heptachlor		141E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1,09E-03	25			13,000	1 35-03	0 0E+00
77474 Hexachlorocyclopentadiene	90	2 00E+05	1615-02	7 21E-06	1 80E+00	1.11E+00	2 71E-02				10,931	0 0E+00	7 0E-05
78875 1.2-Dichlomornana		4 58E+U1	6 23E-02 7 R2E-02	8 78E-06	1.20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10,277	2 75-07	00=+00
79005 1,1,2-Trichloroethane		5.01E+01	7 80E-02	8 80E-06	4 42E+03	3.74E-02	2 80E-03 9 12E-04	22 22 22			6,590	1 6E-05	4 UE-U3 0 0E+00
79016 Trichloroethylene		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25			7,505	1 7E-06	0 0E+00
79345 1,1,2,2-Tetrachloroethane	<b>6</b> )	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04				966'8	5 8E-05	00=+00
83329 Acenaphthene		7 08E+03	4 21E-02	7 695-06	4 24E+00	6 36E-03	1 55E-04				12,155	0.05+00	2 1E-01

2008	:				VLOOKUP TABLES							
84742 Dio byth ships	2 88E+02		6 35E-06	1 08E+03	1 855-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 Buly benzy outhalate	5 75 th +04	4 30E-02 1 74E-03	7 80E-00	1 125+01	3 85 5-08	9 39E-10	55	613 15	798 67	14,751	00±00 0 0	3 5E-01
86306 N-Nitrosodlphenylamine	1 29F+03	3 12 15 02	4 52E-06	2 545400	2 - 7 - 63	1 26E-06	2 2	660 60	839 68	13,000	0 0E+00	7 0E-01
86737 Fluorene	1.385+04	3.635.02	7 885.08	201100	2 03 0 04	5 UVE-05	8 8	632.28	890 45	13,000	1.4E-06	0 0E+00
86748 Carbazole	3 39E+03	3 90 5-02	7 03F-06	7.48F+00	2 0 1 E-03	63/5-05	8 8	570 44	870 00	12,666	00E+00	- 4E-03
87683 Hexachloro-1,3-butadiene	537E+04	5 61E-02	6 16E-06	3 23 1400	3.24E-01	925-00	9 8	62/8/	239 00	73.97	5 7E-06	0 0E+00
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2.44F-08	8 8	460 13 582 15	738 00	10,206	2 44 65 64 64 64 br>64 64 64 br>64 64 64 br>64 6	001100
88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7.78E-06	2 52	519 15	749 03	12,000	3 15-06	00+100
91203 Naphthalene	2.00E+03	5 90E-02	7 50E-06	3 105+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	1 4E-01:
91941 3,3-Dictiorobenzidine	7 24E+02	1 94E-02	674E-06	3 11E+00	1 64E-07	4 00E-09	25	560 26	754 03	13,000	135-04	0 0E+00
95487 2-Methydahass (2 cccs)	3 63E+02	8.70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	52	417 60	630 30	8,661	0.0E+00	7 0E+00
95501 1 2-Dichlomberson	912E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 205-06		464 19	09 269	10,800	005+00	1 8E-01
95578 2-Chlorophenol	3 88 02	5 0111-02	7.90E-06	1 56E+02	7 79E-02	1 905-03		453 57	705 00	9,700	0 0E+00	2 0E-01
95954 2.4.5-Trichlorophenol	1 60F+03	2 915-02	7 035-06	1 205+04	1 0UE-02	3 90E-04		447 53	675 00	9,572	0 0E+00	1 8E-02
98953 Nitrobenzene	6.46F±01	7 605.02	8 505.05	2 005403	1 /81-04	4 345-05	52	526 15	759 13	13,000	00=+00	3 SE-01
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80 5-06	1 69E+02	4 0 4 F 1 C 4	2 401-05		483 95	719 00	10,566	004.00	2 0E-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1138-01	7 76F-03		409 34	01 / 70	106,8	001100	100+00
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	3 2	484 13	707 60	11 329	00+100	7 05-00
	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03		411 52	616 20	8.525	0000	7 OE+00
10545/ 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	53	447 21	684 75	9.271	0 0E+00	8 0E-01
100478 p-Chloroanithe	6 6 1E+01	4 83E 02	1 01E-05	5 30E+03	1 36E-05	3 32E-07		503 65	754 00	11,689	00+300	1 4E-02
	1.74E+01		90-306 G	8 52E+03	4 01E-02	9 78E-04	52	356 65	561 00	7,643	2 65-05	0 0E+00
108383 m. Votene	3 235 + 00	8 50E-02	97026	2 00E+04	2 10E-02	5 12E-04		345 65	519 13	7,800	0 0E+00	2 0E-01
108883 Tolvene	1 825+02	A 20E-02	7 80E-05	1 61=+02	3015-01	7 34E-03		412 27	617 05	8,523	0.0E+00	7 0E+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70F-06	3 20E+02	1.525.01	5 535-03	8 8	383 78	591 79		8+ <u>ii</u> 0	4 0E-01
108952 Phenol	2 88E+01	8 20E-02	9 105-06	8 28 104	1635-05	3 095 07		404 8/	632 40		00+300	2 0E-02
111444 Bls(2-chloroethyl)ether	1 55E+01	6 92E-02	7 53E-06	1 72F±04	7.385-04	10-100 t		455 02	694 20	10,920	0 0E+00	2 1E+00
	2 14E+03	1 15€-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05		674.43	67 600	90.5	3 3E-04	00=+00
117817 Bis(2-ethythexyt)phthalate	1 51E+07	3 51E-02	3.66E-06	3 40E-01	4 18E-06	1 02E-07		657 15	806 00	15.999	4 05-05	70-12-07
117840 Di-n-octyf phthalate	8 32E+07	1 51E-02		2 00E-02	2 74E-03	6 68E-05		704 09	862 22	15,000	0 0E+00	7 0E-02
118/41 Hexachlorobenzene	5 50E+04	5 42E-02	5 91 5-06	6 20E+00	5 41E-02	1 32E-03	55	582 55	825 00	14,447	4 6E-04	0 0E+00
12012/ Antiracana 120821 1 2 4-Trichlossboosses	2 95E+04	3 245-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05		615 18	873 00		0 0E+00	115+00
	1 / 2011 63	3 000-02	8 231-06	3 005+02	5 82E-02	1 42E-03		486 15	725 00		0.00	2 0E-01
12:142 2 4-Dinimphotogoa	0 555-04	3 495-02	8 //E-U6	4 50E+03	1 30E-04	3 17E-06		482 15	708 17		0 0E+00	1 1E-02
124481 Chlorodibromomethane	8 31E±01	1 965-02	1 05 1 05	2 /UE+UZ	3805-06	9 27 E-08		290 00	814 00	13,467	196-04	0.0E+00
	1 55E+02	7 205-02	8 20E-06	2 00E+02	3 4 1 E-02 7 54 E-01	7 83E-04	5 5	41614	678 20	8,000	2 45-05	00=100
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	1 35E-01	4 51E-04	1 105-05	3 %	334 40 667 05	070.70		2 85-07	0.05+00
156592 dis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00	7 197	0.00100	7 17 7
	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516 50		0.0E+00	7 0F-02
195595 Indeno(1,2,5-cq)pyrene	3.47E+06	1 905-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06		809 15	1078 24		2 1E-04	0 OE+00
20552 Delizationalis	1 075+05	2 265-02	5 56E-06	1 50E-03	4 55E-03	11504		71590	969 27	15,000	2 1E-04	0 0E+00
	1 235+08	2 26E-02	5 56E-06	70007	9 50E-04	161E-05	52	655 95	905 00		0 0E+00	1 4E-01
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9.465-05		744 45	1019 70	16,000	2 1E-05	0 0 H 0 0
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	_	603.01	839.37	004,64	2 in 6	00.100
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		596 55	839 36	13,000	185-03	0.05+00
31963/ Deta-Hun (Deta-Bru) 842786 1 3-Dichlomorphy	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	25 5	596 55	839 36	13,000	5 35-04	0 0E+00
606202 2 6-Dinitratolismo	1043764	6 265-02	1 0dE-05	2 80E+03	7 26E-01	1 77E-02		38115	587 38	7,000	3 7E-05	2 0E-02
621647 N-Nitrosod-n-nondemine	2 405+01	3 27 11 02	7 20E-00	1 82E+02	3 06E-05	7 46E-07		558 00	770 00	12,938	1 95-04	00+300
1024573 Heptachlor epoxide	8 32E+04	1325-02	4 23E-06	2.005-01	3 905-03	2 25E-06	522	509 60	746 87	11,000	2 0E-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 305-06	5 62 F-02	4 K7E-01	9 2 1 1 2 2		673.96	848 76		2 66-03	0 0E+00
8001352 Toxaphene	2 57E+05	1 16E-02		7 40E-01	2 46E-04	6.00E-06			1750 00		0.05+00	3 0E-04
11096825 Arador 1260 (PCB-1260)	2 90E+05	1 38E-02		8 00E-02	1 89E-01	4 60E-03		657 13 402 50	539.37	14,000	3 2E-04	00+00
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02		5 70E-02	8 20E-02	2 00E-03		377 50	512.27	19,000		20+1100
12674112 Arador 1016 (PCB-1016)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04		340 50	475 22	18,000		0 0 + 00
53469219 MUGGOT 1642 (FUD-1642)	3 30E+04	2 14E-02	5 31 <b>E-0</b> 6	3 40E-01	2 13E-02	5 20E-04	25	45 50	482 20	18,000	1 05-04	0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 1.2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

		ENTER	User-defined stratum A soil vapor Permeability,	(cm²)
			S. S.	
		ENTER	stratum A SCS Soil type (used to estimate	permeability)
		ENTER	SCS soll type	water table
		ENTER	Soil stratum directly above	(Enter A, B, or C)
	sethane	ENTER (L <sub>MT</sub> (cell D28)	Thickness of soil stratum C, (Enter value or 0)	(cm)
Chemical	I,1,2,2-Tetrachloroethane	ENTER ENTER ENTER Totals must add up to value of L <sub>WT</sub> (cell D28)	Thickness Thickness of soil of soil of soil stratum B, stratum C, (Enter value or 0) (Enter value or 0)	(cm)
	1	ENTER Totals mu	Thickness of soil stratum A,	(cm) 914.4
		ENTER	Depth below grade to water table,	(cm) 2072 64
ENTER Initias groundwater conc , Cw (µg/L)	47 69428571	ENTER Depth	below grade to bottom of enclosed space floor, Le	(cm)
ENTER Chemical CAS No (numbers only,	79345	ENTER	Average soll/ groundwater temperature,	(%)

						Γ	ļ		
Stratum C	soil water-filled	porosity,	ບ * ອ້	(cm <sub>3</sub> /cm <sub>3</sub> )		03			
Stratum C	soil total	porosity,	ပို့	(unitless)		0.43			
Stratum C	soil dry	bulk density,	ું	(g/cm³)		17		ENTER	
Stratum B	soil water-filled	porosity,	6 <sub>w</sub> 8	(cm <sub>3</sub> /cm <sub>3</sub> )		0.27		ENTER	
Stratum B	soil total	porosity,	<b>"</b> c	(unitless)		0 42		ENTER	
Stratum B	soil dry	bulk density,	<b>.</b>	(g/cm³)		1.7		ENTER	Enclosed
Stratum A	soil water-filled	porosity,	ν,*Θ	(cm³/cm³)		0.2		ENTER	Enclosed
Stratum A	soil total	porosity,	<b>←</b>	(unitless)		0 43		ENTER	
Stratum A	soil dry	bulk density,	<b>₹</b> a	(g/cm <sup>3</sup> )		1.5		ENTER	Enclosed
	Stratum A Stratum B Stratum B Stratum C Stratum C	Stratum A Stratum B Stratum B Stratum B Stratum C Stratum C soli total soli water-filled soll dry soli total so	Stratum A Stratum B Stratum B Stratum B Stratum C Stratum C soli total soil water-filled soil dry soil total so porosity, bulk density, porosity, bulk density, porosity, bulk density, porosity,	A Stratum A Stratum B Stratum B Stratum B Stratum C Stratum C stratum C soil total soil water-filled soil dry soil total soil water-filled soil dry soil total soil	Stratum A Stratum B Stratum B Stratum B Stratum C soil total soil water-filled soil dry soil total soil water-filled soil dry porosity, porosity, bulk density, porosity, bulk density, $n^{A} \qquad \Theta_{u^{A}} \qquad \rho_{b} \qquad n^{B} \qquad \Theta_{u^{B}} \qquad \rho_{b}^{C} \qquad (unitjess) \qquad (cm^{3}/cm^{3}) \qquad (g/cm^{3}) \qquad (unitjess) \qquad (cm^{3}/cm^{3}) \qquad (g/cm^{3})$	Stratum A Stratum B Stratum B Stratum B Stratum C Stratum C Stratum C soil total soil water-filled soil water-filled soil dry soil total soil porosity, por	Stratum A Stratum B Stratum B Stratum B Stratum C Stratum C Stratum C soli total soil water-filled soil dry soil total soil water-filled soil dry soil total sci porosity, poros	Stratum A Stratum B Stratum B Stratum B Stratum C Stratum C Stratum C stratum C Stratum C soli total soil water-filled soil dry soil total soil water-filled soil dry soil total soil water-filled soil dry soil total soil water-filled soil dry soil total soil water-filled soil dry soil total soil water-filled bulk density, porosity, nn	Stratum A Stratum B Stratum B Stratum B Stratum C Stratum C stratum C stratum C stratum C soli total soil water-filled soil dry soil total soil water-filled soil dry soil total soil water-filled soil dry soil total soil water-filled soil dry soil total soil total soil water-filled soil dry soil total soil water-filled soil dry soil total soil total soil water-filled soil dry soil total soil total soil water-filled soil dry soil total soil total soil total soil total soil water-filled soil dry soil total soil total soil water-filled soil dry soil total soil total soil water-filled soil dry soil total soil dry soil total soil water-filled soil dry soil total soil water-filled soil dry soil total soil total soil water-filled soil dry soil total soil dry soil total soil dry soil total soil water-filled soil dry soil total soil dry soil total soil water-filled soil water-filled soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil total soil dry soil dry soil total soil dry soil d

	Exposure duration, ED ED (vrs)		Enclosed Floor-wall	space seam crack air exchange height, width, rate,	³.	(cm) (cm) (1/h)	488 01 045			risk for	carcinogens,	Ħ	(unifiess) (unifiess)
		_				(cm)	961	ENTER					(days/vr
Soil-bidg pressure differential, AP (g/cm-s²).  ENTER Averaging time for noncarcinogens, (vrs)		Enclosed	space	moor thickness,	- Fall	(cm)	15	ENTER	Averaging	time for	carcinogens,	ΑT <sub>C</sub>	(ALS)

Used to calculate risk-based groundwater concentration 1 0E-06

	Reference	2000	R.	(ma/m <sub>3</sub> )	
‡id		factor.	J.R.	(uc/m <sup>3</sup> )-1	
Pure	water	solublity.	Ś	(ma/L)	
Organic					
	Cntical	temperature,	۲	ኧ	
	boling				
Entha'py of vaporization at	the normal	boiling point,	ΔH <sub>v,b</sub>	(cal/mol)	
Henry's law constant	reference	temperature,	ħ	(၃)	
Henry's law constant	at reference	temperature,	r	(atm-m³/mol)	
	Diffusivity	ın water,	ੋਂ	(cm <sup>2</sup> /s)	
	Diffusivity	in arr,	<b>å</b> '	(cm <sub>2</sub> /s)	20.00

		Stratum A	Stratum B	Stratum C	Stratum A	Stratum A	Stratum A	Stratum A		Total	Air-filled	Water-filled	Floor
,	Source	Soff	SOil	soil	effective	soil	soil	80	Thickness of	porosity in	porosity in	porosity in	wall
Exposure	Guipling	air-filled	air-filled	an-filled	total fluid	ıntrinsıc	relative air	effective vapor	capillary	capillary	capillary	capillary	seam
duration,	separation,	porosity,	porosity,	porosity,	saturation,	permeability,	permeability,	permeability,	zone,	zone,	zone,	zone,	penmeter,
٢	ٹ	<b>∀</b> •	8°	υ <b>"</b> Θ	'n	<b>∡</b> Z	'n,	ž	ٿ	250	9	9	X
(sec)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sup>3</sup> /cm <sup>3</sup> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sup>2</sup> )	(cm <sup>2</sup> )	(cm <sub>2</sub> )	(CH2)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sup>3</sup> /cm <sup>3</sup> )	(cm)
9 46E+08	2057.64	0 230	0 150	0 130	0 365	7 49E-10	0 797	5 97E-10	17.05	0.43	0 136	0 294	3,844
	Area of							Stratum	Stratum	Stratum	Capillary	Total	
	enclosed	Crack.	Crack	Enthalpy of	Henry's law	Henry's law	Vapor	∢	m	O	zone	overall	
Bldg	space	to-total	depth	vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
ventilation	pelow	area	below	ave groundwater	ave groundwater	ave groundwater	ave soil	diffusion	diffusion	diffusion	diffusion	diffusion	path
rate,	grade,	ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient,	coefficient,	length,
Qoulding	Ą	F	Zorack	ΔH <sub>v TS</sub>	H <sub>Ts</sub>	H 51	μтз	* O	<u>0</u>	ູ້	ບູ	ם. ד	ڙ. ن
(cm <sub>3</sub> /s)	(cm²)	(unitiess)	(cm)	(cal/mol)	(atm-m³/moi)	(unitless)	(g/cm-s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(E)
5 63E+04	9 24E+05	4.16E-04	15	10,480	1 98E-04	8 36E-03	177E-04	2.90E-03	7 95E-04	5 23E-04	5 83E-04	8 50E-04	2057 64
						Exponent of	Infinite						
			Average	Crack		equivalent	Source	Infinite					
Convection	Source		vapor	effective		foundation	indoor	source	Cuit				
path	vapor	Crack	flow rate	diffusion	Area of	Peciet	attenuation	pldg	risk	Reference			
length,	conc,	radius,	into bidg ,	coefficient,	crack,	number,	coefficient,	conc,	factor,	conc,			
_5	Caource	Forack	o o	Donack	Agrack	exp(Pe <sup>l</sup> )	ಕ	Chullding	JRP	RfC			
(cm)	(µg/m³)	(cm)	(cm <sub>3</sub> /s)	(cm <sup>2</sup> /s)	(cm²)	(unitless)	(unitless)	(µg/ш³)	(µg/m³)-1	(mg/m <sub>3</sub> )			
15	8 36E+00	0 10	5.70E-01	2 905-03	3 84E+02	2 15F+03	4 06F-06	3.395.05	5 8E-05	AIN			

						VLOOKUP TABLES	SI				
		S	Soil Properties Lookup Table	ookup Table							
SCS Soil Type	K, (cm/h)	a (1/cm)	N (unitless)	M (unitess)	θ <sub>ε</sub> (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)				
2	0.20	0 008	1 09	0 083	0 38	890 0	0 0092				
<u> </u>	0.26	0 0 19	131	0 237	0 41	0 095	0 0 16				
	104	0 036	1 56	0 359	0 43	0.078	0 020				
รา	14 59	0 124	2 28	0 561	0 41	0 057	0 040				
S	29 70	0 145	2 68	0 627	0 43	0 045	0 044				
ಜ	0 12	0 027	1 23	0 187	0 38	0 100	0 025				
SCL	131	0 059	1 48	0 324	0 39	0 100	0 029				
<u>s</u>	0 25	0 0 16	1 37	0.270	0 46	0 034	0 0046				
SIC	0 02	0 005	1.09	0 083	0.26	0 0 0 0	0 003				
SICL	0 07	0 0 10	1 23	0 187	0 43	0 0 0	0 0056				
SIL	0 45	0 0 0 0 0 0 0 0 0 0 0 0 0	141	0 291	0.45	0 067	0 011				
SL	4 42	0 075	1,89	0 471	041	0 065	0 030				
					Chemic	Chemical Properties Lookup Table	cup Table				
		Cincin						16.11.11			
		Organic			# I		Henrys	Henry s			Enthalp
		Carbon	:		component		law constant	law constant	Normal		vaporzatio
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	polling	Critical	the norn
		coefficient,	in a.r,	In water,	solublity,	law constant	temperature,	lemperature,	point,	temperature,	pailing po
		₹,	<b>_</b>	ثً	Ø	Ì	I	ř	<u> </u>	۲	ΑĀ
CAS No Chemical		(b/_wo)	(cm <sup>2</sup> /s)	(cm²/s)	(ma/l.)	(unitless)	(atm-m³/mol)	ပ္မ	<b>€</b>	( <sub>k</sub> )	July (
		,		)	1	(000)	()	6	,	(1)	Calif
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 105-06	25	533 15	72075	•
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	90-300 6	1 62E-03	4 63E-05	1 135-06	25	715 90	969 27	•
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	52	605 28	827 85	•
53703 Dibenz(a,h)anthracene	ф	3 80E+06	2 02E-02	5 18E-06	2 49€-03	6 03E-07	1 47E-08	25	743 24	990 41	•
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	
56553 Benz(a)anthracene		3 98E+05	5 10E-02	90- <b>3</b> 00 6	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	•
· 57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	•
58899 gamma-HCH (Lindane)	( <del>0</del>	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	•
60571 Dieldrin		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	52	613 32	842 25	•
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	•
67641 Acetone		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	
67663 Chloroform		3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 595-01	3 88E-03	25	458 00	695 00	
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	25	390 88	563 05	•
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 285-01	5,56E-03	25	353 24	562 16	
71556 1,1,1-Trichtoroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	
72208 Endrin		1 235+04	1.25E.02	4 74F-06	2 50F.01	3 08F.04	7.51E.08	ž,	718 15	00 300	•

				Chemica	Chemical Properties Lookup Table	Table						
	Organic			Pure	•	Henry's	Henry's			Enthalpy of		
	carbon			component		law constant	law constant	Normal		vaporization at	5	-
	partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	polling	Critical	the normal	usk	Reference
	coefficient,	in air,	In water,	solubility,	law constant	temperature,	lemperature,	point,	temperature,	poling point,	tactor	conc
	<sub>ሜ</sub>	<b>_</b>	മ്	w	Ì	I	Ľ	<b>1</b>	۲	ΔHν	A.	3
CAS No Chemical	(cm²/g)	(cm <sup>2</sup> /s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/mot)	(్థ్ర)	Ş.	(%K)	(cal/mol)	(µg/m³) <sup>-1</sup>	(mg/m³)
50293 DDT	2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10F-08	25	533 15	72075	11 000	9 75 05	004#0
50328 Benzo(a)pyrene	1 02E+06	4 30E-02	90E-06	1 62E-03	4 63E-05	1 135-06	25.	715 90	0.021	000,71	1 1 1 2	001
51285 2,4-Dintrophenol	1 00E-02	2 73E-02	90-E-06	2 79E+03	1 82E-05	4 44E-07	25.	605.28	827.RS	25,000	00-100	7 00 100
53703 Dibenz(a,h)anthracene	3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1.47E-08	25	743 24	990 41	16,000	2 11.00	00+00
56235 Carbon tetrachloride	1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25	3 05E-02	52	349 90	556 60	7.127	5F-05	200
56553 Benz(a)anthracene	3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	15,000	2 16-04	0.00+00
· 57749 Chlordane	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3.7E-04	00=+00
58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04	0.00
60571 Dieldrin	2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	52	613 32	842 25	13,000	4 6E-03	0 0 0 0
65850 Benzoic Acid	6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10,000	0 OE+00	1 4E+01
67641 Acetone	5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	6,955	0 0E+00	3 5E-01
67663 Chlarofarm	3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6,988	2 3E-05	0 OE+00
67721 Hexachloroethane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00	695 00	9,510	4 0E-06	0 0E+00
71363 Butanol	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 805-06	25	390 88	563 05	10,346	0 0E+00	3 SE-01
71432 Benzene	5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 285-01	5,56E-03	25	353 24	562 16	7,342	8 3E-06	0 00+00
71556 1,1,1-Trichtoroethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0.000	1 0E+00
72208 Endrin	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	71815	986 20	12,000	0 0E+00	1 1E-03
72435 Methoxychlar	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0 0E+00	1 8E-02
72548 DDD	1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863.77	14,000	6 9E-05	0 0E+00
72559 DDE	4 47E+06	1 44E-02	587E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44	860 38	13,000	9 7E-05	0 0E+00
74839 Methyl bromide	1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	25	276 71	467.00	5,714	0.0E+00	5 0E-03
75014 Vinyl chloride (chloroethene)	1.86臣+01	1 06E-01	1 23E-06	2 76E+03	1,11E+00	2 71E-02	25	259 25	432 00	5,250	8 4 11-05	001100
75092 Methylene chloride	1 17E+01	101E-01	1 17E-05	1.30E+04	8 98E-02	2 19E-03	25	313.00	510 00	6,706	4 7E-07	3 0E+00
75150 Carbon disulfide	4.57E+01	104E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	25	319 00	552 00	6,391	0.0E+00	7 0E-01
75252 Bromaform	8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422 35	00 969	9,479	1 1E-06	0 0E+00
75274 Bromodichloromethane	\$ 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 8E-05	0 0E+00
75343 1,1-Dichloroethane	3 16E+01	7 42E-02	1 05E-05	5 06E+03	2,30E-01	5 61E-03	25	330 55	5Z3 00	6,895	0.00	5 0E-01
75354 1,1-Dichloroethylene	5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02		304 75	576 05	6,247	5 0E-05	0 0E+00
76448 Heptachlor	1,41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03		603 69	846 31	13,000	1 3E-03	0 0E+00
77474 Hexachlorocyclopentadiene	2 00E+05	1 61E-02	7 21E-06	1 80E+00	1 11E+00	2 71E-02	52	512 15	746 00	10,931	0.000	7 0E-05
78591 Isophorone	4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10,271	2 7E-07	0 0E+00
78875 1,2-Dichloropropane	4 37E+01	7.82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572.00	7,590	0 0E+00	4 0E-03
79005 1,1,2-Trichloroethane	5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8,322	1 6E-05	0 0E+00
79016 Trichloroethylene	1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	52	360 36	544 20	7,505	1 7E-06	0 OE+00
79345 1,1,2,2-Tetrachioroethans	9.33E+01	7.10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	25	419 60	661 15	8,996	5 8E-05	0.05+00
83329 Acenaphthene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	52	550 54	803 15	12,155	0 OE+00	2 1E-01
												•
					5.04.7							

84667 Chatharathaile	100	L	i i		VLOOKUP TABLES							
84742 Olimbuty ohthalate	3 395+04	Z 30E-UZ 4 38E-U2	5 35E-06	1 08E+03	185E-05	4 51E-07	52	567 15	757 00	13,733	0.05+00	2 8E+00
85687 Butyl benzyl phthalate	5 75E+04	1 74E-02	4 83F-06	2 695+00	5 17E-05	01-165 6	8 8	613 15	798 67	14,751	000	3 5 5-01
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5.00F-08	0 K	632.28	839 58 900 46	3,000	0.05+00	7 0E-01
86737 Fluorene	1 38E+04	3 63E-02	7 88E-06	1 98E+00	2 61E-03	6 37 E-05	2 2	570 44	870.00	12,666	00400	145.00
9769 Harbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	25	627 87	00 668	13.977	5 7E-06	0 0F+00
87865 Dentachlomanosos	5 37E+04	561E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	25	486 15	738 00	10,206	2 2E-05	00+00
88062 2.4.6-Trichlorophenol	3 815+02	3 18E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	52	582 15	813 20	14 000	3 4E-05	0 0E+00
91203 Naphthalene	2 000 +03	5 90E-02	7.50F-06	3 105+02	3.19E-04 1.08E-02	7 78E-06	52 5	51915	749 03	12,000	3 1E-06	0 0E+00
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 11 11 100	164E-07	4 00E-04	5 K	491 14 560 26	748 40	10,373	0 0 0 0 0 0 0 0	- 4E-01
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	2 52	417 60	630.30	8,661	1 2 E C	201400
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	52	464 19	697 60	10,800	0000	186-01
95578 2-Chlomobanol	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	52	453 57	705 00	9,700	0 0E+00	2 0E-01
95954 2.4 5-Trichlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 505-02	3 90E-04	52	447 53	675 00	9,572	0 0E+00	1 8E-02
98953 Nitrobenzene	6 46F±01	7 605-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	52	526 15	759 13	13,000	0 0E+00	3 5E-01
100414 Ethylbenzene	3 63E+02	7 50E-02	7 805-06	1 69E+03	9 64E-U4	2 40E-05	5 52	483 95	719 00	10,566	0 0E+00	2 0E-03
100425 Styrene	7 76E+02	7 105-02	8 00E-06	3 10E+02	1135-01	7 55E-03	e s	409 34	617 20	8,501	0000	100
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 205-05	2 00E-06	3 5	484 13	207 50	11 320	20+400	1 0E+00
	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	28	411 52	616 20	8.525	0.00+00	7 05+00
10046/ 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	52	447 21	684 75	9.271	0 0E+00	8 OF 51
1004/8 p-Chiorogramine	661E+01	4 83E-02	1016-05	5 30E+03	1 36E-05	3 32E-07	22	503 65	754 00	11,689	00+100	1 4E-02
	1 /45+01	1 04E-01	90-306	8 52E+03	4 01E-02	9 78E-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xviene	5 25E+00	2 00E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	52	345 65	519 13		0 0E+00	2 0E-01
108883 Toluene	1 82F+02	8 70F-02	8 60E-06	1 0 I E + 0 Z	3 015-01	7.34E-03	23	412 27	617 05		0 0E+00	7 0E+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 705-06	4 72F+02	1.525.01	5 53E-U3	52	383 78	591 79		00±00	4 0E-01
108952 Phenoi	2 88E+01	8 20E-02	9 10F-06	8 28F±04	1635-06	200000	9 8	404 8/	632 40	8,410	0 0E+00	2 0E-02
111444 Bls(2-chloroethyl)ether	1 55E+01	6 92E-02	7 53E-06	1 72F+04	7.385-04	3.90E-0/	8 8	455 UZ	694 20	10,920	0.00	2 1E+00
115297 Endosultan	2 14E+03	1 15E-02	4 55E-06	5 105-01	4 595-04	1 12 1.05	Q K	451 15 674 43	659 79	9,000	33504	0.0E+00
117817 Bis(2-ethythexyl)phthalate	151E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	3 5	657 15	# 25 90 8 # 25 90 8	000,41	00400	2 1E-02
117840 Di-n-octyl phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05	22	704 09	862.22	15,000	001100	7.05.03
	5 50E+04	5 42E-02	5 91E-06	6 20E+00	541E-02	1 32E-03	52	582 55	825 00	14.447	4 6F-04	0.05+00
12012/ Anutracene 120821 1 2 4-Trackbookstone	2 95E+04	3 24E-02		4 34E-02	2 67E-03	6 515-05	25	615 18	873 00	13,121	0 0E+00	116+00
	1 /8E+03	3 00E-02		3 00E+02	5 82E-02	1 42E-03	52	486.15	725 00	10,471	0 0E+00	2 0E-01
121142 2.4-Dinitrotolliene	9 555+01	3 405-02	3 //E-06	4 50E+03	1 30 E-04	3 17E-06	22	482 15	708 17		0 0E+00	1 1E-02
	6346+01	1 965-01	1055.05	2 / VE+U2	3.805-06	9 27 E-08	52	290 00	814 00	13,467	1 9E-04	0.05+00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20F-06	2 00E+03	3 2 1 E-U2 7 5 4 E-01	7 83E-04	52	416 14	678 20	8,000	2 4E-05	0 0E+00
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4515-04	1 105.05		394 40	620.20		5 8E-07	0 0E+00
156592 ds-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07F-03		333 BS	936 00	7,3/0	001100	1 15-01
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516.50		00+100	3 35-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06		809 15	1078 24		2 1E-04	0 0F+00
	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1115-04		715 90	969 27		2 1E-04	00E+00
207089 Benzo(k)fluoranthene	1235+06	2 265-02	5 565.06	10-100	0 50E-04	161E-05		655 95	905 00	13,815	0 0E+00	1 4E-01
218019 Chrysena	3 98E+05	2 48E-02	6.21E-06	1 60 F 03	3 ARE-03	8 29E-0/ 0 46E 06		753 15	1019 70	16,000	2 1E-05	0 0E+00
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	3 70E-03	2 2	603.01	979 00	16,455	2 16-06	0 OE+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00€+00	4 35E-04	1.065-05		596 55	639.37	13,000	4 9E-03	0 0E+00
319857 beta-HCH (beta-BHC)		1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839.36	96	20 H2 40 A	00+100
542756 1,3-Ukhloropropene		6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	587 38	2,000	3 7E-05	205-00
621647 N-Nitrosodio and ampa	6 92E+01	3 27E-02		1 82E+02	3 06E-05	7 46E-07		558 00	770 00	12,938	1 96-04	0 0E+00
1024573 Hentachlor spoxide		1 225 02	4 22 0 00	9 89E+03	9 23E-05	2 25E-06		209 60	746 87		2 0E-03	0 05+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02		5 62E-01	3 90 E-04	951E-06	52		848 76	_	2 6E-03	0 0E+00
8001352 Toxaphene	2 57E+05	1 16E-02		7 40E-01	2.46E-04	1 14E-02	2 4		1750 00		0 0E+00	3 0E-04
11096825 Arador 1260 (PCB-1260)	2 90E+05	1 38E-02		8 00E-02	1 89E-01	4 605-03	3 15	402 50	530 37	000,60	3 2E-04	0.05+00
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02		5 70E-02	8 20E-02	2 00E-03	33		512 27	19,000	1 05-04	0.00
53469219 Arodor 1242 (PCB-1242)	3.30E+04	2 ZZE-02 2 14E-02	5 42E-06 5 31E-06	4 20E-01	1 19E-02	2.90E-04	53	340 50	475 22	18,000	1 0E-04	0 OE+00
	)	42-141-4		2 +VE-V	2 135-02	5 20E-04	52	345 50	482 20	18,000	1 0E-04	0 0E+00
					6 of 7							

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

×

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

ENTER

ENTER

YES

VERSION 1 2 September, 1998

User-defined stratum A soil vapor permeability, ENTER (cm<sup>2</sup>) soil type (used to estimate OR ENTER Stratum C soil water-filled stratum A SCS permeability) soil vapor porosity, SCS soil type directly above ENTER Stratum C soil total porosity, water table ENTER Soil stratum directly above water table, (Enter A, B, or C) ENTER Stratum C soil dry bulk density, ENTER ENTER Stratum B soil water-filled porosity,  $\theta_w^{\ B}$ of soil of soil stratum B, stratum C, (Enter value or 0) (Enter value or 0) NTER ENTER ENTER TOTAL TOTAL (Cell D28) Thickness 1005 84 (CIII) ج trans-1,2-Dichloroethylene ENTER Stratum B soil total porosity, Thickness 152 4 (cm) Ē Thickness of soit stratum A, ENTER Stratum B soil dry bulk density, Pb<sup>B</sup> (g/cm²) ENTER (cm) £ ENTER Stratum A soil water-filled below grade to water table, porosity, 2072 64 ENTER Depth Ĕ (cm) below grade to bottom of enclosed space floor, groundwater conc. 23 5222222 ENTER Stratum A soil total porosity, n<sup>A</sup> ENTER Depth .ve.(100/L) (cm) ٿ (numbers only, ENTER Stratum A soil dry bulk density, groundwater temperature, Chemical CAS No 156605 no dashes) ENTER Average ||soi

ENTER Enclosed space	ENTER Floor-wall	ENTER		
Enclosed	Floor-wall			
space		Indoor		
	seam crack	air exchange		
height,	width,	rate,		
ŕ	*	꼾		
(cm)	(cm)	(1/h)		
488	0.1	0.45		
ヿ	488	488 01		

unifiess

(g/cm<sup>3</sup>)

(cm3/cm3)

unitless)

(cm<sub>3</sub>/cm<sub>3</sub>)

(unitiess)

(g/cm<sup>3</sup>) **₹** 

0.1	ENTER Target hazard	quotient for	noncardinogens, THQ	(unitless)	1	lead to coloulate rekabased
488	ENTER	risk for	cardinogens, TR	(unitless)	1 0E-06	I lead of boal I
961	ENTER	Exposure	requency.	(days/yr)	350	
961	ENTER	Exposure	durallon, ED	(yrs)	30	
40	ENTER Averaging	time for	noncarcinogens, AT <sub>NC</sub>	(yrs)	30	
15	ENTER	time for	AT <sub>C</sub>	(yrs)	70	

Used to calculate risk-based groundwater concentration

Reference conc , RfC	m³)	8
Refer Sor R	(mg/	7.06
Unit nsk factor, URF	(µg/m³)-1	0 OE+00
Pure component water solubility, S	(mg/L)	6 30E+03
2 . 7 8	(cm <sup>3</sup> /g)	5 25E+01
Critical temperature, T <sub>C</sub>	( <sup>K</sup> K)	516 50
Normal boiling point,	(k)	320 85
Enthalpy of vaponzation at the normal boiling point, $\Delta H_{s,b}$	(cal/mol)	6,717
Henry's law constant reference temperature, T <sub>R</sub>	(၃)	25
Henry's law constant at reference temperature,	(atm-m³/mol)	9 39E-03
Diffusivity in water, D.	(cm <sup>2</sup> /s)	1 19E-05
Diffusivity ın air, D.	(cm²/s)	7 07E-02

	0	Stratum A	Stratum B	Stratum C	Stratum A	Stratum A	Stratum A	Stratum A		Total	Air-filled	Water-filled	Floor-
Exposure	-Baing Building	air-filled	soll air-filled	soli air-filled	enective total fluid	soll intrinsic	soll refative air	soil effective vapor	Thickness of capillary	porosity in capillary	porosity in capiliary	porosity in capillary	wall
duration,	separation,	porosity,	porosity,	porosity,	saturation,	permeability,	permeability,	permeability,	zone,	zone,	zone,	zone,	perimeter,
ب	ت	, Φ'	• • • • • • • • • • • • • • • • • • •	ນ <b>ູ</b>	Š	¥	Ā	ž	'n	n <sub>cz</sub>	Б.	9	X
(sec)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm²)	(cm²)	(cm²)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm)
O VEELO	2067.64	000	0.450	0000	1000	0, 10, 1	-02.0						
9 490409	4007 04	0.230	0.130	0.130	0.365	/ 49E-10	0 797	5 97E-10	17.05	0 43	0.136	U 294	3,844
	Area of							Stratum	Stratum	Stratum	Capillary	Tota	
	enclosed	Crack-	Crack	Enthalpy of	Henry's law	Henry's law	Vapor	∢	۵	O	zone	Overall	
Bldg	space	to-total	depth	vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
ventilation	pelow	area	pelow	ave groundwater	ave groundwater	ave groundwater	ave soll	diffusion	diffusion	diffusion	diffusion	diffusion	path
rate,	grade,	ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient,	coefficient	length.
Obuilding	₹	F	Zonack	ΔH <sub>v,TS</sub>	H <sub>TS</sub>	H' <sub>TS</sub>	hrs hrs	, C	ا ا	ا ا		0 وال	ב
(cm <sub>3</sub> /s)	(cm²)	(unitless)	(cm)	(cai/mol)	(atm-m³/mol)	(unitless)	(a/cm-s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm²/s)	r (H3)
5 63E+04	9 24E+05	4 16E-04	15	7,073	6 48E-03	2 73E-01	1 77E-04	2 87E-03	7 26E-04	4 33E-04	4.98E-04	7 24E-04	2057 64
						Exponent of	Infinite						
1			Average	Crack		equivalent	source	Infinite					
Convection	Source		vapor	effective		foundation	indoor	source	Ę				
path	vapor	Crack	flow rate	diffusion	Area of	Peclet	attenuation	pldg	risk	Reference			
length,	conc,	radius,	into bidg ,	coefficient,	crack,	number,	coefficient,	conc,	factor,	conc,			
ڻ	Caource	Compa	o d	Dorrey	Acrack	exp(Pe <sup>f</sup> )	ಶ	Chullena	URF	SG			
(cm)	(µg/m³)	(cm)	(cm <sup>3</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> )	(unitiess)	(nuitless)	(mg/m <sub>3</sub> )	(µg/m³) <sup>-1</sup>	(mg/m <sub>3</sub> )			
											_		
15	2 73E+02	01.0	5 70E-01	2 87E-03	3 84E+02	2 36E+03	3 67E-06	1 00E-03	AN	7 0E-02			

INCREMENTAL RISK CALCULATIONS.	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)	NA
INCREMENTAL	Incremental nsk from vapor intrusion to indoor ar, carcinogen (untless)	Y.
ULATIONS:	Final indoor exposure groundwater conc, (µg/L).	/ 28E+04
ATION CALCI	Pure component water solubility, S S (μg/L)	0 205+00
R CONCENTR		1 205104
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	Indoor exposure groundwater conc , noncarcinogen (µg/L)	1 202104
RISK-BASE	Indoor exposure groundwater conc , carcinogen (µg/L)	5

Reference conc , RfC (mg/m³)

		Š	Soil Properties L	erties Lookup Table								
SCS Soll Type	K, (cm/h)	a (1/cm)	N (unitless)	M (unitless)	θ <sub>s</sub> (cm³/cm³)	8, (cm³/cm³)	Mean Grain Diameter (cm)					
ပ	0.20	0 008	1.09	0 083	0 38	0 068	0 0092					
ರ .	0.26	0 019	131	0 237	0 41	0 095	0 016					
_ <u>_</u> _	- 04	0 036	156	0 359	0 43	0 078	0 050					
<u>s</u>	14 59	0 124	2 28	0 561	0 41	0 057	0 040					
, <u>o</u>	0.12	0 027	128	0 187	0 38	0 10	0.025					
SCL	131	0 059	1 48	0 324	0 39	0 100	0 029					
<u></u>	0 25	0 0 16	1 37	0.270	0.46	0.034	0 0046					
<u> </u>	002	0 005	9	0 083	0 56	0000	0 0030					
18	0 45	0 0 2 0	141	0.797	0.45	0.089	0.0036					
S	4 42	0 075	1 89	0 471	0.41	0 065	0 030					
	•											
					Chemic	Chemical Properties Lookup Table	okup Table					
		Organic			Pure		Henry's	Henry's			Enthaiov of	
		carbon			component		law constant	law constant	Normal		vaporization at	Ş
		partition	Offusivity	Diffusivity	water	Henry's	at reference	reference	polling	Critical	the normal	risk R
		coefficient,	ji di	in water,	sotubility,	law constant	temperature,	temperature, T	point,	temperature,	boiling point,	factor,
CAS No Chemical		(6/ <sub>E</sub> m <sub>2</sub> )	(cm²/s)	(cm²/s)	(ma/L)	(unitless)	(atm-m³/mol)	≖ ပွ	<u>-</u> &	<u>ა</u> გ	ΔΠ <sub>ν b</sub>	(uo/m³) 1
												,
50293 DDT		2 63E+06	137E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05
50520 Benzu(a)pyrene 51285 2 4. Dinitroshenol		1 025+06	2 72E-02	90-400	1 625-03	4 63E-U5	1 135-06	25	715 90	969 27	15,000	2 1E-03
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 185-06	2.49E-03	6.03F-07	4 44E-U7	5 50 5 40 5 40 5 40 5 40 5 40 5 40 5 40	743 24	827.85	000,61	0 0E+00
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7.127	2 - E-03 1 5E-05
56553 Benz(a)anthracene		3 98E+05		90-300 6	9 40E-03	1 37E-04	3.34E-06	25	708 15	1004 79	15,000	2 1E-04
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3 7E-04
58899 gamma-HCH (Lindane)	_	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04
ASSES DESIGNED		2 14E+04	1.25E-02	4 74E-06	1 95E-01	6.19E-04	151E-05	522	613 32	842 25	13,000	4 6E-03
67641 Acetone		5 75F-01	3 35E-02 1 24E-01	1 148-05	3 50E+03	5.31E-05	1 54E-US	22,5	220 20	751 00	10,000	000+00
		3 98E+01	1 04E-01	1 00E-05	7 925+03	1 50E-01	3 66E-03	25	334 32	536 40	00°,0	235-05
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	<b>52</b>	458 00	695 00	9,510	4 OE-06
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	25	390 88	563 05	10,346	0 0E+00
/1432 Benzene 74666 1 1 Trichhamathana		5 89E+01	8 80E-02	90-H08 6	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342	8 3E-06
72208 Endrin			1 25E-02	<b>D</b> 4	2 50E-03	7 USE-01	1,72E-02 7,54E-06	22 24 34	34/24	945	7,136	0.05+00
72435 Methoxychlor			1 56E-02	4	4 50年-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	001100
72548 DDD			1 69E-02	4	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05
72559 DDE			1.44E-02	ı,	1 20E-01	8 61E-04	2 10E-05	25	636 44	860 38	13,000	9.7E-05
75014 Vind chloride (chloroethere)	(9764	1 865+01	7 28E-02	1215-05	1 52E+04	2 56E-01	6 24E-03	25	276 71	467 00	5,714	0.05+00
75092 Methylene chlonde	,	1 17E+01	1016-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	313 00	510 00	6.706	4 7E-07
75150 Carbon disulfide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	52	319 00	552 00	6,391	0 0E+00
75252 Bromoform		8 715+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422,35	00 969	9,479	1 1E-06
75274 Bromodichloromethane		5 50E+01	2 98E-02	106E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 BE-05
75354 11-Dichlomethylene		5 895+01	9 005-02	1 04 1 -05	2 255+03	2 30E-01	5676.03	52	330 55	523 00	6,895	005-00
76448 Heptachlor		1 41E+06	1 12E-02	5 69 E-06	1 80E-01	4 47E-02	1 096-03	25	603 69	846.31	13.000	13503
77474 Hexachlorocyctopentadiene	fiena	2 00E+05	161E-02	7 21E-06	1 80E+00	1 11E+00	2 715-02	25	512 15	746 00	10,931	0 0E+00
78591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10,271	2 7E-07
78875 1,2-Dichloropropane		4 37E+01		8 735-06	2 80E+03	1,15E-01	2 80E-03	25	369 52	572 00	7,590	0 0E+00
79016 Techomethylene		5 UTE+U1	7 80E-02	8 805-06	4 42E+03	3 74E-02	9 125-04	52	386 15	602 00	8,322	16E-05
79345 1.1.2.2-Tetrachloroethane	90	9 33E+01	7 105-02	2 -05-06 7 90F-06	2 97E+03	1415-02	3 44F-04	2,5	419.60	544 20 881 15	966 8	5.85-05
83329 Acenaphthene	!	7.08E+03	4 21E-02	7 69E-06	4 24E+00	6 365-03	1 555-04	3 %	550 54	803 15	12,155	0 0E+00

84662 Diethydphthalate	2 88E+02	2 56E-02	6 35E-06		VLOOKUP TABLES 1 85E-05	4 515-07	25	567 15	757 00	13.733	0 0E+00	2.8E+00
84742 Di-n-butyl phthalate	3 39E+04	4.38E-02	7 865-06	1 12E+01	3 85E-08	9 39E-10	8	613 15	798 67	14.751	00+100	4 67
86306 N. Minoscott	5.75E+04	1 74E-02	4 83E-06	2 69E+00	5 17E-05	1 265-06	25	09 099	839 68	13,000	00±±00	7 0E-01
86737 Elizando	1 295-03	3 12E-02	6 355-06	3 51E+01	2 05E-04	5 00E-06	52	632 28	890 45	13,000	14E-06	0 0E+00
	2 20E+04	3 63 E-02	7 885-06	1 98E+00	2615-03	6 37E-05	25	570 44	870 00	12,666	0 0E+00	146-01
87683 Hexachloro-1,3-butadiene	5.37E+04	5 81E-02	7 02E-00	2 22E+00	6 26E-0/	1 53E-08	52	627 87	899 00	13,977	57E-06	0 0E+00
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1956+03	1.00F-06	8 15E-03	ខ្ម	486 15	738 00	10,206	2 2E-05	0000
88062 2,4,6-Trichlorophenol	381E+02	3 185-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	22	519 15	749 03	000,5	24E-05	201400
91203 Naphthalene	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	22	491 14	748 40	10.373	000+00	14F-01
913413,3-Ukhlorobenzidine 95478 a.Yukasa	7 24E+02	1 94E-02	674E-06	3 115+00	1 64E-07	4 00E-09	52	560 26	754 03	13,000	135-04	0000
95487 2-Methythenal (p. seed)	3 535 +02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	52	417 60	630 30	8,661	0 0E+00	7 0E+00
95501 1.2-Dichlombenzene	9 12E+01	/ 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	52	464 19	697 60	10,800	0 0E+00	1 8E-01
95578 2-Chlomphenol	3 88 5 + 02	501502	7 90E-06	1 56E+02	7 79E-02	1 90E-03	52	453 57	705 00	9,700	0 0E+00	2 0E-01
95954 2,4,5-Trichlorophenol	1 60E+03	2915-02	7 03F-06	1 205+03	1 78E-04	3 90 = 0.4	ខ	447 53	675 00	9,572	0 0E+00	185
98953 Ntrobenzene	6 46E+01	7 60F-02	8 50F-06	2 096+03	10 U/U/O	50-74-4 50-10-4	ខ្ល	526 15	759 13	13,000	0 00	355-01
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 695 +02	3237-01	2 40E-05 7 88E-03	5 %	483 95	719 00	10,566	음 발 당 당	2 0E-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	113E-01	2765-03	S K	409 34	07 / 10	6,50	00+400	10E+0C
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 695-06	7 87E+03	8 20E-05	2 00E-06	3.5	484 13	707 60	11 220		1 OE+OB
	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	<b>5</b> 8	411 52	616 20	8.525	001100	7 05+07
10045/ 1,4-Dichlorobenzene	6.17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	52	447 21	684 75	9.271	00+100	A OF O
102082 1 2 District then	6 61 5 + 01	4 83E-02	1016-05	5 30E+03	1 36E-05	3 32E-07	52	503 65	754 00	11,689	0 0 0 0 0	1 4E-02
	1.455+01	נט דומיי פ	9 90E-06	8 52E+03	4 01E-02	9 78E-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xviene	4 07F±02	2 00E-02	3 20E-06	2 00E+04	2 10E-02	5 12E-04	52	345 65	519 13	7,800	0 0E+00	2 0E-01
108883 Toluene	1 82E+02	8 70F-02	8605.08	5 26E402	3 7 2 5 6 4	7.34E-03	52	412 27	617 05	8,523	0 0E+00	7 0E+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72F+02	1 525-01	9 53E-03	8 8	383 78	591 79	7,930	0 0E+00	4 0E-01
	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63 E-05	3 985-07	G K	404 07 45 50 50	632.40	8,410	0 0 0 0	2 0E-02
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92E-02	7 535-06	1 72E+04	7.38E-04	1 80E-07	0 K	455 UZ	034.20	10,920	0 05+00	2 1E+00
115297 Endosultan	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	3 52	674 43	67 57 6 67 67 67	9,000	3 35-04	0 0E+00
117817 Bis(2-ethylhexyl)phthalate	1 51E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	52	657 15	806 00	15,999	4 OF-06	005+00
11840 UHn-octyl prinalate 118741 Havachlombarzana	8 32E+07	151E-02		2 00E-02	2 74E-03	6 68E-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
120127 Anthracene	2 0551104	3 24E-02	3 9715-06	6 205 +00	5 41E-02	1 32E-03	52	582 55	825 00	14,447	4 6E-04	0 0E+00
	1 78F±03	3.005.02	7.4E-U5	4 34E-02	2 67 E-03	651E-05	52	615 18	873 00		0 0E+00	1 15+00
	1 47F+02	3.46F-02	8 77E-06	3 00E+02	5 82E-02	1 42E-03	S :	486 15	725 00		0 0E+00	2 0E-0
121142 2,4-Dinitrotoluene	9 55E+01	2 03F-01		4 50E+03	2 SOF CA	3 17E-06	52	482 15	708 17		0 0 0	1 1E-02
124481 Chlorodibromomethane	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21 5-02	7 835-04	0 K	590 00 416 14	814 00	13,467	- 9E 4	0 0E+00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 845-02	3 52	394.40	620 30	000'8	2 46 95	0 0 E + 00
129000 Pyrana	1 05E+05	272E-02	7 24E-06	135E-01	4 51E-04	1 10E-05	22	667.95	936 00	14.370	005400	1 4 6 5 1
150592 CB-1,Z-Dichloroethylene	3 55E+01	7 36E-02	1 135-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00		000+00	3.55-02
193395 Indeno(1.2.3-cd)evrene	3.476+01	7 U/E-U2	1 19E-05	6 30E+03	3 85E-01	9 39 6-03		320 85	516 50		00+300	7 0E-02
205992 Benzo(b)fluoranthene	1 23 5 + 06	2 26F-02	5 56F-06	2 20E-05	6 56E-05	1 60 5-06		809 15	1078 24		2 1E-04	0 0E+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 35 E-06	2.06F-03	4 33E-03	1115-04		715.90	969 27	15,000	2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8.29E-03	G K	655 95 752 46	905 00	13,815	0 0E+00	14501
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05		714.15	07970	000'91	2 1E-05	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1705-04		603 01	839.37	13,000	2 E 2 E	00+100
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05	52	596 55	839 36	13,000	1 85-03	00+400
51955/ Dela-non (Dela-Brio)		1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	004400
606202 2 6-Dinitratalisme	4 3/E+U1	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	587 38	2,000	3 7E-05	2 0E-02
621647 N-Nitrosodl-n-propylamine		5.45E-02	7 20E-UD	1 82E+02	3.06E-05	7 46E-07		558 00	770 00	12,938	1 9E-04	0 0E+00
1024573 Heptachlor epoxide		1 32E-02		2 AME-01	3 00 00	2 25E-06	8 8	209 60	746 87	11,000	2 05-03	0 0E+00
7439976 Mercury (elemental)		3 07E-02		5 62E-02	4 67F-01	9 51E-06		613.96	848 76		2 6E-03	0 0E+00
8001352 Toxaphene	2 57E+05	1 16E-02		7 40E-01	2 46E-04	8.00F-08	6 4	629 88 667 16	1750 00		0 OE+00	3 0E-04
11096825 Arador 1260 (PCB-1260)	2 90E+05	1 38E-02		8 00E-02	1 89E-01	4 60E-03	3 12	402.50	539.37	00,00	2 ZE-04	0 0E+0
11097691 Arador 1254 (PCB-1254)	2 00E+05	1 56E-02		5 70E-02	8 20E-02	2 00E-03	52	377 50	512.27	19.00	֓֞֝֞֜֜֝֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֡֓֓֓֡֓֓֓֓֓֡֓֡֓֡֓֡	
126/4112 Alocar 1016 (PCB-1016) 62469219 Amoly: 1242 (PCB-1016)	3 30 0 + 04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	52	340 50	475 22	18,000	2 - 1- 2 - 1- 2 - 1- 3	0.00
224032 13 AUGUST 1242 (FCD-1242)	3 30=+04	2145-02	5 31E-06	3 40E-01	2 13E-02	S 20E-04	52	345 50	482 20	18,000	1 0 0 0	00+400
					!							

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

		ENTER	stratum A soll vapor permeability, k, (cm²)		
			Q K	٦.	
		ENTER Soil Stratum A	SCS Scoll type (used to estimate soil vapor permeability)	ပ	ENTER Stratum C soil water-filled porosity, $\theta_w^c$ (cm³/cm³)
		ENTER	SCS soil type directly above water table	S	ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)
		ENTER	Soit stratum directly above water table, (Enter A, B, or C)	U	ENTER Stratum C soil dry bulk density, P <sub>o</sub> <sup>c</sup> (q/cm³),
	hylene	ENTER (L <sub>wt</sub> (cell D28) Thickness	effection of soil stratum C, (Enter value or 0) to the (cm)	1005 84	ENTER Stratum B soil water-filled porosity, $\theta_a^B$ (cm³/cm³)
Сћетиса	cis-1,2-Dichloroethylene	NTER ENTER ENTER Totals must add up to value of L <sub>VT</sub> (cell D28) Thickness	of soil stratum B, (Enter value or 0) h <sub>B</sub>	152 4	ENTER Stratum B soit total porosity, n (unitiess)
	8	ENTER Totals mu	Thickness of soil stratum A,	9144	ENTER Stratum B soil dry bulk density, p <sub>B</sub> (g/cm³)
		ENTER	Depth below grade to water table, Lwr (cm)	2072 64	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ (cm <sup>3</sup> /cm <sup>3</sup> )
ENTER Inital groundwater conc , Cw (µg/L)	14 005	ENTER Depth below grade	to bottom of enclosed space floor, Le (cm)	15	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)
ENTER Chemical CAS No (numbers only, no dashes)	156592	ENTER	soil/ groundwater temperature, T <sub>S</sub>	16	ENTER Stratum A soil dry bulk density, Po. <sup>A</sup> (g/cm <sup>3</sup> )

0.43												
17	ENTER	Indoor air exchange	rate ER	(1/h)	0.45							
0.27	ENTER	Floor-wall seam crack	width, *	(cm)	0.1	ENTER	Terget hazard	quotient for	noncarcinogens, THQ	(unitless)		Used to catculate risk-based groundwater concentration 1 of 7
0 42	ENTER	Enclosed	height, Ha	(cm)	488	ENTER	Target	nsk for	carcinogens, TR	(unitless)	1 0E-06	Used to calcul groundwater
17	ENTER	space	width,	(cm)	961	ENTER	I	Exposure	frequency, EF	(days/yr)	350	
0.2	ENTER	space	length, Le	(cm)	1961	ENTER	ı	Exposure	duration, ED	(yrs)	30	
0.43	ENTER	Soit-bidg pressure	omerential, AP	(g/cm-s <sup>2</sup> )	40	ENTER	Averaging	time for	noncarcinogens, AT <sub>NC</sub>	(yrs)	30	
1.5	Enclosed	space	thickness, Land	(cm)	15	ENTER	Averaging			ĺ	70	

Reference conc., RfC (mg/m³)	3.5E-02
Unit risk factor, URF (µg/m³)-1	0 0E+00
Pure component water solubility, S S (mg/L)	3 50E+03
Organic carbon partition coefficient, $K_{\infty}$ $(cm^3/g)$	3 55E+01
Critical temperature, T <sub>C</sub> (*K)	544 00
Normal bouling point, T <sub>B</sub>	333 65
Entha'by of vaporization at the normal bolling point, AH <sub>v,o</sub> (cal/mol)	7,192
Henry's law constant reference temperature, T <sub>R</sub>	25
Henry's law constant at reference temperature, H	4 07E-03
Diffusivity in water, D., (cm²/s)	1 13E-05
Duffusivity in air,  D <sub>a</sub> (cm <sup>2</sup> /s)	7 36E-02

Floor-wall seam permeter, Xerack (cm)	3,844	Diffusion path length, Le	2057 64
Water-filled porosity in capillary zone, $\theta_{w,ca}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 294 Total	overall effective diffusion coefficient, $D^{eff}$ (cm²/s)	7 61E-04
Arr-filled porosity in capillary zone, $\theta_{\mathbf{z}} = (\mathrm{cm}^3/\mathrm{cm}^3)$	0 136 Capillary	zone effective diffusion coefficient, Deff α	5 24 - 04
Total porosity in capillary zone, $\Gamma_{ca}$	0 43 Stratum	effective diffusion coefficient, Deff.	Reference conc., RfC (mg/m³)
Thickness of capillary zone,	17 05 Stratum	effective diffusion coefficient, Deff (cm²/s)	7 60E-04 Unit risk factor, URF (µg/m³)**
Stratum A soil effective vapor permeability, k,	5 97E-10 Stratum	A effective diffusion coefficient, Deff (cm <sup>2</sup> /s)	2 98E-03 Infinite source bidg. conc , Coulding (µg/m³)
Stratum A soil relative air permeability, k <sub>rp</sub>	767 0	Vapor viscosity at ave soil temperature, $\mu_{TS}$ (g/cm-s)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)
Stratum A soil intinnsic permeability, k	7 49E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)	Exponent of equivalent foundation Pectet number, exp(Pe) (unitiess)
Stratum A effective total fund saturation, S <sub>1</sub> , (cm <sup>3</sup> /cm <sup>3</sup> )	0 365	Henry's law constant at ave groundwater temperature, H <sub>Ts</sub>	2 72E-03 Area of crack, Assack (cm <sup>2</sup> )
Stratum C soil au-filled porosity, $\theta_a^c$ $(cm^3/cm^3)$	0 130	enthalpy of vaporization at ave groundwater temperature, ΔΗ, τs (cal/mol)	7,874 Crack effective diffusion coefficient, Drack (cm²/s)
Stratum B soil air-filled porosity, $\theta_{\mathbf{a}}^{\mathbf{B}}$	0 150	Crack depth below grade, Z <sub>grack</sub> (cm)	Average vapor flow rate into bldg., Qsol (cm³/s)
Stratum A soil all-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio,  η (unitiess)	4.18E-04 Crack radius, fenak (cm)
Source- building separation, Lr (cm)	2057 64 Area of	enciosed space below grade, A <sub>e</sub> (cm²)	9 24E+05 Source vapor conc., Cuorce (µg/m³)
Exposure duration, t	9 46E+08	Bidg, ventilation rate, Q <sub>busiding</sub> (cm <sup>3</sup> /s)	S 63E+04  Convection path length, Lp (cm)

UNDWATER CONCENTRATION CALCULATIONS
ED GROUNE
RISK-BASED (

INCREMENTAL RISK CALCULATIONS

Hazard quotient	from vapor	intrusion to	indoor air,	noncarcinogen	(unitless)	Ą
Incremental nsk from	vapor	intrusion to	indoor arr,	carcinogen	(unitless)	¥
Final	Indoor	exposine	groundwater	conc,	(hg/L)	8 40E+04
Pure	component	water	solubility,	S	(µg/L)	3 50E+06
Risk-based	indoor	exposite	groundwater	conc,	(µg/L)	8 40E+04
Indoor	exposure	giocicowatei	couc'	noncarcinogen	(µg/L)	8 40E+04
Indoor	exposure	Somonage	2000	carcinogen	(Jug/L)	¥

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

		Š	Soil Properties Lookup Table	ookun Tabla		VCOORUR I ABLES	62						
SCS Soil Type	K, (cm/h)	α (1/cm)	N (unitless)	M (unitiess)	θ, (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)						
Ų	0.20	0 008	1 09	0 083	0 38	0 068	0 0092						
<u>ಪ</u>	0 26	0 019	131	0 237	0 41	960 0	0 016						
<u>.</u>	2	0 036	1 56	0 359	0 43	0 078	0 0 0 0 0						
מ ני	14 59	0 124	2 28	0 561	0 41	0 057	0 040						
SC	0 12	0 027	1 23	0 187	200	0 100	0.044						
SCL	131	0 059	1 48	0 324	0 39	0 100	0 029						
<u>S</u>	0.25	0 016	1 37	0 2 2 0	0 46	0 034	0 0046						
Ç.	0 02	0 005	6	0.083	0.26	0 0 0 0	0 0038						
מַכּר	0 0 0	0 0 10	123	0 187	0 43	0 089	0 0056						
SL	4 4 4 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0.020	1.47	0.291	0 45	0 065	0011						
					Chemic	Chemical Properties Looking Table	KIID Table						
		Organic			Pure		Henry's	Tank's			Total Control		
		carbon			component		law constant	law constant	2		vanodration at	-	
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	polling	Critical	the normal	į	Reference
		coefficient,	in aır,	in water,	solubildy,	law constant	temperature,	temperature,	point,	temperature,	bailing point,	factor	conc.
		٠	<b>.</b>	<u></u> "	ω	ì	I '	ᄩ	۳	۲٥	ΔH,ν	URF	Ş.
CAS No Chemical		(cm²/g)	(cm <sup>2</sup> /s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/mol)	<u>(</u> )	( <sup>R</sup>	( <b>,</b> K)	(cal/mol)	(mg/m <sub>3</sub> )	(mg/m³)
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32F-04	ያ የቤዝባ	36	K32 1E	27 007	400	74.00	i d
50328 Benzo(a)pyrene		1 02E+06	4 30F-02	90,100	462E-03	4 63E-04	1 13 10 0	25	144	67 030	11,000	9 / H-02	00000
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	90-390 6 9 06E-06	2 79E+03	1 82E-05	4 44 F-07	2,5	605.28	909 21 827 RK	15,000	20-31.2	0 UE+00
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	15.000	2 15-03	00+100
56235 Carbon tetrachlonde		1 74E+02	7.80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7.127	1 5 - 05	00+00
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40€-03	1 37E-04	3 345-06	25	708 15	1004 79	15,000	2 16-04	0 OE+00
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	52	624 24	885 73	13,000	3 7E-04	0 0E+00
S8899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	734E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 75-04	0.0E+00
65850 Benzalo Acid		8.00E.04	1 20E-02	7 075 06	1 95E-01	6 18E-04	1515-05	25	613 32	842 25	13,000	4 65-03	0 0E+00
67641 Acetone		5 75E-01	1 24F-01	1145-05	3 30E+03	1 595.03	3 885-05	S 5	320,000	751 00	10,000	00=+00	146+01
		3 98E+01	1046-01	1 00E-05	7 92E+03	1 50E-01	3.66F-03	2, 22	334.32	536.40	CCS-0	2 35.05	3 35-01
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88 E-03	25	458 00	695 00	9.510	4 0E-06	0 OE+00
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61 E-04	8 80E-06	25	390 88	563 05	10,346	0 0E+00	3 5E-01
/1432 Benzene 71558 1 1 1-Trichlorostrans		5 89E+01	8 80E-02	9 80E-06	175E+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342	8 3E-06	0.0E+00
72208 Endin		1 235+04	1 25E-02	4 74E-06	2 50E-03	2 OBT 0.	7 646 08	2, 2	34/24	545 00	7,136	001100	1 0 = +00
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	000000	20-17
72548 DDD		1 00E+06	1 695-02	4 76E-06	9 00E-02	1 64E-04	4 00E-08	25	639 90	863 77	14,000	6 9E-05	0 0E+00
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61 6-04	2 105-05	25	636 44	860 38	13,000	9 7E-05	0,0E+00
75014 Vinyl chloride (chloroethese)	(aca	1 055+03	1 065-02	1216-05	1 52E+04	2 56E-01	6.24E-03	25	276 71	467 00	5,714	00000	50E-03
75092 Methylene chloride	<u>'</u>	1 17E+01	1015-01	1 17 F-05	1305+04	8 98E-02	2 / 15-02	C7 6	27 627	432 00	5,250	տ - - - 	000+000
75150 Carbon disulfide		4 57E+01	1046-01	1 00E-05	1 19E+03	1 24E+00	3.02F-02	25.	31400	552 00	6,706 8,391	0.0400	2 OF 100 2 OF 101
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	534E-04	25	422 35	00 969	9.479	115-06	0 0E+00
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 8E-05	0 0E+00
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5.61E-03	25	330 55	523 00	6,895	0 0E+00	5 0E-01
75354 1,1-Dichlordethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6,247	5 0E-05	0 0E+00
77474 Hexachlor	aro	2 00E+06	1 12E-02	5 69E-06	1,80E-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	1 3E-03	00400
78591 Isophomoe	<u> </u>	4 685+01	8 23E-02	6 78E-08	1 2011-104	3 725.04	2715-02	8 8	512.15	746 00	10,931	0 05+00	7 05-05
78875 1,2-Dichloropropane		4.37E+01	7 82E-02	8 73E-06	2 80E+03	2 /2E-04 1 15E-01	5 63E-06	8 K	488 35 85 65 65 85 65 65	715 00	7,2/1	2 /E-0/	0 0E+00
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 BOE-06	4 42E+03	3 74E-02	2 40E-33	25	386 15	602.00	8.322	1 6E-05	0.0E+00
79016 Trichloroethylene		1 66E+02	7 90E-02	9 10E-06	1.10E+03	4 22E-01	1 03E-02	25 25	360 36	544 20	7,505	1 7E-06	000+00
79345 1,1,2,2-Tetrachloroethane	ē	9 33E+01	7 10E-02	7 90E-06	2 97E+03	141E-02	3 44E-04	25	419 60	661 15	8,996	5 8E-05	0 OE+00
83329 Acenaphthene		7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0 00+00	2 15-01

84662 Diethylphthalate	2 88E+02		6 35E-06		VLOOKUP TABLES 1 85E-05	4 51E-07	25	567 15	757 00	13.733	0.05+00	2 85+00
84587 Port Londy phthalate	3 39E +04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10	82	613 15	798 67	14.751	00+400	3.5E-01
86306 N Million 1	5 75E+04	1 74E-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06	52	09 099	839 68	13,000	0 0E+00	7 OF-01
SC123 CI.	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 00E-06	52	632 28	890 45	13.000	1.4F-06	0.05+0.0
86748 Carbana	1 38E +04	3 63E-02	7 88E-06	1 98E+00	2 61E-03	6 37E-05	52	570 44	870 00	12,666	00+400	1 4E-01
87683 Hexachlord 3-bidadiese	6 39E+03	3 905-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	55	627 87	899 00	13,977	5 7E-06	0 0E+00
87865 Pentachiorophenol	5926+02	5605-02	6 10E-06	3 23E+00	3345-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0 0E+00
88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6.25E-06	8 00E+02	3 19 17-06	7 785.06	S S	582 15	813.20	14,000	3 46-05	0 OE+00
91203 Naphthalene	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 835-04	3 2	49114	748.40	000,2T	3 15-06	0 dE+00
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	674E-06	3 11E+00	1 64E-07	4 00E-09	22	560 26	754 03	13.000	135-04	00100
95487 2.Methydaban (4. cone)	3 63E+02	8 70E-02	1 005-05	1 78E+02	2 13E-01	5 20E-03	52	417 60	630 30	8,661	0 0E+00	7 OE+00
95501 (2-Dichlomberzene	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	55	464 19	697 60	10,800	0 OE+00	1 8E-01
95578 2-Chlorophenol	3.885+02	5 015-02	7 905-06	1 56E+02	7 79E-02	1 90E-03	52	453 57	705 00	9,700	0 0E+00	2 0E-01
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 035-06	2 20E+04	1 60E-02	3 90 6-04	52	447 53	675 00		0 0E+00	1 8E-02
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9.845-04	4 34E-06 2 40E-05	Ω ¥	526 15 482 05	759 13	13,000	8490	356-01
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88F-03	3 2	463.95	719.00	10,566	00=+00	2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
100425 Styrene	7 76E+02	7 10E-02	8 00€-06	3 10E+02	1 13E-01	2 76E-03	2 22	418.31	636.00		00000	101100
1055/9 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	25	484 13	707 60		0.05+00	7.05-02
	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	56	411 52	616 20		00+400	7 0E+00
106478 p-Chlomantine	6 1/E+02	0 30E-02	7 901-06		9 96E-02	2 43E-03	25	447 21	684 75		0 OE+00	8 0E-01
107062 1,2-Dichloroethane	1 74F+01	1 045-02	0 015-03	5 30E+03	136E-05	3 32E-07	25	503 65	754 00		0 OE+00	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20F-06		2 105-02	9 /81-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3.015-03	7 245 09		345 65	51913		0.05+00	2 0E-01
	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6.635.03		412.2/	617 US		00=+00	7 0E+00
	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3.71E-03	3 2	404.87	537.40	056,0		4 0F-01
108952 Phenol	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	25	455 02	694.20		001100	2 15 100
111444 dis(2-cnigroethyr)ether 115297 Endosuffan	1 55E+01	6 92E-02	7,53E-06	1 72E+04	7 38E-04	1 80E-05	25	451 15	659.79		3 3 3 3 5 5 5	00000
	1.51E+07	3.516-02	4 55E-05	3 10E-01	4 59E-04	1 12E-05		674 43	942 94		0 0E+00	2 1E-02
117840 Di-n-octyl phthalate	8 32E+07	1515-02	3.58F-06	2 00 E-02	2 74E-03	1 02E-07		657 15	806 00		4 0E-06	0 0E+00
	5 505+04	5 42E-02	5 91E-06	6 20E+00	5.415-03	4 225 02	6 5	704 09	862 22		0 OE+00	7 0E-02
	2.95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6.515-05	2 6	582 55 615 18	825 00		4 6E-04	000
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03		486 15	725.00	13,121	00#+00	1 1E+00
120832 Z,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06	52	482 15	708 17		00100	115.02
12   142 z.4-Dinigologologo 124481 Chlomodynomothero	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	52	590 00	814 00		1950	0 0E+00
127184 Tetrachloroethdene	0 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04		416 14	678 20		2 4E-05	0 OE+00
129000 Pyrene	1 05E±05	7.25.02	2 24E-06	2 UVE +UZ	7.545-01	1 84E-02		394 40	620 20		5 8E-07	0 0E+00
156592 ds-1,2-Dichloroethylene	3 55E+01	7.36E-02	1 135-05	3 505+03	4 31E-04	1 10E-05		667 95	936 00		0 0E+00	1 15-01
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3.85F-01	9 395-03	2 2	333 65	544 00		0 0E+00	3 SE-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 605-06		320 83 809 15	016 00	71/9	0 0E+00	7 0E-02
205992 Benzo(b)fluoranthene	1.23E+06	2 26E-02		1 50E-03	4 55E-03	1 11E-04		715 90	969 27			00-100
200440 Figorandinene	1 07E+05	3 02E-02		2 06E-01	6 60E-04	1 61E-05		655 95	905 00			47.01
218019 Chrysene	1 08E+00	2 485 03	5 55E-06	8 00E-04	3 40E-05	8 29E-07		•	1019 70		2 1E-05	0 0E+00
309002 Aldrin	2 45F+06	1 32E-02		1 00E-03	3 885-03	9 46E-05		714 15	979 00		2 15-06	00+30 O
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02		2 00F+00	4 355-04	1,000-04	£ 12	603 01	839 37			0 OE+00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7.44E-07		596 55 506 55	839 36			0 0E+00
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02	3 %	381 15	587.38	000.5	5 3E-04	0 0E+00
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02		1 82E+02	3 06E-05	7 46E-07		58 00	9 8		2 Lega	205-02
1024573 Hentachics energy	2 405+01	5 45E-02		9 89E+03	9 23E-05	2 25E-06		209 60				00+400
7439976 Mercury (elemental)	5 32E+04	1 32E-02		2 00E-01	3 90E-04	9 51 E-06	52					0 0E+00
8001352 Toxaphene	2 57F±05	1 165-02	0 30E-00	5 62E-02	4 67E-01	1 14E-02	92	. 88		Ū	_	3 OE-04
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32F-06	8 OOF 02	1 805.04	6 00E-06	52	12	873 31			0 0E+00
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20F-02	2 00E-03	8 8		539 37	19,000		0 0E+00
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	9 15	3 5	512.27	19,000		0 0 0 0
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 146-02	531E-06	3 40E-01	2 13E-02	5 20E-04	3 52			18,000	0E-04	0.05+00
									ì			Joseph

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1,2 September, 1998 YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

ENTER YES

ENTER

		ENTER	User-defined stratum A	soil vapor permeability,	κ, (cm²)					
				R		' ']				
		ENTER	stratum A SCS	ate	soli vapor permeability)	0	ENTER	Stratum C soil water-filled	porosity, 6 <sub>w</sub> c	(cm3(mm3)
		ENTER		soil type	water table	s	ENTER	Stratum C soil total	porosity, n <sup>c</sup>	(madian)
		ENTER	Soil	stratum directly above	Water (able) (Enter A, B, or C)	O	ENTER	Stratum C soil dry	bulk density, Po <sup>5</sup>	(a,cm3)
	lene	ENTER Lwr (cell D28)	Thickness of soil	Stratum C, (Enter value or 0)	ош)	1005 84	ENTER	Stratum B soil water-filled	porosity,	(cm3/cm3)
Chemical	1,1-Dichloroethylene	NTER ENTER ENTER Totals must add up to value of L <sub>wr</sub> (cell D28)	Thickness of soil	(Enter value or 0) (Enter value or 0)	(ED)	152 4	ENTER	Stratum B soil total	porosity.	(and bear)
		ENTER Totals mu	Thickness	or soll stratum A,	(cm)	914.4	ENTER	Stratum B soil dry	bulk density, P <sub>b</sub> B	/c/m3/
		ENTER	Depth	below grade to water table	cm)	2072 64	ENTER	Stratum A soil water-filled	porosity,	/cm3/cm3/
Inital groundwater conc , Cw (µg/L)	22 18785714	ENTER Depth	betow grade to bottom	or enclosed space floor,	(cm)	15	ENTER	Stratum A soil total	porosity.	(acceptor)
Chemical CAS No (numbers only, no dashes)	75354	ENTER	Average soll/	groundwater temperature, T	နှ (၃)	16	ENTER	Stratum A soil dry	bulk density, Pa	(cons)

ENTER Stratum C soil dry bulk density,  $ho_b^c$ (g/cm³)

ENTER
Stratum B
soil water-filled
porosity,  $\theta_w^B$   $(cm^3/cm^3)$ 

ENTER Stratum B soil dry bulk density, Pb (g/cm³)

ENTER Stratum A soil dry bulk density, Pb<sup>†</sup> (g/cm³)

0.43							
17	ENTER	Indoor air exchange	rate, ER	(1/h)	0.45		
0 27	ENTER	Floor-wall seam crack	width, w	(cm)	0.1	ENTER Target hazard quotient for noncardingens, THQ (unitless)	-
0.42	ENTER	Enclosed space	height, Ha	(cm)	488	ENTER Target risk for carcinogens, TR (unitiess)	1 0E-06
17	ENTER	space	width, Wa	(cm)	961	ENTER Exposure frequency, EF (days/yr)	350
0.2	ENTER	space floor	length, <sup>1</sup> -8	(cm)	961	EXPOSURE duration, ED (yrs)	30
0.43	ENTER	Soil-bldg pressure	differential, ∆P	(g/cm-8²)	40	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	30
15	ENTER	space floor	thickness, Lend	(cm)	15	ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	70

Used to calculate risk-based groundwater concentration

2 of 7

Reference conc , RfC (mg/m³)	0 0E+00
Unit risk factor, URF (µg/m³)-1	5 0E-05
Pure component water solubrity, S S (mg/L)	2 25E+03
Organic carbon partition coefficient, Ke (cm³/g)	5 89E+01
Critical temperature, T <sub>C</sub> (*K)	576 05
Normal bouling point, T <sub>B</sub>	304.75
Enthalpy of vaponzation at the normal boiling point, AH <sub>v.b</sub>	6,247
Henry's law constant reference temperature, T <sub>R</sub> (°C)	25
Henry's law constant at reference temperature, H (atm-m³/mol)	2 61E-02
Diffusivity in water, D <sub>w</sub> (cm²/s)	1 04E-05
Diffusivity in air, D_ (cm²/s)	9 00E-02

Floor- wall seam perimeter, Xonak (cm)	3,844	Diffusion path length, L <sub>s</sub>	2057 64	
Water-filled porosity in capillary zone, $\theta_{w,\alpha}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.294	Total overall effective diffusion coefficient, $\mathbf{D}^{\mathrm{eff}}$	9 15E-04	
Air-filled porosity in capillary zone, $\theta_a$ $\alpha$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 136	Capillary zone effective diffusion coefficient, Doff cm²/s)	6 30E-04	
Total porosity in capillary zone, n <sub>cz</sub>	0 43	Stratum  C  effective diffusion coefficient, D <sup>eff</sup> c (cm <sup>2</sup> /s)	5.47E-04	Reference conc, RfC (mg/m³)
Thickness of capillary zone, La (cm)	17.05	Stratum B B effective diffusion coefficient, D=" (cm <sup>2</sup> /s)	9 22E-04	Unit nsk factor, URF (µg/m³).1
Stratum A soil effective vapor permeability, k,	5,97E-10	Stratum A A effective diffusion coefficient, $D^{eff}_{\Lambda}$ (cm <sup>2</sup> /s)	3 65E-03	Infinite source bldg. conc , Counting (µg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub> (cm²)	0 797	Vapor viscosity at ave soil temperature, hrs (g/cm-s)	1 77E-04	infinite source indoor attenuation coefficient,
Stratum A soil intrinsic permeability, k	7 49E-10	Henry's law constant at ave groundwater temperature, H'rs (unitiess)	7.88 <b>E-</b> 01	Exponent of equivalent foundation Peclet number, exp(Pe <sup>t</sup> ) (unitless)
Stratum A effective total fluid saturation,  Ste (cm <sup>3</sup> /cm <sup>3</sup> )	0.365	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol)	1 87E-02	Area of crack, Acres (cm²)
Stratum C soll air-filled porosity, $\theta_{\mathbf{k}}^{c}$ $(\mathrm{cm}^{3}/\mathrm{cm}^{3})$	0 130	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{\nu, TS}$ (cal/mol)	6,353	Crack effective diffusion coefficient, Densk (cm²/s)
Stratum B soil air-filled porosity, $\theta_*^a$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth befow grade, Zosek (cm)	15	Average vapor flow rate into bidg., Que (cm³/s)
Stratum A soil air-filled porosity, $\theta_a^A$ (cm³/cm³)	0 230	Crack- to-total area ratio,  n (unitless)	4 16E-04	Crack radius, frack (cm)
Source- building separation, Lr (cm)	2057 64	Area of enclosed space below grade, A <sub>a</sub>	9 24E+05	Source vapor conc., Cuerce (µg/m³)
Exposure duration, t (sec)	9 46E+08	Brdg ventilation rate, Quiding (cm <sup>3</sup> /s)	5 63E+04	Convection path length, Le (cm)

D GROUNDWATER CONCENTRATION CALCULATIONS
ROUN
SED G
RISK-BAS

INCREMENTAL RISK CALCULATIONS.

Hazard quotlent	from vapor	intrusion to	indoor air,	noncarcinoden	(andess)	AN
Incremental risk from	vapor	intrusion to	indoor air,	carcinogen	(unitless)	Ϋ́
Final	ndoor	exposure	groundwater	conc,	(hg/L)	1 46E+01
Pure	component	water	solubility,	S	(hg/L)	2 25E+06
Risk-based	ındoor	exposme	groundwater	conc.,	(µg/L)	1 46E+01
Indoor	exposure	groundwater	conc.	noncarcinogen	(ug/L)	NA
Indoor	exposure	roundwater	conc.	carcinogen	٦	÷01

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

Reference conc , RfC (mg/m³)

						VLOOKUP TABLES	LES					
	3		Soil Properties Lookup Table	ookup Table	نه	نه نه						
SCS Soil Type	K, (cm/h)		N (unittess)	M (unitless)	θ, (cm²/cm²)	θ, (cm³/cm³)	Mean Grain Diameter (cm)					
<u>o i</u>	0 20	0 008	1 09	0 083	0 38	0 068	0 0002					
<u>. 5</u>	0.26	0 019	131	0 237	0 41	0.095	0 0 16					
<u>. د</u>	2 5	0.036	156	0,359	640	0.078	0 020					
<u>، د</u>	14 59	0 124	2 28	0.561	041	0 057	0 040					
ກິທິ	28.0	24.0	7 OR	7290	24.0 24.0	0.045	0.044					
200	131	0 059	148	0.324	50 O	9 6	0.029					
· · · ·	0.25	0.016	1 37	0.270	0 46	0 034	0 0046					
SIC	0 02	0 005	1 09	0 083	0.26	0.070	0 0039					
SICL	0 0 0	0100	1 23	0 187	0 43	680 0	9500 0					
]S	0 45	0 020	1.4	0 291	0 45	0.067	0 011					
S.	4 42	0.075	1 89	0 471	0 41	0 065	0 030					
								ı				
					Chemic	Chemical Properties Lookup Table	okup Table					
		Organic			Pure	•	Henry's	Henv's			Enthalox of	
		carbon			component		law constant	Ē	Normal		vaporization at	Ž Č
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	boiling	Critical	the normal	risk Refe
		coefficient,	în air,	in water,	solubility,	taw constant	temperature,	ure,		temperature,	boiling point,	
CAS No Chemical	<del>ro</del>	cm³/g)	(cm²/s)	U.w (cm²/s)	s (ma/L)	H (unitless)	(atm-m³/mol)	۳ گر آ	<u>.</u> &	င်္ဂ န်	ΔH <sub>v</sub> <sub>b</sub>	URF F
					i i		<i>(</i> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	6	2			
50293 DDT 50328 Benzo(a)ovrene		2 635+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05
51285 2.4-Dinitrophenol		1 00E-02	2 73E-02	9065-06	2 79E+03	1 82E-05	4.445-07	8 %	605.2B	909 2/	15,000	2 15-03
53703 Dibenz(a,h)anthracene	ene	3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	147E-08	52 52	743.24	990 41	16.000	2.15-03
56235 Carbon tetrachlonde	•	1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	32 32	349 90	556 60	7,127	25-05 1 5F-05
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34 E-06	25	708 15	1004 79	15,000	2 1E-04
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3 7E-04
58899 gamma-HCH (Lindane)	ne)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	52	596 55	839 36	13,000	3.7E-04
65850 Berroln Acid		2 14E+04	1 25E-02	4 74E-06	195E-01	6 19E-04	151E-05	25	613 32	842 25	13,000	4 6E-03
67641 Acetons		5 75E-01	3 30E-02	1 145.05	3 50FF03	4 505.03	19411-05	522	720 00	751 00	10,000	0 0E+00
67663 Chtoroform		3 98E+01	1 04E-01	1 00E-05	7 926+03	1 50E-01	60-199 c	2,5	334 32	536.40	0,900 80,80	3E-00
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 595-01	3 88 E-03	25	458 00	695 00	9.510	4 0F-06
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	25	390 88	563 05	10,346	0 00+00
		5 89E+01	8 B0E-02	9 80E-06	1 75€+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342	8 3E-06
71556 1,1,1-Trichloroethane	<b>e</b>	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0 0E+00
72/35 Methodichor		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 086-04	7.51E-06	52 54	718 15	986 20	12,000	0 0E+00
72548 DDD		1 00F+06	1 695-02	4 49E-06	4 50E-02	1 645-04	1 38E-05 4 10E-06	0 K	50 LC9	848 49	14,000	0 UE+00 8 9E-08
72559 DDE		4 47E+08	1,44E-02	5 87E-06	1 20E-01	8 615-04	2 10E-05	52	636 44	860 38	13,000	9 7E-05
74839 Methyl bromide		1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24 E-03	25	276 71	467 00	5,714	0 0E+00
75014 Vinyl chlonde (chloroethene)	oethene)	1 86E+01	1066-01	1 23E-06	2 76E+03	1 11E+00	271E-02	25	259 25	432 00	5,250	8 4E-05
75450 Carbon distillate		1.175+01	101101	11/E-05	1 305+04	8 985-02	2 19E-03	52	313 00	510 00	6,706	4 7E-07
75252 Bromoform		4.3/E+01	1 49E-01	1035-05	3 10E+03	2 49E-00	3 UZE-UZ 5 34E-04	52 % 72 %	319 00	552 00	6,391	0 0 11 0 0 1 1 1 0 0 1 1 1 1 0 0 1
75274 Bromodichforomethane	ane	5 50E+01	2 98E-02	1 06E-05	6 74 E+03	6 56E-02	1.60E-03	25	363 15	585.85	2.000	1 86-05
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5615-03	2 12	330 55	523 00	6,895	0 OE+00
75354 1,1-Dichtoroethylene	Φ.	5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	52	304 75	576 05	6,247	5 0E-05
76448 Heptachlor		1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	1 3E-03
77474 Hexachlorocyclopentadiene	ntadiene	2 00E+05	161E-02	7.21E-06	1 80E+00	1 11E+00	271E-02	25	512 15	746 00	10,931	0 05+00
78875 1 3-Dichlomorphone		4,000,101	7035-02	0 705-00	1.20E+04	2 /2E-04	6 63E-08	8 8	488 35 55 55	715 00	10,277	2 /E-0/
79005 1.1.2-Trichloroethane	, <b>9</b>	5 015+01	7 80F-02	8 80 - 306	4.80E+U3	3 74E-02	2 3 2 5 5 4	6 K	368 32	5/200	06C'/	185.05
79016 Trichtonoethytene	!	1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	3 IZE-04 1 03E-02	25	360 36	544 20	7,505	17E-06
79345 1,1,2,2-Tetrachloroethane	ethane	9,33E+01	7 10E-02	7 90E-06	2 97E+03	141E-02	3 44E-04	52	419 60	661 15	966'8	5 8E-05
83329 Acenaphthene		7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0,0E+00

2 56E-02 1 48E-02 3 12E-02 3 63E-02 3 60E-02 5 60E-02 5 90E-02 5 90E-02 7 40E-02 5 01E-02 5 01E-02 5 01E-02 7 50E-02 7 50E-02 7 50E-02 7 10E-02 7 50E-02 8 80E-02 8 80E-02 7 10E-02 8 80E-02 7 10E-02 8 80E-02 8 80E-02 7 7 10E-02 7 7 10E-02 8 80E-02 8 80E-02 8 80E-02 8 80E-02	6 35E-06 4 88E-06 6 35E-06 7 03E-06 7 03E-06 6 10E-06 6 10E-06 6 25E-06 7 50E-06 7 7 50E-06 7 90E-06 9 46E-06 9 46E-06 9 46E-06 8 60E-06 8 60E-06	1 08E+03 2 69E+00 3 51E+01 1 98E+00 3 23E+00 3 23E+00 9 60E+02 3 10E+01 3 11E+00	185E-05 3 85E-08 5 17E-05 2 05E-04 2 61E-07 6 26E-07 3 34E-01	4 51E-07 9 39E-10 1 26E-06 5 00E-06 6 37E-05 1 15E-08	25.25.25.25.25.25.25.25.25.25.25.25.25.2	567 15 613 15 660 60 632 28 570 44	757 00 798 67 839 68 890 45 870 00 738 00 813 20	13,733 14,751 13,000 13,000 12,666 13,977	0.0E+00 0.0E+00 0.0E+00 1.4E-06 0.0E+00 5.7E-06 2.2E-05	2 8E+00 3 5E-01 7 0E-01 0 0E+00
4 38E-02 3 12E-02 3 90E-02 3 90E-02 5 60E-02 5 90E-02 1 94E-02 1 94E-02 7 40E-02 5 91E-02 5 91E-02 5 91E-02 7 10E-02 7 50E-02 7 50E-02 7 10E-02 8 90E-02 7 10E-02 8 80E-02 1 04E-01 8 80E-02 8 80E-02 8 80E-02 7 10E-02 8 80E-02 8 80E-02 8 80E-02 8 80E-02		1 12E+01 3 569E+00 3 569E+00 1 98E+00 3 23E+00 1 95E+03 8 00E+02 3 116E+01 1 78E+00	3 85E-08 2 05E-04 2 05E-04 6 26E-07 3 34E-01 1 00E-06	9 39E-10 1 26E-06 5 00E-06 1 537E-05 1 55E-08		313 15 360 60 332 28 370 44 327 87	798 67 839 68 890 45 870 00 899 00 738 00	14,751 13,000 13,000 12,666 13,977	0 0E+00 0 0E+00 1 4E-06 0 0E+00 5 7E-06 2 2E-05	3 5E-01 7 0E-01 0 0E+00 1 4E-01
3 45E-02 3 63E-02 3 63E-02 5 60E-02 1 8E-02 5 90E-02 7 70E-02 5 91E-02 5 91E-02 7 50E-02 7 50E-02 7 50E-02 7 50E-02 7 50E-02 8 90E-02 7 10E-02 7 50E-02 8 90E-02 7 69E-02 8 90E-02 7 7 10E-02 8 90E-02 8 90E-02 7 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02		2 03E-00 1 98E-00 3 23E-00 1 95E-03 1 95E-03 3 10E-01 3 11E-00 1 78E-00	2 05E-04 2 05E-04 2 01E-03 6 26E-07 3 34E-01 1 00E-06	1.25E-06 5.00E-06 6.37E-05 1.53E-08		350 50 332 28 370 44 327 87	839 68 890 45 870 00 899 00 738 00 813 20	13,000 13,000 12,666 13,977	0 0E+00 1 4E-06 0 0E+00 5 7E-06 2 2E-05	7 0E-01 0 0E+00 1 4E-01
3 635-02 3 605-02 5 615-02 5 605-02 1 845-02 1 945-02 8 905-02 5 015-02 5 015-02 7 505-02 7 505-02 7 505-02 8 905-02 8 905-02 1 045-01 8 905-02 8 505-02 8 505-02 8 705-02 8 705-02		3 23E+00 3 23E+00 3 23E+00 1 95E+03 8 00E+02 3 10E+01 1 78F+02	2 005-04 6 26E-07 3 34E-01 1 00E-06	5 00E-05 6 37E-05 1 53E-08		522 28 570 44 527 87	890 45 870 00 899 00 738 00 813 20	13,000	14E-06 00E+00 57E-06 22E-05	0.0E+00 1.4E-01
3 90E-02 5.60E-02 5.60E-02 5.90E-02 1 94E-02 8 70E-02 6 90E-02 5 01E-02 5 01E-02 7 50E-02 7 50E-02 7 7 50E-02 7 7 60E-02 8 90E-02 6 80E-02 1 04E-01 8 80E-02 8 50E-02 8 50E-02 8 70E-02		7 48E+00 3 23E+00 1 95E+03 8 00E+02 3 10E+01 1 78E+02	6 26E-07 3 34E-01 1 00E-06	1535-08	-	327 87	870 00 899 00 738 00 813 20	13,977	5 7E-06 2 2E-05	- <del>-</del>
5.60E-02 3.18E-02 1.94E-02 1.94E-02 8.70E-02 5.01E-02 5.01E-02 7.10E-02 7.10E-02 7.50E-02 7.10E-02 7.10E-02 8.9		3 23E+00 1 95E+03 8 00E+02 3 10E+01 1 78E+02	3 34E-01 1 00E-06	9 155 03			738 00 813 20	200	2 2E-05	00100
5.60E-02 3 18E-02 5 90E-02 8 70E-02 6 90E-02 5 01E-02 7 50E-02 7 10E-02 7 10E-02 7 10E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 7 7 00E-02		1 95E+03 8 00E+02 3 10E+01 3 11E+00 1 78E+02	1 00E-06	27-17-0		486 15	R13 20	10.206		00+00
3 18E-02 5 90E-02 8 70E-02 7 40E-02 6 90E-02 5 01E-02 7 50E-02 7 50E-02 7 10E-02 7 10E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 7 100E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02		8 00E+02 3 10E+01 3 11E+00 1 78E+02		2 44E-08		582 15	21.5	000,4	3.4E-05	00+400
5 90E-02 8 70E-02 6 90E-02 5 01E-02 7 50E-02 7 50E-02 7 10E-02 7 10E-02 8 90E-02 8 90E-02		3 10E+01 3 11E+00 1 78E+02	3 19E-04	7 78E-06		519 15	749 03	12,000	3 1E-06	0 0E+00
8 70E-02 6 90E-02 5 01E-02 7 50E-02 7 50E-02 7 10E-02 7 10E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 7 106-02 8 90E-02 8 90E-02 8 90E-02 7 106-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02 8 90E-02		1 78F+02	1 98E-02	4 83E-04		491 14	748 40	10,373	0 0E+00	146-01
7 40E-02 6 90E-02 5 01E-02 7 50E-02 7 10E-02 7 10E-02 5 84E-02 5 84E-02 6 90E-02 8 90E-02 1 04E-01 8 50E-02 7 10E-02 8 90E-02 8 90E-02			2 12E.01	4 00E-09	52	560 26	754 03	13,000	1 3E-04	0 0E+00
6 90E-02 5 01E-02 7 50E-02 7 50E-02 7 10E-02 5 84E-02 6 90E-02 8 90E-02 1 04E-01 1 04E-01 8 50E-02 8 50E-02 8 70E-02		2 60E+04	4 92E-05	1 20E-05	3 %	41, 50	630 30 697 60	6,96,0	001400	201400
5 01E-02 2 91E-02 7 50E-02 7 10E-02 7 10E-02 5 84E-02 8 50E-02 4 83E-02 1 04E-01 8 50E-02 8 50E-02 8 70E-02	946E-06 703E-06 860E-06 780E-06 800E-06 869E-06	1 56E+02	7 79E-02	1 90E-03	3 53	453 57	705 00		000+00	2000
2 91E-02 7 50E-02 7 10E-02 5 84E-02 5 84E-02 8 90E-02 4 83E-02 1 04E-01 8 50E-02 8 70E-02 7 70E-02	7 03E-06 8 60E-06 7 80E-06 8 00E-06 8 69E-06 8 44E-06	2 20E+04	1 60E-02	3 90E-04		447 53	675 00		0 0E+00	1 8E-02
7 50E-02 7 50E-02 5 84E-02 7 69E-02 8 90E-02 8 90E-02 1 04E-01 8 50E-02 7 00E-02 8 70E-02	8 60E-06 7 80E-06 8 00E-06 8 69E-06 8 44E-06	1 20E+03	1 78E-04	4 34E-06		526 15	759 13		0 0E+00	3 SE-01
7 30E-02 5 84E-02 7 69E-02 6 90E-02 1 04E-01 8 50E-02 7 00E-02 8 70E-02	7 80E-08 8 69E-06 8 44E-06	2 09E+03	9846-04	2 40E-05		483 95	719 00		0.0E+00	2 0E-03
5 84E-02 7 69E-02 8 90E-02 4 83E-02 1 04E-01 8 50E-02 7 00E-02 8 70E-02	8 69E-06 8 44E-06	1 59E+U2 3 10F+02	3 23E-01 1 13E-01	7 88E-03		409 34	617 20		00000	1 OE +00
7 69E-02 6 90E-02 4 83E-02 1 04E-01 8 50E-02 7 00E-02	8 44E-06	7 87E+03	8 20E-05	2 00E-06		84 13	207 60		0.05+00	7 05-00
6 90E-02 4 83E-02 1 04E-01 8 50E-02 7 00E-02 8 70E-02		1 85E+02	3 14E-01	7 66E-03		11 52	616 20		00+00	7 0E+00
4 83E-02 1 04E-01 8 50E-02 7 00E-02 8 70E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03		47 21	684 75		0 0E+00	8 0E-01
8 50E-02 7 00E-02 8 70E-02	101E-05	5 30E+03	136E-05	3 32E-07		03 65	754 00		0 0E+00	1 4E-02
7 00E-02 8 70F-02	9 30E-06	0.52E+03	2 10E-02	9 785-04		56 65	561 00		2 6E-05	0 0E+00
8 70F-02	7 80F-06	1615+02	3.015-01	2 245 03		45 65	519 13		0.05+00	2 0E-01
	8 60E-06	5 26E+02	2 72E-01	6.635-03		12.2/ 83.78	50170		0.01100	01400
7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03		04 87 04 87	632.40		0.05+00	2 0 U
8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	25 45	55 02	694 20			2 1F+03
6 92E-02		1 72E+04	7 38E-04	1 80E-05	25 4		62 659			00+00
1155-02		5 10E-01	4 59E-04	1 12E-05	52		942 94			2 1E-02
1515-02		3.40E-01	4 185-06	1 025-07	ў 1 1 2 2 1		806 00			0 0E+00
5 42F-02	916-06	2 VVE-V2 6 20F+00	5.41E-03	9 68E-U3	52		862 22			7 0E-02
3.24E-02	74E-06	4 34E-02	2 67E-03	1 32E-03 6 51E-05	0 K		825 00 872 00			0000
3 00E-02	8 23E-06	3 00E+02	5 82E-02	1,42E-03	3 52		725.00			2 10 400
3 46E-02	8 77E-06	4 50E+03	1 30 5-04	3 17E-06			708 17			1110
2 03E-01	7 06E-06	2 70E+02	3 80E-06	9.27E-08			814 00			000+000
196E-02		2 60E+03	3 21E-02	7 83E-04			678 20			0 OE+00
7 ZUE-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02			620 20			0 0E+00
7.36E-02		1 33E-01	4 57E-04	1 10E-05			936.00			100
7 07E-02	_	5 30E+03	3.85E-01	4 0/E-03			544 00			3 55-02
1 90E-02	66E-06	2 20E-05	6 56E-05	1 60E-06			078.24		_	/ UE-UZ
2 26E-02	5 56E-06	1 50E-03	4 55E-03	1 11E-04	25 71		72 696			000+00
302E-02	35E-06	2 06E-01	6 60E-04	161E-05			905 00	_	_	1 4E-01
2.205-02	36E-05	8 UUE-U4		8 29E-07			019 70			0 0E+00
1 32E-02	86F-06	1.80F-01		9 40E-03			979 00			00+300
1 42E-02	34E-06	2 00E+00		1.065-05	3 2		839.3/			00000
142E-02		2 40E-01		7 44E-07			830.36			00=+00
6 26E-02		2 80E+03		1 77E-02			587.38			200-400
27E-02	26E-06	1 82E+02	3 06E-05	7 46E-07	25 55		770 00			0 0F+00
45E-02	17E-06	9 89E+03	9 23E-05	2 25E-06	25 50		746 87			00±00 0 0E
1 325-02	23E-06	2 00E-01	3 905-04	9515-06	25 61		848 76			0 0E+00
1 16E-02	4 34F-06	3 62E-02 7 40E-01	4 6/E-01	1 14E-02	25		750 00	_	_	3 0E-04
138E-02	4.32E-06	8 00E-02	1 89F-01	4 605-03	2 4	2 6	87331			0 0E+00
	5 00E-06	5 70E-02	8 20E-02	2 00E-03	25 37	2 6	539 3/			00+100
	42E-06	4 20E-01	1 19E-02	2 90E-04	35 35 35 35	28	22	18,000		00+00
2 14E-02		3 40E-01	2 13E-02	5 20E-04	25 34	8 8	1 22	18,000		000+00
ア80131533321727712322~11535~311128  		2 8 60E-06 2 7 90E-06 2 7 90E-06 3 9 80E-06 2 8 7 90E-06 3 9 10E-06 2 8 7 90E-06 3 9 10E-06 3 9 10E-06 3 9 10E-06 4 55E-06 5 7 7 8 E-06 5 7 8 E-06 5 8 7 8 E-06 5 8 7 8 E-06 5 8 7 8 E-06 5 8 8 7 8 E-06 5 8 8 7 8 E-06 5 8 8 7 8 E-06 5 8 8 7 8 E-06 5 9 9 10E-06 5 9 9	2 2 8 600E-06 3 4 44E-06 1 1 10E-05 3 8 60E-06 1 1 10E-05 3 8 60E-06 1 1 10E-06 1 1 1 10E-06 1 1 1 10E-06 1 1 1 10E-06 1 1 1 10E-06 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2 8 00E-06 3 10E-02 4 8 00E-05 5 30E-05 7 30E-05 7 30E-05 7 30E-05 7 30E-05 7 30E-05 7 30E-05 7 30E-05 7 30E-05 8 00E-06 8 00E-05	8 600E-06 3 10E+02 13E-01 2 8 600E-06 3 10E+02 13E-01 2 7 90E-06 7 38E+01 9 96E-05 2 7 90E-06 7 38E+01 9 96E-05 2 101E-05 5 30E+03 1 36E-05 3 14E-01 1 30E-05 3 10E-06 8 20E+04 2 10E-02 2 7 80E-06 161E+02 3 11E-01 2 8 50E-06 161E+02 3 11E-01 2 8 70E-06 161E+02 3 11E-01 3 80E-06 172E+04 7 38E-04 4 55E-06 5 10E-01 4 59E-04 2 7 53E-06 172E+04 7 38E-06 2 7 74E-06 4 34E-02 2 67E-03 2 8 70E-06 1 3 80E-06 2 7 74E-06 5 10E-01 4 59E-04 2 3 58E-06 5 10E-01 4 59E-04 2 3 58E-06 5 10E-01 4 59E-04 2 3 58E-06 5 10E-01 4 59E-04 2 4 55E-06 5 10E-01 4 59E-04 2 5 56E-06 5 10E-01 4 51E-04 2 7 74E-06 6 20E-03 3 81E-04 2 7 74E-06 6 20E-03 1 67E-01 1 19E-05 2 8 20E-06 1 35E-01 4 51E-04 2 7 74E-06 1 35E-01 6 60E-04 2 7 74E-06 1 30E-03 1 65E-04 2 7 74E-06 1 30E-03 1 65E-04 2 7 74E-06 1 80E-01 1 30E-04 2 8 17E-06 9 89E+03 9 23E-05 2 8 17E-06 9 89E+03 9 23E-05 2 8 17E-06 9 89E+03 1 19E-02 2 8 17E-06 9 89E+03 1 19E-02 2 8 17E-06 9 80E-02 1 19E-02 2 8 17E-06 9 80E-02 1 19E-02 2 8 17E-06 9 80E-02 1 19E-02 2 8 17E-06 9 80E-02 1 19E-02 2 8 17E-06 9 80E-02 1 19E-02 2 8 17E-06 9 80E-02 1 19E-02 2 8 17E-06 9 80E-01 1 19E-02 2 8 17E-06 9 80E-02 1 19E-02 2 8 17E-06 9 80E-03 1 19E-02 2 8 17E-06 9 80E-03 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 1 10E-02 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02 2 8 17E-06 9 70E-01 1 19E-02	2         8 00E-06         3 10E+02         1 13E-01         2 78E-03         2 78E-03         2 5           2         8 00E-06         3 10E+02         3 14E-01         2 78E-03         2 78E-03	2         8 0000-06         7 97E-03         8 10E-05         2 48 31           2         8 44E-06         1 87E-02         3 10E-03         2 48 131           2         8 44E-06         1 85E-02         3 14E-01         7 66E-03         25 447 21           2         7 90E-06         1 83E-03         3 14E-01         2 96E-02         2 447 21           2         7 90E-06         1 80E-03         4 11E-02         2 32E-07         2 5 50E-04           2         7 90E-06         1 60E-04         2 10E-02         2 47E-03         2 32E-07           2         7 90E-06         1 61E-02         3 10E-01         2 32E-07         2 335 86           2         7 90E-06         1 61E-02         3 10E-01         7 34E-03         2 416 87           2         7 90E-06         1 61E-02         3 10E-01         7 34E-03         3 10E-01         2 416 12           2         7 90E-06         5 10E-01         1 10E-02         3 11E-03         3 11E-03	2         3 10E+02         3 10E+02         3 10E+03         2 78E+03         2 5 48 31           2         3 44E-06         3 70E+04         3 14E-01         2 78E+03         2 5 48 31           2         3 44E-06         1 86E+02         3 44E-03         2 5 48 41         2 44E-03           2         7 90E-06         1 80E+03         3 14E-03         2 5 48E-03         2 5 447           2         7 90E-06         1 00E+04         2 10E-02         3 24E-03         2 5 345           2         7 90E-06         1 00E+04         2 10E-02         3 74E-03         2 5 345           3         9 0E-06         1 00E+04         2 10E-02         3 74E-03         2 5 345           4         9 0E-06         1 00E+04         2 10E-02         3 74E-03         3 5 448           5         9 0E-06         5 0EE+02         2 77E-04         7 38E-04         1 10E-03         2 448           5         9 0E-06         5 0EE+02         2 77E-04         7 38E-04         1 10E-05         2 5 448           5         9 0E-06         5 0EE+02         2 77E-03         2 5 448         2 5 33           5         9 0E-06         5 0EE+02         2 77E-03         2 5 448         2 5 33	2         0.00c-0.0         3.10c-0.0         1.13.20         2.76c-0.3         2.441.3         0.560.0         8.775           2         0.00c-0.0         3.00c-0.0         2.441.3         0.00c-0.0         2.441.3         0.00c-0.0         3.775           2         0.00c-0.0         3.00c-0.0         3.00c-0.0         2.46c-0.0         2.	2         0.00E-06         3.10E-06         2.78E-03         2.

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

× YES

VERSION 1.2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

YES

		ENTER	User-defined stratum A soil vapor permeability. k, (cm²)
,		ENTER	stratum A SCS soil type (used to estimate OR soil vapor permeability)
ı		ENTER	SCS soil type directly above water table
		ENTER	Soil stratum directly above water table, (Enter A, B, or C)
	ane	ENTER Lwr (cell D28)	Thickness of soil stratum C, (Enter value or 0) hc (cm)
Chemical	1,2-Dichloroethane	INTER ENTER ENTER Totals must add up to value of L <sub>wr</sub> (cell D28)	Thickness   Thickness   Thickness   Of soil
		ENTER Totals mus	Thickness of soil stratum A. h. (cm)
	_	ENTER	Depth below grade to water table, Lwr (cm)
ENTER Intral groundwater conc , C <sub>w</sub>	5 684285714	ENTER Depth	below grade to bottom of enclosed space floor, Lr (cm)
ENTER Chemical CAS No (numbers only,	107062	ENTER	Average sout groundwater temperature, T <sub>S</sub> (°C)

03		
0.43		
17	ENTER	Indoor
0.27	ENTER	Ftoor-wall
0 42	ENTER	Enclosed
1.7	ENTER	space
0.2	ENTER	space
0 43	ENTER	Soil-bldg
15	ENTER	space

ENTER Stratum C soil water-filled porosity,  $\theta_{\omega}^{c}$ 

ENTER Stratum C soil total porosity,

ENTER Stratum C soil dry bulk density, Po.<sup>C</sup> (g/cm³)

ENTER
Stratum B
soil water-filled
porosity,  $\theta_{\kappa}^{a}$ (cm<sup>3</sup>/cm<sup>3</sup>)

ENTER Stratum B soit total porosity,

ENTER Stratum B soil dry bulk density, p<sub>b</sub> (g/cm³)

ENTER STARTUM A SOU Water-filled porosity,  $\theta_w^A$ 

ENTER Stratum A soil total porosity,

ENTER Stratum A soil dry bulk density,  $ho_b^A$ (g/cm³)

unitless

(cm<sub>3</sub>/cm<sub>3</sub>)

	(nutless)	(unitless)	(days/yr)	(yrs)	(yrs)	(yrs)
	된	Œ	Ш	읎	ATNC	ΑTc
	noncaranogens,	carchogens,	frequency,	duration,	noncarcinogens,	carcinogens,
	quotient for	risk for	Exposure	Exposure	tlme for	time for
	Target hazard	Target			Averaging	Averaging
	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
0.45	0.1	488	961	961	40	15
(1/h)	(cm)	(ma)	(cm)	(cm)	(a/cm-s-)	(cm)
<b>E</b>		f	*	٦	۵۵	Lored
rate,	width,	height,	width,	length,	differential,	thickness,
aır exchange		space	floor	floor	pressure	floor
Indoor		Enclosed	space	space	Soil-bldg	sbace
			Enclosed	EUCIOSAG		Enclosed
ENTER				T. company		

		_		
quotient for	noncaranogens, THO	(unitless)	1	Used to calculate risk-based groundwater concentration
risk for	carcinogens, TR	(unitless)	1 0E-06	Used to calcu groundwater
Exposure	frequency, FF	(days/yr)	350	
Exposure	duration, FD	(yrs)	30	
time for	noncarcinogens,	(yrs)	30	
time for	carcinogens, AT <sub>C</sub>	(yrrs)	70	

#### 2 of 7

Reference conc , RfC (mg/m³)
Und risk factor, URF (µg/m³)*1
Pure component water solubility, S S (mg/L)
Organic carbon partition coefficient, Ke (cm³/g)
Critical temperature, T <sub>c</sub> (*K)
Normal bolling point, T <sub>B</sub>
Enthalpy of vaporization at the normal bot'ing point, ΔH <sub>v,b</sub> (cal/mol)
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H
Diffusivity in water, D., (cm²/s)
Diffusivity in air, D. (cm²/s)

# INTERMEDIATE CALCULATIONS SHEET

		· ·	
Floor- wall seam penmeter, X <sub>crec</sub> (cm)	3,844	Diffusion path length, L <sub>d</sub> (cm)	
Water-filled porosity in capillary zone, $\theta_w \alpha (cm^3/cm^3)$	0 294	Total overall effective diffusion coefficient, Defr (cm²/s)	
Air-filled porosity in capillary zone, $\theta_{a,ca}$ $(cm^3/cm^3)$	0 136	Capillary Zone effective diffusion coefficient, Deff.z. (cm.²/s) 7 62E-04	
Total porosity in capillary zone, n <sub>ca</sub> (cm³/cm³)	0.43	Stratum C effective diffusion coefficient, Defc (cm²/s)	Reference conc , RfC (mg/m³)
Thickness of capillary zone, La (cm)	17 05	Stratum B B effective diffusion coefficient, D ® (cm²/s)	Insk factor, URF (μg/m³) 1
Stratum A soil effective vapor permeability, k, (cm²)	5 97E-10	Stratum A effective diffusion coefficient, Def (cm²/s) 4 22E-03	Source bldg conc , Coulding (µg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub>	0 797	Vapor viscosity at awe soil temperature, lurs (g/cm-s) 177E-04 Infinite source	attenuation coefficient,
Stratum A soil intrinsic permeability, k	7 49E-10	Henry's law constant at ave, groundwater temperature, H'rs (unitiess)  2 64E-02  Exponent of equivalent	coundation Peclet number, exp(Pe <sup>1</sup> ) (unitless)
Stratum A effective total fluid saturation, Sie (cm <sup>3</sup> /cm <sup>3</sup> )	0 365	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol)	Area of crack, Acrack (cm²)
Stratum C soll air-filled porosity, $\theta_a^c$ ( $cm^3/cm^3$ )	0 130		officent,  Denot  (cm²/s)
Stratum B soil air-filled porosity, $\theta_{\Phi}^{B}$ (cm $^{3}$ /cm $^{3}$ )	0 150	I H	flow rate into bidg , Qual (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_a^A$ (cm³/cm³)	0 230	Crack- to-total area area ratio, n l n n 1 4 16E-04	Crack radius, fund (cm)
Source- building separation, L <sub>7</sub>	2057 64	Area of enclosed space below grade, As (cm²)	vapor conc., C <sub>scource</sub> (μg/m³)
Exposure duration, r	9 46E+08	Bidg. ventilation rate, General (cm³/s)	path length, L <sub>p</sub> (cm)

RESULTS SHEET

NCREMENTAL RISK CALCULATIONS	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitiess)
INCREMENTAL	Incremental risk from vapor intrusion to indoor arr, carcinogen (untiless)
ULATIONS	Final indoor exposure groundwater conc , (µg/L)
ATION CALCI	Pure component water solubility, S
ER CONCENTR	Risk-based indoor exposure groundwater conc, (µg/L)
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	Indoor exposure groundwater conc , noncarcinogen (µg/L)
RISK-BASE	Indoor exposure groundwater conc, carcinogen (µg/L)

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

	;	Š	Soil Properties Lookup Table	ookup Table									
SCS Soil Type	K, (cm/h)	a (1/cm)	N (unitless)	M (unitless)	0, (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)						
υ	0.20	800 0	1 09	0 083	0 38	0 068	0 0092						
<u>ರ</u>	0.26	0 0 19	131	0 237	0.41	0 095	0.016						
	104	0.036	156	0.359	0.43	0000							
SI	4.59	0.124	86.0	0.561	2 6	0 0 0	070 0						
σ.	29.70	0.145	890	0.630	7 5	2000	1000						
_ <u>w</u>	2 2	2000	2 4	700	2 6	0.00	0.044						
<u> </u>		900	2.4	0.00	9 6	9 5	0.025						
<u> </u>	- 6	950	7	4700	h 0	00.0	0.029						
<u> </u>	0.00	9000	\c.'.	0.270	0.46	0.034	0 0046						
- C- S- S- S- S- S- S- S- S- S- S- S- S- S-	200	200	5 -	0000	970	0/00	60000						
100	2 6	0000	123	0.187	0 43	680 0	0 0056						
<u>.</u>	5 4	0.020	141	0.291	0.45	290 0	0 011						
70	4 47	6/00	1 89	0.471	0.41	0 065	0 030						
_				ı									
					Chemic	Chemical Properties Lookup Table	okup Table						ł
		Organic			Pure		Henry's	Henry's			in the last of the		
		carbon			Component		law constant	law constant	Mormod		Cintralpy of		
		partition	Diffusivity	Diffusivity	water	Henck	at reference	reference	Postnar	(	Vaporization at		7
		coefficient.	III all.	in water.	solubility	law constant	tereconet or state	lendience femografius		Childal	me normal		ě
		Ą	۵	۵	5	ī	I	tellipelature,		temperature,	polling point	factor,	8,
CAS No Chemical		(cm <sup>3</sup> /a)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	( l)om/	(application)	(lom/ <sub>e</sub> m-mla)	<u>د</u> و	a 5	ပ ၌			٠,
		6	(S)	(2)	(1.8/L)	(dillipass)	(IOSH) (III-IIIIB)	3	2	(*K)	(cat/mol)	(m/bn)	틔
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 105-06	25	533.15	720.75	1	20 24 0	
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	90-B00 6	1 62E-03	4 63E-05	1131108	3 %	715 95	56077	000,11	20 L	- '
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	90-390 6	2 79E+03	1 82E-05	4 44E-07	3 K	00.00	303 21	000'61	205:00	_
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	2, 20	743 24	92/ 93	000,61	0.000	•
56235 Carbon tetrachlonde		1 74E+02	7 80E-02	8 80E-06	7 93F+02	1 25E±00	2000	3 8	17000	1 000	000,01	2 L	_
56553 Benz(a)anthracene		3 98E+05	5 10E-02	90-H00-6	9 40 E-03	1 37 1 .04	300000	62	100 46	226 60	7,127	1 5E-05	_
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99 - 03	2 H H H H H H H H H H H H H H H H H H H	67	00/	9/ 4/001	15,000	2 1E-04	_
58899 gamma-HCH (Lindane)		1 07E+03	1.42F-02	7.34F-06	S ROE+OO	5 74E-03	4 400 00	6 6	57 570	885 /3	13,000	3 7E-04	_
60571 Dreldrin		2 14F+04	1255-02	4 74E 06	1 96 E. 01	10 10 10	140H-05	9 8	26020	839 36	13,000	3 7E-04	_
65850 Benzoic Acid		6.00E.01	5 36E 02	7 075 06	2 505+03	940,04	00-11-01	3 3	613.32	842 25	13,000	4 6E-03	_
67641 Acetone		7.75.01	201-02	1 4 4 1 08	200000	00-11-00	1.54E-U6	3 3	2000	751 00	10,000	0.000	_
67663 Chloroform		3 985+01	10411-01	100 100	1 025+03	1 50 0 0 0 0	3 88E-US	8 8	329.20	508 10	6,955	0 0 = +00	
67721 Hexachloroethane		1 78F+03	2505.03	80E-08	5 00E+01	200-00-0	50-B00 C	8 8	25 52	536 40	6,988	2 3E-05	_
71363 Butanol		6 92 100	8 00 HOOR	9 305-06	7 40 11 40 4	10-11-0-1	50-100 c	8 8	5000	695 00	9,510	4,0E-06	_
71432 Benzene		5 89E+01	8 80E-02	9 80 1 0 6	1 75F±03	2000	6 60E-06	6 5	38088	563 05	10,346	0 0E+00	•
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80F-06	1 33/1+03	7.058-01	1 72 1 03	67	47.000	90 700	7,342	8 35-06	_
72208 Endrin		1 23F+04	1 255-02	4 74E-06	2.505-03	100 H	1 72E-02	67 6	347.24	545 00	7,136	00=+00	•
72435 Methoxychfor		9 77E+04	1 56E-02	4 48F-06	4 50E-02	6 48E-04	7 31E-06	9 2	01910	07 986	12,000	0.000	
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64 8-04	4 005-06	9 #	20 100	848 49	14,000	00=+00	•
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8611-04	2 105-05	0 4	029 90	77 500	14,000	5 E	- (
74839 Methyl bromide		1 05E+01	7 28E-02	1 21E-05	1 52 1 + 04	2.56F-01	5 24E-03	3 4	27070	000 30	13,000	60-10-6 60-10-6	_
75014 Vinyl chloride (chloroethens)	aue)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2.715.03	3 %	250 25	432.00	4-7,0	0.05100	`
75092 Methylene chloride		1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	313.00	510.00	5,200	4 7F-07	
75150 Carbon disuffide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	52	319.00	552 00	6.391	0.05+00	•
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	52	422 35	696 00	9,479	1.1E-06	_
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	52	363 15	585 85	7.000	1 8E-05	_
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	52	330 55	523 00	6,895	0 0E+00	
75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6,247	5 05-05	_
/ 0448 Heptachior		1416+06	12E-02	5 69E-06	1 80E-01	4 47E-02	1,09E-03	25	603 69	846 31	13,000	1 3E-03	_
79504   contraction ocyclopentaciene	90	2.00E+05	161E-02	7 21E-06	1 80E+00	1 11E+00	2 71E-02	25	512 15	746 00	10,931	0 0E+00	
Tools Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10,271	2 7E-07	0
70005 1 2-Dichichopopahe		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369,52	572 00	7,590	0 0E+00	
79046 Trichlomethiese		5 01E+01	7 80E-02	8 805-06	4 42E+03	374E-02	9 12E-04	52	386 15	602 00	8,322	1 6E-05	0
70345 1 1 2 2 Tetrachlosophora		1 00=+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	52	360 36	544 20	7,505	17E-06	0
83329 Acenanthene	0	4 33E+01	/ 10E-02	7 90E-06	2 97E+03	1 41E-02	3446-04	<b>8</b>	419 60	661 15	966'8	5 8E-05	0
aniamidanan asaa		70±1100°	<b>3</b> 0-□-7 +	00-1	4 245+00	5 35E-U3	1,55E-04	25	550 54	803 15	12,155	0 0F+00	

00E+00 00E+00

84862 Cleaned about a second	-	1			VLOOKUP TABLES							
84742 Die Profit datate	2 68E+UZ 3 39E+O4	Z 56E-0Z	6 35E-06	1 08E+03	185E-05	4515-07	22	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 Butyl benzyl phthatate	5 75F+04	1 74 F-02	4 835-06	2 695+01	3 83 E-U6	9 395-10	ខុង	613 15	79867	14,751	0 0E+00	3.5E-01
86306 N-Nitrosodiphenytarune	1 29E+03	3 125-02	6.355-06	3 516+01	2056-03	1 26E-U6	Q X	09 099	639.68	13,000	00E+00	7 0E-01
86737 Fluorena	1 38E+04	3 635-02	7 88F-06	1 98 1 + 00	2615-03	3 375 05	6 5	632.26	630.45	2,000	1 45-06	0.0=+00
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6.26E-07	1535-08	3 X	627.87	890,00	12 077	5 7E 08	00000
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	32	486 15	738 00	10.206	2 2E-05	00+100
87855 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	22	582 15	813 20	14,000	3 4E-05	0 0E+00
91203 Nanhthalana	3 815+02	3 185-02	6 25E-06	8 00E+02	3 195-04	7 78E-06	52	519 15	749 03	12,000	3 1E-06	00000
91941 3,3-Dichlorobenzidine	7 24F+02	3 90E-02	6 745-06	3 10E+01	1 98E-02 1 64E 07	4 83E-04	52	491 14	748 40	10,373	0 0E+00	1 4E-01
95476 o-Xylene	3 63E+02	8 705-02	1 00E-05	1 78E+02	2 13F-01	4 00E-09	5 K	360 26 417 60	754 03	13,000	1 3E-04	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1.205-06	3 12	464 19	697.60	0,00	201100	1 8 F. 00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	22	453 57	705 00	9.700	00+400	2 0 = 01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9,572	0 0E+00	1 86-02
99994 2,4,5-Inchiorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	25	526 15	759 13	13,000	0 0E+00	3 5E-01
100414 Ethuhanzana	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	25	483 95	719 00	10,566	0 0E+00	2 0E-03
100425 Styrene	3 53E+02 7 76E+02	7 105-02	7 80E-06	1 69E+02	3 23 2-01	7 88E-03	25	409 34	617 20	8,501	00+300	1 0E+00
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87F+03	A 20E-05	2 705-03	8 8	41831	636 00	8,737	00000	1 0E+00
106423 p-Xylene	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	2 00E-08 7 66E-03	3 8	411.52	616.20	8 525 8 525	00+100	7 05-02
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	2 22	447 21	684 75	9,77	20100	8 OF-01
106478 p-Chloroantine	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	52	503 65	754 00	11,689	00+300	1 4E-02
107062 1,2-Dichloroethane	1 74E+01	1045-01	90-306 G	8 52E+03	4 01E-02	9 785-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Yvlene	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	22	345 65	519 13	7,800	0.0E+00	2 0E-01
108883 Toluene	1 825+02	8 70E-02	7 80E-06	1 61 5 402	3015-01	7 34E-03	83	412 27	617 05	8,523	0 0E+00	7 0E+00
108907 Chlorobenzene	2 19F+02	2 30F-02	8 705-08	3 25E+U2 4 72E+02	2 /2E-U1	6 63E-03	13 t	383 78	591 79	7,930	0 0E+00	4 0E-01
108952 Phenol	2 88E+01	8 20E-02	9 10 5-06	8 28F+04	1 635-01	3 086.07	8 8	404 87	632 40	8,410	0000	2 0E-02
111444 Bis(2-chloroethyf)ether	1.55E+01	6 92E-02	7 53E-06	1 72E+04	7.38F-04	1 805-05	3 4	453.02	25 420	026,01	0.01100	2 1E+00
	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	3 5	674 43	947.94	00,41	3 CH-04	3 15 00
117817 Bis(2-ethythexyd)phthalate	1 51E+07	3 515-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	22	657 15	806 00	200, 4	4 05.06	0.05+00
117840 Di-n-octyl phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
120127 Arthrocan	5 50E+04	5 42E-02	591E-06	6 20E+00	5 41E-02	1 32E-03	52	582 55	825 00	14,447	4 6E-04	0 0E+00
12012/ Antiracenter 120821-1-2-4-Trichlorobenzese	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6.51E-05	52	615 18	873 00		0 0E+00	1 15+00
120832 2.4-Dichlomohenot	1 475+02	3 465 02	6 23E-UD	3 00E+02	5 82E-02	1 42E-03	22	486 15	725 00		0 0E+00	2 0E-01
121142 2,4-Dinitrotoluene	9.556+01	2.03F-01		2 70E+03	3 800.04	3 1/E-U6	8 5	482 15	708 17	11,000	0 0E+00	1 1E-02
124481 Chlorodibromomethane	6 315+01	1 96E-02	1 05E-05	2 60E+03	3 21 F-02	3 5 E-06	6 %	590.00	814 00	13,467	1.9E-04	00=+00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	22 52	394 40	620.20	9,000	2.4E-U3	201100
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 515-04	1 10E-05	52	667 95	936 00		0 0E+00	115-01
130332 dis-1,2-Dichloroethylene	3 55E+01	7 36E-02	135-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00		0.000	3.55-02
193395 Indeport 2 3-cd bywere	3.475+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516 50		0 0E+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26F-02	5.565-06	1 50E-03	6 30E-03	1 60 60 6		809 15	1078 24	17,000	2 16-04	0 0E+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 605-04	1 61 11.05	0 K	713 90 655 05	969.27	15,000	2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07		753 15	1019 70	15,613	0 UE+00	1450
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05	52	714 15	979 00	16.455	2 1E-d6	00+100
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04		603 01	839 37	13,000	4 9E-03	0 0E+00
319940 April - HOLD (Ribna-Bric)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05	52	596 55	839 36	13,000	1 8E-03	0 0E+00
542756 13-Dichlompmhene		20-07-0	4 00E 0E	2 4UE-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5 3E-04	0 0E+00
606202 2.6-Dinitratoluene		3 275-02	7 265-08	2 80E+U3	7 Z6E-U1	177E-02		381 15	587 38	2,000	3.7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17F-06	9 895+03	9 23 11-05	7 40E-U7	0 5	228 00	770 00	12,938	1 9E-04	0 0E+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02		2 00E-01	3 90 0-04	9.515.06		509 50 613 96	1458/	96.5	2 0E-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02		5 62E-02	4 67E-01	1 14E-02		629 88	1750.00	13,000	2 00-03	0 00+00
8001352 Toxaphene	2 57E+05	1 16E-02		7 40E-01	2 46E-04	6 00 - 06		657 15	873 31		3.2F-04	0.05+00
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1385-02		8 00E-02	1 89E-01	4 60E-03	52		539 37	19,000	1 0E-04	0 0E+00
12674112 Amelor 1016 (PCB-1016)	3 30E+03	2 22E-02	5 42E-06	3 70E-02	8 201-02	2 00E-03			512 27	19,000	1 0E-04	0 0E+00
53469219 Arodor 1242 (PCB-1242)	3 305+04	2 14E-02	5 31E-06	3405-01	2 13E-02	2 90E-04 5 20E-04	13 X	340 50 345 50	475 22	18,000	10HO	0 0 = +00
		: !	! !	:	1	* EVE-7-4			482 20	18,000	1 OF OR	0 0E+00]

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

× g YES

ENTER

ENTER

YES

VERSION 1.2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

		_					
		ENTER	User-defined stratum A soil vapor	permeability, k <sub>v</sub> (cm²)			
		1		e E	٠٦		
		ENTER		(used to estimate soil vapor permeability)	IS	ENTER	soil water-filled porosity.
		ENTER	scs	soil type directly above water table	ဖ	ENTER Stratum C	soil total porosity,
		ENTER	Soll	directly above water table, (Enter A, B, or C)	U	Stratum C	soll dry bulk density,
		ENTER (Lwr (cell D28)	Thickness of soil stratum C,	(Enter value or v) (Enter value or v)  hs  (cm) (cm)	1158 24	ENTER Stratum B	soil water-filled porosity, $\theta_w^8$
Сћегиса	Chloroform	NTER ENTER ENTER Totals must add up to value of L <sub>w1</sub> (cell D28)	Thickness of soil stratum B,	(Enter value or U) h <sub>B</sub> (cm)	3048	ENTER Stratum B	soil total porosity, n <sup>B</sup>
		ENTER Totals mus	1	suatum A, h <sub>A</sub> (cm)	762	ENTER Stratum B	soil dry bulk density, p <sub>b</sub>
_		ENTER	Depth below grade	to water table, Lwr (cm)	2225 04	ENTER Stratum A	soil water-filled porosity, $\theta_w^A$
Initial groundwater conc , C <sub>w</sub> (µg/L)	1 005	ENTER Depth	below grade to bottom of enclosed	space noor, L <sub>F</sub> (cm)	15	ENTER Stratum A	soil total porosity, n <sup>4</sup>
Chemical CAS No (numbers only, no dashes)	67663	ENTER	Average sort/ groundwater	T <sub>s</sub> (°C)	16	ENTER Stratum A	soil dry bulk density, Po <sup>A</sup>

15	0.43	0.2	17	0 42	0.27	17		0 43	
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER			
Enclosed		Enclosed	Enclosed						
space	Soil-bidg	space	space	Enclosed	Floor-wall	Indoor			
floor	pressure	floar	floor	space	seam crack	air exchange			
thickness,	differential,	length,	width,	height,	width,	rate,			
Corner	ΔP	<b>_</b>	W	Ť	3	E E			
(cm)	(g/cm-s²)	(cm)	(ша)	(cm)	(cm)	(1/h)	1		
å	700	081	190	486	7.7	0.45	ŀГ		
2		200		00+	>	0.43	7		
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER				
Averaging	Averaging			Target	Target hazard				
time for	time for		Exposure	risk for	quatient for				
carcinogens,	noncarcinogens,		frequency.	carcinogens,	noncarcinogens,				
ΑTc	AT		띮	Æ	돺				
(yrs)	(ALS)	(yrs)	(days/yr)	(unitless)	(unitless)				

ENTER
Stratum C
soil water-filled
porosity,  $\theta_w^c$ (cm³/cm³)

ENTER Stratum C soil dry bulk density, p<sub>b</sub><sup>c</sup> (g/cm³)

ENTER Stratum B soil dry bulk density, ρ<sub>b</sub> (g/cm³)

ENTER Stratum A soil dry bulk density, Po<sup>A</sup> (g/cm³)

(cm3/cm3)

(cm<sub>3</sub>/cm<sub>3</sub>)

Used to calculate risk-based groundwater concentration	Used to calcu groundwater			
1	1 0E-06	350	30	30
(unitiess)	(unitless)	(days/yr)	(yrs)	(yrs)
쥪	¥	띰		AT <sub>™C</sub>
noncarcinogens,	carcinogens,	frequency.	duration,	noncarcinogens,
quatient for	nsk for	Exposure	Exposure	time for
	, a			B D

					_
Reference	conc.	R <sub>C</sub>	(ma/m³)		00+30 0
nsk	factor,	J.R.	(ma/m <sup>3</sup> ) <sup>-1</sup>		2 3E-05
water	sofubility,	, v	(ma/L)		7 92E+03 2 3E-05
	O		(cm <sub>3</sub> /g)		3 98E+01
Cutical	temperature,	٦°	S.		536 40
polling	point,	re.	€		334 32
the normal	bouling point,	ΔH,	(cal/mol)		6,988
refarence	temperature,	۳ ۳	(၁၀)		25
at reference	temperature,	I	(atm-m³/mol)		3 66E-03
Orffuswity	in water,	o <sup>‡</sup>	(cm <sup>2</sup> /s)		1 00E-05
Diffusivity	n air,	o" '	(cm <sub>2</sub> /s)		104E-01
	Diffusivity at reference reference the normal boiling Critical partition water risk F	at reference reference the normal bouling Critical partition water risk F temperature, temperature, temperature, coefficient, solubility, factor,	<ul> <li>Diffusivity at reference reference the normal boiling Critical partition water risk F in water, temperature, temperature, boiling point, point, temperature, coefficient, solubility, factor, D<sub>w</sub></li> <li>D<sub>w</sub></li> </ul>	Diffusivity at reference reference the normal boiling Critical partition water risk F in water, temperature, temperature, boiling point, point, temperature, coefficient, solubility, factor, D <sub>w</sub> H T <sub>R</sub> ΔH <sub>v,b</sub> T <sub>B</sub> T <sub>C</sub> K <sub>∞</sub> S URF URF (cm <sup>2</sup> /s) (atm-m <sup>3</sup> /mol) (°C) (cal/mol) (°K) (°K) (cm <sup>3</sup> /g) (mg/L) (μg/m <sup>3</sup> ) <sup>-1</sup>	Diffusivity at reference reference the normal boiling Critical partition water in water, temperature, temperature, boiling point, point, temperature, coefficient, solubility, f D $_{\rm w}$ H $_{\rm Re}$ $\Delta H_{\rm u,0}$ $\Gamma_{\rm R}$ $\Gamma_{\rm E}$ $\Gamma_{\rm C}$ $K_{\rm cc}$ $S$ $({\rm cm}^2/{\rm s})$ (atm-m $^3/{\rm mol}$ ) (°C) (cal/mol) (°K) (°K) (°K) (cm $^3/{\rm g}$ ) (mg/L) ( $\mu$

# INTERMEDIATE CALCULATIONS SHEET

	ć	Stratum A	Stratum B	Stratum C	Stratum A	Stratum A	Stratum A	Stratum A		Total		Water-filled	Floor-
Exposure	Source-	soil air-fiiled	soil air-filled	soil air-filled	effective total fluid	soli intrinsic	soil relative aır	soil effective vapor	Thickness of capillary	porosity in capillary	porosity in	porosity in	wall was
duration,	separation,		porosity,	porosity,	saturation,	permeability,	permeability,	permeability,	ZONB,	zone,		Z006,	perimeter,
Ļ	ڑ	, e	0	ງ ອີ	ี่ ซื้	¥	£	Ϋ́.	<u>"</u>	ם	9 8	g ∯	X
(sec)	(cm)	(cm <sub>2</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm²)	(cm²)	(cm²)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sup>3</sup> /cm <sup>3</sup> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm)
9 46F+0A	2210 04	0.230	0.450	0 430	0 440	2000	710	07 ±00 0	1 1				
2017	40.04	0.530	0.130	061.0	0.439	9.365-10	0 /46	6 98E-10	17.05	0.43	0 136	0 294	3,844
	Area of							Stratum	Stratum	Stratum	Capillary	Totai	
i	enclosed	Crack-	Crack	Enthalpy of	Henry's law	Henry's law	Vapor	∢	æ	O	zone	overa	
60	sbace	to-total	depth	vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
ventilation	pelow	area	pelow	ave groundwater	ave groundwater	ave groundwater	ave. soil	diffusion	diffusion	diffusion	diffusion	diffusion	path
rate,	grade,	ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient,	coefficient,	length.
Obveliding	₹	F	Zorack	ΔH <sub>v,TS</sub>	H <sub>Ts</sub>	H'Ts	uts	, O	٦٩٩	ي ص	, t	D.	• _1
(cm <sub>3</sub> /s)	(cm²)	(unitiess)	(cm)	(cal/mol)	(atm-m³/mol)	(unitless)	(a/cm-s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sub>2</sub> /s)	(cm <sup>2</sup> /s)	r (E)
5 83 5 + 04	0.245+05	A 185.04	7,	7 400	0 475 00	10.10.7		*****					
	2 545.00	1 101-04	2	764,	Z 4/E-U3	1048-01	1 //=-04	4 ZZE-03	1.07E-03	6 40E-04	7 36E-04	9 74E-04	2210 04
						Exponent of	Infinite						
3	(		Average	Crack		equivalent	Source	Infinite					
Convection	Source		vapor	effective		foundation	Indoor	Source	Ę				
path	vapor	Çraçk	flow rate	diffusion	Area of	Peclet	attenuation	pldg	nsk	Reference			
length,	conc,	radius,	into btdg.,	coefficient,	crack,	number,	coefficient,	conc,	factor,	conc.,			
ĵ.	Caouros	Crack	Q	Danck	Aorack	exp(Pe <sup>(</sup> )	ರ	Chullding	URF	RfC			
(cm)	(mg/m³)	(cm)	(cm³/s)	(cm <sup>2</sup> /s)	(cm²)	(unitless)	(nutless)	(mg/m <sub>3</sub> )	, ( <sub>md/m3</sub> )	(mg/m <sub>3</sub> )			
15	1.04E+02	0.10	6 67E-01	4 22E-03	3 84E+02	4.80E+02	4 49E-06	4 67E-04	2 3E-05	¥			

#### RESULTS SHEET

ISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS
ч.

INCREMENTAL RISK CALCULATIONS

Hazard	quotient	from vapor	intrusion to	indoor arr,	noncarcinogen	(nuitess)	ΦN
Incremental	nsk from	vapor	intrusion to	indoor air,	carcinogen	(unitless)	ΦN
	Final	ındoor	exposure	groundwater	conc.,	(hg/L)	2.26F+02
	Pure	component	water	solubitty,	တ	(hg/L)	7 92E+06
	Risk-based	indoor	exposare	groundwater	conc,	(µ9/L)	2 26E+02
	Indoor	exposare	groundwater	conc,	noncarcinogen	(μg/L)	¥
	Indoor	exposare	groundwater	conc,	carcinogen	(µg/L)	2 26E+02

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

VLOOKUP TABLES

						100							
SOS Soil Type	K (cm/h)			ookup Table	0 (sm3)2m3								
Pd6 100 000	(CITAIL)		- 1	M (unidess)	e (cm/cm²)	ŀ	Mean Grain Diameter (cm)						
<u>ة د</u>	0 50	0 008	1 09	0 083	0.38	0 068	0 0092						
<u>.</u>	0.26	0 019	131	0 237	0 41	0 095	0 0 16						
. ب	104	0 036	1 56	0 359	0 43	0 078	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
<u> </u>	14 59	0 124	2 28	0 561	041	0 0 0 0 0	0 040						
so i	29 70	0 145	2 68	0 627	0 43	0 045	0 044						
SC	0 12	0 027	1 23	0 187	0 38	0 100	0 025						
- C	131	0 059	148	0 324	0 39	0 100	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
, C	8 8	0 016	137	0270	0.46	0 034	0 0046						
) <u>(</u>	200	0.00	5 - 5 - 5 -	0.063	0.20	0.00	0 0038						
18	45	000		0.00	240	0.089	9500 0						
TS.	4 4 5	0 0 0 5 5	189	0.471	0 4 5	0 065	0013						
		Omanic			Chemic	Chemical Properties Lookup Table	p Table						
		carbon			component		law constant	Henry's	Monne		Enthalpy of		
		partition	Diffusivity	Diffusivity	water	Henry's	of reference	reference	Pottor.	(	vaponzation at	<u>.</u>	
	•	coefficient,	ın air.	in water.	solubility	law constant	femnerature	temperature	Bottling	Chilcai	the normal	NSE.	Reference
		<b>.</b> 8			S	'n	I	T	<u>.</u>	temperature,	Collection point,	ractor,	conc.
CAS No Chemical		(cm <sup>3</sup> /g)	(cm <sup>2</sup> /s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/mol)	် ပို	S	, <del>(</del> )	_	(na/m³)	(ma/m³)
											l		
60293 DDT		2 63E+06	1 37 E-02	4.95E-06	2 50E-02	3 32E-04	8 10E-06	25			11,000	9 7E-05	0 OE+00
51285 2.4 Dialtrockers		1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 135-06	25			15,000	2 1E-03	0 OE+00
53703 Otherste Northmoore		1 00E-02	2 /3E-02	90-190 6	2 /95+03	1 82E-05	4 44E-07	75			15,000	0 0E+00	7 0E-03
55235 Carbon tetrachloide		1 746+00	2 02E-02	5 1815-06	2 495-03	6 03E-07	1 47E-08	25			16,000	2 1E-03	0 0E+00
56553 Benz(a)anthracene		3 095-105	7 BOE-02	8 805-06	/ 93E+02	1 25E+00	3 05E-02	25			7,127	15E-05	0 OE+00
57749 Chlordana		1 20F±05	1 185-02	4 37E-06	5 60E-03	13/11-04	3.34E-06	25		_	15,000	2 1E-04	0 0E+00
58899 gamma-HCH (Lindana)		1 07F+03	1 42F-02	7.34F-06	3 00E-02	50-056 F	4 83E-U3	2 5			13,000	376-04	0 0E+00
60571 Dieldrin		2 14E+04	1.25F-02	4 74E-06	1 055-01	2 d	1 405-05	2 2			13,000	3.75-04	0 0 = +00
65850 Benzolc Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6.31F-05	1 54E-06	22	72007	751.00	13,000	4 5E-U3	0 0E+00
67641 Acetone		5 75E-01	124E-01	1 14E-05	1 00E+06	1 59E-03	3.88F-05	2, 2,	-		000'01	001100	7 4E+01
67663 Chloroform		3 98E+01	1 04E-01	1 00E-05	7 92E+03	1,50E-01	3 66E-03	22 22			0,933 6,988	2 35.05	0.05+00
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1.59E-01	3 88E-03	25			9.510	4 OE-06	00+100
		6 92E+00	8 00E-02	9 305-06	7 40E+04	3 61E-04	8 80E-06	25			10,346	00=+00	3 5E-01
/1432 Benzene 74568 4 4 \$ Tanklamethane		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25			7,342	8 3E-06	0 OE+00
72208 Endin		1 225+02	/ 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	35			7,136	00=+00	1 0E+00
72435 Methoxychlor		9 775+04	1 56E-02	4 /4E-06	2 50E-01	3 USE-04	7515-06	25			12,000	0.00	100
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00 E-02	1 64F-04	1 386-03	£ 5	651 02	848 49	14,000	0 001100	1 8E-02
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	2, 2,			13,000	20.07	00+100
74839 Methyl bromide		1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	25			5,714	005+00	5 05-03
75014 Vinyl chloride (chloroethene)	ne)	1.86E+01	1 06E-01	1 23E-06	2 76E+03	111E+00	2 71E-02	25			5,250	8 4E-05	0 OE+00
75150 Cotto		1 17E+01	1015-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25			6,706	4 7E-07	3 0E+00
75252 Brownson		4 5/E+01	104E-01	1000-05	1 19E+03	1 24E+00	3 02E-02	25			6,391	0 0E+00	7 0E-01
75274 Bromodichloromethane		5 505101	20-386-02	1 03E-05	3 10E+03	2 19E-02	5 346-04	25			9,479	115-06	0 0E+00
75343 1.1-Dichlomethane		3 165+01	7 425-02	1.065-05	6,74E+U3	5 30E-02	1 60E-03	25			7,000	1 BE-05	0 0 +00
		5 89E+01	9 00E-02	1046-05	2.25E+03	1 07F+00	2615-03	0 K	304 75	523 00	6,895	0.000	5 OE-01
76448 Heptachlor		141E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	109E-03	25			13,000	1 3 E C	00+400
77474 Hexachlorocyclopentadiene	Ð	2 00E+05	161E-02	7 21E-06	1 80E+00	1 11E+00	2 71E-02	25			10,931	0 0 10 0	7 0E-05
/8591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 635-06	25			10,271	2 7E-07	00100
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 805-03	25			7,590	0 0E+00	4 0E-03
79005 Trichlomethylene		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 125-04	52			8,322	1 6E-05	0 0E+00
79345 1.1.2.2-Tetrachloroethane	4	9 33F+01	7 50F-02	3 10E-06	1 10E+03	4 22E-01	1 03E-02	25			7,505	1.7E-06	0 0E+00
83329 Acenaphthene	_	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	3 44E-04 1 55E-04	25 25	41960	861 15	8,996 13,165	5 85-05	000+00
•		1	ř I I		1	? ? ?	120	3			201 21	0.00	10-11

RAEES Promission assessment	1				VLOOKUP TABLES							
84742 Dearlyphinasate	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 Butt heard optibilities	5 59E+04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10	52	613 15	798 67	14,751	0 0E+00	3 5E-01
	3 /3E+04	1 /4E-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06	£	990 90	839 68	13,000	0 0E+00	7 0E-01
86737 Firement	1 285-03	3 125-02	6 355-06	3 51E+01	2 05E-04	5 00E-06	52	632 28	890 45	13,000	1 4E-06	0 0E+00
86748 Carbazole	1 30E+04	3 635-02	7 88E-06	1 98E+00	2 61E-03	6 37E-05	52	570 44	870 00	12,666	0 0E+00	1 4E-01
87683 Hexachloro-1.3-butadiene	5 375+04	5 84E-02	7 USE-UD	7 48E+U0	6 26E-0/	1 53E-08	52	627 87	00 668	13,977	5 7E-06	0 0E+00
87865 Pentachlorophenoi	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1005-06	8 15E-U3	5 5	486 15	738 00	10,206	2 2E-05	00000
88062 2,4,6-Trichlorophenol	3 81	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	3 %	519 15	749 03	000,5	2 4 Th	000000
91203 Naphthalene	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	22	491 14	748 40	10,373	0.000	1 4E-01
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 11 €+00	1 64E-07	4 00E-09	52	560 26	754 03	13,000	1 3 4 4	0.000
954/0 0-Xylene	3 63E+02	8 70E-02		1 78E+02	2 13E-01	5 20E-03	22	417 60	630 30	8,661	0 0E+00	7 0E+00
95497 Z-Mernylphenol (o-cresol) 95501-1-2-Dichlombenson	9 12E+01	7 40E-02	8 30E-08	2 60E+04	4 92E-05	1 20E-06	22	464 19	09 7 69	10,800	0 0E+00	1 8E-01
	3 ARE+02	5 90E-02	7 90E-06	1,56E+02	7 79E-02	1 90E-03	52	453 57	705.00	9,700	0 0E+00	2 0E-01
95954 2,4,5-Trichlorophenol	1 60E+03	2915-02		1 20E+04	1 50E-02	3 905-04	52	447 53	675 00	9,572	0 OE+00	1 8E-02
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60 = -06	2 09F+03	9 847-04	2 405.05	8 8	526 15 482 0F	710.00	13,000	00+100	3.55-01
	3 63E+02	7 50E-02		1 69E+02	3 23E-01	7 88E-03	3 5	403 93	617.20	10,365 10,565	00100	2 UE-03
	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03	25 52	41831	636.00	2,00	201400	100+00
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	32	484 13	707 60	11.329	000+00	7 OF-02
ш,	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	56	411 52	616 20	8,525	00+00	7 0E+00
10640/ 1,4-Dichloropenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	22	447 21	684 75	9,271	0 0E+00	8 0E-01
107062 1 2 Dichlomethans	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	52	503 65	754 00	11,689	0 0E+00	1 4E-02
	5 25F±00	2 50E 50	905-06	8 52E+03	4 01E-02	9 785-04	8	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xylene	4 07F+02	2 30E-02	3 20E-06 7 80E-06	1 61 11 10 2	2 105-02	5 12E-04	8 8	345 65	519 13	7,800	0 OE+00	2 0E-01
108883 Toluene	1 82E+02	8 70F-02	8 605-06	5 26E+02	3 0 1 E-U	24F-43	9 5	412.27	617 05	8,523	0 05 +00	7 0E+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 525-01	3 745-03	0 K	383 /8	591 79	7,930	84 100 100	4 0E-01
108952 Phenol	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98 F-07	3 5	455.02	694 20	0.410	00+400	2 05-02
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 806-05	22	451 15	659 79	000 6	3 35.04	00000
115297 Endosulfan 447947 Piz/2 Jahrahaman	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 595-04	1 12E-05	25	674 43	942 94	14,000	0 0E+00	2 1E-02
117840 Discords obtained	1575+0/	3515-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	25	657 15	806 00	15,999	4 0E-06	0 0E+00
118741 Hexachlorobenzene		1 31E-02	3 28E-05	2 00E-02	2 74E-03	6 68E-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
120127 Anthracene	2.95F+04	3.24F-02	7 74 15-06	0 20E+00	3 47 5-02	1 32E-03	52	582 55	825 00	14,447	4 6E-04	0 0E+00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 005-02	8 23E-06	3 00E+02	5.825-02	6 57E-U5	2 %	615 18	873 00	13,121	0 0E+00	1 1E+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 305-04	3 175-06	S K	400 13 482 15	70 47	10,471	00000	2 0E-01
121142 2,4-Dinitrototuene	9 55E+01	2 035-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	22	590 00	814.00	13.467	1 95.04	7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	631E+01	1 96E-02		2 60E+03	3 21E-02	7 835-04	25	416 14	678 20	000	2.4E-05	00+100
12/184 letrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	22	394 40	620 20	8,288	5 8E-07	00+00
159000 Pytene 156500 ce-1 2 Dishlososthidono	1 USE+US	2 /2E-02	7 24E-06	135E-01	4 51E-04	1 10E-05	52	667 95	936 00	14,370	0 0E+00	1 1E-01
156605 trans-1 2-Dichlomethylene	5 255+01	7.075.02	1 13E-05	3 50E+03	167E-01	4 07E-03	52	333 65	544 00	7,192	0 OE+00	3 5E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1905-02	5 665-06	2 20E-03	5 55E-01	20-11-03	5 5	320 85	516 50	6,717	0 0E+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02		1 50E-03	4 55E-03	11504	Ç K	715-00	1078 24	000,71	2 15 0	00=+00
206440 Fluoranthene	1 07E+05	3 02E-02	6.35E-06	2 06E-01	6 60E-04	161E-05	2 22	655.95	905.00	12,000	40 L	00=+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02		8 00E-04	3 40E-05	8 29E-07	32	753 15	1019 70	16,000	2 1F-05	0.05+00
218019 Chrysene	3 98E+05	2 48E-02		1 60E-03	3 88E-03	9 46E-05	52	714 15	979 00	16,455	2 15-06	000+00
30900Z Aldrin 310846 alaba-HOU (alaba BHO)	2 45E+06	1325-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	52	603 01	839 37	13,000	4 9E-03	00000
319857 beta-HCH (heta-BHC)	1 265+03	1425-02	7.345-06	2 00E+00	4 35E-04	1 06E-05	52	596 55	839 36	13,000	1 8E-03	0 00+00
542756 1.3-Dichloropropene	4.57F+01	6 26F-02	1 OOF OS	2 40E-01	3 USE-US	/ 44E-07	52	596 55	839 36	13,000	5 3E-04	0 0E+00
	6 92E+01	3.27E-02	7 26E-06	1 82F+02	2 06E-01	7.46E-07	8 8	381 15	587 38	000,	3 7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2.25E-08	3 %	200 00	745.87	12,938	1 96-04	0 0E+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02		2 00E-01	3 905-04	9516-08	3 5	513 96	740 07 878 76	000	2 0E-03	00000
7439976 Mercury (elemental)	5 20E+01	3 07E-02		S 62E-02	4 67E-01	1 14E-02	32	629 88	1750 00	14 127	20-02	2000
8001352 Foxaphene	2 57E+05	1 16E-02		7 40E-01	2 46E-04	6 00E-06	25	657 15	87331	1,000	3 2E-04	0.05+00
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	189E-01	4 60E-03	52		539 37	19,000	1 OE-04	00+90
17674112 Apodor 1016 (PCB-1015)	2.00E+03	1 30E-02		5 70E-02	8 20E-02	2 00E-03	52	377 50	512 27	19,000	1 0E-04	0 0E+00
53469219 Arodor 1242 (PCB-1242)	330E+04	2 14E-02	5316-06	3 40F-01	7 13F-02	2 90E-04 5 20E-04	53 %	340 50	475 22	18,000	1 0E-04	0 0E+00
				:	1	1	}		482.20	18,000	1 0E-04	0 0E+001

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

ENTER Initial groundwater conc ,

ENTER

°, (µ9/L)

Chemical CAS No (numbers only, no dashes)

YES

			<del></del>
	ENTER	User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm²)	
	1	æ	' '
	ENTER	stratum A SCS soil type (used to estimate soil vapor permeability)	ENTER Stratum C soil water-filled porosity, $\theta_{w}^{c}$
	ENTER	SCS soil type directly above	
	ENTER	Soil stratum directly above water table, (Enter A, B, or C)	ENTER Stratum C soll dry bulk density, P <sub>c</sub> P <sub>c</sub> (alcm <sup>3</sup> )
sthane	ENTER f L <sub>wr</sub> (cell D28)	Thickness of soil stratum C, (Enter value or 0) hc (cm)	ENTER Stratum B soil water-filled porosity, B,* B,* (cm³/cm³)
Bromodichloromethane	NTER ENTER ENTER Totals must add up to value of L <sub>vrf</sub> (cell D28)	Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub>	ENTER Stratum B soil total porosity, n <sup>8</sup> (untilless)
	ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Stratum B soll dry bulk density, pla
	ENTER	Depth below grade to water table, Lwr (cm)	ENTER Stratum Scal water-filled porosity, $\theta_{\rm sh}^A$ (cm <sup>3</sup> /cm <sup>3</sup> )
3 743205128	ENTER Depth	below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER ENTER Stratum A soli total porosity, n (unitless)
75274	ENTER	Average soil/ groundwater temperature, T <sub>s</sub>	ENTER Stratum A Soll dry bulk density, p <sub>b</sub> (g/cm³)

15	0 43	0.2	17	0.42	0 27	17	0.43	03
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
Enclosed		Enclosed	Enclosed					
space	Soil-bidg	space	space	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
thickness,	differential,	length,	width,	height,	width,	rate,		
Lond	ΔР	ٿ	W	ī	*	ዴ		
(E)	(a/cm-s <sup>2</sup> )	(cm)	(cm)	(cm)	(La)	(1Jh)		

	Jsed to calculate risk-based groundwater concentration	Used to calcu groundwater				
		1 0E-06	350	30	30	70
	(unitless)	(unitless)	(days/yr)	(yrs)	(yrs)	(yrs)
	돧	¥	ᇤ	8	ATNC	ATc
	noncarcinogens,	carcinogens,	frequency,	duration,	noncarcinogens,	carcinogens,
	quotient for	risk for	Exposure	Exposure	time for	time for
	Target hazard	Target			Averaging	Averaging
	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
0.45	0.1	488	961	961	] 40 [	15

			_
ć	Mellerence Conc, RfC	(mg/m³)	0 0 0
Č.	factor, URF	(µg/m³).1	1 8E-05
Pure component	solubility, S	(mg/L)	6 74E+03
Organic	coefficient,	(cm <sup>3</sup> /g)	5 50E+01
C C	temperature, T <sub>c</sub>	(%)	585 85
Normal	Polnt,	( <del>K</del>	363 15
Enthalpy of vaporization at the normal	boi ing point,	(cal/mol)	7,000
Henry's taw constant	temperature, T <sub>R</sub>	(2)	25
Henry's law constant	temperature, H	(atm-m³/mot)	1.60E-03
Diffusivity	ın water, D	(cm <sup>2</sup> /s)	1.06E-05
Diffusivity	in air, O	(cm <sup>2</sup> /s)	2.98E-02

# INTERMEDIATE CALCULATIONS SHEET

	0	Stratum A	र्छ	Stratum C	Stratum A	Stratum A	Stratum A	Stratum A	·	Total	Air-filled	Water-filled	Floor-
Exposure	building	air-fiiled	soli air-filled	son air-filled	enective total fluid	sou intrinsic	soll relative air	soul effective vapor	Thickness of capillary	porosity in capillary	porosity in capillary	porosity in	wa!!
duration,	separation,	porosity,	porosity,	porosity,	saturation,	permeability,	permeability,	permeability,	zone,	zone,	zone,	zone,	perimeter,
ų.	ئ	•	, B	ນ <b>ູ້</b>	တိ	×Ζ	Ş.	¥.	7	ŋ	9 6	θ,	X
(sec)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sup>2</sup> )	(cm²)	(cm²)	(cm)	(cm³/cm³)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(E)
9 46E+08	1509	0.230	0.150	0.130	0440	0.080.40	0.210	C7 100 0					
	2007	0.50	000	0.130	0.413	9,300-10	0 /40	0.386-10	17.05	0.43	0 136	0 294	3,844
	Area of							Stratum	Stratum	Stratum	Capillary	Total	
Č	enclosed	Crack-	Crack	Enthalpy of	Henry's law	Henry's law	Vapor	∢	<b>E</b>	O	zone	overall	
6019	space	to-total	depth	vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
vendiation	Moleo.	area	Delow	ave groundwater	ave. groundwater	ave groundwater	ave. soil	diffusion	diffusion	diffusion	diffusion	diffusion	path
rate,	grade,	ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient,	coefficient,	length,
Obuilding	₹ `	F	Zorack	ΔH <sub>v,τs</sub>	H <sub>TS</sub>	H'rs	P.T.S	Doff A	_ _ _	ا م	D**	ָרֶּי <sup>ָ</sup>	· _1
(s/, шэ)	(cm²)	(unitless)	(cm)	(cal/mol)	(atm-m³/mol)	(unitless)	(g/cm-s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm)
5 63E+04	9.24E+05	4 16E-04	15	7,723	1 07E-03	4 49E-02	1 77E-04	1 21E-03	3 22E-04	2 04E-04	2 30E-04	3 27E-04	1509
						Exponent of	Infinite						
,			Average	Crack		equivalent	source	infinite					
Convection	Source		vapor	effective		foundation	indoor	sonce	Chit				
path	vapor	Crack	flow rate	diffusion	Area of	Peclet	attenuation	bjq	nsk	Reference			
length,	conc,	radius,	into bldg,	coefficient,	crack,	number,	coefficient,	conc,	factor,	cond,			
ڻـ	Ceours	Foreck	Q,	O Callet	Acrack	exp(Pe')	ಕ	Chullding	URF	S,C			
(ma)	(µg/m³)	(cm)	(cm³/s)	(cm²/s)	(cm²)	(unitless)	(nuitless)	(µg/m³)	(µg/m³) ¹	(mg/m³)			
15	4 49F+01	0.10	8.87 <b>E.</b> 01	1.21E.03	COT-318 6	0078706	90 302 0	Lac	1010				

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INCREMENTAL RISK CALCULATIONS:

						_	_
Hazard quotient	from vapor	intrusion to	indoor air,	noncarcinogen	(unitless)		ΝΑ
Incremental nsk from	vapor	intrusion to	indoor air,	carcinogen	(unitless)		AN
Final	Indoor	exposure	groundwater	conc.	(ng/L)		1 10E+03
Pure	component	water	solubility,	S	(µg/L)		6 74E+06
Risk-based	indoor	exposure	groundwater	conc,	(hg/L)		1 10E+03
Indoor	exposure	groundwater	couc.	noncarcinogen	(µg/L)		ΝA
Indoor	exposine	oundwater	conc,	arcinogen	(µg/L)		.10E+03

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

			The state of the s	7 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		VLOOKUP TABLES	LES					
SCS Soil Type	K, (cm/h)	a (1/cm)	oli riopeilles L N (unitless)	M (unitiess)	6. (cm³/cm³)	A. (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Gran Diameter (cm)					
Ü	0 20	0 008	1 09	0.083	0.38	0.068	Mari Cialii Diailletai (Mil)					
<u>ن</u>	0.26	0 019	131		0.41	0 095	0.016					
	104	0 036	1 56		0 43	0 078	0.020					
rs.	14 59	0 124	2 28	0	0 41	0 057	0 040					
ω (d	29 70	0 145	2 68		0.43	0 045	0 044					
) <u>C</u>	0 12	0.027	123		0 38	0 100	0 025					
1) 10	131	0.059	148	0 324	039	0 100	0 029					
Sic	005	0000	50-		0.40	0.00	0 0046					
SICT	0 07	0 010	1 23	0 187	0.43	0000	0 0056					
SIL	0 45	0 0 0 0 0 0 0 0	141	0 291	0 45	290 0	0.011					
SL	4 42	0 075	1 89	0 471	0.41	0 065	0 030					
					Chemic	Chemical Properties Lookup Table	okup Table					
		Organic			Pure	-	Henry's	Henry's			1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	
		carbon			component		law constant	law constant	Normal		Enthalpy of vanorization at	<u>.</u>
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	porfing	Critical	the normal	ıısk
		coefficient,	ئارة م	ın water,	solubility,	law constant	temperature,	temperature,		temperature,	boiling point,	
CAS No Chemical		(cm <sup>3</sup> /g)	(cm²/s)	Cm <sup>2</sup> /s)	(ma/L)	(unifiess)	H (atm-m³/mol)	<u>,</u> €	_ი გ	ု မွ		
ĺ				,	(4)8111	(2000)	(duties)	5	2	Ŷ.	(ca/mol)	u) (_w/6n)
50293 DDT 50328 Benzo(a)myrana		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8,10E-06	25	533 15	720 75	11,000	9 7E-05
51285 24-Dinitronhandi		1 005-03	2 73E 02	90-190 6	2 705-03	4 63tt-U5	1 13E-06	52	715 90	969 27	15,000	2 1E-03
53703 Dibenz(a,h)anthracene	-	3 80E+06	2 02E-02	3 18F-06	2 /9E+03	1 82E-U5 6 03E-07	4 44E-07	25	605 28	827 85	15,000	0.000
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1.25E+00	3 05E-02	2,5	340 04	14088	16,000	2 15-03
56553 Benz(a)anthracene		3 98E+05	5 10E-02	90-300 6	9 40E-03	1 37E-04	3.34E-06	3 %	708 15	1004 79	121,1	- 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	52	624 24	885 73	13,000	3 7E-04
58899 gamma-HCH (Lindane)	_	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839.36	13,000	3.7E-04
SOS/1 Dieldrin		2 14E+04	1 25E-02	4 74E-06	195E-01	6 19E-04	1 51E-05	25	613 32	842 25	13,000	4 6E-03
67641 Acatona		6 UOE-01	5 36E-02	7.97E-06	3 50E+03	6 31E-05	1 54E-06	52	720 00	751 00	10,000	0 0E+00
67663 Chloroform		3 98F±01	104E-01	1 145-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	6,955	0.00
67721 Hexachloroethane		1 78F+03	2 50F-03	80E08	5 00E+01	1 505-01	3 55 - 03	52.5	334 32	536 40	6,988	2 3E-05
71363 Butanol		6 92E+00	8 00E-02	9305-06	7 40E+04	3.615-04	3 80E-US	2 50 24 50	300 88	695 00 563 06	9,510	4 0E-06
71432 Benzene		5 89E+01	8 80E-02	90-308 6	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7.342	8 3E-06
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0 0E+00
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7.51E-06	25	718 15	986 20	12,000	0 0E+00
72548 DDD		9 //E+04 + 00E+08	1 505-02	4 465-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0 0 = +00
72559 DDE		4 47E+06	1 44F-02	5.875-06	9 00E-02	1 04E-04	4 UCH-U6	22	639 90	863 77	14,000	6 9E-05
74839 Methyl bromide		1 05E+01	7 28E-02	121E-05	1 52E+04	2 56E-01	6.24E-03	2 2	276.71	467.00	13,000	975-05
75014 Vinyl chlonde (chloroethene)	hene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 116+00	2 71€-02	52 52 52	259 25	437.00	5,250	8.45-05
75092 Methylene chloride		1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 196-03	25	313 00	510 00	6,706	4 7E-07
75150 Carbon disulfide		4 57E+01	1.04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	25	319 00	552 00	6,391	0.05+00
75254 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10 = +03	2 19E-02	5 34E-04	25	422 35	696 00	9,479	1 1E-06
75343 1 1-Dichlomethere		3 16E+01	2 985-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	2,000	1 8E-05
75354 1.1-Dichloroethylene		5 89F+01	9 00E-02	1045-05	2 2551403	2 30E-01	5 61E-03	5 5	330 55	523 00	6,895	0 0E+00
76448 Heptachlor		1 41E+06	1 12E-02	5 69 = -06	1 80E-01	4 47E-02	1.095-03	, K	504 /50 603 60	5/605	6,247	5 OF 05
77474 Hexachlorocyclopentadiene	liene	2 00E+05	1 61E-02	7 21E-06	1 80E+00	1 11E+00	2.71E-02	72	512.15	746.00	10.931	0.05+00
78591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	52	488 35	715 00	10,271	2 7E-07
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	52	369 52	572 00	7,590	0.000
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8,322	1 6E-05
70346 1 1 2 2-Totasphane		1 66E+02	7 90E-02	9 105-08	1 105-103	4 22E-01	1 03E-02	52	360 36	544 20	7,505	1 7E-06
83329 Acensonthese	<u> </u>	9 55E+01	7 105-02	7 SOE-06	2.97E+03	141E-02	3 44E-04	52	419 60	661 15	8,996	5 8E-05
		201-100	40.0174	00-060	4 24 2 + 00	0 30E-U3	1 55E-04	25	550 54	803 15	12 155	0 05+00

BARRA CORNE					VLOOKUP TABLES							
84742 D T A A A A.	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	25	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 Books herry photograph	3 3911+04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10	52	613 15	798 67	14,751	00E+00	3 55-01
86306 N-Mirrosodinhendemine	1 200.00	1 /4E-02		2 69E+00	5 17E-05	1 26E-06	25	09 099	839 68	13,000	0.0E+00	7 0E-01
86737 Flypmone	1 385+03	3 125-02	1 25-06	3515+01	2 05E-04	5 00E-06	25	632 28	890 45	13,000	14E-06	0 0E+00
86748 Carbazole	3 39E+03	3 905-02	7 03F-06	7.485+00	6 26E-03	63/E-05	23	570 44	870 00	12,666	00=+00	1 4E-01
87683 Hexachloro-1,3-butadrene	5 37E+04	561E-02	6 16E-06	3 23 E+00	3.34F-01	925508	8 %	18/29	230 00	13,977	57E-06	00+300
87855 Pertachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	22	582 15	813.20	14,000	2 4E-05	00+100
88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	25	519 15	749 03	12,000	3 1E-06	00+00
91941 3 3-Dichlomberaidise	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 985-02	4 83E-04	22	491,14	748 40	10,373	0 0E+00	1 45-01
95476 o-Xylene	3 63E+02	8 70F-02	1 000-05	3 11E+00	164E-0/	4 00E-09	52	560 26	754 03	13,000	1 3E-04	0 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92F-05	3 ZUE-03	S E	417 60	630 30	8,661	00+00	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02		1 56E+02	7 79E-02	1 90E-03	22 53	453.57	705.00	008,01	001100	1850
95578 2-Chlorophenol	3 88E+02	5 01E-02		2 20E+04	1 60E-02	3 90E-04	22	447 53	675 00	9.572	0.000	1 85-02
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02		1 20E+03	1 78E-04	4 34E-06	52	526 15	759 13	13,000	00+00	3 5E-01
100414 Ethylpenae	6 46E+01	7 605-02		2 09E+03	9 84E-04	2 40E-05	52	483 95	719 00	10,566	00+300	2 0E-03
100425 Styrene	7 76F±02	7 10E-02	7 80E-08	1 69E+02	3 23 8-01	7 88E-03	25	409.34	617 20	8,501	0 0E+00	1 0E+00
105679 2,4-Dumethytphenol	2 09E+02	5 84E-02		7 87F±03	8 20E-05	2 /6E-03	52	41831	636 00	8,737	0 0 0 0	1 0E+00
106423 p-Xylene	3 89E+02	7 69E-02		1 85E+02	3 14E-01	7 665-03	C 92	464 13	615 20	11,329	000+00	7 0E-02
106467 1,4-Dichlorobenzene	8 17E+02	6 90E-02		7 38E+01	9 96E-02	2 43E-03	22 22	447 21	684 75	0,020		00000
106478 p-Chloroantine	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	55	503 65	754 00	11,689	00+100	1 4E-02
108054 Vinvi acatata	1 /4E+01	1 04E-01	9 90E-06	8 52E+03	4 016-02	9 78E-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xviene	3 235+00	8 30E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	52	345 65	519 13	7,800	0 0E+00	2 0E-01
108883 Toluene	1 82F+02	8 70F-02	A 60E-06	1 01E+02	3 07 15-07	7 34 E-03	52	412 27	617 05	8,523	0 0E+00	7 OE+00
108907 Chlorobenzens	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1.52F-01	3 7 1E-03	2 4	383 78	591 79	7,930	0 日 日 日 日 日 日 日	4 0E-01
108952 Phenol	2 88E+01	8 20E-02		8 28E+04	1 63E-05	3.985-07	6 K	455.02	694.20	0.410	004	2 0E-02
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92E-02		1 72E+04	7 38E-04	1 80E-05	3 15	451 15	659 79	028'0	201100	2 12+00
135297 Endosulfan	2 14E+03	1 15E-02		5 10E-01	4 59E-04	1 12E-05	52	674 43	942.94	14,000	0 OE+00	2 15-02
117940 DLA conditions 117940 DLA conditions	1 51E+07	3 51E-02		3 40E-01	4 18E-06	1 02E-07	22	657 15	806 00	15,999	4 0E-06	0 0 0 0
118741 Hexachlorobenzene	6 32E+0/ 5 50E+0/	1 51E-UZ	3 5811-06	2 00E-02	2 74E-03	6 68E-05	52	704 09	862 22	15,000	0.05+00	7 0E-02
120127 Anthracene	2 95E+04	3 24F-02	7 74E-06	6 20E+00	5 41E-02	1 32E-03	52	582 55	825 00	14,447	4 6E-04	0 0E+00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02		3 00E+02	5.875-02	0 51E-05 1 42E-03	នូង	615 18 486 15	873 00	13,121	0 OE +00	1 1E+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	•	4 50E+03	1 30E-04	3 17E-06 ~	3 5	482 15	708 17	10,471	001100	2 0E-01
		2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	52	590 00	814 00	13.467	מיקים ג	00500
124481 Chlorodibromomethane	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04	25	416 14	678 20	8,000	2 4E-05	0 00+00
129000 Pyrana	1 555+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	52	394 40	620 20	8,288	5 8E-07	0.0E+00
156592 cis-1,2-Dichloroethylene	3 55E+01	7.365-02	1 135-05	3 50E+03	4 57E-04	1 10E-05	52	667 95	936 00	14,370	0 0E+00	1 1E-01
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39 1-03	2 %	333 65 320 85	544 00 546 50	7,192	00+00	3 5E-02
	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06	22	809 15	1078 24	17,000	2 TF-00	/ 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1 11E-04	32	715 90	969 27	15,000	2 11 04 44 44 44 44 44 44 44 44 44 44 44 44	00+100
207089 Benzo(VM:iorsethene	1 0/E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 61E-05	25	655 95	905 00	13,815	0 0E+00	1 4E-01
218019 Chrysene	3 98F+05	2 48E-02	3 30E-06	8 00E-04	3 40E-05	8 29E-07	52	753 15	1019 70	16,000	2 15-05	0 0E+00
309002 Aldrin	2 45E+06	1 32E-02	4 B6F-06	1 80E-03	5 07E-03	4 40 00	Q t	714.15	979 00	16,455	2 15-06	0 0 0 0
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1.065-05	g K	505 51 506 55	839.37	13,000	4 9E-03	0 OE+00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	3 %	596.55	830 36	3,000	2 de 19	0.05+00
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	177E-02	22	381 15	587.38	200.2	2 7E-04	0 0E+00
606202 Z,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06		3 06E-05	7 46E-07	25	558 00	770 00	12.938	2 H	0.05+00
1024573 Hentschlor ecoside	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06	52	209 60	746 87	11,000	2 0E-03	00000
7439976 Mercury (elemental)	5 20F+04	1 32E-02 3 07E-03	4 23E-06	2 00E-01	3 90E-04	951E-06	52	613 96	848 76	13,000	2 6E-03	0 0E+00
8001352 Toxaphene	2 57E+05	1 16E-02	4 34F-06	7 40E-01	2 46E-04	1 14E-02	S	629 88	1750 00	14, 127	00+300	3 0E-04
11096825 Arador 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	6 K	657 15 402 50	5393	14,000	326	0 0 0 0 0 0 0
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	3 53	377 50	512 27	19,000		00 = 00
12674112 Arador 1016 (PCB-1016) 63460219 Amdor 1242 (DCB-1242)	3 30E+04	2 22E-02	<b>N</b> :	4 20E-01	1 19E-02	2 90E-04		340 50	475 22	18,000	- 1 - 0 - 4 - 4	000+00
53469Z19 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02	531E-06	3 40E-01	2 13E-02	5 20E-04	52	345 50	482 20	18,000	1 0E-04	0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

VERSION 1 2 September, 1998

		ENTER	User-defined stratum A soil vapor permeability,	κ, (cm²)		
			8	•	7	
		ENTER Soil	stratum A SCS soli type (used to estimate	soil vapor permeability)	IS.	ENTER Stratum C soil water-filled porosity, e,c e,c (cm <sup>3</sup> /cm <sup>3</sup> )
		ENTER	SCS soi type	directly above water table	s	ENTER Stratum C soil total porosity, n <sup>c</sup> ((in)illess)
		ENTER	Soil stratum directly above	water table, (Enter A, B, or C)	O	ENTER Stratum C soil dry bulk density, p <sub>c</sub> p <sub>c</sub> (c/cm <sup>3</sup> )
	oride	ENTER Lwr (cell D28)	Thickness of soil stratum C, (Enter value or 0)	h <sub>c</sub> (cm)	792 48	ENTER Stratum B soil water-filled porosity, $\theta_w^B$
Съвтиса	Carbon tetrachloride	NTER ENTER ENTER Totals must add up to value of LwT (cell D28)	Thickness Thickness of soil of soil stratum B, stratum C, (Enter value or 0)	h <sub>B</sub> (cm)	96 09	ENTER Stratum B soil fotal porosity, n <sup>8</sup> (untilless)
		ENTER Totals mus	Thickness of soil stratum A,		670 56	ENTER Stratum B soll dry bulk density. Pb
		ENTER	Depth below grade to water table,	Lwr (cm)	1524	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ (cm <sup>3</sup> /cm <sup>3</sup> )
ENTER Initial groundwater conc. Cw (µg/L)	3 141282051	ENTER Depth	below grade to bottom of enclosed space floor,	Le (cm)	15	ENTER Stratum A soil total porosity, n^A (unliless)
ENTER Chemical CAS No (numbers only, no dashes),	56235	ENTER	Average soil/ groundwater temperature,	٦ <sub>s</sub> (2)	16	ENTER Stratum A soll dry bulk density,  \$\rho_b^A \\ (\alpha \cmod

0.27 1.7	ENTER	Floor-wall Indoor		width, rate,		(cm) (1/h)	0.1
0 42	ENTER	Enclosed	space	height,	f	(cm)	488
17	ENTER	space	floor	width,	w <sub>s</sub>	(cm)	961
0.2	ENTER Enclosed	space	floor	length,	La	(cm)	961
0 43	ENTER	Soil-bidg.	pressure	differential,	ΔP	(g/cm-s²)	40

ENTER Stratum C soil dry bulk density, Pe<sup>C</sup> (g/cm³)

ENTER Stratum A soll dry bulk density, ρ<sup>b</sup> (g/cm<sup>3</sup>)

Averaging Averaging ENTER ENTER ENTER ENTER ENTER  Averaging Averaging Exposure Target Target hazard time for Exposure risk for quotient for carcinogens, noncarcinogens, duration, frequency, carcinogens, noncarcinogens, THQ  ATC AT <sub>INC</sub> ED EF TR THQ  (vrs) (vrs) (vrs) (unitiess) (unitiess)  TO 30 350 10E-06 1  Used to calculate risk-based groundwater concentration
ENTER ENTER ENTER Averaging time for Exposure Exposure can noncarcinogens, duration, frequency, can AT <sub>MC</sub> EP EF (yrs) (yrs) (yrs) (days/yr) (t
ENTER ENTER Averaging time for Exposure noncarcinogens, duration, AT <sub>NC</sub> ED (yrs) (yrs)
ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)
ENTER ENTER Averaging Averaging time for time for carcinogens, noncarcinogens, AT <sub>C</sub> AT <sub>NC</sub> (yrs) (yrs)
ENTER Averaging time for carcinogens, ATc (yrs)

Reference conc., RfC (mg/m³)
Unit risk factor, URF (µg/m³)·1
Pure component water solubility. S
Organic carbon partution coefficient, K <sub>cc</sub> (cm <sup>3</sup> /g)
Critical temperature, T <sub>c</sub> ( <sup>2</sup> K)
Normal boling point, T <sub>B</sub>
Enthalpy of vaporization at the normal boiling point, AH, b
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H
Diffusivity In water, D.* (cm²/s)
Diffusivity in air, D <sub>a</sub> (cm²/s)

Exposure duration,	Source- building separation, L <sub>T</sub>		Stratum B soil air-filled porosity,	Stratum C soll soll air-fiiled porosity,	Stratum A effective total fluid saturation,	Stratum A soil intrinsic permeability,	Stratum A solf relative alr permeability,	Stratum A soil effective vapor permeability,	Thickness of capillary zone,	Total porosity in capillary zone,	Air-filled porosity in capillary zone,	Water-filled porosity in capillary zone,	Floor- wall seam perimeter,
(sec)	(cm)	(cm²/cm³)	(cm³/cm³)	(cm³/cm³)	(cm³/cm³)	(cm²)	(cm²)	(cm <sub>2</sub> )	(cm)	(cm³/cm³)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm)
9 46E+08	1509	0 230	0 1 50	0 130	0 419	9 36E-10	0 746	6 98E-10	17 05	0.43	0.136	0 294	3,844
	Area of enclosed	Crack	Cack	Enthalpy of	Henry's law	Henry's law	Vapor	Stratum A	Stratum	Stratum	Capillary	Total	
Bldg ventilation	space below	to-total area	depth below	vaporization at ave. groundwater	constant at ave. groundwater	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
rate,	grade,	ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient	coefficient	coefficient,	coefficient,	coefficient,	ength,
(cm <sup>3</sup> /s)	(cm²)	n (unitless)	Comick (cm)	ΔΗν,τs (cal/mol)	H <sub>TS</sub> (atm-m³/mol)	H'rs (unitless)	μτs (g/cm-s)	Cm <sup>2</sup> /s)	D**s (cm²/s)	O <sup>err</sup> c (cm²/s)	D•"" (cm²/s)	D"T (cm²/s)	<u>ڳ</u> ڻ
5.63E+04	9.24E+05	4 16E-04	15	862'2	2 02E-02	8 53E-01	1 77E-04	3 16E-03	7 99E-04	4 74E-04	5 46E-04	7 73E-04	1509
			Average	Crack		Exponent of equivalent	Infinite	Infinite					
Convection path	Source	Crack	vapor flow rate	effective diffusion	Area of	foundation Peclet	indoor	source	i c	Oofers			
length,	COLC,	radius,	ınto bidg,	coefficient,	crack,	number,	coefficient,	cono,	factor,	COUC,			
ڻـ	Caourca	Creck	Q,	O clack	Acrack	exp(Pe <sup>(</sup> )	ಶ	Countding	URF	RfC			
(шо)	(mg/m <sub>3</sub> )	(cm)	(s/ <sub>c</sub> mo)	(cm <sup>2</sup> /s)	$\langle cm^2 \rangle$	(unitless)	(unitless)	(mg/m <sub>3</sub> )	(mg/m³)	(mg/m³)			
15	8.53E+02	0 10	6 67E-01	3 16E-03	3 84E+02	3 77E+03	4 91 <b>E</b> -06	4.19E-03	1.5E-05	ΑN			

### RESULTS SHEET

RISK-BASE	RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	ER CONCENTR	ATION CALC	ULATIONS	INCREMENTAL	NCREMENTAL RISK CALCULATIONS
	:	,			Incremental	Hazard
ndoor	Indoor	Risk-based	Pure	Final	nsk from	quotient
exposure	exposite	indoor	component	Indoor	vapor	from vapor
poundwater	groundwater	exposare	water	exposnue	intrusion to	intrusion to
conc'	conc.	groundwater	solubility,	groundwater	indoor air,	indoor air,
carcinogen	noncarcinogen	couc	Ø	conc.	carcinogen	noncarcinogen
(µg/L)	(µg/L)	(μg/L)	(µg/L)	(µg/L)	(nutless)	(unitless)
3 87E+01	NA	3 87E+01	7 93E+05	3 87E+01	AN AN	ΝΑ

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

VLOOKUP TABLES

									1	U	4	L	۔ کا	4	٦	•																																							
																		Reference	conc.	) IV		0.05+00	0.05+00	7 0E-03	0 00+00	0 0E+00	0 0 0 0	0 0E+00	0 0E+00	0 OE+00	1 4E+01	3.5E-01	0 0E+00	0 0E+00	3.56-01	00+900	1 00+00	20 H	0 0E+00	0 0E+00	5 0E-03	0 0E+00	3 0E+00	7 0E-01	0 0 = +00	00=+00	9 0E-01	00+100	0.0E+00	000	4 OF-03	0 0E+00	0 OE+00	00±00	2 1E-01
																	<del>1</del> 5	nsk ,	factor.	1,0,7,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,	/ III	9.7E-05	2 1E-03	0.00	2 1E-03	1.5E-05	2 1E-04	3 7E-04	3 7E-04	4 6E-03	0.06+00	0 0E+00	2 3E-05	4 0E-06	00=+00	2 c c c c c c c c c c c c c c c c c c c		001100	6 9E-05	9 7E-05	0.00	8 4 6-05	4 7E-07	0 0 0 0	116-06	185-05	00=+00	0 0 0 0 0 0 0 0	2010	275-07	00400	16 16 16 16 16 16 16 16 16 16 16 16 16 1	1.7E-06	5 8E-05	0.00
																Enthalpy of	vaportzation at	the normal	boiling point,	Calimol)		11,000	15,000	15,000	16,000	7,127	15,000	13,000	13,000	13,000	10,000	6,955	6,988	9,510	10,346	7,342	12,000	14.000	14,000	13,000	5,714	5,250	6,706	6,391	9,479	7,000	0,000	6,247	13,000	10,93	7.590	8,322	7,505	8,996	12,155
																		Critical	temperature, T-	Σ		720 75	969 27	827 85	990 41	556 60	1004 79	885 73	839 36	842 25	751 00	508 10	536 40	695 00	563 05	562 16	986 20	848 49	863 77	860 38	467 00	432 00	510 00	552,00	00 969	585 85	223 00	5/6 05	246.31	715.00	572.00	602 00	544 20	661 15	803 15
														ĺ			Noma	Bolling G	point.	<u>.</u> &		533 15	715 90	605 28	743 24	349 90	708 15			613,32	720 00	329 20	334 32	458 00	390 88	247 24	718 15	651 02	639 90	636 44	276 71	259 25	313 00	319 00	422 35	363 15	20000	504 /3	512 45	488.35	369.52	386 15	360 36	419 60	550 54
																Tenrys	iaw constant	rerence	ternperature, T,	<u>.</u> ઈ	) 1	25	25	25	25	25	25	25	25	25	25	25	25	25	52	2 2	25.	25	25	25	25	25	52	25	25	52.5	7 2	2 Z	2 6	25.	35.	52 52 52	25	25	52
	Mean Grain Diameter (cm)	0 0092	0.016	0 0 0 0	0 040	0 044	0 025	0.0046	8±00 0	99000	0 011	0 030		Table		nemy s	iaw constant	at reference	'a inhalaine)	(atm-m³/mol)		8 10E-06	1 13E-06	4 44E-07	1 47E-08	3 05E-02	3 34E-06	4 85E-05	1 40E-05	1515-05	1 54E-06	3 88E-05	3 66E-03	3 88E-03	8 805-06	0.300-03	7 516-06	1 58E-05	4 00E-06	2 10E-05	6 24E-03	2 71E-02	2 195-03	3 025-02	534E-04	1 605-03	20100	2 0 1 E-02 1 00 E-03	2718-03	6.635-06	2 80E-03	9 12E-04	1 03E-02	3 44E-04	1 55E-04
	ı	8900	CBD 0	0 078	0 057	0 045	0 100	0 000	0 0 0 0	0 089	0 067	0 065		Chemical Dropogles 1 only Inches	a rioperiles cook		1	tour constant	T,	(unitless)		3 32E-04	4 63E-05	1 82E-05	6 03E-07	1 25E+00	137E-04	1 99E-03	5 74E-04	6 195-04	6 31E-05	1 59E-03	1 50E-01	1 59E-01	3 615-04	7 05E-01	3 085-04	6 48E-04	1 64E-04	8 615-04	2 56E-01	1 11E+00	8 98E-02	1 24E+00	2 19E-02	20-305	1075400	4 475-02	1115+00	2 72E-04	1 15E-01	3 74E-02	4 22E-01	1 41E-02	6 36E-03
3,000 3,000 3,	o (can year)	85.0	40	0 43	0 41	0 43	98	0.39	0.26	0.43	0.45	041		Chamic		- une	winponeric states	water	S S	(mg/L)		2 50E-02	1 62E-03	2 795+03	2 49E-03	7 93E+02	9 40E-03	5 60E-02	6 80E+00	1 95E-01	3 50E+03	1 00E+06	7 92E+03	5 00E+01	7 40E+04	1.335+03	2 50E-01	4 50E-02	9 00E-02	1 20E-01	1 52E+04	2 76E+03	1 30E+04	1 19E+03	3.10E+03	5 74E+U3	2.00E-03	1.80F-01	1 BOF +00	1 20E+04	2 80E+03	4 42E+03	1 10E+03	2 97E+03	4 24E+00
		0.083	7570	0.359	0.561	0 627	0 187	0.220	0 083	0 187	0 291	0 471					Oiff rehalty	Investor		(cm <sup>2</sup> /s)		4 95E-06	9 00E-06	9 06E-06	5 18E-06	8 80E-06	9 00E-06	4 37E-06	7 34E-06	4 74E-06	7 97E-06	1 14E-05	1 00E-05	6 80E-06	9.30E-06	8 80E-06	4 74E-06	4 46E-06	4 76E-06	5 87E-06	121E-05	1 23E-06	1.17E-05	1 00E-05	1 035-05	1058-03	104 105	5 69 6-06	7 21E-06	6 765-06	8 73E-06	8 80E-06	9 10E-06	7 90E-06	7 69E-06
Soil Properties Lookup Table	١,	20.5	- i	156	2.28	2 68	123	137	1 09	1 23	141	1 89					Diffushih	in air		(cm <sup>2</sup> /s)		137E-02	4 30E-02	2 73E-02	2 02E-02	7 80E-02	5 10E-02	1 18E-02	1 42E-02	1 25E-02	5 36E-02	1 24E-01	104E-01	2 50E-03	8 BOE-02	7 80E-02	1 25E-02	1 56E-02	1 69E-02	1 44E-02	7.28E-02	106E-01	101E-01	1 04E-01	1 49E-02	7 42E-02	9 00 5 0 2	1 12E-02	161E-02	6 23E-02	7 82E-02	7 80E-02	7 90E-02	7 10E-02	4 21E-02
Sc (1/cm) Sc	å	0 000	600	0.036	0 124	0 145	0.027	0.016	0 005	0 0 0 10	0 020	0 075			Organio	corpes	i di itali	Coefficient	, Y	(cm <sup>3</sup> /g)		2 63E+06	1.02E+06	1 00E-02	3 80E+06	1 74E+02	3 98E+05	1 20E+05	1 07E+03	2 14E+04	6 00E-01	5 75E-01	3 98 E+01	1 /8E+03	5 89E+01	1 10E+02	1 23E+04	9 77E+04	1 00E+06	4 47E+06	1 05E+01	1 86E+01	11/E+01	4 5/E+01	0 / 10±01	3 16 101	5.896+01	1 41E+06	2 00E+05	4 68E+01	4 37E+01	5 01E+01	1 66E+02	9 33	7 08E+03
(h) N	A) B()	020	20	40 - 4	90 4t.	29 / 0	191	0.25	0 02	200	0.45	4 42								Chemical		50293 DDT	50328 Benzo(a)pyrene	51285 2,4-Dinitrophenol	537U3 Utbenz(a,h)anthracene	56235 Carbon tetrachloride	55553 Benz(a)anthracene	57749 Chlordane	99 gamma-HCH (Lindane)	60571 Dieldrin	65850 Benzoic Acid	6/641 Acetone	67663 Chlorotorm	077263 Buttool	71432 Benzene	71556 1,1,1-Trichloroethane	72208 Endrin	72435 Methoxychlor	72548 DDD	72559 DDE	74839 Methyl bromide	75014 Vinyl chloride (chloroethene)	75450 Carbon distilled	75353 Brandom distinge	75274 Bromodichioromethere	3 1.1-Dichlomethane	75354 1.1-Dichloroethylene	8 Heptachlor	77474 Hexachlorocyclopentadiene	78591 Isophorone	78875 1,2-Dichloropropane	79005 1,1,2-Trichloroethane	79016 Inchloroethylene	79345 1,1,2,2-Tetrachloroethane	83329 Acenaphthene
SCS Soil Type	200000	) č	ł _	و ر	3 .	, (	ກູ່ວ່າ	 	sic	SICL	SIL	35			_				_	CAS No		5028	5037	5128	337	5620	5656	5/74	58886	6057	6585	6/64	6/66	2110	7143	7156	7220	7243	7254	7255	7480	7507	7848	7525	7527	75343	7535	76448	7747	7859	7887	7900	7901	7934	8332

	;				VLOOKUP TABLES							
84742 Or hittal alternation	2 88E+02	2 56E-02	6 35E-06	1 08E+03	185E-05	4 51E-07	52	567 15	757 00	13,733	0.05+00	2 BE+00
85687 Butvi benzy phunalate	3 39E+04	4 38E-02.	7 86E-06	1 12E+01	3 85E-08	9 39E-10	52	613 15	798 67	14,751	0 0E+00	3 SE-01
86306 N-Nitrosodiphenylamine	1 29F+03	3 125-02	6 35E-06	2 51E+01	5 1/E-U5	1.26E-06	52 2	660 60	839 68	13,000	0 GE+00	7 0E-01
86737 Fluorene	1 38E+04	3 63E-02	7 88E-06	1 98E+00	2.61E-03	5.37F-05	3 %	570 44	870.00	12,668	004100	1 4 5 01
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 535-08	25	627.87	00 668	13.977	5 7F-06	0.05+00
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0 OE+00
88062 2.4.6.Tachlosophenei	5 92E+02	5 50E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	52	582 15	813.20	14,000	3 4E-05	0 0E+00
91203 Naphthalane	3 0 1E+02	5 10E-02	5 25E-06	8 00E+02	3 195-04	7 78E-06	52	519 15	749 03	12,000	3 15-06	0 0E+00
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 116+00	1 64E-07	4 63E-04	8 %	560.28	754 03	10,373	4 GE+00	1440
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	3 23	417 60	630 30	8.661	- 00+LO	201100
95487 2-Methytphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 205-06	32	464 19	697 60	10,800	0 OE+00	185-01
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02		1 56E+02	7 79E-02	1 90E-03	52	453 57	705 00	9,700	0.000	2 0E-01
955/8 Z-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9,572	0 0E+00	1 8E-02
93934 Z.4.5-Inchlorophenol	1 605+03	2 91E-02		1 20E+03	1 78E-04	4 34E-06	25	526 15	759 13	13,000	0 OE+00	3 5E-01
100414 Ethylbonene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	52	483 95	719 00	10,566	0 0E+00	2 0E-03
100425 Styrene	7 76E+02	7 10F-02	7 80E-08	1 69E+02	3 235-01	7 88E-03	52	409 34	617.20	8,501	00=+00	10E+00
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 70E-03	3 %	410.5	207 60	3,737	901100	1 0E+00
106423 р-Хујепе	3 895+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	8 8	411 52	616.20	8.525	00+100	7 OF+00
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	32	447 21	684 75	9.271	00E+00	8 OF-01
106478 p-Chloroanine	661E+01	4 83E-02		5 30E+03	1 36E-05	3 32E-07	52	503 65	754 00	11,689	0 0E+00	1 4E-02
10/05/2 1,Z-Dichloroemane	174E+01	1045-01	90E-06	8 52E+03	4 01E-02	9 78E-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
100004 VIII) acetate	2 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	52	345 65	519 13	7,800	0 OE+00	2 0E-01
108883 Tohiene	1 825402	4 70E 02	90-209 /	1 61E+02	3 01 E-01	7 34E-03	8	412 27	617 05	8,523	0 0E+00	7 0E+00
108907 Chlorobenzene	2 19E+02	7.30F-02	8 705-08	4 72F±02	1 525-01	9 7 1 1 0 0	8 8	383 78	591 79	7,930	00=+00	4 0E-01
108952 Phenol	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1635-05	3 98 F-07	3 %	455.02	604.20	0.40	001100	2 UE-02
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92€-02	7 53E-06	1 72E+04	7 385-04	1 80 8-05	3 %	455 02	024 20	026,01	00E+00	2 1E+00
115297 Endosulfan	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	25	674 43	942.94	14,000	\$ E + U = 0	2 15-02
117817 Bis(2-ethythexyt)phthalate	1 51E+07	351E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	52	657 15	806 00	15,999	4 OF O6	0.05+00
117840 Di-n-octyl phthalate	8 32E+07	151E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
118/41 Hexachlorobenzene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03	52	582 55	825 00	14,447	4 6E-04	0 0E+00
12012/ Anuiracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05	52	615 18	873 00	13,121	0 0E+00	1 1E+00
	1 / 25+03	3 00E-02	8 235-06	3 00E+02	5 82E-02	1 42E-03	52	486 15	725 00	10,471	0 0E+00	2 0E-01
121142 2.4-Dinitrotollene	9 555 +01	2035-01	7 065-06	2 20E+03	1 30E-04	3175-06	8 8	482 15	708 17	1,000	0 0E+00	1 1E-02
124481 Chlorodibromomethane	6.31E+01	1 96E-02	1 05F-05	2 FOE+02	3 245.02	9 27 E-08 7 83 E-04	8 8	590 00	814 00	13,467	- 8 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4	00=+00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1.845-02	3 %	394.40	620.20	3,000	2 45-05	000
129000 Pyrene	1 05E+05	272E-02	7 24E-06	1 35E-01	4 51E-04	1 10E-05	22	667.95	936.00	0,200	70-100	1 16 01
156592 as-1,2-Dichlaroethylene		7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03	22	333 65	544 00	7 192	00000	3 55.02
156605 trans-1,2-Dichloroethylene		7 07E-02		6 30E+03	3 85E-01	9 39 6-03	52	320 85	516 50	6,717	00=00	7 0E-02
193393 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02		2 20E-05	6 56E-05	1 60E-06	22	809 15	1078 24	17,000	2 1E-04	0 0E+00
205440 Fitoranthene	1 075+05	2 20E-02	5 35E-U5	1 50E-03	4 55E-03	11504	25	715 90	27 696	15,000	2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2.26E-02		8 00E-04	3 40E-05	0 2010 0	8 8	655 95	905 00	13,815	0 0 0 0	145-01
218019 Chrysene	3 98E+05	2 48E-02		1 60E-03	3 88E-03	9.46F-05	, K	714 15	07 670	16,000	2 15-05	0 0E+00
309002 Aldrin	2 45E+06	132E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	22	603 01	839.37	13,000	4 97 53	00+100
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05	52	596 55	839.36	13,000	1 85-03	00+00
31985/ Deta-HCH (Deta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	52	596 55	839 36	13,000	5 35-04	0 0E+00
sociolo 1,3-Distributione	4 5/E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02	52	381 15	587 38	2,000	3 7E-05	2 0E-02
621647 N-Mtrosod-n-propylamine		5455.02	7 ZGE-06	1 625+02	3 USE-05	7 46E-07	52	558 00	770 00	12,938	1 9E-04	0 0E+00
	8 32F+04	1325-02		9 09E+03		2 255-06	52	509 60	746 87	1,000	2 0E-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07 E-02	6 30E-06	5 625-02	4 67F-01	1148-00	0 K	670.88	1750 00		2 6E-03	0 0E+00
8001352 Тохарнепе	2 57E+05	1 16E-02		7 40E-01	2 46E-04	6 00E-06	22	657.15	873.31	14,12,	2010	3050
11096825 Arador 1260 (PCB-1260)	2 90E+05	138E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	52		539.37	500	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	00=+00
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	22	377 50	512 27	19,000	9	000+00
126/4112 Arodor 1018 (PCB-1016) 52460219 Arodor 1242 (PCB-1242)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	52	340 50	475 22	18,000	1 OE-04	0 0E+00
(4) 4: 10 A 4: 4: 1000 2: 0: 40000	5	7 14576	מיין בי	105010	2 13E-02	5 ZUE-4/4	23	345 50	482 20	18,000	1 0E-04	0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 1.2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

		ENTER	User-defined stratum A soil vapor	_	(cm²)			
				R		A		
		ENTER	stratum A SCS soil type	(used to estimate soil vapor	permeability)	IS	ENTER Stratum C soil water-filled	porosity,
		ENTER	scs	~ Š	water table	S	ENTER Stratum C soil total	porosity,
		ENTER	Soil	drectly above water table,	(Enter A, B, or C)	O	ENTER Stratum C soil dry	bulk density, p <sub>b</sub> <sup>C</sup>
	ne	ENTER ILwr (cell D28)	Thickness of soil stratum C,	(Enter value or 0)	(cm)	1066.8	ENTER Stratum B soil water-filled	porosity, θ <sub>w</sub> <sup>B</sup> (cm³/cm³)
Сћетиса	Trichloroethylene	INTER ENTER COLLER Totals must add up to vatue of LwT (cell D28)	Thickness of soil stratum B,	(Enter value or 0) (Enter value or 0)	(cm)	3048	ENTER Stratum B soil total	porosity, n <sup>8</sup>
		ENTER Totals mu	L	stratum A, h <sub>A</sub>	(cm)	70104	ENTER Stratum B soil dry	
		ENTER	Depth below grade	to water table, Lwr	(cm)	2072 64	ENTER Stratum A soil water-filled	porosity,
ENTER Initial groundwater Conc , Cw (µg/L)	144 508	ENTER Depth	betow grade to bottom of enclosed	space floor, Lr	(m <sub>0</sub> )	15	ENTER Stratum A soil total	porosity, n^ (imifless)
ENTER Chemical CAS No. (numbers only, no dashes)	79016	ENTER	Average soil/ groundwater	temperature, T <sub>s</sub>	(°C)	16	ENTER Stratum A soil dry	bulk density, p <sub>b</sub> <sup>A</sup> (a/cm³)

	$\overline{}$		
ENTER Stratum C soil water-filled porosity, e,c e,c (cm³/cm³)	03		
ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)	0 43		
ENTER Stratum C soil dry bulk density, ρ <sup>c</sup> (g/cm³)	17	ENTER	
ENTER Stratum B soil water-filled porosity, $\theta_w^B$ $(cm^3/cm^3)$	0.27	ENTER	
ENTER Stratum B soil total porosity, n <sup>8</sup> (unitless)	0.42	ENTER	
ENTER Stratum B soil dry bulk density, p. <sup>8</sup> (g/cm³)	1.7	ENTER Enclosed	
ENTER Stratum A sol water-filled porosity. $\theta_w^A$ (cm³/cm³)	0.2	ENTER Enclosed	
ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	0.43	ENTER	
ENTER Stratum A soll dry bulk density, Pb <sup>A</sup> (g/cm³)	15	ENTER Enclosed	

c L	0.43	0.2	1.7	0 42	0.27	17	0 43
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	
Enclosed		Enclosed	Enclosed				
sbace	Soil-bldg	space	space	Enclosed	Floor-wall	Indoor	
floor	pressure	floor	floor	space	seam crack	air exchange	
thickness,	differential,	length,	width,	height,	width,	rate,	
Lorack	ΔР	ŗ.	×	f	*	<b>E</b>	
(cm)	(g/cm-s <sup>2</sup> )	(cm)	(cm)	(cm)	(cm)	(1/h)	
15	40	961	961	488	0.1	0.45	
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
Averaging	Averaging			Target	Target hazard		
time for	time for	Exposure	Exposure	risk for			
carcinogens,	noncarcinogens,	duration,	frequency,	carcinogens,			
ΑTc	ATNC	8	Ħ	Œ	된		
(yrs)	(yrs)	(yrs)	(days/yr)	(nuttless)	(unitless)		

noncardinogens,	펀	(unitless)	1	Jsed to calculate risk-based	groundwater concentration	770
cardinogens,	똢	(unitless)	1 0E-06	Used to calcu	groundwater	
frequency,	Ħ	(days/yr)	350	••••		•
duration,	8	(yrs)	30			
noncarchogens,	ATNC	(yrs)	30			
carcinogens,	ΑT <sub>c</sub>	(yrs)	70			

#### 2 of 7

CHEMICAL PROPERTIES SHEET

	Reference	sonc,	RfC	(mg/m³)
S <sub>ai</sub> t	risk	factor,	묾	(mg/m <sub>3</sub> ).1
Pure component	water	solubility,	Ø	(mg/L)
Organic carbon	partition	coefficient,	Ž,	(cm <sub>3</sub> /g)
	Cutical	temperature,	T <sub>o</sub>	(%)
Normal	polling	point,	ᄩ	S
Enthalpy of vaponzation at	the normal	boiling point,	ΔH,	(cal/mol)
Henry's law constant	reference	temperature,	ř	(్థ్రి)
Henry's law constant	at reference	temperature,	I	(atm-m³/mol)
	Diffusivity	in water,	ភំ	(cm²/s)
	Diffusivity	in air,	o*	(cm <sup>2</sup> /s)

Floor- wall seam perimeter, X <sub>rack</sub>	3,844	Diffusion path length, Le	2057 64	
Water-filled porosity in capillary zone, $\theta_{w,\alpha}$	0.294	Total overall effective diffusion coefficient, D** (cm²/s)	7 35E-04	
Air-filled porosity in capillary zone, $\theta_{\mathbf{a},\mathbf{c}}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 136	Capillary zone effective diffusion coefficient, Deff_ca	5 55E-04	
Total porosity in capillary zone, $n_{cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0,43	Stratum C effective diffusion coefficient, Deff (cm²/s)	4 82E-04	Reference conc. RfC (mg/m³)
Thickness of capitlary zone, La	17 05	Stratum B B effective diffusion coefficient, D** (cm²/s)	8 11E-04	Unit nsk factor, URF (µg/m³) 1
Stratum A soil effective vapor permeability, k,	6 98E-10	Stratum A A effective diffusion coefficient, D** (cm²/s)	3 20E-03	Infinite source bidg conc, Chudre (ug/m³)
Stratum A soil relative air permeability, k <sub>rg</sub>	0.746	Vapor Viscosity at ave soil temperature, µrs (q/cm-s)	1 77E-04	Infinite source indoor attenuation coefficient, a (unitless)
Stratum A soul intrinsic permeabulity, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)	2 78E-01	Exponent of equivalent foundation Peciet number, exp(Pe <sup>5</sup> ) (unitiess)
Stratum A effective total fluid saturation, Sie (cm³/cm³)	0 419	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mo!)	6 60E-03	Area of crack, Acrack (cm²)
Stratum C soil air-filled porosity, $\theta_{\bullet}^{c}$ (cm³/cm³)	0,130	Enthalpy of vaporization at ave groundwater temperature, AH <sub>v, rs</sub> (cal/mol)	8,483	Crack effective diffusion coefficient, Denot (cm²/s)
Stratum B soil air-filled porosity, $\theta_{\bullet}^{B}$ (cm³/cm³)	0 150	Crack depth below grade.  Zank (cm)	15	Average vapor flow rate into bldg , $Q_{\rm col}$ $({\rm cm}^3/{\rm s})$
Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.230	Crack- to-total area ratio, n (unitless)	4.16E-04	Crack radius, radius, (cm)
Source- building separation, L <sub>T</sub>	2057 64	Area of enclosed space below grade, Ae	9.24E+05	Source vapor conc. Ceouce (µg/m³)
Exposure duration, t	9 46E+08	Bidg ventilation rate, Goodeling (cm <sup>3</sup> /s)	5 63E+04	Convection path length, Lo (cm)

NCREMENTAL RISK CALCULATIONS	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
INCREMENTAL F	incremental nsk from vapor intrusion to indoor air, carcinogen (unitless)
JLATIONS.	Final indoor exposure groundwater conc. (µg/L)
ATION CALCL	Pure component water solubility. S S (µg/L)
R CONCENTR	Risk-based indoor exposure groundwater conc (µg/L)
ISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS.	Indoor exposure groundwater conc., noncarcinogen (µg/L)
RISK-BASE	indoor exposure groundwater conc , carcinogen (µg/L)

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

K, (cm/h) α (1/cm) 0 20 0 008 0 26 0 019 1,04 0 036 1,14 59 0 124 29 70 0 145 0,12 0 025 0 025 0 025 0 025 0 045 0 025 0 045 0	M (unitiess)  M (unitiess)  0 037  0 037  0 037  0 037  0 027  0 0291  0 0291  0 0291  0 0291  0 0291  0 471  0 471  4 95E-06  9 00E-06	Be, (cm³/cm³) 8 0 41 0 38 0 41 0 43 0 43 0 43 0 45 0 45 0 45 0 45 0 45	76m³) 6, (cm³/cm³) Mean Gre 0 38 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	in Diameter (cm)  0 0092  0 0100  0 01	Henry's law constant reference temperature, T R (°C)	Normal boiling point, Ts (%)	Gritical temperature,			
0 20 0 008 0 26 0 019 1,04 0 036 1,14 59 0 124 29 70 0 145 0,12 0 027 0,12 0 027 0,12 0 029 0,25 0 016 0,02 0 005 0,07 0 010 0,45 0 020 0,45 0	99 0 0 0 8 3 3 4 9 5 5 6 6 9 5 6 9 5 6 9 5 6 9 6 5 6 9 6 5 6 9 6 5 6 9 6 5 6 9 6 5 6 9 6 9	0.38 0.41 0.43 0.43 0.43 0.39 0.39 0.45 0.45 0.45 0.41  Chemical Pure component water solubtity, la S S (mg/L) 2.50E-0.2	0 0088 0 095 0 078 0 045 0 100 0 100 0 100 0 034 0 007 0 065 0 067 0 065 0 067 0 065 0 067 0 065 0 067 0 065 0 067 0 067 0 067 0 065 0 067 0 067	0 0092 0 016 0 020 0 046 0 029 0 0039 0 0039 0 0039 0 0039 0 0039 0 0039 0 0039 0 0039 0 0039 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, Ts (%)				
0.26 0.019 1.04 0.036 1.04 0.036 1.24 29.70 0.124 29.70 0.124 29.70 0.027 1.31 0.059 0.25 0.016 0.02 0.005 0.02 0.005 0.02 0.005 0.045 0.005 0.07 0.010 0.45 0.005 0.07 0.010 0.45 0.005 0.07 0.010 0.	31 0 237 56 0 359 28 0 561 68 0 627 63 0 187 48 0 324 48 0 324 37 0 270 09 0 083 37 0 270 09 0 471 0 291 0 471 0 291 0 4 95E-06 0 9 00E-06 0 9 00E-06 0 9 06E-06	0 41 0 43 0 43 0 48 0 98 0 96 0 26 0 45 0 45 0 41 0 41 Even component water solubitity, lass \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	0 096 0 078 0 045 0 045 0 100 0 100 0 034 0 067 0 067	0 000 0 020 0 040 0 025 0 025 0 0039 0 0039 0 0030 1 0030 0 0030	Henry's law constant reference temperature, T R (°C)	Normal boiling point, Ts (%)				
1.04 0.036 14.59 0.124 29.70 0.124 29.70 0.145 0.12 0.027 1.31 0.059 0.25 0.016 0.02 0.005 0.02 0.005 0.02 0.005 0.02 0.005 0.02 0.005 0.045 0.020 0.045 0.0	66 0 359 28 0 561 68 0 627 48 0 627 48 0 324 37 0 270 39 0 083 23 0 187 41 0 291 89 0 0471 1 0 291 89 0 0471 20 4 95E-06 20 9 00E-06	Chemical Pure  component water solibitity, la \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	0 078 0 045 0 045 0 100 0 100 0 034 0 070 0 089 0 067 0 065 Properties Looku	0 000 0 040 0 044 0 025 0 0039 0 0039 0 0039 0 0039 0 0039 0 0039 0 0039 0 0039 0 0039 1 0004 0 0028 0 0039 0 0039 0 0039 0 0044 0 0028 0 0039 0 0039 0 0039 0 0039 0 0039 0 0039 0 0039 0 0044 0 0039 0 0039 0 0048 0 0048	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal Nopming Position 1 Ps (%)				
29 70 0 124  29 70 0 145  0.12 0 027  1.31 0 0.059  0.22 0 0.066  0.02 0 0.006  0.07 0 0.010  0.45 0 0.020  24.2 0 0.075  Carbon partition Orffusivi Coefficient, in arr.  Koc No.  1.02E+06 1 37E  2.63E+06 1 37E  1.02E+06 4 30E  1.02E+06 4 30E  1.02E+06 1 37E  2.63E+06 1 37E  2.63E+06 1 37E  3.98E+05 5 10E  1.00E+02 2 73E  3.98E+05 5 10E  1.00E+02 1 12E  3.98E+06 2 0.02  3.98E+06 2 0.02  3.98E+06 2 0.02  3.98E+06 1 36E  1.00E+07 1 12E  6.00E-01 1 24E  5.55E-01 1 24E	28 0 561 29 0 627 23 0 187 34 0 270 30 0 283 30 0 187 41 0 291 89 0 471 89 0 471 Can <sup>2</sup> (s) 22 9 00E-06 22 9 00E-06 23 9 00E-06 24 95E-06 25 9 00E-06 26 9 00E-06 27 9 00E-06 28 80E-06 29 0 60E-06 20 9 0 60E-06 20 9 0 60E-06 21 8 8 6 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6	Chemical Pure component water solubility, last 8 (mg/L)	0057 0045 0100 0100 0034 0070 0067 0067 0067 Properties Looku	Henry's 0.030 0.031 0.03	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T s (%)				
29 70 0 145 0.12 0 027 1 31 0 059 0.25 0 016 0 02 0 005 0 07 0 010 0 45 0 020 0 45 0 020 0 442 0 075  Carbon partition Drifusive Carbon partition Drifusive Carbon partition Drifusive Carbon partition Drifusive Carbon partition Drifusive Carbon partition Drifusive Carbon partition Drifusive Carbon partition Drifusive Carbon Drif	23 0 187 24 0 324 25 0 083 26 0 083 27 0 083 29 0 083 29 0 0471 89 0 0471 89 0 06-06 20 9 0 06-0	Chemical Pure  Component water solubitity, la S S CA5 Chemical Che	0.037 0.045 0.100 0.100 0.034 0.067 0.065 0.065 0.065 Properties Looku	0.040 0.046 0.029 0.0039 0.0030 0.003	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, Ts (%)				
Cal (cm³/g) (cm²/s  Cal (cm³/g) (cm²/s  Cal (cm²/g) (cm²/s  Cal (cm²/s) (cm²/s) (cm²/s  Cal (cm²/s) (cm²/s	088 0 0 627 09 0 0 270 09 0 0 683 09 0 0 683 09 0 0 683 09 0 187 09 0 187 09 0 187 09 0 0 6 6 0 6 09 0 0 6 6 0 6 09 0 0 6 6 0 6 09 0 0 6 6 0 6 09 0 0 6 6 0 6 09 0 0 6 6 0 6 09 0 0 0 6 0 6 09 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Chemical Pure  component water  solibitity, la \$ \$ (mg/L)  2 50E-02	0 045 0 100 0 100 0 100 0 034 0 070 0 089 0 065 0 065 Properties Looku	0 025 0 025 0 025 0 0039 0 0039 0 0039 0 0030 0 003	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T <sub>B</sub> (%)				
Carbon  Carbon	23 0 187 48 0 324 48 0 324 69 0 083 29 0 187 41 0 291 89 0 471 D, cm²(s) 22 4 95E-06 22 9 00E-06 22 9 00E-06 22 8 80E-06 22 9 00E-06 23 5.18E-06 24 37E-06 25 9 00E-06 26 9 37E-06 27 37E-06 28 30E-06 29 37E-06	0.38 0.39 0.39 0.46 0.45 0.45 0.45 0.41 Chemical Pure component water solubitity, las S S (mg/L) 2.50E-02	0 100 0 100 0 034 0 070 0 067 0 067 0 065 0 065 Henry's w constant w constant	0 025 0 029 0 0046 0 0038 0 0011 0 0011 0 0030 1 0 0030 0 0011 0 0030 0	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T s (%)				
Cal (cm³/g) (cm²/g) (c	48 0 324 37 0 270 09 0 083 09 0 1087 41 0 291 41 0 291 62 0 477 62 0 477 62 9 00E-06 02 9 00E-06 03 8 00E-06 02 9 00E-06 03 9 00E-06 04 37E-06 05 9 00E-06	0 39 0 46 0 46 0 45 0 45 0 45 0 41 0 41 0 41 0 41 0 41	0 100 0 034 0 070 0 089 0 067 0 065 Properties Looku Henry's W constant	0 029 0 0046 0 0039 0 0030 0 0010 0 0030 0 0	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, Ts (%)				
Call (cm³/g) (cm²/s) (	37 0 270 09 0 083 23 0 187 41 0 291 89 0 471  Diffusivity in water, D <sub>w</sub> (cm²/s) 22 4 95E-06 22 9 00E-06 22 9 06E-06 23 5.18E-06 24 37E-06 25 9 06E-06 26 9 06E-06 27 9 06E-06 28 9 06E-06 29 9 06E-06 20 9 06E-06	0 46 0 26 0 43 0 45 0 41 0 45 0 41 0 41 0 41 0 41 0 41	0 034 0 070 0 089 0 067 0 065 Properties Looku Henry's W constant H	0 0046 0 0039 0 0039 0 0030 0 0030 1 0 0030 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T <sub>B</sub> (%)				
Cal (cm <sup>3</sup> /g) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (c	23 0.083 24 0.083 25 0.187 26 0.081 27 0.081 28 0.081 29 0.081 20	Chemical Pure component water solubitity, las \$ (mg/L) 2 50E-02	Properties Looku Henry's W constant Henry's	Henry's 0.030 0.011 0.031 0.011 0.031 0.011 0.031 0.011 0.03	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T s (%)				
Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /g) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>2</sup> /s)  Cal (Cm <sup>3</sup> /s) (cm <sup>3</sup> /	0.9 0.083 2.3 0.187 8.9 0.471 1.0 0.471 1.0 0.471 1.0 0.471 1.0 0.471 1.0 0.471 1.0 0.471 1.0 0.471 1.0 0.065-06 1.0	Chemical Pure component water solubitty, la \$ \$ (mg/L) 2 50E-02	0 070 0 089 0 067 0 065 0 065 Properties Looku Henry's Henry's Henry's	0 0039 0 0056 0 0011 0 030 Henry's constant reference perature, H H H H H H H H H H H H H H H H H H H	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal botting point, T <sub>B</sub> (°K)				
Coefficient, in air,  Coefficient, in air,	23 0 187 41 0 291 89 0 471 Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s) 22 4 95E-06 22 9 00E-06 22 9 00E-06 22 9 00E-06 22 9 00E-06 22 9 00E-06 22 9 00E-06 22 9 00E-06	Chemical Pure component water solubility, la \$ (mg/L) 2 50E-02	0 089 0 067 0 067 Properties Looku	0 0058 0.011 0 030 	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, Ts (%)				
Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>2</sup> s)  Cal (Cm <sup>3</sup> /g) (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)  Cal (Cm <sup>3</sup> s)	11 0 291  12 0 471  13 0 471  14 0 291  15 0 471  16 0 471  17 0 4 95  18 0 9 0 6 6 6 6 9 9 6 6 6 6 9 9 6 6 6 6 6	Chemical Chemical Pure component water solubitity, la S S (mg/L) 2 50E-02	0 065 0 065 0 065 Properties Looku Henry's w constant H	0.010 0.030 Henry's constant reference aperature, H H H H m-m³/mol) 13E-06 44E-07 147E-08 305E-02	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T <sub>B</sub> (°K)				
Control of the contro	Diffusivity In water, Dw (cm²/s)  22 4 95E-06 D2 9 00E-06 D3 9 00E	Chemical Chemical Pure component water solubitity, la \$ (mg/L) 2 50E-02	0 065 0 065 Properties Looku Henry's W constant H	0 030  Henry's constant reference perature, H m-m³/mol) 13E-06 113E-06 44E-07 147E-08	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T <sub>s</sub> (°K) 533 15				
Coganic carbon partition Officent, in Ke. (cm³/g) (cr 1,02E+06 1,00E+05 2 1,02E+06 1,00E+05 2 1,00E+05 1 1,00E+05 1 1,00E+05 1 1,00E+05 1 1,00E+05 1 1,00E+05 1 1,00E+05 1 1,00E+05 1 1,00E+05 1 1,00E+05 1 1,00E+05 1 1,00E+05 1 1,00E+05 1 1,00E+05 1 1,00E+04 1 1 1,00E+04 1 1 1,00E+04 1 1 1,00E+04 1 1 1,00E+04 1 1 1,00E+04 1 1 1,00E+04 1 1 1,00E+04 1 1 1,00E+04 1 1 1,00E+04	Diffusivity In water, D <sub>4</sub> (cm <sup>2</sup> /s)  22 4 95E-06 22 9 00E-06 22 9 06E-06 22 9.18E-06 22 9.08E-06 22 9.08E-06	Chemical Pure component water solubitity, la \$ \$ (mg/L) 2 50E-02	Properties Looku Henry's W constant H	0.030  Henry's  constant reference perature, H m-m³/mol)  1.13E-06 4.4E-07 147E-08	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T <sub>B</sub> (°K) 533 16				
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Coefficient, in K <sub>Sc</sub> Cal (cm <sup>3</sup> /g) (cr 2 6.3E+06 1.02E+06 4 1.02E+06 4 1.02E+06 1.02E+06 2 2 2.0E+06 2 2 2.0E+06 2 2 2.0E+06 2 2 2.0E+06 1.07E+02 1.00E+03 1.00E+04	E 9 00 00 00 00 00 00 00 00 00 00 00 00 0	. 8	w constant H'	3 10E-06 1 13E-06 1 44E-07 1 47E-08 3 05E-02	temperature, T <sub>R</sub> (°C)	Point, T <sub>B</sub> (%) (%) 533 15 715 90	temperature,	the normal	osk Pa	Reference
Cal (cm³/g) (cr 2 63E+06 1 1.02E+06 1 1.02E+06 4 1 74E+06 2 2 9 1 74E+06 5 1 20E+05 5 1 17E+04 1 1 6 00E-01 1 398E+04 1 1 398E+04 1 1 398E+01 1 1	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	. 6	H.	3 10E-06 1 13E-06 4 44E-07 1 47E-08 3 05E-02	(°C)	Form, T <sub>B</sub> (°K) (°K) (°K) (°K) (°K) (°K) (°K) (°K)	temperature,			919109
Cal (cm³/g) (cr 2 63E+06 1 1.02E+06 4 1.02E+06 4 1.02E+06 4 1.02E+06 2 2 80E+06 2 3 80E+06 2 3 98E+02 7 1.20E+02 7 1.20E+03 1 1.70E+03 1 6 00E-01 5 5 75E-01 1	555555	S (mg/L) 2 50E-02	H. H.	(atm-m³/mol) 8 10E-06 1 13E-06 4 44E-07 1 3 05E-02		715 90		boiling point,	factor,	COUC,
themical (cm³/g) (cr 2 63E+06 1 2 63E+06 1 102E+06 4 100E-02 2 110ride 3 80E+06 2 120E+05 1 120E+05 1 120E+05 1 120E+05 1 120E+05 1 120E+05 1 160E-01 1 3 96E+04 1 6 00E-01 1	00000000000000000000000000000000000000	(mg/L) 2 50E-02	(accelerate)	(atm-m³mol) 8 10E-06 1 13E-06 4 4E-07 1 47E-08 3 05E-02		(°K) 533 16 715 90	Ļ	, HV		()
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anol 100E-02 2  10tracene 30E+06 2  acene 174E+02 7  acene 39EE+05 1  (Lindane) 107E+03 1  6 00E-01 5  5 75E-01 1  3 98E+01 1		1 62E-03	4 63E-05	4 44E-07 1 47E-08 3 05E-02	52		969 27	15,000	2 1E.03	0.0440
acene 3 80E+06 2  Aloride 174E+02 7  acene 3 98E+05 5  (Lindane) 1 07E+03 1  2 14E+04 1  6 00E-01 1  3 98E+01 1		2.79E+03	1 R2F-05	1 47E-08 3 05E-02	i c	200	1000	000	2010	30.100
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(Lindane) 1 07E+03 1 2 14E+04 1 6 00E-01 5 5 75E-01 1 3 98E+01 1		5 60 E-02	1 99F-03	4 RSE-05	1 4	VC VC3	000 10	000	1 1	3 6
(circaily) 10/E+05 1 2 14/E+04 1 6 00E-01 5 5 75E-01 1 3 98E+01 1		1000	201	CO-UCO +	3	67 670	600	13,000	3 /E-04	0 OE+00
2 145+04 1 6 00E-01 5 5 75E-01 1 3 98E+01 1		6.80E+00	5 74E-04	1 40E-05	33	596 55	839 36	13.000	3.7E-04	0 OF +00
6 00E-01 5 5 75E-01 1 3 98E+01 1	-02 4 74E-06	195E-01	6 19E-04	1 515.05	7,5	612.32	30 040	1000	000	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5 75E-01 1 3 98E+01 1		2 500 - 02	100	0001	3 :	7000	7 740	000'81	4 05-03	00+400
5 75E-01 1 3 98E+01 1		3 305103	021120	1 54E-06	52	720 00	751 00	10,000	00+400	1 4E+01
3 98E+01 1	1.46	1 00E+06	1 59E-03	3 88E-05	25	329.20	508 10	6 955	0.0440.0	155.01
	-01 1 00E-05	7 92E+03	1.50F-01	2 66E-03	36	224 22	20 40	000	20.10.0	2 0 0
67721 Hexachioroethane 1 78E±03 3 60E,03	000	100		0 0 0	3 :	5	2	008'0	50-JC 7	00+400
2 CUTIO!	900	9 00E+03	1286-01	3.88E-03	22	458 00	695 00	9,510	4 0E-06	00E+00
6 92E+00 8 00E-02	9 30E	7 40E+04	3 61E-04	8 80E-06	25	390 88	583.05		00400	2 KE 01
5 89E+01 8 80E-02	-02 9 80E-06	1 75E+03	2.28F-01	5 565-03	30	262 24	25 46		00 100	
71556 1 1 1-Trichlomethane 1 10E±00 7 ppc 00		4 2 2 C 4		0000	3 :	47 000	200	7,542	2000	00=+00
30.301		325+03	10-100	1 /25-02	25	347 24	545 00	7,136	0 OE+00	1 OE+00
	-02 4 74E-06	2 505-01	3 08E-04	7 515-06	25	718 15	986 20	12,000	005+00	1 1E.03
72435 Methoxychlor 9 77E+04 1 56E-02		4 50E-02	6.48F-04	1 585-05	36	BE 100	07070			1 1
1 005408		1000		200-00	3	20 100	040			1 8E-UZ
		300E-07	40-11-04	4 00E-06	22	639 90	863 77	14,000		0 OE+00
4 47E+06 1	'n	1 20E-01	8 61E-04	2 10E-05	25	636 44	860 38	13.000		0.05+00
74839 Methyl bromide 7 28E-02	-02 1 21E-05	1.52F+04	2.58F_01	R 24E-03	4	17. 27.0	00 297	77.7		100
thoroathone) + occitor			00.00	50-3430	3	1017	40/00	5,714		2000
		\$ 10E+D3	201-1	Z / JE-0Z	3	259 25	432 00	5,250	8 4E-05	0000
1044171		1 30E+04	8 98E-02	2 19E-03	52	313 00	510 00	90.706	4 7E-07	3 0E+00
75150 Carbon disuitide 4 57E+01 1 04E-01	01 1 00E-05	1 19E+03	1 24F+00	3 02E-02	36	310.00	66.00	400		1070
R 71E±01	•	0 + DO + C		100	11	2	20.400	500		2
٠ ،		201010	70-261 7	5 34E-U4	9	422.35	00 969	9,479		0 0E+00
ane bouctul 2	_	6 74E+03	6 56E-02	1 60E-03	52	363 15	585 85	7.000	1 8E-05	00+300
75343 1,1-Dichloroethane 3 16E+01 7 42E-02	02 1 05E-05	5 06E+03	2.30F-01	5.81E-03	35	33055	200 00	400		10 4
5 80E+01 0		00.000	00.000	000	3 :	0 1	0000	0.00	_	0.00
0.000	02 045-03	C 43E 403	2012	2 61E-UZ	52	304 75	576 05	6.247	5 OE-05	0 0 0 0 0
1415+06		1 80E-01	4 47E-02	1 09E-03	52	603 69	84631	13.000	135-03	0 OE+00
77474 Hexachlorocyclopentadiene 2 00E+05 1 61E-02	02 7 21E-06	1 80E+00	1 11E+00	2 71F-02	25	512.15	748 00	10 021		700
4 68E+01 6		1 200.1	2 275	20-11-12	3 8	0 44	200	06,0	_	ביי ביי
10:1100		10.10	t0-27 / 7	90-359 9	S	488 35	715 00	10,271	2 7E-07	0.05+00
00/3   4-5/G  010ptopane		2 80E+03	1155-01	2 80E-03	25	369 52	572 00	7.590	0.000	4 OE-03
79005 1,1,2-Trichloroethane 5 01E+01 7 80E-02	02 8 80E-06	4 42F+03	3.74F.02	A 10 H 0	č	300	00000	000		
4 68E±02		1 100 100	4 6 J L C C C	17-17-0	3 :	360 13	90.500	8,322	165-05	0.01
100-105		100+03	4 22E-01	1 035-02	52	360 36	544 20	7,505		0.05+00
/ 9340 1, 1, 2, 2-1 6trachloroethane 9 33E+01 7 10E-02	02 7 90E-06	2 97E+03	1 41E-02	3 44E-04	25	419 60	661 15	8.996	5 8F-05	0.0E+00
7.08E+03		4 245+00	8 36E 03	1 55 0 0 0	1 8	200	2 6			200

84567 Distribution	CO. 1995	20 133 0	L		VLOOKUP TABLES	!						•
84742 Dischipturingsia	3 395+04	2 30E-02	0 33E-06	1 08E+03	1855-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 85+00
85687 Butyl benzyl phthalate	5 75E+04	1.74F-02	4 835-06	2 69E+00	5 475.05	9.39E-10	8 8	613 15	798 67	14,751	00±00	3 55-01
86306 N-Nitrosodiphenylamine	1 29F+03	3 12F-02	6 25E-06	3 515+03	20-0-2	1 26E-06	2 2	660 60	839 68	13,000	0.05+00	7 0E-01
86737 Fivorene	1385+04	3 63F-02	7 88F-06	1 98 H	2.615-03	3 00E-08	8 8	632.28	890 45	13,000	1.4E-06	00+400
86748 Carbazole	3 39E+03	3 905-02	7 03E-06	7 48E+00	6 26F-07	1 535.08	8 %	570 44	00000	12,666	005+00	14E-01
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	334E-01	8 15E-03	3 12	486 15	738.00	10,01	2 7 7 6	00+300
	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	32	582 15	813.20	14,000	3.45-05	00+100
66U62 2,4,6-Trichlorophenol 91203 Nashthalasa	3 81E+02	3,18E-02	6 25E-06	8 OOE+02	3 19E-04	7 78E-06	25	519 15	749 03	12,000	3 15-06	0 0E+00
	2 00E+03	5 SOE-02	7 50E-06	3 10E+01	1 98E-02	4 835-04	52	491 14	748 40	10,373	0 0E+00	1 4E-01
	3 63F+02	8 20F-02	1000	3 11E+00	1 04 E-U.	4 00E-09	52 2	560 26	754 03	13,000	135-04	0.00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92 15-05	3.20E-03	6 4	417 60	63030	8,661	0 0 0 0 0 0	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	3 52	453.57	705.00	0000	00+400	1 85-01
	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	22	447 53	675 00	9.572	00+100	1 85.02
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	22	526 15	759 13	13,000	000+00	3 5E-01
100414 Ethichonagos	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	25	483 95	719 00	10,566	0 0E+00	2 0E-03
	3 83E+02 7 76E+02	7 105-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20	8,501	00=+00	1 0E+00
	2 09E+02	5 PAE-02	869508	7 875-402	- 130-0 - 130-0	2 /6E-03	8	418 31	636 00	8,737	0 0E+00	1 0E+00
106423 p-Xylene	3 896+02	7 69E-02	8 44E-06	1 85E+02	3.14E-01	2 00E-06 7 66E-03	£ 52	484 13	707 60	11,329	0 0E+00	7 0E-02
106467 1,4-Dichlorobenzene	6,17E+02	6 90E-02	7 90E-06	7 385+01	9 96E-02	2 435-03	8 %	41132	07 919	6,525	00000	7 OE +00
106478 p-Chloroaniline	6 61 5 + 01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	3 53	503 65	754.00	11,680		0 0 0 0
107062 1,2-Dichloroethane	1 74E+01	104E-01	90E-06	8 52E+03	4 01E-02	9 78E-04	22	356 65	561 00	7.643	2 65-05	0.05+00
106054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04		345 65	519 13	7,800	0.00	2 0E-01
108883 Tollege	4 0/E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03		412 27	617 05	8,523	0 0E+00	7 0E+00
108907 Chinobenzena	2 195+02	3 70E-02	8 505-05	5 Z6E+02	2 72E-01	6 63E-03		383 78	591 79	7,930	0 0E+00	4 0E-01
108952 Phenol	2 88E+01	8 205-02	9 105-06	8 28E+04	1 525-01	3 715-03	52	404 87	632 40	8,410	0.0E+00	2 0E-02
111444 Bis(2-chloroethyl)ether	155E+01	6 92E-02	7.535-06	1 72E+04	7 385-04	0.90E-U/		455 02	694 20	10,920	0.00	2 1E+00
115297 Endosulfan	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12F-05	G K	451 15 674 43	659 79	9,000	3 38-04	0 0E+00
117817 Bis(2-ethylhexyl)phthatate	151E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07		657 15	806.00	15,900	4 0E -00	70-21
117840 Di-n-octyl phthalate	8 32E+07	151E-02		2 00E-02	2 74E-03	6 68E-05		704 09	862 22	15,000	00E+00	7 0F-02
110/41 nexactioropenzene 120127 Anthracene	5 50E+04	5 42E-02	5.91E-06	6 20E+00	5 41E-02	1 32E-03		582 55	825 00	14,447	4 6E-04	0 05+00
120821 1.2.4-Trichlorobenzene	1 78E±03	3 24E-02	7 74E-U5	4 34E-02	2 67E-03	6 51E-05		615 18	873 00	13,121	0 0E+00	1 16+00
120832 2,4-Dichlorophenol	1 47E+02	3.46E-02	8 77F-06	3 00E+02 4 50E+03	3 62E-02	1 42E-03		486 15	725 00	10,471	0 OE+00	2 0E-01
121142 2,4-Dinitrotoliuene	9 55E+01	2 03E-01		2 70F+02	3 80F-08	3 1/15-06	2 2	482.15	708 17	1,00	00E+00	1 1E-02
	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 835-04		390 00 416 14	814 00 878 20	13,467	196-04	00+400
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 845-02		394 40	620 20	286	2 4E-03	00000
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	1 35E-01	4 516-04	1 10E-05		667 95	936 00	14,370	0 0E+00	1 1E-01
150592 GS-1,2-Dichlomethylene 156605 franc.1 2.Dichlomethylene	3 555+01	7.36E-02	1 135-05	3 50E+03	1 67E-01	4 07E-03	52	333 65	544 00	7,192	0 0E+00	3 5E-02
193395 Indeno(1.2.3-cd)pyrene	3.47F+06	1 90F-02	- 19E-05	5 30E+03	3 85E-01 6 66E 06	9 39 5-03		320 85	516 50	6,717	0 0E+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02		1 50E-03	4.55F-03	1100	3 2	809 15	1078 24	17,000	2 16-94	0 0E+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1615-05		735 80	72.696	15,000	2 15-04	0 OE+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07		753 15	903 00 1019 70	13,815	0 0E+00	1 45-01
218019 Chrysene	3 98E+05	2 48E-02	621E-06	1 60E-03	3 88E-03	9 46E-05		714 15	979 00	16,455	2 15-06	00+100
30900Z Aldra 310846 alaba-DCH (alaba:DDC)	2 45E+06	132E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04		603 01	839 37	13,000	4 9E-03	00000
319857 beta-HCH (beta-BHC)	1.265+03	1 42E-02	7.34E-06	2 00E+00	4 355-04	1 06E-05		596 55	839 36	13,000	1 8E-03	0 0E+00
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1001-05	2 40E-03	3 USE-US	7 44E-U7		596 55	839 36	13,000	5 3E-04	0 0E+00
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1.82E+02	3.06E-05	7.485-07	9 4	381 15	587 38	000'	3 7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 255-06		338 50 509 60	746 97	12,938	196-04	0 0 0 0 0 0
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	. 4	2 00E-01	3 90E-04	9 515-06		613.96	848 76	000	2 OE-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02	22	62988	1750 00		70270	0 UE+00
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	25 6	657 15	873 31		3 25-04	0.05+00
11096825 Arodor 1260 (PCB-1260) 11097691 Amdor 1254 (PCB-1254)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 895-01	4 60E-03	25	402 50	539 37	19,000	- 유 수 수	000
12674112 Arodor 1016 (PCB-1234)	3 30E+04	1 30E-02 2 22E-02	5 42F-06	5 / UE-02 4 20E-01	8 20E-02	2 00E-03	52	377 50	512 27	19,000	1 0E-04	0 0E+00
53469219 Aroctor 1242 (PCB-1242)	3 30 0-04	2 14E-02	5 31E-06	3406-01	1 19E-02 2 13E-02	2 90E-04 5 20E-04		340 50	475 22	18,000	106-04	0 0E+00
		! !	1	·  -  -	**	40-707 O	3	20.04		18,000	1 0E-04	0.0E+00[

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below) 8

		ENTER	3	soll vapor late OR permeability, k,	v) (cm²)		. 8
		ENTER	stratum A SCS	(used to estimate soil vapor	permeability)	IS	ENTER Stratum C soil water-filled porosity,
ı		ENTER	ď	soil type directly above	water table	S	ENTER Stratum C soil total porosity,
ı		ENTER	Soil	directly above water table,	(Enter A, B, or C)	O	ENTER Stratum C soil dry buik density, Po (A)
	thane	ENTER of Lwt (cell D28)	Thickness of soil stratum C	Ų.	(cm)	10668	ENTER Stratum B soil water-filled porosity, $\theta_{\mathbf{w}}^{B}$
Chemical	1,1,2-Trichloroethane	INTER ENTER ENTER Totals must add up to value of LwT (cell D28)	Thickness of soil stratum B	(Enter value or 0)	(cm)	304 8	ENTER Stratum B soil total porosity, n <sup>8</sup>
		ENTER Totals mu	Thickness	stratum A,	(cm)	701 04	ENTER Stratum B soil dry bulk density, p <sub>b</sub>
		ENTER	Depth below grade	to water table.	(cm)	2072 64	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ (cm <sup>3</sup> /cm <sup>3</sup> )
groundwater conc , C <sub>w</sub> (µg/L)	5 054	ENTER Depth	below grade to bottom of enclosed	space floor, Lr	(cm)	15	ENTER Stratum A soil total porosity, n <sup>A</sup>
Chemical CAS No (numbers only, no dashes)	79005	ENTER	Average soil/ groundwater	temperature, T <sub>s</sub>	(၃)	16	ENTER Stratum A soll dry bulk density, \$\rho_h^A\$ (\alpha(\alpha)^2)

ENTER Stratum C soil dry bulk density, Pb. (g/cm³)

ENTER Stratum B soil dry bulk density, p<sub>b</sub> (g/cm³)

ENTER Stratum A soil dry bulk density,  $ho_b^A$ (g/cm³)

Target hazard quotient for noncardnogens, THQ (untitless)	1.0E-06 1 Used to calculate risk-based aroundwater concentration	0.47
Target nsk for carcinogens, TR (unitless)	1.0E-06 Used to calcu	
Exposure frequency, EF (days/yr)	350	•
Exposure duration, ED (yrs)	30	
Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	30	
Averaging time for carcinogens, AT <sub>C</sub> (yrs)	70	



## CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)
Unit risk factor, URF (µg/m³) 1
Pure component water solubrity, S (mg/L)
Organic carbon partition coefficient, $K_{\infty}$ (cm $^3$ g)
Critical temperature, T <sub>c</sub> (*K)
Normal boiling point, T <sub>B</sub>
Enthatpy of vaporization at the normal bolling point, AH.,,
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H
Diffusivity in water, D <sub>w</sub> (cm²/s)
Diffusivity In air, D. (cm²/s)

Definess of porosity in poro	au-filled au-filled total fulled solid s	O	Stratum A	ş	Stratum C	Stratum A	Stratum A	Stratum A	Stratum A	:	Total	Air-filled	Water-filled	Floor-
θ <sub>s</sub> <sup>g</sup> θ <sub>s</sub> <sup>c</sup> S <sub>s</sub> <sup>g</sup> k <sub>s</sub> k <sub>s</sub> k <sub>s</sub> L <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub> H <sub>m</sub>	θ <sub>1</sub> /εm         Θ <sub>1</sub> /εm         S <sub>2</sub> /εm         K <sub>1</sub> /εm         K <sub>2</sub> /εm         L <sub>2</sub> /εm         n <sub>2</sub> /εm         θ <sub>2</sub> /εm           ( cm²/cm²)         ( cm²/cm²)<	air-fi poro	sity,	air-filled porosity,		enective total fluid saturation,	soll intrinsic permeability,	soll relative air permeability,	soil effective vapor permeablity,	Thickness of capillary zone.	porosity in capillary zone.	porosity in capillary	porosity in capillary	wall seam
0150   0130   0419   9.36E-10   0746   6.96E-10   17.05   043   0.136   0.294	0150   0130   0419   936E-10   0746   696E-10   1705   043   0136   0294	į	0.A	θ.θ.		S 6	F.	, K		֟ ֖֖֖֖֖֖֞֝֞֞֞֞֞֓֞֞֞֞֓֞֞֞֞֓֞֞֞֓֓֞֞֝֞֓֓֞֞֝֞֡֓֓֓֞֝֡֡֡֓֓֓֓֡֡֡֡֝	2	θ. Ω,	0, 4,0	Xorack
Crack Enthalpy of Henry's law Henry's law Vapor A B C Cache Overall depth vaporization at constant at constant at viscosity at effective	Crack Enthalpy of Henry's law Henry's law Vapor A B C zone overall depth vaporization at constant at constant at viscosity at effective		0 230	0 150	0 130	0 419	9 36E-10	0.746	(cm.) 6 98E-10	(CM)	(cm <sup>-</sup> /cm <sup>-</sup> )	(cm²/cm²)	(cm²/cm²)	(cm)
Crack Entitalpy of Henry's law Henry's Jaw Vapor A B C zone overall depth vaporzation at constant at constant at viscosity at effective coefficient, coefficient, coefficient, coefficient, conc.    15   9,507   5,53£-04   2,33£-02   1,77£-04   3,17£-03   8,25£-04   5,10£-04   7,69£	Crack Enthalpy of Henry's law Henry's law Vapor A B C zone overall depth vaporization at constant at constant at viscosity at effective (cm²/s)								Stratum	Stratum	Stratum	Capillary	Total	1000
below ave groundwater ave groundwater ave soil diffusion diffusio	below ave groundwater ave groundwater ave soil diffusion diffusio		Crack- to-total	Crack depth	Enthalpy of vaporization at	Henry's law constant at	Henry's Jaw constant at	Vapor viscosity at	A effective	Beffective	offective	Zone	overall	Office
Sandaria   California   Cali	Second Control Cont		area	woled	ave groundwater	ave groundwater	ave groundwater	ave soil	diffusion	diffusion	diffusion	diffusion	diffusion	path
(cm)         (cal/mo!)         (aftra-m³/mo!)         (unitiess)         (g/cm-s)         (cm²/s)         (unitiess)         (up/m³)         (ug/m³)         (ug/m³)         (ug/m³)         (cm²/s)         (cm²/s)         (unitiess)         (ug/m³)         (ug/m³)         (ug/m³)	(cm)         (cal/mo!)         (aftra-m³/mo!)         (unitless)         (g/cm-s)         (cm²/s)		F	Zorack	ΔH <sub>vTS</sub>	S.T.	H' <sub>TS</sub>	temperature, µTS		coemcless,	coemicient,	coefficient,	coefficient,	length,
15   9,507   5,53E-04   2,33E-02   177E-04   3,17E-03   8,25E-04   5,10E-04   7,69E-04	15   9,507   5,53E-04   2,33E-02   177E-04   3,17E-03   8,25E-04   5,10E-04   7,69E-04	٦	unitless)	(cm)	(cal/moł)	(atm-m³/mo!)	(unitless)	(g/cm-s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	ື (ພິວ)
Average vapor       Crack club duration       Exponent of lnfinite cource       Infinite number       Unit number         Name vapor of fiction, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, conc.       Acrack of pass       Acrack of pass <t< td=""><td>Average Crack equivalent source Infinite counce of a control of the control of th</td><td>Ц</td><td>1.16E-04</td><td>15</td><td>9,507</td><td>5 53E-04</td><td>2 33E-02</td><td>1 77E-04</td><td>3 17E-03</td><td>8 25E-04</td><td>5.10E-04</td><td>5 80E-04</td><td>7 69E-04</td><td>2057 64</td></t<>	Average Crack equivalent source Infinite counce of a control of the control of th	Ц	1.16E-04	15	9,507	5 53E-04	2 33E-02	1 77E-04	3 17E-03	8 25E-04	5.10E-04	5 80E-04	7 69E-04	2057 64
Average         Crack         equivalent         source         Infinite           vapor         effective         foundation         Indoor         source         Unit           flow rate         diffusion         Area of         Peclet         attenuation         bldg         risk           into bldg         coefficient         crack         number         conc         factor,           Quest         Dones         Ages         exp(Pe)         α         Chadeng         URF           (cm²/s)         (cm²/s)         (unitless)         (unitless)         (ug/m³)         (ug/m³)	Average         Crack         equivalent         source         Infinite           vapor         effective         foundation         indoor         source         Unit           flow rate         diffusion         Area of         Peclet         attenuation         bldg         risk           into bldg         coefficient         conc         factor,         factor,         factor,           Q <sub>sust</sub> D <sup>crack</sup> A <sub>crack</sub> exp(Pe <sup>f</sup> )         α         C <sub>busters</sub> URF           (cm <sup>2</sup> /s)         (cm <sup>2</sup> /s)         (cm <sup>2</sup> )         (unitless)         (unitless)         (ug/m³)         (ug/m³)           f 6 f7E-01         3 17E-03         3 84E+02         3 65E+03         A AAE-06         A AE-06         A AE-06						Exponent of	Infinite						
flow rate diffusion Area of Peclet attenuation bldg risk into bldg, coefficient, crack, number, coefficient, conc., factor, Q <sub>post</sub> D <sup>crack</sup> A <sub>crack</sub> exp(Pe <sup>l</sup> ) α C <sub>bustero</sub> URF (cm <sup>2</sup> )s) (cm <sup>2</sup> )s (cm <sup>2</sup> ) (unitless) (ug/m <sup>3</sup> ) (ug/m <sup>3</sup> )	flow rate diffusion Area of Peclet attenuation bldg risk into bldg, coefficient, crack, number, coefficient, conc., factor, G <sub>cell</sub> D <sub>cell</sub> A <sub>cell</sub> (cm²/s) (cm²/s) (cm²/s) (unitless) (unitless) (ug/m³) (ug/m³) (ug/m³) (ug/m³) (ug/m³) (ug/m³) (ug/m³) (ug/m³)			Average	Crack		equivalent	source	Infinite	4				
into bidg , coefficient, crack, number, coefficient, conc., factor, $Q_{\text{sell}}$ Donat $A_{\text{crack}}$ $A_{\text{crack}}$ exp(Pe $^{\prime}$ ) $\alpha$ $C_{\text{building}}$ URF $(\text{cm}^3/\text{s})$ $(\text{cm}^2)$ $(\text{unitiess})$ $(\text{unitiess})$ $(\text{unitiess})$ $(\text{ug/m}^3)^4$	into bldg , coefficient, crack, number, coefficient, conc.         factor, factor, dead         Acrack exp(Pe)         α         Country         URF           (cm³/s) (cm²/s) (cm²)         (cm²)         (unitless) (unitless) (ug/m³) (ug/		Crack	flow rate	diffusion	Area of	Peclet	affenuation	sonice	Š	Reference			
$Q_{\rm poll}$ $D^{\rm children}$ $A_{\rm chi$	Q <sub>end</sub> D <sup>cmods</sup> A <sub>cmods</sub> exp(Pe <sup>f</sup> )         α         C <sub>halleng</sub> URF           (cm <sup>2</sup> /s)         (cm <sup>2</sup> /s)         (unitless)         (μg/m³) (μg/m³) (μg/m³) (μg/m³) (μg/m³) (μg/m²) (μg/m		radius,	into bidg,	coefficient,	crack,	number,	coefficient,	conc	factor	conc.			
$(cm^3/s)$ $(cm^2/s)$ $(cm^2)$ $(unitless)$ $(\mu g/m^3)$ $(\mu g/m^3)$ $($	(cm³/s) (cm²/s) (cm²) (unitless) (unitless) (µg/m³) (µg/m³) (		Torect	ď	Dogg	Agrack	exp(Pe <sup>f</sup> )	ಶ	Spuiden	URF	R.C.			
	6.67E.01   3.17E.03   3.84E+02   3.88E+03   4.04E.06   0.42E.06   4.6E.06	J	(cm)	(cm <sub>3</sub> /s)	(cm <sup>2</sup> /s)	(cm <sub>2</sub> )	(unitless)	(unitless)	(mg/m <sub>3</sub> )	(mg/m³)	(mg/m <sub>3</sub> )			

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NCREMENTAL RISK CALCULATIONS	Hazard quotient from vapor intrusion to indoor alr, noncarcinogen (unitless)	NA
INCREMENTAL	Incremental risk from vapor intrusion to indoor air, cardinogen (unitless)	¥
JLATIONS	Final indoor exposure groundwater conc, (µg/L)	1 61E+03
ATION CALCL	Pure component water solubility, S	4 42E+06
R CONCENTR	Risk-based indoor exposure groundwater conc, (µg/L)	1 61E+03
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	Indoor exposure groundwater conc , noncarcinogen (µQL)	AN
RISK-BASE	Indoor exposure groundwater conc, carcinogen (µg/L)	1.61E+03

(DO NOT USE RESULTS IF ERRORS ARE PRESENT) ERROR SUMMARY BELOW

										1	L	,	ŧ	L	٠.	י נ	J																																							
																			•	Reference	conc.	RfC (mg/m³)	(1116)	0 0E+00	0 0E+00	7 0E-03	0 0 1 0 0	00100	00+400	00+400	00+100	1 4 F +01	3.55-01	0 0E+00	0 0E+00	3 5E-01	004	1 16-03	1 8E-02	0 0E+00	0 0E+00	5 OE-03	0041100	7 0F-01	0 0E+00	0 0E+00	5 0E-01	0 0E+00	0 0 0 0	7 0E-05	0 0 0 0	4 0E-03	000	0.05+00	0 0E+00 2 1E-01	- !
																			ב כ	rısk	factor,	URF (iio/m³) 1	(hg/!!! )	9 7E-05	2 1E-03	0.05+00	2 1E-03	1 56-05	2 1E-04	2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	4 6 H 0 4	001100	0 0E+00	2 3E-05	4 0E-06	0 0E+00	97479 97479	00+90	00+00	6 9E-05	9 7E-05	0 0E+00	х 20-11-4 10-11-4	0.05+00	1.1E-06	1 8E-05	00+300	5 0E-05	1 3E-03	0 0 +00	2 7E-07	00+400	1 5E-05	9 10	5 8E-55 0 0E+50	
																		Enthalpy of	vaporization at	the normal	boiling point,	ΔH <sub>v</sub> <sub>b</sub>	(cavinol)	11,000	15,000	15,000	16,000	7,127	15,000	13,000	13,000	10,000	6.955	6,988	9,510	10,346	7,342	12.000	14,000	14,000	13,000	5,714	5,250	6.391	9,479	7,000	6,895	6,247	13,000	10,931	10.271	7,590	8,322	4,505	8,996 12,155	
																				Criftcal	temperature,	r° €	(1)	720 75	969.27	827.85	140.44	556 60	1004 /9	839.36	842.25	751 00	508 10	536 40	695 00	563 05	91 Z96 97 373	986 20	848 49	863 77	86038	467 00	510.00	552.00	00 969	585 85	523 00	576 05	84631	746 00	715 00	572 00	602 00	544.20	661 15 803 15	1,000
																			Norma	poiling	point,	rª &		533 15	26.00	97 97	43.24	349.90	7.08,T5	596 55	613 32	720 00	329 20	334 32	458 00	390 88	303 24	718 15	65102	639 90	636 44	276 71	313 00	319.00	422 35	363 15	330 55	304 75	603 69	512 15	488 35	369 52	386.15	36036	419 60 550 54	
															1		1	Jenry	law constant	reference	temperature,	<u>ب</u> ق	6	25	8 8	8 2	2 5	52	0 K	25.	25.	25 25	122	52	25	25	9 4	200	2 <del>2</del> 2	25	25	52	<b>6</b> %	25.	25	25	25	25	22	25	52	52	52	5 t	22 23	
ES	A control of control o	Meal Class Claimerer (CII)	0.0092	9100	0 020	0 040	0 044	0 025	0 028	0 0046	0 0039	0.0056	0 011	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ı		or or	S ATUBLE .	law constant	at reference	temperature,	H (atm-m³/mol)		8.10E-06	1 135-06	4 44 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	14/E-08	3 055-02	3.34E-U5 4.85E-U5	1 405-05	1.516-05	1 54E-06	3 88 5-05	3 66E-03	3 88E-03	8 805-06	5 50E-03	7 515-06	1 58E-05	4 00E-06	2 10E-05	6 24E-03	2 / 1E-02 2 19E-03	3 02 E-02	5 34E-04	1 60E-03	5 61E-03	2 61E-02	1 09E-03	2 71E-02	6 635-06	2 805-03	9 12E-04	1 035-02	3 44E-04 1 55E-04	
VLOOKUP TABLES	A (cm <sup>3</sup> /cm <sup>3</sup> )	١,	8950	CBO 0	0 0 78	0 057	0 045	0 100	0 100	0 034	0 0 0 0 0 0	0 0 0 0 0 0	290 0	0 065		1	Chemical Properties Lookup Tabl			Henry's	law constant	(northess)	(2000)	3 32E-04	4 650-00	07E-05	1 255400	1 255 +00	1 995-03	5 74E-04	6 19E-04	6 31E-05	1 59E-03	1 50E-01	1 59E-01	3 61E-04	7 05E-01	3 08E-04	6 48E-04	1 64E-04	8 61E-04	2 56E-01	8 98F-02	1 24E+00	2 19E-02	6 56E-02	2 30E-01	1 07E+00	4 47E-02	1 11E+00	2 72E-04	1 15E-01	3 /4E-02	4 22E-01	1 41E-02 6 36E-03	
	6 (cm <sup>3</sup> /cm <sup>3</sup> )	3	92.0	U 41	0 43	0 41	0 43	0 38	0 39	0 46	0.26	0 43	0.45	0 41		100	Chemic	B .	component	water	solubility.	s (ma(r)	1	2 50E-02	1 0ZE-03	2 495-03	7 035+03	9.405-03	5 50F-02	6 80E+00	1 95E-01	3 50E+03	1 00E+06	7 92E+03	5 00E+01	7 40E+04	1 335+03	2 50E-01	4 50E-02	9 00E-02	1 20E-01	1 52E+04	1 30F+04	1 19E+03	3,10E+03	6 74E+03	5 06E+03	2 25E+03	1 80E-01	1 80E+00	1 20E+04	2 80E+03	4 42E+U3	1 105+03	2 97E+03 4 24E+00	
	ء و	I,	0 083	0.237	0 328	0 561	0 627	0 187	0 324	0 270	0 083	0 187	0.291	0 471						Diffusivity	in water,	U., (cm²/s)		4 95E-06	90 190 6	9 005-00	90-101 c	8 50E-06	9 00E-06	7.34E-06	4 74E-06	7 97E-06	1 14E-05	1 00E-05	6 80E-06	930506	8 80E-06	4 74E-06	4 46E-06	4 76E-06	587E-06	121E-05	1 17F-05	1 00E-05	1 03E-05	1 06E-05	1 05E-05	1 04E-05	5 69E-06	7.21E-06	6 765-06	8 /35-06	8 801-05	9 105-06	7.90E-06	
	Soil Properties Lookup Tabl	L	90.		1 56	2 28	2 68	1 23	1 48	1 37	109	123	141	1 89					:	Diffusivity	ın aır,	 (cm²/s)		1 37E-02	2 325 02	2005-02	20-E-02	7 60E-02	1 18F-02	1 42E-02	1 25E-02	5 36E-02	1 24E-01	1 04E-01	2 50E-03	8 00E-02	7 80E-02	1 25E-02	1 56E-02	1 69E-02	1 44E-02	7 28E-02	1015-01	1046-01	1 49E-02	2 98E-02	7 42E-02	9 00E-02	112E-02	1 61E-02	6 23E-02	7 82E-02	7 805-02	7 SUE-02	4 21E-02	
	S (1/cm)	(1101)	0.008	BLO O	0 036	0 124	0 145	0 027	0 059	0 0 16	0 005	0 0 10	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 075			2		Cardon	partition	coefficient,	κ <sub>α</sub> (cm³/q)	în.	2 63E+06	1 005 03	3 905-02	3 80E+06	3 08E±02	1.20F+05	1 07E+03	2 14E+04	6 00E-01	5 75E-01	3 98€+01	1 78E+03	6 92E+00	1 1011+03	1 23E+04	9 77E+04	1 00E+06	4.47E+06	1 05E+01	1 17F+01	4 57E+01	8 71E+01	5 50E+01	3 16E+01	5 89E+01	1 41E+06	2,00E+05	4 58E+01	4 3/E+01	5 UTE+UT	1 00 11 10 1	7 08E+03	
	K (cm/h)	(Hallo) and	2 2	97.0	104	14 59	29 70	0 12	131	0.25	0 02	007	0 45	4 42								Chemical			<u> </u>	hracene	linderin	iolide Page	<u> </u>	Cindane}	,				ane		athana					9 Shformathona	critici cerrierie) oride	e.		methane	nane	nylene		lopentadiene		opane	emane	and Managhan	Moroemane	
	SCS Soil Type	200 000	<b>.</b>	ı		r.		o	SCL	22	O	ដ	SIL	St.								CAS No		50293 DDT 50238 Bozza/a/addaga	51285 2 4-Dialtochemot	53703 Dibenz(a h)anthracene	56235 Carbon tetrachlodde	56553 Renz(a)anthracene	57749 Chlordane	58899 camma-HCH (Lindane)	60571 Dieldrin	65850 Benzoic Acid	67641 Acetone	67663 Chloroform	67721 Hexachloroethane	71363 Butanol	71556 1 1.1-Trichloroethane		72435 Methoxychlor	72548 DDD	72559 DDE	75011 Vest chicade (chicaesthore)	75092 Methylene chloride	75150 Carbon disuffide	75252 Bromoform	75274 Bromodichloromethane	75343 1,1-Dichloroethane	75354 1,1-Dichloroethylene	76448 Heptachlor	77474 Hexachlorocyclopentadiene	/ 8591 Isophorone	70005 4 0 Table	79018 Techlomorbulens	70346 4 4 9 9 Totalogicalities	/ 9345 1,1,2,2-1 etracr 83329 Acenaphthene	

84662 Diethylphthalate	2 88E+02	2 56E-02	6 35E-06	1 08E+03	VLOOKUP TABLES 185E-05	4 515.07	ć	34 753	100	6	i i	1
84742 Di-n-butyl phthalate	3 39E+04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10	2 2	613.15	798.67	13,/33	00+400	N C
86306 N. Witnessellshood on the	5 75E+04	1 74E-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06	25	09 099	839 68	13,000	0 OE+00	7 OF 01
86737 Fhorers	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 00E-06	22	632 28	890 45	13,000	1.46-06	00+00
86748 Carbazole	3.396+03	3 63E-02	7 035 06	1 98E+00	2 61 5-03	6 37E-05	52	570 44	870 00	12,666	0.0E+00	1 4E-01
87683 Hexachloro-1,3-butadiene	5 37E+04	5 615-02	6 16 1-06	3 235400	3 34 5 64	1535-08	52	627 87	899 00	13,977	5 7E-06	0 OE+00
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06			8 T5E-U3	5 5	485 15	738 00	10,206	2 2E-05	0 0 -0
88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 195-04	7.78E-06	3 53	519 15	749.03	12,000	20 H	0.00+00
91203 Naphthatene 91941 3.3-Dichlombenzidine	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	000+00	146-01
	3 63 5 + 02	201102 8 701102	5 /4E-05	3 116+00	164E-07	4 00E-09	52	560 26	754 03	13,000	1 3E-04	0 0E+00
95487 2-Methytphenol (o-cresol)	9 12E+01	7 40E-02	8 305-06	2 FOE+02	Z 13E-U1	5 20E-03	<u>ب</u>	417 60	630 30	8,661	0 0E+00	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	4 92E-U5 7 79E-02	1 20E-06	52	\$ 1 6 1 6 1	697 60	10,800	0 0E+00	185-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 905-04	0 K	4535/	705 00	9,700	0.000	2 06
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4.34F-06	3 %	526 15	750 13	9,5/2	000	1 8E-02
98953 Natrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	22	483.95	719.00	13,000	00+300	מינים היינים היינים
100414 Emylpenzene	3 635+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	22	409 34	617.20	8,501	0.05+00	1 OF+OC
	7 765+02	7 105-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03	52	418 31	636 00	8,737	0 0E+00	10E+00
106423 p-Xylene	3 895+02	3 84E-02 7 69E-02	8 691-06	7 87E+03	8 20E-05	2 00E-06	22	484 13	707 60	11,329	0 0E+00	7 0E-02
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02		7 385+01	0.086.00	7 66E-03	56	411 52	616 20	8,525	0 0E+00	7 0E+00
	6 61E+01	4 83E-02	1015-05	5 30E+03	1.36E-05	3 325-03	9 8	447.21	684 75	9,271	0 0E+00	8 0E-01
107062 1,2-Dichloroethane	174E+01	1 04E-01	9 90E-06	8 52E+03	4 01E-02	9 785-04	3 %	356 65	7.54 OC	11,689	00+300	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 125-04	2 5	345 65	519 13	7,045	20110	00000
108883 Taking	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03	52	412 27	617 05	8.523	00.00	7.0F±00
	2 19E+02	8 /UE-02	8 50E-06	5 26E+02	2 72E-01	6 63E-03	52	383 78	591 79	7,930	0.05+00	4 00-01
108952 Phenol	2 88E+01	8 205-02	9 705-06	9 72E+02	1 52E-01	3 71E-03	52	404 87	632 40		0 0E+00	2 0E-02
111444 Bis(2-chloroethyt)ether	1 55E+01	6 92E-02	7.535-06	1 725+04	7 38 04	398E-07	52	455 02	694 20	10,920	0 0E+00	2 1E+00
	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 595-04	1 305-05	£2 #	45115	659 79		33504	0 0E+00
117817 Bis(2-ethylhexyl)phthalate	151E+07	3 515-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	3 5	657 15	942.94 806.00		0.05+00	2 1E-02
117640 Ui-n-octyl phthalate	8 32E+07	1 51E-02		2 00E-02	2 74E-03	6 68E-05	22	704 09	862 22	15,999	4 OF 100	7 00.00
120127 Authracene	2 95E+04	5 42E-02	591E-06	6 20E+00	5 41E-02	1 32E-03	25	582 55	825 00	14,447	4 6E-04	0.05+00
120821 1.2.4-Trichlorobenzene	1 78E±03	3 005 03	/ /4t-05	4 34E-02	2 67E-03	6 51E-05	52	615 18	873 00	13,121	0.05+00	, <u>-</u>
120832 2,4-Dichlorophenol	1476+02	3.46F-02		3 00=+02	5 825-02	1 42E-03	52	486 15	725 00		0 0E+00	2 0E-01
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01		2 70E+03	3 80 E 06	3 17 E-06		482 15	708 17		0 0E+00	1 15-02
124481 Chlorodibromomethane	631E+01	196E-02	1 05E-05	2 60E+03	3 21 F-02	9 2/E-08 7 83E-04	8 8	590 00	814 00		195-04	0 0E+00
127184 Tetrachloroethylene	1.55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1845-02		416 14 304 40	678 20	8,000	2 46-05	ė,
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 10E-05		567.95	926.00		5 8E-07	+ O O .
130392 ds-1,2-Ulchioroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00		00100	3 56 53
193395 Indeno(12.3-c)lovene	3 475+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516 50		0000	. 9
205992 Benzo(b)fluoranthene	1235+06	2 26E-02	2 555 - US	2 20E-05	6 56E-05	1 60E-06		809 15	1078 24		2 1E-04	0 0E+00
206440 Fluoranthene	1 07E+05	3 02E-02	6.35F-06	2.065-03	4 50E-03	1115-04		715 90	969 27		2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2 265-02	5 56E-06	8 00E-04	3.40F-05	1 51E-U5	8 8	655 95	905 00		0 OE+00	1 4E-01
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9.48E-05	0 K	733 15	1019 70	16,000	2 1E-05	0 OE+00
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70 F-04	3 %	503.01	979 00	16,455	2 15-06	0 0 0 0
319846 alpha-HCH (alpha-BHC)	1 23 € + 03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05	25.	596.55	830.36	13,000	4 9F-03	000
31985/ Deta-HCH (Deta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596.55	830 36	13,000	1 SH C	1 i
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381.15	587.18	2,000	5 35-04	0 05+00
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07		558.00	20,72	000, 4	2 C	2 0E-02
4024572 Hortestin county	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06		209 60	746.87	11,000	- 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6	1 1
1024575 Neptagnior epoxice 7430976 Marz in (elemental)	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9.51E-06		613 96	848 76	13 000	2 6F-03	001100
8001352 Toxanhene	10+302 6	3 0/E-02	6 305-06	5 62E-02	4 67E-01	1 14E-02	22	629 88	1750 00		005-00	3 OF 04
11096825 Amdor 1260 (PCB-1260)	2 905+05	1 285 02	4 34E-05	/ 40E-01	2 46E-04	6 00E-06	55	657 15	873 31		3 2E-04	0 OF+00
11097691 Aroclor 1254 (PCB-1254)	2 00F+05	1 58E-02	4 32E-06	5 UUE-UZ	1 89E-01	4 60E-03	52	402 50	539 37		1 0E-04	0 0E+00
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2 22E-02	5 42F.06	3 / UE-UZ	8 20E-02	2 00E-03	52	377 50	512 27	19,000	1 0E-04	0 0 = +(
53469219 Arador 1242 (PCB-1242)	3 30E+04	2 14E-02	531E-06	3.40F-01	2 135-02	2 905-04	8	340 50	475 22	18,000	1 OE-04	0 0E+00
				:	***	3 205-04	6	345 50	482 20	18,000	1 0E-04	0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

VERSION 1 2 September, 1998

		ENTER	User-defined stratum A soil vapor permeability, k, (cm²)		
			Б	IЦ	
		ENTER	A de timate or or	SI	ENTER Stratum C soil water-filled porosity, $\theta_u^c$ $(cm^3/cm^3)$
		ENTER	SCS soil type directly above	S	ENTER Stratum C soil total porosity, n <sup>c</sup> (unittess)
		ENTER	Soil stratum directly above water table, (Enter A. B. or C.)	U	ENTER Stratum C soll dry bulk density, P <sub>b</sub> c (g/cm³)
	lene	ENTER Lwr (cell D28)	Thickness of soil stratum C, (Enter value or 0)	1066 8	ENTER Stratum B soil water-filled porosity, $\theta_n^{B}$ $(cm^3/cm^3)$
Chemical	Tetrachloroethylene	NTER ENTER ENTER Totals must add up to value of L <sub>WT</sub> (cell D28)	Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub>	3048	ENTER Stratum B soul total porosity, n <sup>8</sup> (unitless)
		ENTER Totals mus	Thickness of soil stratum A, h <sub>A</sub>	701 04	ENTER Stratum B soil dry bulk density, Pb (g/cm³)
		ENTER	Depth below grade to water table, Lwr (cm)	2072 64	ENTER Stratum A sod water-filled porosity, $\theta_w^{\lambda}$ (cm <sup>3</sup> /cm <sup>3</sup> )
ENTER Initial groundwater conc , Cw (µg/L)	5 6584	ENTER Depth	below grade to bottom of enclosed space floor, L <sub>F</sub>	15	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)
ENTER Chemical CAS No (numbers only, no dashes)	127184	ENTER	Average soil/ groundwater temperature, T <sub>s</sub>	16	ENTER Stratum A soll dry bulk density, P <sub>b</sub> (g/cm³)

0 43												
1.7	ENTER	Indoor	air exchange rate,	<b>E</b>	(1/h)	0.45						
0.27	ENTER		seam crack width,	*	(cm)	0.1	ENTER	Target hazard	quotient for	noncardinogens,	ă E	(unitless)
0 42	ENTER	Enclosed	space height,	f	(cm)	488	ENTER	Target	nsk for	cardinogens,	፳	(unitless)
17	ENTER Enclosed	space	width,	×	(cm)	961	ENTER		Exposure	frequency.	Ħ	(days/yr)
0.2	ENTER Enclosed	space	length,	ŗ.	(cm)	961	ENTER		Exposure	duration,	<del>a</del>	(yrs)
0.43	ENTER	Soil-bldg	pressure differential,	Φ	(g/cm-s <sup>2</sup> )	40	ENTER	Averaging	time for	noncarcinogens,	ATNC	(yrs)
15	ENTER	space	thickness,	Lorack	(cm)	15	ENTER	Averaging	time for	carcinogens,	ATc	(yrs)

Used to calculate risk-based groundwater concentration.

1 0E-06

### CHEMICAL PROPERTIES SHEET

	•				ı	٢
	Reference	2000	2 <u>K</u>	(mg/m <sub>3</sub> )		
Ç	risk	factor,	A F	(µg/m³)-1		
Pure component	water	solub/ny,	Ø	(mg/L)		
Organic carbon	partition	coefficient,	چ	(cm <sup>3</sup> /g)		
	Cutical	temperature,	င္	(k)		0000
Noma	poling	point,	ᇣ	ઈ ઇ		300
Enthalpy of vaportzation at	the normal	posling point,	ΔH <sub>v,b</sub>	(cal/mol)		0000
Henry's faw constant	reference	temperature,	F.	(၃)		30
Henry's law constant	at reference	iemperature,	r '	(atm-m³/mol)		7 20F-02   R 20F-06   1 84F-02
	Ulfusivity			(cm,/x)		A 20F OF
,	Umasivity to oir		' د	(cm,/s)		7 20F-02

1				
Floor- wall seam perimeter, X <sub>deak</sub>	3,844	Diffusion path length, La	2057,64	
Water-filled porosity in capillary zone, $\theta_{w,ca}$ $(cm^3/cm^3)$	0 204	Total overali effective diffusion coefficient, Doff (cm²/s)	6 68E-04	
Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 136	Capillary zone effective diffusion coefficient, D''' (cm²/s)	5 05E-04	
Total porosity in capillary zone, n <sub>cz</sub> (cm³/cm³)	0.43	Stratum C C effective diffusion coefficient, D°fc (cm²/s)	4 38E-04	Reference conc , RfC (mg/m³)
Thickness of captllary zone,	17 05	Stratum B B effective diffusion coefficient, D <sup>off</sup> (cm <sup>2</sup> /s)	7 38E-04	Unit risk factor, URF (µg/m³)**
Stratum A soil effective vapor permeability.	6,98€-10	Stratum A effective diffusion coefficient, Der (cm²/s)	2 92E-03	Infinite source bidg conc , Cousting (µg/m³)
Stratum A soil relative air permeability, $k_{rp}$ (cm <sup>2</sup> )	0 746	Vapor viscosity at ave soil temperature, µrs (q/cm-s)	1 77E-04	Infinite source indoor attenuation coefficient, a cuntitiess)
Stratum A soil Intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitiess)	4 71E-01	Exponent of equivalent foundation Pectet number, exp(Pe <sup>§</sup> ) (unitiess) 7 48E+03
Stratum A effective total fluid saturation, S <sub>th</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0 419	Henry's law constant at ave groundwater temperature, Hrs (atm-m²/mol)	1 12E-02	Area of crack, Acred (cm²)
Stratum C soil air-filled porosity, $\theta_{\bullet}^{c}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 130	Enthalpy of vaporization at ave groundwater temperature, ΔΗ <sub>ν,τs</sub> (cal/mol)	9,492	Crack effective diffusion coefficient, Drawck (cm <sup>2</sup> /s)
Stratum B soil air-filled porosity, $\theta_n^8$ (cm $^3$ /cm $^3$ )	0 150	Crack depth below grade, Zanck	15	Average vapor flow rate into bidg ,  Quel (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_a^A$ (cm³/cm³)	0 230	Crack- to-fotal area ratio, n	4 16E-04	Crack radius, fond (cm)
Source- building separation, L <sub>T</sub>	2057 64	Area of enctosed space below grade, A <sub>B</sub>	9 24E+05	Source vapor conc, C <sub>source</sub> (µg/m <sup>3</sup> )
Exposure duration, t	9 46E+08	Bidg. ventilation rate, Qualding (cm <sup>3</sup> /s)	5 63E+04	Convection path length, L.p. (cm)

, CO	1	1	ć	i	Incremental	Hazard
AXDOSEMA	PADOSITION	Kisk-based indoor	Pure	Final	risk from	quotient
omer design		DOD!!!	Hallodillon - July	1000	vapor	trom vapor
	Storage of the state of the sta	amendya	AS I	exposite	intrusion to	intrusion to
Sourc'	conc.	groundwater	solubility,	groundwater	indoor air,	indoor air,
carcinogen	noncarcinogen	couc,	တ	couc '	carcinocen	noncarcinoden
(ng/L)	(hg/L)	(µg/L)	(µg/L)	(πg/L)	(untless)	(unitiess)
2 435 +03	MA	2 43E+03	2 43E+03   2 00E+05	2,43E+03	ΑN	¥

Type	K, (cm/t	(1/om)	N (unitiess)	ന	0. (cm³/cm³)	6, (cm³/cm³) 0 068	Mean Grain Diameter (cm) 0 0092						
0.02 0.009 111 0.003 0.03 0.03 0.03 0.000	0.0	מ (וושוו)	ı	083	96.0	0 088	0 0032						
0.00 0.019 150 0.029 150 0.020	40		1 09		200								
194   0.124   2.126   0.645   0.645   0.045   0.046	02		131	0 237	041	0 0 0 0	0 0 0						
1.50   0.152   2.50   0.54   0.057   0.054   0.055   0.054   0.055	10		156	0.359	0.43	0.078	0000						
131   0.055   128   0.052   0.05	14.5		2.08	188	0.00	750.0	0 0						
13   0.057   1.25   0.052	700		24	0000		200							
1	3 5		9 6	0000	2 6	2 6	4400						
Comparison   17	- c			200	9 6	000	620.0						
Companies   Comp	- 6		9 1	0.024	800	3 6	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
Common   100   0.000	700		13.	0.270	Q (	0 034	0 0046						
Other   13   0.25   0.05   0	0 0		2	0.083	0.26	0.00	60000						
Communication   Communicatio	00		123	0 187	0 43	0 080	0 0026						
Claimanty   Clai	0.4		141	0 291	0 45	0 067	1100						
Organic	4		189	0 471	0 41	0 065	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
Ciganical Chapters   Chapters   Chapters   Lookup Tabbe   Henry's   Henry'	3												
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Company		,			Chemica	il Properties Looi	up Table						
Comfiging   Diffusivity   Di		Organic			Pure		Henry's	Henry's			Enthaloy of		
Charlest   Diffusion   Diffu		carbon			component		law constant	and Constant	Morran		- 1000000000000000000000000000000000000	1	
Configuration   Configuratii   Configuration   Configuration   Configuration   Configuration		10 10 10 10	46.46.4		11000000	1	TI BISTON MAI	idw constant	acciliate		vaponzation at		
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Committee   Comm		ئد	ď	ď		ì		, ,		,	· · · · · · · · · · · · · · · · · · ·		3 6
2 28EE-06 137E-02 49EE-06 20EC-07 10EE-07 13EE-04 10EE-07 13EE-07 emical	(6/ <sub>s</sub> us)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(ma/L)	(unitless)	(atm-m³/mol)	ž (č	<u> </u>	, §		, (m)	) N ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )	
2 SSECTION         1 TIPE-OR         2 SSECTION         1 TIPE-OR         2 SSECTION         1 TIPE-OR         2 SSECTION         1 TIPE-OR         2 STSECTION         1 TIPE-OR         2 STSECTION						/200	,;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	ĵ.		(A) (	ļ	hg/m )	1116
TOTE-106   100E-102   100E-102   100E-103		2 63 = +06	1.375-02	4 0515-06	2 505.02	3 325 04	90 100	Ċ	44				1
100E-02   200E-02   200E	a	1 025406	4 300 00	90 100 0	100-100	20 20 C	0 105-00	67	220	5/07/	000,11	9 7E-05	0 OE+0C
90E-00         20E-00         20E-00<	- Jones	00.00	2 725 02	90.0	2 705 -02	100 to 10	97-11-1	9 ;	08 617	72.696	000,61	Z 1E-03	0 0E+00
3 MECHO         2 MECHO         3 MECHO         3 MECHO         3 MECHO         3 MECHO         2 MECHO         3 MECHO         2 MECHO         3 MECHO <t< td=""><td></td><td>100-02</td><td>70-07</td><td>00-00 6</td><td>201103</td><td>CO-#20  </td><td>4 44E-U</td><td>52</td><td>605 28</td><td>827.85</td><td>15,000</td><td>0 0E+00</td><td>7 OE-03</td></t<>		100-02	70-07	00-00 6	201103	CO-#20	4 44E-U	52	605 28	827.85	15,000	0 0E+00	7 OE-03
	anthracene	3 80 = +06	2 025-02	5 18E-06	2,49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03	0 OE+00
98E-65         10E-02         90E-06         90E-07         19E-03         19E-03<	achlonde	1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349.90	556.60	7 127	1 SE-05	O C
120E+05   19E-02   437E-06   560E+00   19E-02   199E-03   486E-06   25 02424   886773   13,000   27E-04   14E-04   14E-02   74E-04   196E-03   1	Benz(a)anthracene	3 98E+05	5 10F-02	9 00E-06	9.40F-03	1.37E.04	3 34E.06	, ,	700 16	1004 70	1000 54	9 0	9 6
10TE-03   14E-02   14E-02   14E-02   14E-04   14E-05   14E-04   14E-05   14E-04   14E-05   14E-04   14E-05   14E-04   14E-05   14E-04   14E-05   14E-04   14E-05   14E-04   14E-04   14E-05   14E-04   14E-05   14E-04   14E-04   14E-05   14E-04   14E-04   14E-04   14E-05   14E-04   14E-05   14E-04   14E-04   14E-05   14E-04   14E-04   14E-05   14E-05		1 20E+05	1 18E-02	4 37E-06	5 BOE 02	0000	4 85 05	3 2	2 2	004 100	000,61	2 -E-04	001100
1/HE-NA         142E-A         74E-A         74E-A         140E-B         25 586 58         83 36         13,000         37E-A           1/HE-NA         14E-A         14E-A         14E-A         14E-A         14E-B         150E-B         13,000         37E-A           6 00E-A         58E-B         78E-B         25 13.2         25 13.2         25 13.0         1500         1500           6 00E-A         150E-B         150E-B         150E-B         150E-B         150E-B         150E-B         150E-B         150D-B         150D	(	2	7010	000	3 00E-02	CO-1100 -	4 60E-U0	Ş	624.24	882 /3	13,000	3 7E-04	0 0E+00
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178E-01   124E-01   14E-05   100E-05   198E-03   388E-05   25 329 20 508 10   6950   60E-00   6950	65850 Benzoic Acid	6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720.00	751 00	10.00	0.05	145+01
398E+O1         104E-O1         100E-O5         792E+O3         100E-O5         792E+O3         100E-O5         792E+O3         792E+O3 <t< td=""><td></td><td>5 75F-01</td><td>1 24F-01</td><td>1 148,05</td><td>1 00E+06</td><td>1 50E.03</td><td>3 885.05</td><td>1</td><td>0000</td><td>000</td><td>000</td><td></td><td></td></t<>		5 75F-01	1 24F-01	1 148,05	1 00E+06	1 50E.03	3 885.05	1	0000	000	000		
178E-03         50E-04         60E-06         60E-06         60E-06         60E-06         60E-06         7.46E-04         80E-06         7.56E-04		2 98E+01	1048.51	100	7 025103	1 EOH 0	00 100 0	3 6	22.20	900	CDD O	00000	0000
6 92E+01         2 90E+02         9 00E+01         1 95E+01         3 88E-03         25 880         685 00         9 5/10         4 0E-06           5 98E+01         8 00E+02         9 00E+02         1 5E+04         3 6E+04         2 89E+03         25 3324         562 16         7,342         8 0E-06           1 00E+02         9 00E+02         1 75E+02         2 28E-01         5 6E+03         25 3324         562 16         7,342         8 0E-06           1 10E+02         7 80E+02         8 00E+06         1 32E+04         5 6E+04         5 69E+03         25 3324         562 16         7,342         8 0E-06           1 10E+02         7 80E+02         4 6E+04         4 00E+02         7 6E+04         1 6E+04         4 00E+02         2 638 0         8 6E+04         6 69E+03         2 7 68 7         4 7 80         6 60E+03         6 60E+03         2 7 68 7         4 7 80         6 6 6 6 0         6 6 6 6 0         6 6 6 6 0         7 7 38 6 0         6 6 6 6 0         7 7 38 6 0         6 6 6 6 0         7 7 38 6 0         7 7 38 6 0         7 7 38 6 0         7 7 38 6 0         7 7 38 6 0         7 7 38 6 0         7 7 38 6 0         7 7 38 6 0         7 7 38 6 0         7 7 38 6 0         7 7 38 6 0         7 7 38 6 0         7 7 38 6 0         7 7 3 5 0         7		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0	ביים ביים ביים ביים ביים ביים	7 950 100	0 100	200E-02	C7 :	334 32	236 40	0,988	Z 3E-05	0 0E+00
6 82E+100         8 00E-02         9 10E-02         9 30E-06         7 40E-04         8 10E-04         8 10E-04         8 10E-06         25 390 88         563 05         10.346         0 0E-00           1 10E+02         8 00E-02         9 30E-06         1 75E-03         25E-01         1 75E-03         25         347 24         545 00         7 136         0 0E-00           1 10E+02         7 80E-02         8 80E-06         1 37E-04         1 25E-02         2 718 15         968 20         1 2,000         0 0E-00           1 10E+02         7 80E-02         4 46E-06         4 50E-07         1 64E-04         4 00E-06         2 63 90         893 77         14,000         0 6E-00           1 00E+02         4 76E-06         1 20E-01         8 61E-04         4 06E-06         2 16E-04         4 06E-06         2 698 90         893 77         14,000         0 6E-00           4 77E-06         1 44E-02         5 87E-03         1 52E-04         2 56E-01         2 71E-03         2 787 7         4 77E-07         1 77E-07         1 77E-03         2 77E-03         2 77E-03         1 77E-03         2 77E-03         2 77E-03         2 77E-03         2 77E-03         2 77E-03         2 77E-03         2 77E-03         2 77E-03         2 77E-03         2 77E-03		1 /8/14/03	2 50E-03	6 80E-06	5 UOE+01	1 295-01	3 88E-03	52	458 00	695 00	9,510	4.0E-06	000
5 80E+01         8 80E+02         8 80E+06         1 77E+03         2 28E-01         5 66E-03         2 55.24         5 62.16         7,342         8 32-06           1 10E+02         7 80E+02         8 80E+06         1 33E+03         7 75E+02         25         3172         5 56         0         7,132         8 35-06           1 22E+04         1 56E-02         4 46E-06         4 50E-02         6 48E-04         1 56E-05         2 65102         848 49         1 4,000         0 0E+00           9 77E+04         1 56E-02         4 46E-04         4 50E-04         2 66E-04         2 66E-05         2 66T-02         6 48E-04         2 66E-05         2 66T-02         2 66E-05         2 66E-05         2 66T-02         2 66E-05         2 66E-05         2 66T-03         2 66E-05		6 92E+00	8 00E-02	9 30E-06	7,40E+04	3 61 6-04	8 80E-06	25	390 88	563 05	10,346	0.0E+00	3.5E-01
10E+02         7 80E-02         8 90E-06         133E+03         7.05E-01         172E-02         2         347 24         945 00         7,136         0 0E+00           123E+04         125E-04         4 74E-06         2 50E-01         3 08E-04         7 51E-06         25 718 15         986 20         1,200         0 0E+00           9 77E-04         1 56E-02         4 46E-06         4 50E-04         4 50E-04         4 50E-04         2 56E-04         4 50E-06         2 569 90         863 77         14,000         0 0E+00           9 77E-04         1 56E-02         4 76E-06         9 00E-02         1 64E-04         4 00E-05         2 588 44         860 38         13,000         9 7E-05           1 05E-01         1 21E-05         1 52E-04         2 56E-01         2 10E-05         2 58 26         3 13,000         9 7E-05           1 75E+01         1 01E-01         1 17E-05         1 30E+04         2 98E-02         2 58 26         3 13,000         9 7E-05           1 75E+01         1 01E-01         1 17E-05         1 30E+04         2 98E-02         2 58 40         5 70         6 70         6 70           1 75E+01         1 01E-01         1 17E-05         1 30E+04         2 98E-02         2 58 40         8 60 <t< td=""><td></td><td>5 89E+01</td><td>8 80E-02</td><td>9 80E-06</td><td>1 75E+03</td><td>2 28E-01</td><td>5 56E-03</td><td>25</td><td>353 24</td><td>562 16</td><td>7.342</td><td>8 35-06</td><td>0.00</td></t<>		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7.342	8 35-06	0.00
123E+04         125E-02         474E-06         250E-01         3 08E-04         751E-06         25         71815         988 20         12,000         0 0E+00           977E+04         156E-02         446E-06         450E-02         648E-04         450E-05         25         61102         884 9         14,000         0 0E+00           977E+04         156E-02         446E-06         450E-02         164E-04         400E-05         25         6102         884 9         14,000         0 0E+00           477E+04         156E-02         166E-03         152E+04         256E-01         216E-05         25         638 44         800 38         13,000         9 0E+00           105E+01         128E-02         121E-05         152E+04         256E-01         216E-02         25         239 0         863 77         14,000         0 0E+00           105E+01         128E-02         121E-03         116E-04         24E-03         25         278 71         467 00         676 00         676 00         676 00         676 00         676 00         676 00         676 00         676 00         676 00         676 00         676 00         676 00         676 00         676 00         676 00         676 00         676 00 <td< td=""><td>oethane</td><td>1 10E+02</td><td>7 80E-02</td><td>8 80E-06</td><td>1 33E+03</td><td>7.05E-01</td><td>1 72E-02</td><td>25</td><td>347 24</td><td>545 00</td><td>7 136</td><td>0.05+00</td><td>OH-</td></td<>	oethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7.05E-01	1 72E-02	25	347 24	545 00	7 136	0.05+00	OH-
977E+04         156E-02         446E-06         450E-02         648E-04         156E-05         25         6510Z         26.00         12,000         0.00         0		1 23E+04	1 25E-02	4 74E-06	2.50F-01	3 ORF-04	7 K1E-08	3,5	718 45	086 20	000.01		
00E-06         10E-07         10E-07<		9 77 E+04	1 56E.02	4 485-08	4 505.00	VO LIGHT OF	7 - 4	3 6	2 6	07000	12,000	001100	200
100E+00   10E+02   10E+04		1 1 2 2 3	20-100	1100	4 30E-02	10-10-1	20E-02	ę	20 100	64849	000,41	0.05+00	1 8E-02
47E+06         144E-02         587E-06         120E-01         861E-04         210E-05         264E-03         26 638 44         860 38         13,000         97E-05           105E+01         728E-02         121E-05         152E+04         256E-01         624E-03         25         278 71         467 00         5,714         0 0E+00           105E+01         106E+01         177E+01         101E-01         117E-05         130E+04         898E-02         219E-03         25         313 00         552 00         5,714         0 0E+00           477E+01         101E-01         117E-05         130E+04         898E-02         219E-02         25         319 00         552 00         6,391         0 0E+00           877E+01         104E-01         100E-05         110E+03         219E-02         54E-04         25         319 00         552 00         6,391         0 0E+00           877E+01         104E-02         108E-02         106E-03         20E+02         106E-03         253 00         6,391         0 0E+00           876E+01         104E-02         104E-02         256E-03         107E-00         261E-03         253 00         6,391         0 0E+00           80E-02         104E-03         20E-02		95+130	3 08E-02	4 / 65-06	9 00E-02	1 541-04	4 00E-06	22	639 90	863 77	14,000	6 9E-05	0 0E+00
105E+01         7.28E-02         121E-05         152E+04         2.56E-01         6.24E-03         25         276 TI         467 00         5,714         0 0E+00           1.68E+01         1.06E+01         1.23E-06         2.76E+03         1.11E+00         2.71E-02         25         259         25         432 00         5,250         8 4E-05           1.68E+01         1.01E-01         1.17E+04         1.01E-01         1.01E-02         1.01E-03         2.19E-03         2.19E-03         25         313 00         6,700         6,700         4.7E-07           4.57E+01         1.01E-01         1.01E-02         1.01E-03         2.19E-02         2.19E-03		4 47E+06	1 44E-02	5 87E-06	1 205-01	8 61E-04	2 10E-05	52	636 44	860 38	13,000	9 7E-05	0 0 0 +00
186E+01         106E-01         123E-06         276E+03         111E+00         271E-02         25         259.55         432.00         5,250         8 4E-05           17E+01         101E-01         17E-05         130E+04         898E-02         219E-03         25         313.00         510.00         6,706         47E-07           8 7E+01         104E-01         107E-02         136E-02         236E-02         25         313.00         552.00         6,706         47E-07           8 7E+01         104E-01         106E-05         104E-02         234E-04         25         313.00         552.00         6,706         47E-07           8 50E+01         106E-05         106E-02         106E-03         206E-02         106E-03         260E-03         106E-03         260E-03         106E-03         260E-03         106E-03         260E-03         106E-03         260E-03	8	1 05E+01	7 28E-02	1 21E-05	1 52E+04	2.56E-01	6 24E-03	25	276 71	467.00	5714	0.05+0.0	50.00
175E+01   101E-01   175E+02   130E+04   898E+02   219E+03   219E	(chloroethene)	ARE TO	1085.01	1 235,08	2 755-03	115100	2411	2	000	0000	1 000	200	2000
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## 57E+01 104E-01 100E-05 119E+03 124E+00 3 02E-02 25 319 00 552 00 6,391 0 0E+00 10E+00 149E-02 103E-05 3 10E+03 2 19E-02 5 34E-04 25 365 00 6,391 0 0E+00 149E-02 103E-05 3 10E+03 2 19E-02 5 34E-04 25 365 00 6,391 0 0E+00 149E-02 103E-02 103E-03 2 10E-03 2 10E-03 2 10E-03 2 10E-03 2 10E-03 2 10E-02 106E-03 2 10E-03 2 10E-03 2 10E-03 2 10E-03 2 10E-03 2 10E-02 2 106E-03 2 10E-03			10.0		40+100	20-305 0	2 195-03	2	313 00	510 00	90,706	4 7E-07	3 0 = +00
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10         5 50E+01         2 98E-02         1 08E-05         6 74E+03         6 56E-02         1 60E-03         25         363 15         585 85         7,000         1 8E-05           3 16E+01         7 42E-02         1 05E-05         5 05E+03         2 30E-01         6 61E-03         25         330.55         523 00         6,895         0 0E+00           5 89E+01         7 02E-02         1 02E-02         2 56E+03         1 07E+00         2 61E-02         25         330.45         576 05         6,895         0 0E+00           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422,35	696 00	9.479	1 1E-06	0.05+00
3 16E+01         7 42E-02         1 65E-05         5 06E+03         2 30E+01         5 00E-02         1 00E-02         1 00E-02         1 00E-02         1 00E-02         1 00E-02         1 00E-02         1 00E-02         1 00E-02         1 00E-02         1 00E-02         1 00E-03         2 50E-03         5 300 55         5 300 55         5 300 55         5 300 55         6 20 00 6 50         6 20E-03         1 00E-02         1 00E-02         1 00E-03	omethane	5 50E+01	2 98E-02	1.06E-05	6 74F+03	6.56F-02	1.605-03	25	363 15	SRS RE	1	1 20 75	100
88E+01 9 00E-02 10E-02 10E-02 10E-02 25E+03 10TE-00 20E-02	thane	3 16E+01	7 42F-02	1.05E-05	5.06日403	205.01	8 8 1 1 1 1 1	36	330 55	2000	000	00.00	100
SBE+01         9 UB-UZ         1 OB-UZ         1 OB-UZ         1 OB-UZ         1 OB-UZ         1 OB-UZ         2 SBE+03         1 OB-UZ         2 SBE+04         2 SBE+03         1 OB-UZ         2 SBE-04         5 SBE-05         6 SBE-03         6 SBE-04         2 SBE-03         6 SBE-03         6 SBE-03         6 SBE-03         6 SBE-03         6 SBE-03         6 SBE-03         6 SBE-03         7 SBE-03         7 SBE-03         7 SBE-03         7 SBE-03         7 SBE-03         7 SBE-03         7 SBE-03         7 SBE-03         7 SBE-03         7 SBE-03         7 SBE-03         7 SBE-03         7 SBE-03         7 SBE-03         7 SBE-03         7 SBE-03         8 SBE	th. down	100 E	1000	1000	) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	00.150	2000	3 1	5000	20.020	0000	001100	2 2
41E+06   11ZE-02   568E-06   180E-01   447E-02   109E-03   25 603.69   846.31   13,000   13E-03     500E+05   161E-02   721E-06   180E+00   111E+06   271E-02   25 512.15   746.00   10,231   00E+00     500E+05   161E-02   873E-06   280E+03   15E-04   280E-03   280E-03   25 369.52   572.00   7,590   0.0E+00     501E+01   780E-02   880E-06   442E+03   374E-02   912E-04   25 366.15   602.00   8,322   16E-05     501E+01   780E-02   910E-06   110E+03   374E-04   25 360.36   544.20   7,505   7.0E-05     501E+02   780E-02   790E-02   790E-03   740E-04   25 360.36   544.20   7,505   7.0E-05     501E+02   780E-03   780E-05   780E-05   780E-05   780E-05     501E+02   780E-02   780E-04   780E-05   780E-05   780E-05     501E+02   780E-02   780E-05   780E-05   780E-05   780E-05     501E+02   780E-02   780E-05   780E-05   780E-05   780E-05     501E+02   780E-02   780E-05   780E-05   780E-05     501E+02   780E-03   780E-05   780E-05   780E-05     501E+03   780E-02   780E-03   780E-05   780E-05     501E+04   780E-03   780E-03   780E-05     501E+05   780E-05   780E-05   780E-05     501E+05   780E-05   780E-05   780E-05     501E+05   780E-05   780E-05   780E-05     501E+05   780E-05     501E+05   780E-05     501E+05   780E-05     501E+05   780	'll'yealle	- OF U.S.	40-300 K	1 CF F F F F F F F F F F F F F F F F F F		1 U/E+00	2 675-02	93	304 75	576 05	6,247	5 OE-05	0 0E+00
entacliene 2 00E+05 161E-02 7 21E-06 180E+00 111E+00 2 71E-02 25 512.15 746.00 10,931 0 0E+00 10 0E+00	:	141110	1125-02	5 69E-UG	1 80E-01	4 47E-02	1 09E-03	52	603.69	846 31	13,000	1 3E-03	00=+00
4 68E+01 6 23E-02 6 76E-06 1 20E+04 2 72E-04 6 63E-06 25 488 35 715 00 10,271 2 7E-07 In 4 57E+01 7 82E-02 8 73E-06 2 80E+03 1 15E-01 2 80E-03 25 369 52 572 00 7,590 0 0E+00 an 5 01E+01 7 80E-02 8 80E-06 4 42E+03 3 74E-02 9 12E-04 25 386 15 602 00 8,322 1 6E-05 outhanno 9 33E+01 7 10E-02 7 90E-02 7 90E-06 2 97E+03 1 41E-02 2 7 90E-02 7 90E-06 2 97E+03 1 41E-02 7 90E-04 2 7 90E-05 7 90E-0	clopentadiene	2 00E+05	1 61E-02	7 21E-06	1 80E+00	1 11E+00	2 71E-02	25	512 15	746 00	10,931	0 0E+00	7,0E-05
ne         4.37E+01         7.82E-02         8.73E-02         8.73E-02         8.73E-03         1.5E-01         2.80E-03         25         369.52         572.00         7.590         0.6E-03           ane         5.01E+01         7.80E-02         8.80E-06         4.42E+03         3.74E-02         9.12E-04         25         386.15         602.00         7.590         0.6E-05           ne         7.80E-02         9.10E-06         4.22E-01         1.03E-02         25         386.15         602.00         8,322         1.6E-05           coethane         9.33E+01         7.80E-02         9.12E-04         25         386.36         544.20         7.505         1.7E-06           coethane         9.33E+01         7.10E-02         7.90E-02         1.41E-02         7.505         1.7E-06           coethane         9.33E+01         7.10E-02         7.50F+03         1.41E-02         3.44E-04         2.5         4.19E-03         6.81E-05           coethane         9.33E+01         7.60E-05         8.35E-05         6.8E-05         7.50E-05         7.50E-05		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	8 635-06	25	488.35	715.00	10 271	2 7E-07	10+U
ane 501E+01 780E-02 878E-02 275E-01 102E-01 2.05E-03 28.952 97.200 7,590 0.0E-00 ane 501E+01 780E-02 8.06E-03 374E-02 912E-04 25 386.15 602.00 8,322 1.6E-05 912E-04 25 386.15 602.00 7,590 7.650 7.650 936E-05 936E-05 7.650E-05 297EE+03 4.26E-01 3.44E-04 25 419.60 66.15 8,980 7.650 7.650E-05 7.650	monana	4.37F±01	7 ROE-512	8 73E.08	2 805+03	1.50.04	3 801 03	2 2	0000	1 2 2 2	- 6	00.00	100
alle 3 VIE+VI / 80E-VZ 8 80E-VG 4-XE-VJZ 9 12E-Q4 25 386 15 602 00 8,322 1 6E-Q5 10E-Q5 10E-VG 100E-VG 110E-VJZ 4 22E-Q1 1 03E-Q2 25 360 36 544 20 7,505 1 7E-Q5 cethane 9 33E+VJZ 7 10E-Q5 2 97E-VJZ 1 41E-Q2 3 44E-Q4 25 419 60 661 15 8,996 5 8E-Q5 7 8E-Q5 7 80E-Q5	2000		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		300		2 00E-02	67	20 600	00 7 /0	ר'י	20+100	4 05-0
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7.08E+03 4.21E-02 7.69E-06 4.24E+00 6.38E-03 1.65E-04 26 660.64 803.15 1.3.16E 0.0E±0.0	chloroethane	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	25	419 60	661 15	988	5 8E-05	0 0E+00
	9	7 08 1103	4 21 11 03	7 600 08	707H70 F	20 20 20	1000	1 6		2 6	0 10	9 6	

9.5		8	5 6	3 8	8 8	8	5	8 8	3 5	. <del>.</del>	. 23	7.	33	2 2	22	8		20.5	2 5	9		21 1	0 0	2 0	10	73	0	<del></del>		10	0					_		0.6			_	<b>51.</b>	<del>-</del>								63	
2.8E+00	7 0E-01	0 0E+00	44.	001100	00=+00	0 0E+	1 4E	0 0E+00	181	2 OE+	187	3 5E-	205	1 OF+00	7 0E-(	7 0E+00	8 OH	1 4E-02	2 0E-01	7 0E+00	4 0E-01	2 OE-0	2 15+00	2 1E-02	0 OE+00	7 0E-02	0 0E+00	1,100	115	0 0E+0	0 0E+00	0 OE+0	1 1E-01	3 35-02 7 0F-02	0 0E+00	0 0E+00	1460	00+400	0.00	0 OE+00	0 0E+00	2 0E-02	0.06+00	20+110-0	3 0E-04	0 0E+00	0 0E+00	0 0E+00	0000			
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13,733	13,000	13,000	12,666	10.206	14,000	12,000	10,373	13,000	10,800	9,700	9,572	13,000	10,566	6.737	11,329	8,525	9,271	7,643	7,800	8,523	7,930	8,410	076,01	14,000	15,999	15,000	14,447	13,121	11.000	13,467	8,000	8,288	7 192	6,717	17,000	15,000	13,815	16,000	13,000	13,000	13,000	7,000	11,000	13,000	14,127	14,000	19,000	19,000	18,000			
757.00	839 68	890 45	870,00	738 00	813 20	749 03	748 40	630.30	697 60	705 00	675 00	759 13	719 00	636 00	707 60	616 20	684 75	561 96 561 96	51913	617 05	59179	664.20	659 79	942 94	806 00	862 22	825 00	725.00	708 17	814 00	678 20	620 20	544 00	516.50	1078 24	969 27	905 00	979 00	839 37	839 36	839 36	287 38 770 00	746.87	848 76	1750 00	873 31	539 37	512.27	482 20			
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VLOOKUP TABLES 1 85E-05 3 85E-08	5 17E-05	2 05E-04 2 61E-03	6 26E-07	3 346-01	1 00E-06	3 195-04	1 64E-07	2 13E-01	4 92E-05	7 79E-02	1 60E-02	1 /8E-04	3 23E-01	1 13E-01	8 20E-05	3 14E-01 9 96E-02	136E-05	4 01E-02	2 10E-02	3015-01	1 52E-01	1 63E-05	7 38E-04			2 /4E-03 5 41E 03	2 67 E-03	5 82E-02	1 30E-04	3 80E-06	3 Z1E-0Z 7 54E-01	4 516-04	1 67E-01	3 85E-01	6 56E-05	5 60E-04	3 40E-05	3 88E-03	6 97E-03	4 35E-04	3 03E-03 7 26F-01	3 06E-05	9 23E-05	3 90E-04	4 67E-01	4 89E-04	8 20E-02	1 19E-02	2 135-02	6 of 7		
1 08E+03 1 12E+01	2 69E+00	3 576+01	7 48E+00	3 23E+00	1 95E+03	8 UNE+UZ	3 11E+00	1 78E+02	2 60E+04	1 56E+02	2 20E+04	2 09F+03	1 69E+02	3 10E+02	7 87E+03	7 38E+01	5 30E+03	8 52E+03	2 00E+04	1615+02	4 72E+02	8 28E+04	1 72E+04	5 10E-01	3 40E-01	2.00E-02	4 34E-02	3 00E+02	4 50E+03	2 70E+02	2 OOE+02	1 35E-01		6 30E+03	2 20E-05	2.06E-01	8 00E-04	1 60E-03	1 B0E-01	2 00E +00	2 80E+03	1 82E+02	9 89E+03	2 00E-01	5 62E-02	8 00F-02	5 70E-02	4 20E-01	3 40E-01			
6 35E-06 7 86E-06	4 83E-06	7 885-06	7 03E-06	6 16E-06	6 10E-06	7 50E-06	6 74E-06	1 00E-05	8 30E-06	7 90E-06	9 46E-06	8 60 1-06	7 80E-06	8 005-06	8 69E-06	7 905-06	1015-05	90E-06	9 20E-06	7 80E-06	8 70E-06	9 105-06	7 53E-06	4 55E-06	3 66E-06	5.91F-06	7 74E-06	8 23E-06	8 77E-06	7 06E-06	8 20E-06	7 24E-06	1 13E-05	1 196-05	5 56 F-06	6 35E-06	5 56E-06	6.21E-06	4 86E-06	7.345-05	1 00E-05	7 26E-06	8 17E-06	4 23E-06	6 30E-06	4 32E-06	5 00E-06	5 42E-06	5315-06			
2 56E-02 4 38E-02	1 74E-02	3 635-02	3 90E-02	5 61E-02	5 60E-02	5 90F-02	1 94E-02	8 70E-02	7 40E-02	6 90E-02	5 01E-02	7 605-02	7 50E-02	7 105-02	2 84E-02	6 90E-02	4 83E-02	1 04E-01	8 50E-02	8 70F-02	7 30E-02	8 20E-02	6 92E-02	1 15E-02	3 51E-02	5 42E-02	3 24E-02	3 005-02	3 46E-02	2 03E-01	7 20E-02	2 72E-02	7 36E-02	7 07E-02	2 26E-02	3 025-02	2 26E-02	2 48E-02	1 32E-02	1 42E-02 1 42E-02	6 26E-02	3 27E-02	5 45E-02	1 32E-02	3 U/E-U2	1 38E-02	1 56E-02	2 22E-02	2 14E-02			
2 88E+02 3 39E+04	5 75E+04	1 38E+04	3 39 €+03	5 37E+04	3 925+02	2 OOE+03	7 24E+02	3 63E+02	9 12E+01	6 175+02	3 88E+02 1 60E+03	6 46E+01	3 63E+02	7 76E+02	2 USE+02	6 17E+02	661E+01	174E+01	5 Z5E+00	1.82E+02	2 19E+02	2 88E+01	155E+01	2 14E+03	8.32F+07	5 50E+04	2 95E+04	1 78E+03	147E+02	8 33E+01	1.55E+02	1 05E+05	3 55E+01	5.25E+01	1 23E+06	1 07E+05	1 23E+06	3 98E+05	2 45E+06	1.26F+03	4 57E+01	6 92E+01	2 40E+01	8 325+04	2 57E+01	2 90E+05	2 00E+05	3 30E+04	3 30E+04			
84682 Diethyfphthalate 84742 DH-chryff phthalate 8587 Dind homed Little 144	86306 N-Nitrosodioheovlamine	86737 Fluorene	86748 Carbazole	87865 Descriptor-1,3-butadiene	88062 2 4 6-Troblocophenol	91203 Naphthalene	91941 3,3-Dichlorobenzidine	95476 o-Xylene	95501 1 2-Dichlomborrano	95578 2-Chlorophanol	95954 2.4.5-Trichlorophenol	98953 Nitrobenzene	100414 Ethylbenzene	100425 Styrene 105679 2 4-Dimothydahanal	106423 p-Xviene	106467 1,4-Dichlorobenzene		107062 1,2-Dichloroethans	108383 m-Xylene	108883 Toluene	108907 Chlorobenzene		111444 Bis(2-chloroethyl)ether			118741 Hexachlorobenzene	120127 Anthracene	120821 1,2,4-Trichlorobenzene	120832 z,4-Dichlorophenol	124481 Chlorodibromomethane	127184 Tetrachloroethylene	129000 Pyrene	156592 cis-1,2-Dichloroethylene	199909 uans-1,2-Urmonemensens 193395 Indeno(1.2 3-nd)owene	205992 Benzo(b)fluoranthene	206440 Fluoranthene	207089 Benzo(k)fluoranthene	218019 Chrysene	319846 alpha-HCH (alpha-BHC)	319857 beta-HCH (beta-BHC)	542756 1,3-Dichloropropene		621647 N-Nitrosodi-n-propylamine	102437.3 Heptachior epoxide 7430976 Meminy (elomontal)	8001352 Toxaphene	11096825 Arodor 1260 (PCB-1260)	11097691 Arodor 1254 (PCB-1254)	12674112 Arador 1016 (PCB-1016)	534692 19 Aududi 1242 (PCB-1242)			

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

ENTER Initial groundwater conc,

Chemical CAS No

YES

		ENTER	User-defined stratum A	soil vapor permeability.	×.	(cm²)						
				S.		•						_
		ENTER	stratum A SCS	soil type (used to estimate	soil vapor	permeability)	Ξ.	ENTER	Stratum C	sou water-rilled porosity,	0	(cm³/cm³)
		ENTER		SCS soll type	directly above	water table	s	ENTER	Stratum C	soli totali porosity,	o <sub>C</sub>	(unitless)
,		ENTER	Sol	stratum directly above	water table,	(Enter A, B, or C)	0			soll dry bulk density,		(g/cm³)
	ethane	ENTER Lwt (cell D28)	Thickness of soil	stratum C, (Enter vatue or 0)	Ę	(cm)	1066 8	ENTER	Stratum 8	sou water-filled porosity,	В*Ф	(cm³/cm³)
Chemical	1,1,2,2-Tetrachloroethane	NTER ENTER ENTER TOTALS	Thickness of soil	stratum B, (Enter value or 0)	ළ	(cm)	304 8			soli total porosity,		(unitless)
		ENTER Totals mus	Thickness	of soil stratum A.	₹	(cm)	70104	ENTER	Stratum B	soil dry bulk density,	<b>.</b>	(g/cm³)
,		ENTER	Depth	below grade to water table.	Lwı	(cm)	2072 64	ENTER	Stratum A	sou water-filled porosity,	<b>∀</b> ,₩	(cm³/cm³)
С. <b>w</b> (µg/L)	120 6884	ENTER Depth	below grade to bottom	of enclosed space floor.	<u>ٿ</u>	(cm)	15	ENTER	Stratum A	soil fotal porosity,	<b>4</b> ∟	(unitless)
(numbers only, no dashes)	79345	ENTER	Average soil/	groundwater temperature.	ř.	(2)	16	ENTER	Stratum A	soil dry bulk density,	√a	(g/cm³)

15	0 43	0.5	17	0.42	0.27	1.7	0.43	03
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
space	Soil-bidg	space	space	Enclosed		Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
thickness,	differential,	length,	width,	height,		rate,		
Lorack	PΔ	ٿ	Wa	ī	*	ደ		
(cm)	(g/cm-s²)	(cm)	(cm)	(cm)	(cm)	(1/h)		
15	40	961	961	488	0.1	0.45		
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER			
Averaging	Averaging			Target	Target hazard			
teme for	time for	Exposure	Exposure	risk for	quotient for			
carcinogens,	noncarcinogens,	duration,	frequency,	carcinogens,	noncardinogens,			
ATc	ATNC	8	出	፳	ФH			
(yrs)	(yrrs)	(yrs)	(days/yr)	(unitless)	(nuitless)			

Used to calculate risk-based groundwater concentration 1 0E-06

### CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)	
Unit nsk factor, URF (µg/m³)-1	
Pure component water solubi.ity, S (mg/L)	
Organic carbon partition coefficient, K <sub>oe</sub> (cm³/g)	201 45 0 00T 04 0 00T
Critical lemperature, c T <sub>C</sub> (*K)	264.45
Normal boiling point,	440.60
Enthalpy of vaporzation at the normal bouling point, $\Delta H_{\rm ch}$ (cal/mol)	8 006 1410 80
Henry's law constant reference temperature, T <sub>R</sub>	25
Henry's faw constant at reference temperature, H (atm-m³/mol)	3 44E-04
Diffusivity In water, D <sub>w</sub> (cm <sup>2</sup> /s)	7 10E-02 7 90E-06
Diffusivity C in air, D.	7 10E-02

ed Floor- n wall seam permeter, Xexet (cm)		(cm)
Water-filled porosity in capillary zone, $\theta_{w,ca}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Total overall effective diffusion coefficient.	(cm*/s)
Aur-filled porosity in capillary zone, e.c. (cm³/cm³)	Capillary cone effective diffusion coefficient,	5 83E-04
Total porosity in capillary zone, Inc. (cm.3/cm.3)	Stratum C effective diffusion coefficient,	Reference conc.  Reference (mg/m³)
Thickness of capillary zone, La (cm)	Stratum B effective diffusion coefficient, D E E	(cm7.8) 7.95E-04 Unit risk factor, UR (mg/m³)**
Stratum A soil effective vapor permeability, k, (cm²)	Stratum A effective diffusion coefficient,	(cm.7s)  2 90E-03  Infinite source bidg. conc., Chalding (μg/m³)
Stratum A soul relative air permeability, k <sub>ra</sub> (cm²)	Vapor viscosity at ave soil temperature, brs	(g/cm-s)  Infinite source indoor attenuation coefficient,   (unitiess)  4 06E-06
Stratum A soil intinisic permeability, k	9 36E-10 Henry's law constant at ave groundwater temperature, H'rs	8 36E-03 Exponent of equivalent foundation Peclet number, exp(Pe <sup>§</sup> ) (unitless) 7 88E+03
Stratum A effective total fluid saturation, S <sub>6</sub> S <sub>6</sub>	6419 Henry's law constant at ave groundwater temperature, Hrs	(atm-m /mol)  1 98E-04  Area of crack,  Asset (cm²)
Stratum C soil air-filled porosity, $\theta_a^c$ (cm <sup>3</sup> /cm <sup>3</sup> )	Enthalpy of vaporization at ave groundwater temperature, AH,vrs	Crack effective diffusion coefficient, Domak (cm²/s)
Stratum B soil aur-filled porosity, $\theta_a^{\ B}$ (cm $^3$ /cm $^3$ )	Crack depth below grade,	(cm)  Average Average rapor flow rate into bidg ,  Qual (cm³/s)
Stratum A soil air-filled porosity, $\theta_a^A$ (cm³/cm³)	Crack-to-total area ratio,	Crack radius, franck (cm)
Source- building separation, L <sub>T</sub>	Area of enclosed space below grade,	Source vapor conc., Cause (µg/m³).
Exposure duration, t	Bitdg ventilation rate, Quadra	Convection path length, Le (cm)

RISK-BASEI	RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	ER CONCENTR	VATION CALC	ULATIONS	INCREMENTAL	INCREMENTAL RISK CALCULATIONS:
Indoor exposure groundwater conc, carcinogen (µg/L)	Indoor exposure groundwater conc , noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc, (µg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc (µg/L)	Incremental nsk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quottent from vapor intusion to indoor air, noncarcinogen (unitless)
1 24E+03	AN	1 24E+03	124E+03 2 97E+06	1 24E+03	NA	4N

conc , RfC (mg/m³)

Unit risk factor, URF

(mg/m<sup>3</sup>) 1

		ď	Soil Properties Lookun Tablo	okun Tabla		VLOOKUP TABLES	LES					
SCS Soil Type	K, (cm/h)	a (1/cm)	N (unitless)	M (unitless)	e, (cm³/cm³)	9, (cm³/cm³)	Mean Grain Diameter (cm)					
O	0.20	0 008	1 09	0 083	0 38	0 068	0 0002					
ರ .	0.26	0 0 19	131	0 237	0.41	0,095	0 016					
. د.	40.5	0 036	156	0 359	0.43	0.078	0 020					
2 2	20 70	0 145	2.68	0.567	. 4 O	0.057	0.040					
<u> </u>	0 12	0 027	1 23	0 187	0 38	0,100	0 028					
SCL	131	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.48	0 324	0 39	0 100	0 029					
<u></u>	0 25	0 0 16	137	0.270	0.46	0 034	0 0046					
<u> </u>	0 02	0 005	109	0.083	0.26	0.070	0 0039					
,	0.45	0000	4.	0.291	0.40	0.000	0.0036					
SL	4 42	0.075	1.89	0.471	041	0.065	0 030					
					Сћети	Chemical Properties Lookup Table	okup Table					1
		Organic			Pure	•	Henry's	Henry's			Enthalpy of	
		carbon			component		law constant	law constant	Normal		vaporization at	_
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	polling	Critical		
		K	, d	n water, D	solubility,	aw constant	emperature,	temperature, Ts	politi L	temperature, To	Doiling point.	₽ –
CAS No Chemical		(b/ <sub>E</sub> wo)	(cm²/s)	(cm <sup>2</sup> /s)	(ma/L)	(nu)tless)	(atm-m³/mol)	<u>.</u>	- £	Š	_	, 5
												i i
90293		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8,10E-06		533 15	720 75	11,000	0
50328 Benzo(a)pyrene		1 025-406	4 30E-02	9 005-05	1 62E-03	4 63E-05	1 13E-06		715 90	969 27	15,000	N C
53703 Dihenzia hizathracene		3 ROF+06	2.73E-02	9 00m00 8 48m08	2 49E-03	1 02E-03	4 44E-0/		743.24	827 85	15,000	٥,
56235 Carbon tetrachloride		1 74 E+02	7 80E-02	8 80E-06	7 93E+02	1.25E+00	3.056-02		349.90	558 60	7 127	4 -
56553 Benz(a)anthracene		3 98E+05	5 10E-02	90E-06	9 40E-03	1 37E-04	3.34是-06		708.15	1004 79	15 000	- 14
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05		624 24	885 73	13,000	60
58899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05		596 55	839 36	13,000	,
60571 Dieldrin		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1516-05		613 32	842 25	13,000	4
65850 Benzoic Acid		6 00E-01	5.36E-02	7 975-06	3,50E+03	6 31E-05	154E-06	25	720 00	751 00	10,000	0
67663 Chlomform		3.98F+01	1045-01	1 00F-05	7 92F+03	1.508-01	3.66.173		334 32	536.40	6,69	۰ د
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03		458 00	695 00	9.510	4
71363 Butanol		6 92E+00	8 00E-02	9 305-06	7 40E+04	3 61E-04	8 80E-06		390 88	563 05	10,346	0
71432 Benzene		5 89E+01	8 80E-02	9 805-06	1.75E+03	2 28E-01	5 56E-03		353 24	562 16	7,342	₩,
71000 1,1,1-1 richioroethane		1 10=+02	7 80E-02	8 80E-06	1 335+03	7 055-01	1 72E-02		347 24	545 00	7,136	0 (
72435 Methoxychlor		9 77 F+04	1.56E-02	4.745-06	2 50E-01 4 50E-02	3.08E-04 6.48E-04	7 57E-06 1 58E-05	2.52	65102	986 20	12,000	0 0
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06		639 90	863 77	14,000	, Ψ
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05		636 44	860 38	13,000	Ų
74839 Methyl bromide		105E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03		276 71	467 00	5,714	O 1
75092 Methylene chlorde 75092 Methylene chlorde	nene)	1 17 5 4 0 1	1 000 -0 :	1 17E-05	2 / DE+U3	1 1 1 E+00	2 / 1E-02 2 19E-03		313 00	510 00	9,230	
75150 Carbon disuffice		4 57E+01	1 04E-01	1.00E-05	1 19E+03	1 24E+00	3 02 E-02		319 00	552 00	6.391	. 0
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04		422 35	00 969	9,479	. –
75274 Bromodichloromethane	_	5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03		363 15	585 85	2,000	_
75343 1,1-Dichloroethane		3 16	7 42E-02	1 05E-05	5 06E+03	2 305-01	5 61E-03		330 22	523 00	6,895	0
75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02		304 75	576 05	6,247	٠,
76448 Heptachlor	4	141E+06	1 125-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	522	603 69	346 31	13,000	٠ ,
78591 Isonborone	9 9		8 23E-02	6.76F-08	1 205+04	2 72F-04	2 / IE-02 6 63E-06		488.35	715.00	10,931	٠,
78875 1.2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25.	369 52	572 00	7.590	. 0
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04		386 15	602 00	8,322	•
79016 Trichloroethylene		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02		360 36	544 20	7,505	•
79345 1, 1, 2, 2-Tetrachloroethane	ane	933E+01	7,10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	25	419 60	661 15	966'8	٠, ,
83329 Acenaphthene		7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04		550 54	803 15	12,155	0

				>	VLOOKUP TABLES							
04662 Diethylphthalate	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	25	567 15	757 00	13.733	0 0E+00	2.8E+00
85587 But 4 home dutument	3 395 +04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10	22	613 15	798 67	14,751	00=+00	3 5E-01
86306 N-Massociation	5 /5E+04	174E-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06	<b>2</b> \$	09 099	839 68	13,000	0 0E+00	7 0E-01
86737 Fhorens	1 385+03	3 125-02	6 35E-06	3 51E+01	2 05E-04	5 00E-06	52	632 28	890 45	13,000	1 4E-06	000+00
86748 Carbazole	3 395+03	3 90 5-02	7.035-06	7 485400	2 67 E-03	6375-05	25	570 44	870 00	12,666	0 0E+00	14E-01
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23 8 +00	3.345-01	1 53E-U8	5 2	627.87	899 00	13,977	57E-06	0 0E+00
87865 Pentachtorophenol	5 92E+02	5 60E-02	6 105-06	1 95E+03	1 00E-06	2 44E-08	3 5	582 15	738 00	10,206	2.2E-05	00=+00
88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	2 23	519 15	749 03	12.000	3.15.06	0.00+00
912U3 Naphthalene 91941 3 3 Dichlemboraides	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	1 4E-01
95476 o-Xylene	7 24E+U2	1 945-02	674E-06	3.11E+00	164E-07	4 00E-09	52	560 26	754 03	13,000	135-04	0 0E+00
95487 2-Methylohenol (o-gresol)	9 12E+01	2 40E-02	1 00E-03	1 78E+02	2 13E-01	5 20E-03	52	417 60	630 30	8,661	0 0E+00	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90 F-02	7 905-06	2 505 + U4	4 92E-05	1 20E-06	52 5	464 19	697 60	10,800	0 0E+00	185-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9.466-06	2 20F+04	1 60E-02	1 90 1 03	52	453.57	705 00	9,700	0 0E+00	2 0E-01
95954 2,4,5-Trichiorophenol	1 60E+03	2 91E-02		1 20E+03	1 78E-04	3 30E-04	9 %	44/ 53 626 16	675 00	9,572	00+300	1 85-02
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 845-04	2.40F-05	3 5	320 13 483 95	719.00	13,000	0.000	3000
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	22	409 34	617.20	8.501	0.05+00	10110
100423 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03	52	41831	636 00		0 0E+00	1.05+00
106423 p. Yvtene	2 095+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	52	484 13	707 60		0 0E+00	7 0E-02
106467 1.4-Dichlombenzene	5 09E+02 6 17E+02	6 GOE 02	3 44E-U6	1 85E+02	3 14E-01	7 66E-03	56	411 52	616 20	8,525	0 0E+00	7 0E+00
	6.615+01	4 835-02	1016-06	7 30E+01	4 36F-02	2 435-03	52	447 21	684 75	9,271	0 OE+00	8.0E-01
107062 1,2-Dichloroethane	1 74E+01	104601	90E-08	8 52F+03	4.015-02	3 32E-0/ 0 78E-04	Q E	503 65	754 00	11,689	0 OE +00	1 4E-02
108054 Vinyi acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 17E-04	8 %	330 63 345 65	261 00	7,643	2 65-05	00100
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3016-01	7.34E-03		412.27	517.05	000	001100	Z 0E-01
108883 Toluene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03		383.78	591.79	7 030		7 UE+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03	_	404 87	632.40	0.410	00+100	200
108952 Preno!	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07		455 02	694 20		00+000	2 1F+00
111444 bis(z-chloroemyl)einer 115297 Endosultan	1 55E+01	6 925-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05		451 15	629 79		3 3E-04	00+00
		3.515.02	4 35E-00	2 400 01	4 59 11 54	1 125-05		674 43	942 94		0 0E+00	2 1E-02
117840 Di-n-octyl phthalate	8 32E+07	1515-02	3.58F-06	2 00E-01	9 74E-05	1 02E-07		657 15	806 00		4 0E-06	0 0E+00
118741 Hexachlorobenzene		5 42E-02	5 91E-06	6 20E+00	5.416-02	1 22 11.03	0 4	704 09 582 55	862 22		001100	7 0E-02
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6.51E-05		502 33 615 18	873.00	14,447	4 6E-04	00±00 00±00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03		486 15	725 00		001100	2 00.0
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06		482 15	708 17		30±00 00±00	115-02
12448 † Chlorodhomomethere	9 555+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08		590 00	814 00		195-04	00±00
127184 Tetrachloroethylene	1.555+02	7.206-02	1 USE-US	2 505+03	3 21E-02	7 83E-04		416 14	678 20		2 4E-05	0 0E+00
	1 05E+05	2 72F-02		1355-01	10-040 /	1846-02		394 40	620 20		5 8E-07	00+30 O
156592 as-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67F-01	1 10E-05	52	667 95 333 65	936 00		00=+00	11501
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39 11-03		333 83 320 85	516 50	7,192	0.00	3 5E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 605-06	22	109 15	1078.24			20-07 0 00-02
20599Z Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1 11E-04		715 90	969 27			001100
20245 Floorantierie 207089 Renzo(k)flooranthene	1 0/ 5+05	3 UZE-UZ	6355-06	2 06E-01	6 605-04	1 61E-05		655 95	905 00			1 4E-01
218019 Chrysene	3 98E+05	2 48E-02	5 21F-06	1 50 50 5	3 40E-U5	8 29E-07	55	753 15	1019 70			0 0E+00
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97F-03	1 705-04		14 13	979.00			0 0E+00
319846 atpha-HCH (alpha-BHC)	1 23E+03	1 42E-02		2 00E+00	4 35E-04	1 06E-05		596.55	839.36		4 5F-03	00=+00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839.36	13,000		001100
542/56 1,3-Dichloropropens	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		38115	587 38			2 05-02
601647 N-Nitrosodin-moderne	0 92E+01	3 2/E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07	25 5	558 00	770 00			0 0E+00
1024573 Heptachlor epoxide	8 32F+04	1 325-02		2005.04	9 235-05	2 25E-06	25		746 87			0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02		5 62E-02	3 90E-04	9515-06	52		848 76		2 6E-03	00=+00
8001352 Toxaphene	2 57E+05	1 16E-02		7 40E-01	2 46E-04	6 00E-08	e a	62988	750 00		0 0E+00	3 OE-04
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	25 4	402.50	539.37	000,00	3 ZE-04	00000
11097691 Aroctor 1254 (PCB-1254)	2,00E+05	1 56E-02	·	5 70E-02	8 20E-02	2 00E-03	25	377 50	512 27	19,000	10 H	00+400
126/4112 Aroctor 1016 (PCB-1016) 53469219 Aroctor 1242 (PCB-1242)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	33	340 50	475 22	18,000		00+100
facal (5) y and (5) y and (5) y	ב ב ב	70-241 7	.,	3 4UE-0.1	2 13E-02	5 20E-04	35	345 50	482 20	18,000		0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 1.2 September, 1998

YES X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

		ENTER	stratum A soil vapor permeability, k, (cm²)		
			К	٦	
		ENTER Soil	substitution SCS SCS soll type (used to estimate soll vapor permeability)	S	ENTER Stratum C soil water-filled porosity, $\theta_w^{C}$ $(cm^3/cm^3)$
		ENTER	SCS soil type directly above	s	ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)
		ENTER THE	Soil stratum directly above water table, (Enter A, B, or C)	O	ENTER Stratum C soil dry bulk density, p <sub>c</sub> (g/cm³)
	thylene	ENTER 'Lwr (cell D28) Thickness	Ē	1066 8	ENTER Stratum B soil water-filled porosity, $\theta_{\mathbf{w}}^{\mathbf{B}}$
Chemical	trans-1,2-Dichloroethylene	NTER ENTER ENTER Totals must add up to value of Lwr (cell D28) Thickness Thickness	<u></u>	304 8	ENTER Stratum B soil total porosity, n (unittess)
	tra	ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub> (cm)	701 04	ENTER Stratum B soil dry bulk density, p <sub>b</sub> <sup>8</sup> (g/cm³)
		ENTER	Depth below grade to water table, Lwr (cm)	2072 64	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ (cm³/cm³)
ENTER initial groundwater conc , Cw (µg/L)	4 340714286	ENTER Depth below grade	to bottom of enclosed space floor, LF (cm)	15	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)
ENTER Chemical CAS No (numbers only,	156605	ENTER	soldy groundwater temperature, T <sub>8</sub>	16	ENTER Stratum A soil dry bulk density, p <sub>b</sub> <sup>A</sup> (g/cm³)

0	54.5	70	-	740	0.27	11/	0.43
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	
space	Soil-bidg	space	space	Enclosed	Floor-wall	Indoor	
floor	pressure	floor	floor	space	seam crack	air exchange	
thickness,	differential,	length,	width,	height,	width,	rate,	
Lores	ΦĐ	r <sub>B</sub>	W	f	*	<b>6</b>	
(cm)	(g/cm-s²)	(cm)	(сш)	(cm)	(cm)	(1/h)	
15	40	961	961	488	0 1	0.45	
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
Averaging	Averaging			Target	Target hazard		
time for	time for	Exposure	Exposure	nsk for	quotient for		
cardinogens,	noncardinogens,	duration,	frequency,	carcinogens,	noncardnogens,		
ΑTc	ATNC	<u> </u>	ដូ	똔	돼		
(yrs)	(yrs)	(yrs)	(days/yr)	(unitless)	(unitless)		
70	30	30	350	1 0E-06	1		
				Used to calcu	Used to calculate risk-based		

#### 2 of 7

CHEMICAL PROPERTIES SHEET

80	
Reference conc , RfC (mg/m³)	1
Unit nsk factor, URF (µg/m³)*¹	001.100
Pure component water sotubility, S (mg/L)	6 200 400
Organic carbon partition coefficient, K <sub>se</sub> (cm³/g)	5 255-104
Critical temperature, T <sub>c</sub> (%)	518 50   5 255±04   6 205±03   0 0F:00
Normal bothng point, t T <sub>e</sub>	320.85
Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	6 717
Henry's law constant reference temperature, T <sub>R</sub>	25
Henry's law constant at reference temperature, H (atm-m³/mol)	7 07E-02 1 19E-05 9 39E-03
Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	1 19E-05
Diffusivity Dr in air, in D <sub>*</sub> (cm <sup>2</sup> /s) ((	7 07E-02

Exposure	Source- building	Stratum A soll air-filled	Stratum B soil air-filled	Stratum C soil air-filled	Stratum A effective total fluid	Stratum A soll intrinsic	Stratum A soil relative air	Stratum A soll effective vapor	Thickness of capillary	Total porosity in capillary	Air-filled porosity in capıllary	Water-filled porosity in capillary	Floor- wall seam
duration,	separation, L <sub>T</sub>	porosity,	porosity, 9 <sub>8</sub> 8	porosity, 9°c	saturation, S <sub>te</sub>	permeability,	permeability, k <sub>ra</sub>	permeability, k,	zone, La	zone, n <sub>ez</sub>	zone, 0 <sub>ect</sub>	zone, ⊕ <sub>w.cz</sub>	perimeter, X <sub>erack</sub>
(sec)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm³/cm³)	(cm²)	(cm²)	(cm²)	(cm)	(cm³/cm³)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm)
9 46E+08	2057 64	0 230	0 150	0 130	0 419	9 36E-10	0 746	6.98E-10	17 05	0 43	0 136	0.294	3,844
	Area of							Stratum	Stratum	Stratum	Capillary	Total	
	enclosed	Crack-	Crack	Enthalpy of	Henry's law	Henry's law	Vapor	∢	മ	o	ZONE	overall	
Bldg	space	to-total	depth	vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
ventilation	woled	area	pelow	ave groundwater	ave groundwater	ave groundwater	ave soil	diffusion	diffusion	diffusion	diffusion	diffusion	path
rate,	grade,	ratio,	grade.	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient,	coefficient,	length,
Qbuilding	Å	F	Zorack	ΔH <sub>v τs</sub>	H <sub>TS</sub>	H' <sub>TS</sub>	HTS	D *	, °	, 0	_ 	₽.O	ت
(cm³/s)	(cm³)	(unitless)	(cm)	(cal/mol)	(atm-m³/mol)	(unitiess)	(g/cm-s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm²/s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm)
5 63E+04	9 24E+05	4 16E-04	15	7,073	6 48E-03	2 73E-01	1 77E-04	2.87E-03	7 26E-04	4 33E-04	4 98E-04	6 60E-04	2057 64
						Exponent of	Infinite						
,	i		Average	Crack		equivalent	source	Infinite					
Convection	Source		vapor	effective		foundation	indoor	source	ž				
path	vapor	Crack	flow rate	diffusion	Area of	Peclet	attenuation	plág	rlsk	Reference			
length,	conc,	radius,	ınto bldg,	coefficient,	crack,	number,	coefficient,	conc.	factor,	couc '			
ٹ	Caource	, the state of	o o	Dask	Agrade	exp(Pe <sup>(</sup> )	ಶ	Chuliding	URF	RfC			
(cm)	(mg/m³)	(cm)	(cm <sub>3</sub> /s)	(cm <sup>2</sup> /s)	(cm <sub>2</sub> )	(unitless)	(unitless)	(µg/m³)	(µg/m³)-1	(mg/m <sub>3</sub> )			
, 1,5	2 735409	0 10	8 675.04	2 875 03	CUT SPO &	50±308 6	30 =78 C	VO 300 0	VIV	7 05 00			
2	Z / 3E+02	2	70/00	20/E-02	3 545 102	2 80 E+⊓2	3 04 12-00	9 93E-04	₹ <u></u>	7.05-02			

#### RESULTS SHEET

RISK-BASE	RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	ER CONCENTR	VATION CALC	ULATIONS	INCREMENTAL	INCREMENTAL RISK CALCULATIONS	
					Incremental	Hazard	
Indoor	Indoor	Risk-based	Pure	Final	nsk from	quotient	
exposite	exposure	Indoor	component	indoor	vapor	from vapor	
groundwater	groundwater	exposure	water	exposure	intrusion to	intrusion to	
conc.	couc'	groundwater	solubility,	groundwater	indoor air,	Indoor air.	
carcinogen	noncarcinogen	conc	ഗ	conc.	carcinogen	noncarcinogen	
(Jug/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(nuitless)	(anitiess)	
¥	7 35E+04	7 35E+04	6 30E+06	7.35E+04	¥	Æ	

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

			Soil Properties Lookup Table	Lookup Table			
SCS Soil Type	K, (cm/h)	a (1/cm)	N (unitless)	M (unitless)	θ <sub>s</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	θ, (cm³/cm³)	Mean Grain Diameter (cm)
0	0.20	0 008	1				0 0082
ರ	0.26	0 019		0 237	0 41	0 095	0.016
	1 04	0 036	1 56				0 020
LS	14 59	0 124					0 040
S	29 70	0 145					0 044
သူ	0 12	720 0					0 025
10s	131	0 059	-	0 324			0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
<u></u>	0 25	0 0 16	1 37	0 270			0 0046
Sic	0 02	0 005	1 09	0 083			60000
SICI	0.07	0 010	-	0 187	0.43		0 0056
2เเ	0 45	0 020	141	0 291	0.45		0 011
SL	4 42	0 075	189	0 471	0 41	0 065	0.030

				Chemic	Chemical Properties Lookup Table	p Table						
	Organic			Pure		Henry's	Henry's			Enthalpy of		
	carbon			component		law constant	law constant	Normal		vaponzation at	Ş	
	partition	Officiality	Diffusivity	water	Henry's	at reference	reference	-	Critical	the normal	risk	Reference
	coefficient,	in air,	ın water,	solubility,	law constant	temperature,	temperature,	_	temperature,	boiling point,	factor,	conc ,
	χ,	o <b>"</b> '	ື້ "	u)	r	Ι,	ď	<b>-</b> =	Ļ	ΔH,δ	H.	Ric
CAS No Chemical	(b/, uo)	(cm*/s)	(cm <sup>2</sup> /9)	(mg/L)	(unifless)	(atm-m³/mol)	(၁)	( <del>)</del>	( <del>)</del>	(cal/mol)	(µg/ш³) <sup>1</sup>	(mg/m³)
50293 DDT	2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7F-05	0.08+00
50328 Benzo(a)pyrene	1 02E+06	4 30E-02	90E-06	1 62E-03	4 63E-05	1 13E-06	25	715 90	969 27	15.000	2 1F-03	00+400
51285 2,4-Dinitrophenol	1 00E-02	2 73E-02	90°E-06	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15.000	00+300	7 0F-03
53703 Dibenz(a,h)anthracene	3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03	0 0E+00
56235 Carbon tetrachlonde	174E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	1 5E-05	00+300
56553 Benz(a)anthracene	3 98E+05	5 10E-02	9 00E-06	9 40E-03	137E-04	3 34E-06	25	708 15	1004 79	15,000	2 1E-04	00000
57749 Chlordane	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05		624 24	885 73	13,000	3 7E-04	000
58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839.36	13,000	3 7E-04	00+400
60571 Dieldrin	2 14E+04	1 25E-02	4 74E-06	195E-01	6 19E-04	1 51E-05	25	613 32	842 25	13,000	4 6E-03	0 0E+00
65850 Benzoic Acid	6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 315-05	1 54E-06		720 00	751 00	10,000	0 0E+00	1 4E+01
67641 Acetone	5,75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3.88E-05	25	329 20	508 10	6,955	0 0E+00	3 5E-01
67663 Chloroform	3 98€+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6,988	2 3E-05	0 0E+00
67721 Hexachloroethane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00	695 00	9,510	4 0E-06	0 0E+00
71363 Butanol	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	25	330 88	563 05	10,346	0 0E+00	3 5E-01
71432 Benzena	5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342	8 3E-06	0 0E+00
71556 1,1,1-Trichloroethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0 0E+00	1 0E+00
72208 Endrin	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	718 15	986 20	12,000	0 0E+00	1 1E-03
72435 Methoxychlor	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0.0E+00	1 8E-02
72548 DDD	1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	6 9€-05	0 0E+00
72559 DDE	4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44	860 38	13,000	9.7E-05	0 0E+00
74839 Methyl bromide	1055+01	7 28E-02	121E-05	1 52E+04	2 56E-01	6 24E-03	25	276 71	467 00	5,714	0 0E+00	5 0E-03
75014 Vinyl chlonde (chloroethene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	111E+00	2 716-02	25	259 25	432 00	5,250	8 4E-05	0 0E+00
75092 Methylene chloride	1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	313 00	510 00	6,706	4 7E-07	3 0€+00
75150 Carbon disuffide	4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	22	319 00	552 00	6,391	0 0E+00	7 05-01
75252 Bromoform	8 71E+01	1 49E-02	1 03E-05	3 105+03	2 19E-02	5 34E-04	25	422 35	00 969	9,479	1 1E-06	0 0E+00
75274 Bromodichloromethane	5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	185-05	0 0E+00
75343 1,1-Dichloroethane	3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61 E-03	25	330 55	523 00	6,895	0.0E+00	5 0E-01
75354 1,1-Dichloroethylene	5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 616-02	25	304 75	576 05	6 247	5 OE-05	0 0E+00
76448 Heptachior	1,41E+06	112E-02	5 69E-06	1 80E-01	4 47E-02	1.09E-03	25	603 69	846 31	13,000	1 3E-03	0 0E+00
77474 Hexachlorocyclopentadiene	2 00E+05	161E-02	7 21E-06	1 80E+00	1 11E+00	271E-02	25	512 15	746 00	10,931	0 0E+00	7 0E-05
78591 Isophorone	4.68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10,271	2 7E-07	0 0E+00
78875 1,2-Dichloropropane	4 37E+01	7 82E-02	8 73E-06	2 80E+03	115E-01	2 80E-03	25	369 52	572 00	7,590	0 0E+00	4 0E-03
79005 1,1,2-Trichloroethane	5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9.12E-04	25	386 15	602 00	8,322	1 6E-05	0 0E+00
79016 Trichloroethylene	1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25	360 36	544 20	7,505	1 7E-06	0 0E+00
79345 1,1,2,2-Tetrachloroethane	9 33 6+01	7.10E-02	7 90E-06	2 97E+03	1.41E-02	3 44E-04	25	419 60	661 15	966'8	5 8E-05	0.0E+00
83329 Acenaphthene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1.55E-04	25	550 54	803,15	12 155	0.00	2 1E-01

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84662 Drethy/phthalate	2 88E+02	2 56E-02	6 35E-06	V 1 08E+03	VLOOKUP TABLES 1856-05	4.51F-07	ζ.	567 15	257.00	13 733	004200	Too ta c
84742 Di-n-butyl phthalate	3 39E+04	4 38E-02	7 86E-06	1 12E+01	3.855-08	9 395-10	3 %	813 15	709 67	13,753	00100	2.55+00
85687 Butyl benzyl phthalate	5 75E+04	1 74E-02	4.83E-06	2 69	5 17E-05	1.26F-06	3 %	660.60	10.001	2,5	00400	7000
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 005-06	35	632.28	890.45	200.51	1 45-06	00-00
86737 Fluorene	1 38E+04	3 63E-02	7 88E-06	1 98E+00	261E-03	6 37 E-05	52	570 44	870.00	12.666	005+00	145-01
60/48 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	25	627 87	00 668	13,977	5 7E-06	0 0E+00
87865 Perfections-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	334E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0 0E+00
88062 2 4 6-Trichlosopheral	3 845+02	3 48E 03	6 10E-06	1 95E+03	1 00 5-06	2 44E-08	52	582 15	813 20	14,000	3 46-05	0 0E+00
91203 Naphthalene	2 00 E+02	5 90E-02	7 505 06	8 UUE+02	3.19F-04	7 785-06	52	519 15	749 03	12,000	3 15-06	0 0E+00
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6.74F-06	3 11 F +00	1 90E-02 1 64E-07	4 835-04	8 8	491 14 560 26	748 40	10,373	00=+00	1 4E-01
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78€+02	2 13E-01	5 20E-03	0 K	360 26 417 60	630 33 630 33	13,000	40 de 0	0.000
95487 2-Methytphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	3 2	464 19	697.60	10,00	0.05+00	7 8E-01
	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 905-03	22	453 57	705 00	9.700	0.05+00	2.000.0
955/8 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9.572	00+00	1 85-02
99994 Z,4,9+ Inchlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	52	526 15	759 13	13,000	0.01	3 5E-01
100414 Filty/henzene	5 45E+01	7 60E-02	8 60E-06	2 09E+03	9845-04	2 40E-05	22	483 95	719 00	10,566	0 0E+00	2 0E-03
100425 Styrene	2 05E+02	7 10F-02	7 80E-06	1 59E+02	3 23E-01	7 88E-03	25	409 34	617 20	8,501	0.0E+00	1 0E+00
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 695-06	7 R7E+03	8 20E-05	2 705-03	8 8	41831	636 00	8,737	0 0E+00	1 OE+00
106423 p-Xylene	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14 E-01	2 00E-06 7 66E-03	Ç %	484 13	707 60	11,329	00+100	7 0E-02
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96 6-02	2 43E-03	3 %	447.24	010 20	0,000	00.00	00100
106478 p-Chloroaniline	6 61 E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	2 2	503 65	754 00	11 689	00+100	46.00
107062 1,2-Dichloroethane	1 74E+01	1 04E-01	9 90E-06	8 52E+03	4 01E-02	9 78E-04	52	356 65	561 00	7,643	2 GE-05	0 0E+00
100034 Vinyt acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	52	345 65	519 13	7,800	0 0E+00	2 0E-01
100000 IIPAylane	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03	52	412 27	617 05	8,523	0 0E+00	7 0E+00
108007 Chlomboropo	1 82E+02	8 70E-02	8 505-06	5 26E+02	2 72E-01	6 63E-03	52	383,78	591 79	7,930	0 0E+00	4 0E-01
	2 19E+02	/ 30E-02	8 70E-06	4 72E+02	1 52E-01	371E-03	52	404 87	632 40	8,410	0.0E+00	2 0E-02
111444 Rie(2-thoroathulather	1 665.00	20-202	\$ 10E-06	8 285+04	1 63E-05	3 98E-07	52	455 02	694 20	10,920	0.000	2 1E+00
115297 Endosulfan	2 14 5 + 03	1 15F-02	7 93E-06	1,72E+04	7 38E-04	1 80E-05	52	451 15	629 79	000'6	3 3E-04	0 0E+00
117817 Bis(2-ethylhexyl)phthatate	1 51E+07	3,51E-02	3 66E-06	3.40F-01	4 18 5-04	1 025 03	2 5	6/443	942 94	14,000	004400	2 1E-02
	8 32E+07	151E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05	3 2	704.09	862 22	15,999 000,44	4 UE-06	0 0E+00
	5 50E+04	5,42E-02	5 915-06	6 20E+00	5 41E-02	1 32E-03	52	582 55	825 00	14.447	4 6 1 0 4	0.05+001
120127 Anthracehe	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05	52	615 18	873 00	13,121	0000	1 16+00
120521 1,4,4-INGNORDBENE 120832 2 4. Dichlamahanai	1 /8E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03	52	486 15	725 00	10,471	0 0E+00	2 0E-01
	14/12+02	3 465-02	8 77E-06	4 50E+03	1 30 6-04	3 17E-06	52	482 15	708 17	11,000	0 0E+00	1 1E-02
124481 Chlorodibornomethane	8 31E±01	2 03E-01	1 065-06	270=+02	3 80 E-06	9 27 E-08	52	590 00	814 00	13,467	1 9E-04	0 OE+00
127184 Tetrachloroethylene	1 55E+02	7 20F-02	8 205-03	2 00E+03	3 21E-02 7 54E-01	7 835-04	52	416 14	678 20	8,000	2 4E-05	0 0E+00
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	1.35F-01	4515-04	1 100 06	8 5	364 40	620 20		5 8E-07	0 0E+00
156592 cts-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07F-03	6 K	333 65	936 00		0.00	1 10-01
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 395-03	25	320.85	516 50	201,1	00100	2000
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06	22	809 15	1078 24		2 15.04	) OE+02
203992 Benzo(b)mubraninene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1116-04	52	715 90	969 27	15,000	2 1E-04	0 0E+00
202450 Haddania leine 207089 Benzo(khiji joranibeoe	1 225+05	3 UZE-UZ	6 33E-06	2 06E-01	6 60E-04	161E-05	22	655 95	905 00	13,815	0 0E+00	1 4E-01
218019 Chrysene	3 98F+05	2 48E-02	9 30E-06	1 600.04	3 40 0 03	8 295-07	52	753 15	1019 70	16,000	2 1E-05	0 0E+00
309002 Aldrin	2 45E+06	1 32E-02	4 86F-06	1 80F-01	5 97E-03	4 400-00	9 8	714 15	979 00	16,455	2 1E-06	0 0 0 0 0
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1.06F-05	0 K	596 66	839.37	13,000	4 95-03	0 0 0 0 0
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	3 %	596.55	830 36	13,000	200	0.0E+00
542756 1,3-Dichloropropene		6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02	22	381 15	587.38	200,5	2 2E-04	0 UE+00
606202 2,6-Dinitrotohiene	6 92E+01	3 27E-02		1 82E+02	3 06E-05	7 46E-07	52	558 00	770 00	12,938	2 HP 4	2 05-02
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02		9 89E+03	9 23E-05	2 25E-06		909 609	74687	11,000	2 0E-03	00+100
10245/3 Heptachior epoxide	8 32E+04	1 32E-02		2 00E-01	3 90E-04	9 51E-06	52	613 96	848 76	13.000	2 6E-03	0.05+00
4433370 Merculy (elemental)	5 20E+01	3 0/E-02		5 62E-02	4 67E-01	1 14E-02	22	629 88	1750 00	14.127	0.05+00	3 OF-04
1106825 Amster 1260 (DCB.1260)	2 5/E+05	1 165-02		7 40E-01	2 46E-04	6 00E-06	52	657 15	873 31	14,000	3 2E-04	0 0E+00
11097691 Aroclor 1254 (PCB-1254)	2 00F+05	1.565-02	4 32E-06 5 00E-06	8 00E-02	1 89E-01	4 60E-03	52	402 50	539 37	19,000	1 0E-04	0 0E+00
12674112 Arodor 1016 (PCB-1016)	3 30 0 + 04	2 22E-02		4 20F-01	1 19E-02	2 000-03	2 8	377 50	512 27	19 000	1 OE-04	0 0E+00
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02	531E-06	3 40E-01	2 13E-02	5 20E-04	6 %	340 50	475 22	18,000	수 주 수 수 수	0 0E+00
				!			3	25.25	492 CU	18,000	1 0E-04	0.05+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1 2 September, 1998

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

YES

					_								·- ·
					ENTER		User-defined	stratum A	soil vapor	permeability,	ž	(cm²)	
										R		,	' -
					ENTER	Soil	stratum A	SCS	soil type	ate	soil vapor	permeability)	IS
					ENTER	-	-		scs	soil type	directly above	water table	8
					ENTER			Sol	stratum	directly above	water table,	(Enter A, B, or C)	ပ
				hylene	ENTER	Lw⊤ (cell D28)	Thickness	of soil	stratum C,	(Enter value or 0)	Ę	(cm)	1066 8
		Chemical		cis-1,2-Dichloroethylene	ENTER	Totals must add up to value of LwT (cell D28)	Thickness	of soil	stratum B,	stratum A, (Enter value or 0) (Enter value or 0)	ą	(cm)	3048
				ਰ	ENTER	Totals mu		Thickness	of soil	stratum A,	ć	(cm)	701 04
			-		ENTER			Depth	below grade	to water table,	Lw1	(cm)	2072 64
ENTER	groundwater conc ,	C C	7,53	7 6425	ENTER	Depth	below grade	to bottom	of enclosed	space floor,	۳.	(cm)	15
ENTER	Chemical CAS No	(numbers only,		156592	ENTER		Average	lios	groundwater	temperature,	Ę	(၁)	16

	2						2	3
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
space	Soil-bldg,	space	space	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
iickness,	differential,	length,	width,	height,	width,	rate,		
Lorack	٩v	ר. מ	WB	ī	*	æ		
(cm)	(g/cm-s <sup>2</sup> )	(cm)	(cm)	(E	(E3)	(1/F)		

ENTER Stratum C soil water-filled porosity,

ENTER Stratum C soil total porosity,

ENTER Stratum C soil dry bulk density, p<sub>o</sub>c (g/cm³)

ENTER
Stratum B
soli water-filled
porosity,  $\theta_{w}^{B}$ 

ENTER Stratum B soll total porosity,

ENTER Stratum B soil dry bulk density, p<sub>b</sub> (g/cm³)

ENTER
Stratum A
soil water-filled 's
porosity, bulk  $\theta_s^A$ 

ENTER Stratum A soil total porosity,

ENTER Stratum A soil dry bulk density,  $ho_b^A$ (g/cm³)

(unitiess)

(cm<sub>3</sub>/cm<sub>3</sub>)

(unitless)

(cm<sub>3</sub>/cm<sub>3</sub>)

unitless

ENTER Target hazard quotient for noncarcinogens, THQ {unitless}	1 0E-06 Used to calculate risk-based groundwater concentration
ENTER Target nsk for carcinogens, TR (unitless)	1 0E-06 Used to calco
ENTER Exposure frequency, EF (days/yr)	350
ENTER Exposure duration, ED (yrs)	30
ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	30
ENTER Averaging time for carcinogens, ATc (yrs)	70

## CHEMICAL PROPERTIES SHEET

	_
Reference conc , RfC (mg/m³)	3 5E-02
Unit nsk factor, URF (µg/m³)-¹	0 0E+00
Pure component water solubility, S (mg/L)	3 50E+03   0 0E+00
Organic carbon partition coefficient, $K_{\infty}$ $(cm^3/g)$	3 55E+01
Critical temperature, T <sub>C</sub> ( <sup>2</sup> K)	544 00
Normal boung point, T <sub>B</sub>	333 65
Enthalpy of vaponzation at the normal boiling point, AH <sub>v.b</sub>	7,192
Henry's law constant reference temperature, T <sub>A</sub>	25
Henry's law constant at reference temperature, H	4 07E-03
Diffusivity in water, D <sub>w</sub> (cm²/s)	1 13E-05
Diffusivity in air, D.	7 36E-02

ر ج		Б -	75
Floor-wall seam perimeter, X <sub>Gest</sub> (cm)	3,844	Diffusion path length, Le	2057 64
Water-filled porosity in capillary zone, $\theta_w = (cm)^3/cm^3$	0 294	Total overall effective diffusion coefficient, Deff (cm²/s)	6 94E-04
Aur-filled porosity in capillary zone, $\theta_{\mathbf{a},\mathbf{cz}}$ $(\mathrm{cm}^3/\mathrm{cm}^3)$	0 136	Capillary Zone effective diffusion coefficient, Deff (cm²/s)	5.24 <u>E-04</u>
Total porosity in capiliary zone, n <sub>c2</sub>	0.43	Stratum C C effective diffusion coefficient, D***c (cm²/s)	A 56E-04 Reference conc , Rfc (mg/m³)
Thickness of capillary zone, La	17 05	Stratum B B effective diffusion coefficient, D <sup>off</sup> (cm²/s)	7 60E-04 Unit Hsk factor, URF (µg/m³)-1
Stratum A soil soil effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, Deff (cm²/s)	2 98E-03 Infinite source bldg conc , C <sub>bulding</sub> (μg/m³)
Stratum A soil relative air permeability, k <sub>s</sub>	0 746	Vapor viscosity at ave. soil temperature, µrs (g/cm-s)	thin the source indoor attenuation coefficient,     (untiless)
Stratum A soil intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)	1 15E-01  Exponent of equivalent foundation Peclet number, exp(Pe) (unitless)
Stratum A effective total fluid saturation, Sta	0419	Henry's law constant at ave groundwater temperature, H <sub>Ts</sub>	2 72E-03  Area of crack, Acrack (cm <sup>2</sup> )
Stratum C soil air-filted porosity, e 9,c (cm <sup>3</sup> /cm <sup>3</sup> )	0 130	Enthalpy of vaporization at ave groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Crack effective diffusion coefficient, Dusck (cm²/s)
Stratum 8 soil air-filled porosity, $\theta_s^{B}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Z <sub>crack</sub> (cm)	Average vapor flow rate into bldg , Quel (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_{\bullet}^{A}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitless)	Crack radius, fanct (cm)
Source- building separation, L <sub>T</sub>	2057 64	Area of enclosed space below grade, A <sub>6</sub>	Source vapor conc., Casarce (µg/m³)
Exposure duration, r	9 46E+09	Bidg ventilation rate, Quating (cm <sup>3</sup> /s)	5 63E+04 Convection path length, L (cm)

NCREMENTAL RISK CALCULATIONS	Hazard quotient from vapor intrusion to indoor air, noncarchogen (unitless)
INCREMENTALR	Incremental risk from vapor intrusion to indoor air, carcinogen (unitiess)
JLATIONS.	Final indoor exposure groundwater conc , (ug/L)
ATION CALCI	Pure component water solubility, S S (μg/L)
R CONCENTR	Risk-based indoor exposure groundwater conc , (µg/L)
NSK-BASED GROUNDWATER CONCENTRATION CALCULATIONS.	indoor exposure groundwater conc , noncarcinogen (49(L)
RISK-BASEI	indoor exposure groundwater conc, carcinogen (µg/L)

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

K, (cm/h)	a (1/am)	Soil Properties L N (unitless)	Table hitless)		θ, (cm³/cm³) Me	aan Grain Diameter						
0.20	0 008		0 083	0 38	0 068	0 0092						
4 (		1.56	0 359	0 43	0 078	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
24 50 20 70 20 70	0 124	0 0	0 561	041	0.057	0 040						
0 12		. –	0 187	0 38	0 100	0 025						
5 3	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	148	0 324	0 39	0 100	0 029						
0 0 2 2			0.270	0.45	0.034	0.0046						
0 07		-	0 187	0 43	680 0	0 0026						
0 45 4 42	0 020 0	141	0 291	0 45	0 067	0 011						
							,					·
				Chemica	Chemical Properties Lookup Table	cup Table						
	Organic			Pure		Henry's	Henry's			Enthalpy of		•
	carbon			component		law constant	law constant	Normal	ia i	vaporization at	Ç	•
	partition	Diffusivity	_		Henry's	at reference	reference	bolling		the normal		Reference
	coefficient,	in alt,	ın water,	solubility,	faw constant	temperature,	temperature,	point,	temp	boiling point,	factor,	conc.
	χ α <sub>2</sub>	D.,		တ	<b>H</b>	H	r≖ g	<b>-</b> €		ΔH <sub>V</sub> Þ	URF	J. R.
	(6) (10)	(6/1112)	(6111.69)	(mg/L)	(unitiess)	(dun-m)	3	2	(Y.)	(cal/mol)	, (,ш/бл)	(mg/m.)
	2 63E+06	_	4 95E-06	2 50E-02	3 32E-04	8 10E-06	Õ		533 15 720 75	11,000	9 7E-05	0 0E+00
	1 02E+06	4	9 00E-06	1 62E-03	4 63E-05	1 13E-06	ä			15,000	2 1E-03	0 0E+00
	1 00E-02	2 73E-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	2 .	25 605		15 000	0 0E+00	7 0E-03
	3 60E+00		3 10E-U5	7 03E±03	1 25E±07	14/E-08	N C		743.24 990.41		2 1E-03	000+00
	3 98E+05	- 40	9 DOE-06	9 40E-03	1.37E-04	3.34E-06	40		Ţ	7,12/	- 5 - 15 - 5 - 16 - 5	0 0 0 0
	1 20E+05	_	4 37E-06	5 60E-02	1 99E-03	4 85E-05	1 04				3 7E-04	000
	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	2				3 7E-04	00 0
	2 14E+04	1 25E-02	4 74E-06	195E-01	6 19E-04	1 51E-05	8		613 32 842 25	13,000	4 6E-03	00€+00
	6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54 E-06	6			10,000	0000	1 4E+01
	5.75E-01	124E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	C) (	25 329		6,955	0 0E+00	3 5E-01
	1 78E+03	2 505-03	6 80F-08	7 92E+03	1 20 m -0	3 885 73	N C		334 32 536 40	6,988	2 3E-05	00100
	6 92E+00		9 30E-06	7 40E+04	3 61E-04	8 80 = -06	4 64				00+00	3 55-01
	5 89E+01	€	9 80E-06	1 75E+03	2 28E-01	5 56E-03	1 (2)		353 24 562 16			00=+00
	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	6					1 0E+00
	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	2					1 1E-03
	9 //E+U4	1 565-02	4,46E-06	4 50E-02	6 48E-04	1 58E-05	8			14,000	0 0E+00	1 8E-02
	4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 615-04	4 VOE-06	4 0	25 636 44	636 44 860 38	14,000	ט פ ט ה גילי	00+400
	1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	. 6			5.714	0 DE+00	5 0E-03
	1 86E+01	1.06E-01	1 23E-06	2 76E+03	1,11E+00	2 716-02				5,250	8 4E-05	0 0E+00
	1 17E+01	1015-01	1,17E-05	1 30E+04	8 98E-02	2 19E-03					4 7E-07	3 0E+00
	4 57E+01	1046-01	1 005-05	1 19E+03	1 24E+00	3 02E-02	2				0 0E+00	7 0E-01
	8 715+01	1 49E-02	1 03E-05	3 10E+03	2 195-02	5.34E-04	2				1 18-06	00##00
	5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	2		363 15 585 85		1 8E-05	0 0E+00
	3 16E+01	7 42E-02	105E-05	5 06E+03	2 30E-01	5 61E-03	6		330 55 523 00		0.05+00	5 0E-01
	5 89E+01	9.00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	2		304 75 576 05	6,247	5 0E-05	0.0E+00
	141€+06	_	5 69E-06	1 80E-01	4 47E-02	1 09E-03	8		603 69 846 31	13,000	1 3E-03	0 0E+00
	2.00E+05		7.21E-06	1 80E+00	1115+00	2 71E-02	7			10,931	0 0E+00	7 0E-05
	4.68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 635-06	2			10,271	2 7E-07	00=+00
	4,3/E+U	7 82E-02	8 /3E-U0	2 80E+03	1 15E-01	2 80E-03	01.0	25 369	369 52 572 00	7,590	0.05+00	4 0E-03
	1 66E+02	7.90E-02	9 105-06	1 10F+03	4 22F-04	1 03E-04	<i>,</i> ,		366 15 602 00		20-11-	000
	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 446-04	10			8.996	5 8E-05	00+00
	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	2	22	550 54 803 15	12,155	0 0E+00	2 1E-01

84662 Diethytphthalate 84742 Diethytphthalate	2 88E+02	2 56E-02	6 35E-06		VLOOKUP TABLES 1 85E-05	4 515-07	25	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 Bird heart abttalets	40+195 v	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10	52	613 15	798 67	14,751	000+000	3 SE-01
BESTE National Design D	9 /3E+04	1 74E-02	4 83E-06	2 69E+00	5 17 E-05	1 26E-06	55	09 099	839 68	13,000	0 0E+00	7 0E-01
96727 Chicago	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5 00E-06	52	632 28	890 45	13,000	1 4E-08	0.05+00
86748 Carbanda	1 385+04	3 63E-02	7 88E-06	1 98E+00	2 61E-03	6 37E-05	52	570 44	870 00	12,666	000+000	1 4E-01
87683 Hevarthorn 1 3 Intradiens	5 335+03	3 305 02	/ USE-06	7 48E+00	6 26E-07	1535-08	52	627 87	899 00	13,977	5 7E-06	0 0E+00
87865 Pentachlorophenol	5 925+02	5 60 E-02	6 10E-06	3 235+00	3.34E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0 0E+00
88062 2,4,6-Trichlorophenol	3 81E+02	3 18F-02	6.255-06	90E+03	1 00E-06	2 44E-08	52	582 15	813 20	14,000	3 4E-05	0 0E+00
91203 Naphthalene	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 985-02	7 32 O	52	519 15	749 03	12,000	3 16-06	0 OE+00
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 11 1 + 00	1 64E-07	4 00E-09	3 K	560 26	754 03	10,373	0 0E+00	1 4E-01
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	3 12	417 60	630.30	8,660 15,000	100 tu	200400
95487 Z-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	8	464 19	697 60	10,800	00110	1 85-04
9550 1,2-Diamorabenzene 95578 2-Chlomphanol	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7.79E-02	1 90E-03	52	453 57	705 00	9,700	0 0E+00	2 05-01
95954 2,4,5-Trichlorophenol	1 60E+03	2915-02	7 035-06	2 20E+04	1 50E-02	3 90 5-04	52	447 53	675 00	9,572	0 0E+00	1 8E-02
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60 5-06	2.0E+03	9 845-04	4 34F-06	8 8	526 15	759 13	13,000	00+300	3 55-01
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23 E-01	7 88F-03	8 K	483 95	719 00	10,566	000	2 OE-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2.76E-03	3 52	418.31	636.00	0,0	00+00	00+00
103679 Z.4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	22	484 13	707 60	11 329	00+100	20100
106457 1 4-Dichlombonsons	3 89E+02	7 69 5-02	8 44E-06	185E+02	3 14E-01	7 66E-03	26	411 52	616 20	8,525	000+00	7 OE+00
106478 p-Chomanilina	6 17 5+02	6 90E-02	7 90E-06	7 38E+01	9 965-02	2 43E-03	52	447 21	684 75	9,271	00+300	8 0E-01
107062 1.2-Dichloroethane	1 745+01	1 04E-01	0 000	5 30E+03	1 36E-05	3 32E-07	52	503 65	754.00	11,689	0 0E+00	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20F-06	0 52E+U3	9 UTE-02	9 78E-04	8 8	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61F+02	2 10E-02	7 245 02	3 8	345 65	519 13	7,800	0.0€+00	2 0E-01
108883 Toluene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03	9 %	382.70	617 05	8,523	005+00	7 0E+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 715-03	3 %	263 76 404 87	63 70	068,	001100	4 0E-01
108952 Phenol	2 88E+01		9 10E-06	8 28E+04	1 63E-05	3 98E-07	25 25	455 02	694 20	10.930	00+400	2 UE-02
111444 Bis(2-chloroethyd)ether	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	52	451 15	629 79	0,920	3 35-04	204
117817 Ris/2-ath/dhex-d/rehthalete	2 145+03	1 155-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	25	674 43	942 94	14,000	000+00	2 1F-02
117840 Dimocral outbalate	1 31E+07	3 51 5 62	3 555 06	3 40E-01	4 18E-06	1 02E-07	52	657 15	806 00	15,999	4 0E-06	00+00
118741 Hexachlorobenzene	5 50F+04	5.425-02	3.30E-00	2 DUE-02	2 /4E-03	6 68E-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
120127 Anthracene	2 95E+04	3 245-02	7 74E-06	4 34F-02	3.41E-02 2.67E-03	1 32E-03	52 5	582 55	825 00	14,447	4 6E-04	0 0E+00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00F+02	5.875-03	4.200.00	52 2	615 18	873 00	13,121	0 OE+00	1 1E+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3.17F-06	3 %	480 13	725 00	10,471	0000	2 0E-01
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27 E-08	3 %	590.00	/UG  /	12,487	0 01 +00	1 15-02
124481 Chlorodibromomethane	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04	2 23	416 14	678.20	9.40	2 H 2	50400
127 184   Birachioroethytene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	52	394 40	620 20	8,288	5 85-07	0.05+00
156592 cis-1,2-Dichloroethylene	1 USE+US	2 /2E-02	7 24E-06	135E-01	4 51E-04	1 10E-05	52	667 95	936 00	14,370	0 0E+00	115.01
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 195.05	3 50E+03	16/E-01	4 07E-03	52	333 65	544 00	7,192	0 05 +00	3 5E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 665-06	2.20F-05	6.56E-05	9 395-03	8 8	320 85	516 50	6,717	0 OE+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	115.00	0 K	715.00	1078 24 059 27	17,000	2 1 2 2	0.05+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 61E-05	52	655 95	905 00	12,000	2 1E-04	00=+00
207009 Benzo(K)nuoraninene 218010 Champan	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07	52	753 15	1019 70	16,000	2 1F-05	00+110
309002 Aldrin	3 305+03	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05	52	714 15	979 00	16,455	2 1E-06	0 0E+00
319846 alpha-HCH (alpha-BHC)	1 23 1 + 103	1 425-02	4 85E-US	1 80E-01	6 97E-03	1 70E-04	52	603 01	839 37	13,000	4 9E-03	0 OE+00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7.34F-06	2 40E-03	4 35E-04	1 06E-05	52	596 55	839 36	13,000	1 8E-03	0 0E+00
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26F-01	1 775.02	8 8	596 55	839.36	13,000	5 3E-04	0 0E+00
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7.46E-07	3 X	569.13	387.38	00,5	3 7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamine		5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06	3 5	209 60	746.87	12,938	2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0 OE+00
1024573 Replacator epoxide	8 32E+04	1 32E-02		2 00E-01	3 90E-04	9 51 E-06	\$	613 96	848 76	13,000	2 65 03	20+100
/4359/o mercury (elemental)	5 20E+01	3 07E-02		5 62E-02	4 67E-01	1 14E-02	52	629 88	1750 00	14 127	0.05+00	3 05-00
11096825 Amolor 1260 (PCB-1260)	2 5/E+05	1 165-02		7 40E-01	2 46E-04	6 00E-06	25	657 15	873 31	14,000	3 2E-04	00+400
11097691 Aroctor 1254 (PCB-1254)	2 00E+05	1 56F-02	4 32E-06 5 00E-06	8 00E-02	189E-01	4 60E-03	52	402 50	539 37	19 000	1 OE-04	00+300
12674112 Arodor 1016 (PCB-1016)	3 305+04	2 22E-02	5 42E-06	4 20E-01	1 19F-02	2 00E-03	52	377 50	512.27	19,000	1 0E-04	0 OE+00
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02		3 40E-01	2 13E-02	5 20E-04	2 2	345.50	475 22	18,000	1 05-04	00=+00
							ļ	<b>&gt;</b>	74 40	200	- NE C4	

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

		ENTER	User-defined	soil vapor	permeability, k <sub>v</sub>	(cm²)										
					8	•	_	1								
		ENTER	stratum A	soil type	(used to estimate soil vapor	permeability)	ā	5	ENTER	Stratum C	soil water-filled	porosity,	ບ <b>ູ</b>	(cm³/cm³)	0.3	
		ENTER		SCS	soil type directly above	water table	ď	<b>1</b>	ENTER	Stratum C	soil total	porosity.	ບຼ	(unitless)	0.43	
		ENTER	e e	stratum	directly above water table,	(Enter A, B, or C)	c		ENTER	Stratum C	soll dry	bulk density,	હ	(g/cm³)	1.7	
Opin	Julia Julia	ENTER Lwt (cell D28)	Thickness	stratum C,	(Enter value or 0) hc	(cm)	1066.8		ENTER	Stratum B	soil water-filled	porosity,	8 <sup>*</sup>	(cm³/cm³)	0.27	7
Chemical	Calibon terracinoride	NTER ENTER ENTER Totals must add up to value of L <sub>w1</sub> (cell D28)	Thickness	stratum B.	(Enter value or 0) (Enter value or 0) h <sub>s</sub>	(cm)	3048		ENTER	Stratum B	soil total	porosity,	<b>9</b> L	(unitless)	0.42	
		ENTER Totals mu	Duckness	of soil	stratum A, h <sub>A</sub>	(cm)	701.04		ENTER	Stratum B	soil dry	bulk density,	<b>"</b> &	(g/cm³)	17	
	_	ENTER	Denth	below grade	to water table,	(cm)	2072.84		ENTER	Stratum A	soil water-filled	porosity.	<b>ξ</b> ,30	(cm³/cm³)	0.2	
ENTER Initial groundwater conc , Cw (µg/L)	100	ENTER Depth	below grade	of enclosed	space floor, Lr	(cm)	ą.		ENTER	_	soil total		€	(unitless)	0.43	21.2
Chemical CAS No (numbers only, no dashes)	2000	ENTER	Average soil/	groundwater	temperature, T <sub>s</sub>	(၁)	4.		ENTER	Stratum A	soil dry	bulk density,	<b>√</b> &	(g/cm³)	1.5	,

1 / 0.43	ENTER	Indoor	rate,	<b>E</b>	(1fh)	0.45								
					)		ER	nazard	nt for	ogens,	œ	988)		
0.47	ENTER	Floor-wall	widt	*	(cm)	0 1		Target hazard				(untless)	1	
0.44	ENTER	Enclosed	height,	Ŧ,	(cm)	488	ENTER	Target				(unitless)	1 05-06	
1,	ENTER	space	width,	W	(cm)	961	ENTER		Exposure		Ħ	(days/yr)	350	
70	ENTER Enclosed	space	length,	٦	(cm)	961	ENTER		Exposure			(yrs)	30	
043	ENTER	Soil-bidg	differential,	٩V	(g/cm-s²)	40	ENTER	Averaging	time for	noncarcinogens	ATNC	(yrs)	30	
0	ENTER Enclosed	space	thickness,	Loreck	(cm)	15	ENTER	Averaging	time for	carcinogens,	ΑT <sub>C</sub>	(yrs)	70	

Used to calculate risk-based groundwater concentration

#### 2 of 7

CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)	0 0E+00
Unit risk factor, URF (µg/m³)-1	1 SE-05
Pure component water solubility, S S (mg/L)	7 93E+02
Organic carbon partition coefficient, Ke (cm³/g)	174E+02
Critical temperature, T <sub>c</sub> (*K)	556 60
Normal boiling point, T <sub>B</sub>	349 90
Enthalpy of vaponzation at the normal bouling point, $\Delta H_{\nu,b}$ (cal/mol)	7,127
Henry's law constant reference temperature, T <sub>R</sub>	25
Henry's law constant at reference temperature, H	3 05E-02
Ouffusivity in water, Dw (cm²/s)	8.80E-06
Duffusivity in air, D <sub>e</sub> (cm²/s)	7 80E-02

	Source	Stratum A	Stratum B	Stratum C	Stratum A	Stratum A	Stratum A	Stratum A	Thickness of	Total	Air-filled	Water-filled	Floor-
Exposure duration,	building separation,	<u> </u>	<u> </u>	air-filled porosity,	total fluid saturation,	intrinsic permeability,	relative air permeability,	effective vapor permeability,	capillary zone,	capillary zone,	capillary zone,	capitlary zone,	seam perimeter,
1 (880)	( <del>س</del> )	e,^A (cm³/cm³)	e, B (cm³/cm³)	e, cm³/cm³)	S <sub>w</sub>	(cm <sup>2</sup> )	ν. γ. (cm²)	čm <sup>2</sup> )	L (H)	n <sub>ez</sub>	θ, cm <sup>3</sup> /cm <sup>3</sup> )	6wa (cm <sup>3</sup> /cm <sup>3</sup> )	Xorack
9 46E+08	2(	0 230	0 150	0 130	0.419	9 36E-10	0 746	6 98E-10	17.05	0.43	0 136	0 294	3,844
	Area of							Stratum	Stratum	Stratum	Capillary	Total	
i	enclosed	Crack-	Crack	Enthalpy of	Henry's law	Henry's law	Vapor	۷ .	œ	ပ	Zone	overall	
Bidg	space	to-total	depth below	vaporization at	constant at ave, groundwater	constant at ave aroundwater	viscosity at	effective	effective	effective	effective	effective	Diffusion
rate,		ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient,	coefficient,	ength,
O. building	AB	E	Zarack	ΔH,τs	H <sub>TS</sub>	H"Ts	HT3	F O	ູ້	<u>۔</u> ا	O		۳.
(cm <sub>3</sub> /s)	(cm <sup>2</sup> )	(unitless)	(cm)	(cal/mol)	(atm-m³/mol)	(unitless)	(g/cm-s)	(cm²/s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm²/s)	(cm <sup>2</sup> /s)	(cm)
5 63E+04	9 24E+05	4 16E-04	15	7,798	2 02E-02	8 53E-01	177E-04	3 16E-03	7 99E-04	4 74E-04	5 46E-04	7 23E-04	2057 64
						Exponent of	Infinite						
			Average	Crack		equivalent	source	Infinite	2.5				
Coliverior	POINCE I	Crack	flow rate	diffusion	Area of	Daziet	affentiation	appos pply	, c	Reference			
fength,	conc	radius,	into bldg	coefficient,	crack,	number,	coefficient,	COUC	factor	conc,			
<b>ئ</b> ـ	Captros	Consider	ď	Done	Agrack	exp(Pe <sup>f</sup> )	ಶ	Chuitding	URF	RfC			
(cm)	(µg/m³)	(cm)	(cm <sup>3</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> )	(unitless)	(unitiess)	( <sub>г</sub> ш/вн)	(mg/m <sub>3</sub> )	(mg/m <sub>3</sub> )			
4.	8 535403	╽┟	6 87E 01	3 185 03	COT 11 PA C	2 775403	80 H88 6	9 245.02	1 55 05	VIV			
2	8 555+02	⊅o	66/12-01	3 16 - 03	3 84 = + 0.2	27.403	3 881-05	337E-03	125-05	¥.			

RISK-BASE	RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	ER CONCENTR	VATION CALC	ULATIONS	INCREMENTAL	INCREMENTAL RISK CALCULATIONS:
Indoor exposure roundwater conc , cardinogen (ug/L)	Indoor exposure groundwater conc , noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc , (ug/L)	Pure component water sotubility, S (μg/L)	Final indoor exposure groundwater conc, (ug/L)	Incremental nsk from vapor intrusion to indoor air, carcinogen (untless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitiess)
4 91E+01	۸N	4 91E+01	4 91E+01 7 93E+05	4 91E+01	ΦN	NA

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

									7	U	1 4	L	L 4	Ċ	) C	,																																							
																		-	Кетегелсе	, conc	(mg/m³)		004100	00m+00	00400	00+1100	0.00	00+400	00+00	00+00	145+01	3.5E-01	0 0E+00	0 0E+00	3 5E-01	0 0E+00	1 05+00	100 100 100 100 100 100 100 100 100 100	0.05+00	00E+00	5 0E-03	0 0E+00	3 0E+00	7 0E-01	0 0E+00	0 0E+00	5 0E-01	0.05+00	2 OE +00	00410	4 OF-03	00+00	0 0E+00	0 0E+00	2 1E-01
																		į	risk	ומנות. ומנות	(µg/m³) ¹		9 7E-05	50-11-7	2 15-03	2 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	- с 10 с 10 с 10 с	3 75-04	3 7E-04	4 6E-03	0 OF+00	00000	2 3E-05	4 0E-06	0 0E+00	8 3E-06	0 0E+00	001	8 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	9.7E-05	00+300	8 4E-05	4 7E-07	0 0E+00	1 16-06	8E-05	0 0E+00	505-05	5000	2 7F-07	004400	1 6E-05	1 7E-06	5.8E-05	0 0E+00
																ì	Enthalpy of	vaporization at	me normal	AL POINT,	(cal/mol)		11,000	15,000	000 41	7 127	15,000	13,000	13,000	13,000	10,000	6,955	6,988	9.510	10,346	7,342	7,136	12,000	4,000	13,000	5.714	5,250	6,706	6,391	9,479	2,000	6,895	6,247	3,000	10,931	7.590	8,322	7,505	8,996	12,155
														1			•	-	Critical	T.	Š		720 75	909 Z/	990 41	556 60	1004 79	885 73	839.36	842 25	751 00	508 10	536 40	695 00	563 05	562 16	545 00	900 200	863 77	860.38	467 00	432 00	510 00	552 00	00 969	585 85	523 00	576 05	040 01	745 00	572.00	602 00	544 20	661 15	803 15
																	Mormal	in direct	Bruing Grand	Ĭ	E		248 75	605 28	743 24	349.90	708 15	624 24	596 55	613 32	720 00	329 20	334 32	458 00	390 88	353 24	347.24	551.02	639 90	636 44	276 71	259 25	313 00	319 00	422 35	363 15	330 55	304 75	9000	488.35	369.53	386 15	36036	419 60	550 54
																7	nemy s	raforana	temperature	, L	ະ (ວິ	1	2 K	2, 2,	3 5	25.	3 15	25	25	25	25	52	25	25	25	25	9 K	54 K	3 50	25	25	25	25	25	25	25	25	25	67	25.	3 50	: <b>5</b> 2	25	52	52
SE		Mean Grain Diameter (cm)	0.0092	010 0	020	0 0 0	0 025	0 0 0 0	0 0046	0 0039	0 0056	0 011	0 030		un Tahle		s gallon	octopos de			(atm-m³/mol)	L	8 10E-06	4 44 15-07	1475-08	3 05E-02	3346-06	4 85E-05	1 40E-05	1 51E-05	1 54E-06	3 88E-05	3 66E-03	3 88 2-03	8 805-06	5 56E-03	1 /2E-02 7 51E-06	1 58F-05	4 00E-06	2 10E-05	6 24E-03	2.71E-02	2 19E-03	3 02E-02	5 34 E-04	1 605-03	5.615-03	2615-02	20-11-15-C	8 635-06	2 805-03	9 125-04	1 03E-02	3 44E-04	1 55E-04
VLOOKUP TABLES	6 (cm <sup>3</sup> (-m <sup>3</sup> )	١,	9000	0.035	7900	0.045	0 100	0 100	0 034	0 0 0 0	0 089	290 0	0 065		Chemical Properties Locking Table			Hanny	law constant	Ì	(unitless)	1000	3 32E-04 4 63E-05	1825-05	6 03E-07	1 25E+00	137E-04	1 99E-03	5 74E-04	6 19E-04	6 31E-05	1 59E-03	1 50E-01	1 59E-01	3 61E-04	2 28E-01	7 USE-01	6 48F-04	1 64E-04	8 61E-04	2 56E-01	111E+00	8 98E-02	1 24E+00	2 19E-02	6 56E-02	2 30E-01	1 0/11+00	1115400	2 72E-04	115E-01	3 74E-02	4 22E-01	141E-02	6 36E-03
	o (cm <sup>3</sup> /cm <sup>3</sup> )	of cm /cm )	0.00	* 6	5 5	0.43	0.38	0.39	046	0.26	0 43	0 45	0.41		Chemic	Q.	Sur Common	water	solubility	တ	(mg/L)	00 101 0	1 62F-03	2 79E+03	2 49E-03	7 93E+02	9 40E-03	5 60E-02	6 80E+00	1 95E-01	3 50E+03	1 00E+06	7 92E+03	5 00E+01	7 40E+04	1,000	2 50E-01	4 50E-02	9 00E-02	1 20E-01	1 52E+04	2 76E+03	1 30E+04	1 19E+03	3,10E+03	6 74E+03	2000-403	2 25E+U3	1 805+00	1 20E+04	2 80E+03	4 42E+03	1 10€+03	2 97E+03	4 24E+00
	9 (	(88)	0 003	0.25	0.561	0 627	0 187	0 324	0.270	0 083	0.187	0 291	0 471					Difficeroity		۵	(cm <sup>2</sup> /s)	90 130 1	90E-06	90-E-06		8 80E-06	90-100 6	4 37E-06	7 34E-06	4 74E-06	7 97E-06	1 14E-05	1 00E-05	6 80E-06	9 305-06	90-109	4 74F-06	4 46E-06		5 87E-06	1 21E-05	1 23E-06	1 17E-05	1 00E-05	1 03E-05	1 06E-05	0000	- 04E-05	7.2111-08	6.76E-06	8 73E-06	8 80E-06	9 10E-06	7 90E-06	7 69E-06
	<u>.</u>		9 6	- 6	200	2.68	1 23	1 48	1 37	1 09	1 23	141	189					Diffricivity	in air.	៤	(cm <sup>2</sup> /s)	4 976 00	4 30E-02	2 73E-02	2 02E-02	7 80E-02	5 10E-02	1 18E-02	1 42E-02	1 25E-02	5 36E-02	1 24E-01	1 04E-01	2 50E-03	8 00E-02	0 00E-02	1 25F-02	1.56E-02	1 69E-02	1.44E-02	7 28E-02	1 06E-01	101E-01	1.04E-01	1 49E-02	2 98E-02	70-27-7	9 00E-02	1 R1E-02	6 23E-02	7 82E-02	7 80E-02	7 90E-02	7 10E-02	4 21E-02
	χ, (Ε/) τ	8	920	920	0.124	0 145	0 027	0 059	0 0 0 16	0 005	0 0 0 0	0 020	0 075			Omanic	carbon	nartition	coefficient	Υ.	(cm <sup>3</sup> /g)	20.352.0	1 02E+06	1 00E-02	3 80E+06	1,74E+02	3 98E+05	1 20E+05	1 07E+03	2 14E+04	6 00E-01	5 75E-01	3 98E+01	1 78E+03	6 92E+00	1 400 +01	1 23 = +04	9 77E+04	1 00E+06	4 47E+06	1 05E+01	186E+01	117E+01	4 57E+01	8 71E+01	5 50E+01	3 100-101	1 415+06	2 00E+05	4 68E+01	4 37E+01	5 01 1 + 01	1 66E+02	9 33E+01	7 08E+03
	K (cm(h)	(c) (c) (c) (c) (c) (c) (c) (c) (c) (c)	900	104	14.59	2970	012	131	0.25	0.02	200	0.45	4 42								Chemical	<u>.</u>	50328 Benzo(a)pyrene	51285 2,4-Dinitrophenol	53703 Dibenz(a,h)anthracene	56235 Carbon tetrachlonde	Benz(a)anthracene	ordane	gamma-HCH (Lindane)	Dietdrin	Benzoic Acid	Acetone	Chloraform	Hexachloroethane	Butanol	Delizelle 1.1.1-Trickforpothone	rin	hoxychlor		10	74839 Methyl bromide	'5014 Vinyl chloride (chloroethene)	75092 Methylene chloride	75150 Carbon disuffide	motorm	752/4 bromodicnioromethane	75954 4 4-Dichlosochidoso	tachlor	77474 Hexachlorovolopentadiene	horone	78875 1,2-Dichloropropane	79005 1,1,2-Trichloroethane	79016 Trichloroethylene	9345 1,1,2,2-Tetrachloroethane	83329 Acenaphthene
	S.C.S. Soil Tune	200 Soll 1798	o 5	ب أ	S	်တ	သင	SCL	N.	Sic	SICL	등 :	St.								CAS No	50203	50328 Ben	51285 2,4-	53703 Dib	56235 Car	56553 Ben	57749 Chlordane		60571 Diet	65850 Ben	67641 Ace	67663 Chic	67721 Hex	71363 But	71556 1 1	72208 Endrin	72435 Methoxychlor	72548 DDD	72559 DDE	74839 Met	75014 Vin)	75092 Met	75150 Car	moromora 26261	75373 1 1	75354 1 1	76448 Hentachlor	77474 Hex	78591 Isophorone	78875 1,2-	79005 1,1,	79016 Tric	79345 1,1,	83329 ACE

84682 Diethyrothelete	0000				VLOOKUP TABLES							
84742 Den-buth obthalate	3 395+04	2 30E-02	5 35E-06	1 08E+03	185E-05	4 51E-07	8	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 Butyl benzyl phthalate	5 75F+04	1.74F-02	4 835-06	2 505±00	5 80E-08	9 39E-10	1 22	613 15	798 67	14,751	0.00	3 SE-01
86306 N-Nitrosodiphenylamine	1 29E+03	3.12E-02	6.355-06	3.516+01	2055-03	1 26E-06	8 8	650 60	839 68	13,000	0 0E+00	7 0E-01
86737 Fluorene	1 38E+04	3 63E-02	7.885-06	1 98 1-10	2 615.03	5 00E-06	8 8	632.28	890 45	13,000	1 4E-06	0 0 0
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 57 E-08	Q K	5/044	20 00	12,666	24 14 14 14 14 14 14 14 14 14 14 14 14 14	1460
87683 Hexachloro-1,3-butadiene	537E+04	5 61E-02	6 16E-06	3 23 E+00	334501	8 15F-03	3 %	486 15	738.00	1000	200	00+100
87885 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	22	582 15	813.20	2,500	2 4E-05	00+40
91203 Nanthaland	3 81E+02		6 25E-06	8 00E+02	3 19E-04	7 785-06	52	519 15	749 03	12,000	3 16-06	00+100
91941 3 3-Dichlombenzidine	2 UNE+U3	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	1 4E-01
95476 o-Xvene	3 635+02	8 70E-02	40000	3 115+00	1 645-07	4 00E-09	22	560 26	754 03	13,000	135-04	0 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40F-02	8.30F-05	2 60F±04	Z 13E-03 A 92E-05	5 20E-03	52	417 60	630 30	8,661	0 0E+00	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79F-02	1 20E-06	52	464 19 453 53	697 60	10,800	0 0E+00	1 8E-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 605-02	3 905-04	9 %	453 5/	705,00	9,700	0000	2 00 0
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1785-04	4 34E-06	2 5	447 33 526 15	759 13	43,000	00000	1 8E-02
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	25	483 95	719 00	10.566	001100	ָבְּבְּיבְּבְּיבְּיבְּיבְּיבְּיבְּיבְּיבְ
100474 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	25	409 34	617 20	8,501	000-00	1 0E+00
105879 2 4-Dimothidahana	7.000	7 105-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03	52	418 31	636 00	8,737	0.000	1 0E+00
106423 p-Xviens	2 USE+02	5 84E-02	8 69E-06	7 87E+03		2 00E-06		484 13	707 60	11,329	0 0E+00	7 0E-02
106467 1,4-Dichlorobenzene	6 17F+02	6 90F-02	7 90E-06	7 385±02	3 145-01	7 66E-03	56	411 52	616 20		0 0E+00	7 0E+00
	6.61E+01	4 83E-02	1015-05	5 20E+01	30E-07	2 43E-03	52	447 21	684 75		0 0E+00	8 0E-01
107062 1,2-Dichloroethane	174E+01	1 04E-01	9 90 1 - 06		1 30E-03	3 32E-07	52	503 65	754 00	11,689	0 0E+00	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00F+04	2 10E-02	40000		306 65	561 00		2 6E-05	0 0E+00
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	161F+02	3.015.01	7 240 02		345 55	519.13		0.00	2 0E-01
	1 82E+02	8 70E-02	8 605-06	5 26E+02	2 72E-01	5 63E-03		4   2 2 /	01/00		0.05+00	7 0E+00
	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3.715-03	2 %	303 70 404 87	391/9	7,930	0.0E+00	4 0E-01
	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3.98E-07		455.02	694 20		001100	2 UE-02
	155E+01	6 92E-02	7 53E-06	1 72E+04	7 385-04	1 80E-05		451 15	659 79		2 25 04	2 1 = +00
11529/ Endosulfan 117917 Bw/2 othuhowalla butata	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59 6-04	1 12E-05		674 43	942.94		00F+00	2 1F-02
117840 Distacted obtained	1515+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 025-07		657 15	806 00		4 0E-06	00+300
118741 Havachlorobanzana	8 32E+U/	1515-02	3 586-06	2 00E-02	2 74E-03	6 68E-05		704 09	862 22		0 0E+00	7 0E-02
120127 Anthracene	2 95 104	3 24E-02	2 2 E-06	6 20E+00	5 415-02	1 32E-03		582 55	825.00		4 6E-04	0 0E+00
	1 78E+03	3 00E-02	8 235-06	3.005+02	5 82E-03	6515-05		615 18	873 00		0 0E+00	1 1E+00
120832 2,4-Dichlarophenal	1 47E+02	3 46E-02		4 50F+03	1.30F-04	3 175 08		486 15	725 00		0 0E+00	2 0E-01
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01		2 70E+02	3.80F-06	90-11-0	6 4	482.15	708 17		0 0E+00	1 1E-02
	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 215-02	7 835-04		390 00 446 44	814 00	13,467		0 0E+00
127184 Tetrachioroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1.845-02	6 K	304.40	07.879			9 H + 0
	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 10 6-05		667.95	936 AN	44 320	0 SE-U/	00=+00
	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00		005+00	2 56.03
193396 Indens-1,2-2,000000000000000000000000000000000	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3 85E-01	9 39E-03		320 85	516 50		0.000	7 OF-02
	3 47 E+06	3 36E 02	30 292 30	2 20E-05	6 56E-05	1 60E-06		809 15	1078.24		2 1E-04	0 0E+00
	1 075 +05	3 0 2 5 . 0 2	300000	1 50E-03	4 55E-03	1116-04		715 90	969 27		2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2.26F-02	5.568-06	8 00E-01	3 400 06	1615-05		655 95	905 00		0 0E+00	1 4E-01
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 885-03	0.285-0/	3 5	753 15	1019 70			0 0E+00
309002 Aldrin	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 705-04		603.01	979.00			0 0 0 0
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	106E-05		596.55	639 3/ 830 36			00=+00
319857 beta-HCH (beta-BHC)		1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596.55	839.36	200	1 85-03	00000
542/56 1,3-Dichloropropene		6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	587.38			0 0E+001
621647 N-Nitrosodi-o-mondamine	9 40E+01	3 27E-02		1 82E+02	3 06E-05	7 46E-07		558 00	770 00		3 9E-04	00000
1024573 Heptachlor epoxide	8 32F±04	1 32E-02	4 235 06	9 695+03	9 235-05	2 25E-06		509 60	746.87	11,000	2 0E-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02		5.625-03	3 90E-04	9515-06	52		848 76			0 0E+00
8001352 Toxaphene		1 16E-02		7 40E-01	2.46E-04	1 14E-02	52	62988 1	1750 00	_		3 0E-04
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 605-03	2 4	65/ 15 402 50	8/331			0 OE +00
11097691 Arador 1254 (PCB-1254)	2 00E+05	1 56E-02		5 70E-02	8 20E-02	2 00E-03	25 3	377.50	512.27	900.61	40 10	00=00
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	32	340 50	475 22	18 000		00000
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02		3 40E-01	2 13E-02	5 20E-04	25 3	200	482 20	18,000		0 0 0 0 0 0
												-

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

		ENTER User-defined stratum A soil vapor permeability, k, (cm²)
		8 9
		ENTER Soil stratum A SCS Soil yea (used to estimate soil vapor permeability) SI ENTER Stratum C soil water-filled porosity, eve
		SCS soll type directly above water table S ENTER Stratum C soil total porosity, n <sup>c</sup>
		Soil stratum drectly above water table, (Enter A, B, or C) C C C ENTER Stratum C soil dry bulk density, bulk density, bulk density, p. c.
	thane	ENTER Thickness of soil stratum C, (Enter value or 0) hc (cm) 1066 8 ENTER Stratum B soil water-filled porosity, g, g, g, g, g, g, g, g, g, g, g, g, g, g
Chemical	Bromodichloromethane	Totals must add up to value of L <sub>wr</sub> (cell D28) Thickness Thickness Thickness of soil stratum B, stratum C, and Lwr (enter value of 0) (Enter value of Lwr (cm)  Tot 04 304.8 1066.8  INTER ENTER ENTER ENTER attum B Stratum B Stratum B Stratum B oil dry soil total soil water-filt clensify, porosity, possity, possity, be a general control of the contro
		ENTER Totals mu Thickness of soil statum A, (cm)  701.04  ENTER Stratum B soit dry bulk density.
	_	Depth Depth Delow grade to water table, Lwr (cm) (cm) 2072 64 ENTER Stratum A soil water-filled porosity, 6 %
ENTER Initial groundwater conc., C <sub>w</sub> (µg/L)	4 1516	ENTER Depth below grade to bottom of enclosed space floor, Lr (cm) 15 15 ENTER Stratum A soil total porosity,
ENTER Chemical CAS No (numbers only, no dashes)	75274	Average soul/ groundwater temperature, Ts (°C) 16 16 Stratum A soil dry bulk density, Pa

0 43	
L_I	
17 ENTER	
0 27 ENTER	4:::
0 42 ENTER	
17 ENTER Enclosed	
0.2 ENTER Enclosed	
043 ENTER	
15 ENTER Enclosed	4444

ENTER Stratum C soil dry bulk density, Po<sup>C</sup> (g/cm³)

ENTER Stratum B soil dry bulk density, Pb (g/cm³)

ENTER Stratum A soul dry bulk density,  $\rho_b^A$ (g/cm³)

(cm<sub>3</sub>/cm<sub>3</sub>)

ENTER         ENTER <th< th=""><th>2</th><th>2</th><th>70</th><th></th><th>740</th><th>777</th><th>-</th><th>2</th></th<>	2	2	70		740	777	-	2
Enclosed	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	
pressure floor floor space seam crack differential, length, width, height, width, ΔP L <sub>B</sub> W <sub>B</sub> H <sub>B</sub> w (g/cm·s²) (cm) (cm) (cm) (cm)	Enclosed	opid lico	Enclosed	Enclosed	T Second	llew-root	acopal	
differential, length, width, height, width, ΔP  ΔP  Lg W <sub>B</sub> H <sub>B</sub> w  (g/cm·s²) (cm) (cm) (cm) (cm)	floor	bressure	floor	floor	Space	seam crack	ar exchange	
ΔP L <sub>B</sub> W <sub>B</sub> H <sub>B</sub> w (cm) (cm) (cm) (cm) (cm) (cm)	thickness,	differential,	length,	width,	height,	width,	rate,	
(g/cm-s²) (cm) (cm) (cm) (cm)	Lorect	ΔP	ڻ_ ا	W	Ť	>	æ	
961	(cm)	(g/cm-s <sub>2</sub> )	(cm)	(cm)	(cm)	(cm)	(1/h)	
961								
	15	40	961	961	488	0.1	0.45	

0.1	ENTER	Target hazard	quotient for	noncardinogens,	チ	(nuttless)		-	Jsed to calculate risk-based
488	ENTER	Target	risk for	carcinogens,	Œ	(unitless)		1 0E-06	Used to calcu
961	ENTER		Exposure	frequency,	ш	(days/yr)		350	•
961	ENTER		Exposure	duration,		(yrs)		8	
40	ENTER	Averaging	time for	noncarcinogens,	AT <sub>NC</sub>	(yrs)	:	30	
15	ENTER	Averaging	time for	carcinogens,	ATc	(yrs)		7.0	

groundwater concentration

## CHEMICAL PROPERTIES SHEET

Reference conc., RfC (mg/m³)	0 0E+00
Unit nsk factor, URF (µg/m³) ¹	1 8E-05
Pure component water solubility, S S (mg/L)	6 74E+03
Organic carbon partition coefficient, K <sub>ee</sub> (cm <sup>3</sup> /g)	5 50E+01
Critical temperature, T <sub>c</sub> (*K)	585.85
Normal bouling point, T <sub>B</sub>	363 15
Enthalpy of vaponzation at the normal bouling point, $\Delta H_{v,b}$ (cal/mol)	7,000
Henry's law constant reference temperature, T <sub>R</sub>	25
Henry's law constant at reference temperature, H	1 60E-03
Diffusivity in water, D., (cm²/s)	1 06E-05
Diffusivity in air, D. (cm²(s)	2.98E-02

	7041230	
Floor-wall seam perimeter,	3,844 Diffusion path length,	(cm) 2057 64
Water-filled porosity in capillary zone, $\theta_w = (cm^3) (cm^3)$	0 294 Total overall effective diffusion coefficient, neef	(cm <sup>2</sup> /s)
Air-filled porosity in capillary zone, $\theta_{a,cz}$ $(cm^3/cm^3)$	Capillary zone effective diffusion coefficient,	(cm <sup>2</sup> /s)
Total porosity in capillary zone, nez (cm <sup>3</sup> /cm <sup>3</sup> ).	Stratum C effective diffusion coefficient,	Cm <sup>2</sup> /s)  2.04E-04  Reference conc. RfC (mg/m²)
Thickness of capillary zone, La	Stratum B effective diffusion coefficient,	Unit risk factor, URF (ug/m³) 1
Stratum A soll soll effective vapor permeability.	Stratum A A effective diffusion coefficient,	(com²/s) (cm²/s) (21E-03 Infinite source bldg conc. Coulding (µg/m³)
Stratum A soil relative air permeability, kn (cm²)	Vapor viscosity at ave soil temperature,	μτs (g/cm-s) (g/cm-s) (g/cm-s) (177E-04 Infinite source indoor attenuation coefficient, α α α α α α α α α α α α α α α α α α α
Stratum A soil intrinsic permeability, k	9.36E-10 Henry's law constant at ave, groundwater temperature,	(unitiess) 4 49E-02 Exponent of equivalent foundation Paclet number, exp(Pe <sup>5</sup> ) (unitiess)
Stratum A effective total fluid saturation, S <sub>la</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0.419 Henry's law constant at ave, groundwater temperature,	Hrs (atm-m³/mol) 1 07E-03 Area of crack, Acres (cm²)
Stratum C soil air-filled porosity, $\theta_{\mathbf{a}}^{\mathbf{c}}$ $(\mathbf{cn}^{3}/\mathbf{cm}^{3})$	Enthalpy of suppression at ave, groundwater temperature,	Crack effective diffusion coefficient, Drack (cm²/s)
Stratum B soil air-filled porosity, $\theta_{\bullet}^{B}$ (cm $^{3}$ /cm <sup>3</sup> )		Com)  15  Average vapor flow rate into bldg ,  Qual (cm²/s)
Stratum A soil air-filled porosity, $\theta_{\mathbf{a}}^{A}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230 Crack- to-total area ratio,	7 (unitless) 4 16E-04   radius, radius, (cm)
Source- building separation, L <sub>T</sub>	Area of enclosed space below grade,	A <sub>6</sub> (cm <sup>2</sup> ) 9 24E+05 Source vapor conc , C <sub>cource</sub> (μg/m <sup>3</sup> )
Exposure duration,	9 46E+08 Bidg ventilation rate,	Convection path length, Lp (cm)

(µg/L) (µg/L) (µg/L) (unitless)	Indoor Indoor Risk-based Pure Final exposure exposure indoor component indoor component indoor concource, groundwater exposure conc., groundwater solubility, groundwater caranogen noncarcinogen conc., s. conc.	Risk-based indoor exposure groundwater conc.	Pure component water sotubility,	Final Indoor exposure groundwater conc.	INCREMENTAL Incremental risk from vapor intrusion to indoor air,	INCKEMENTAL RISK CALCULATIONS incremental Hazard risk from quotient vapor from vapor intusion to intrusion to intrusion to intrusion to carchonen nonvarrinodae
	(µg/L)	(hg/L)	(µ9/L)	(μg/L)	(unitless)	(untless)

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

Mean Grain Diameter (cm)

θ, (cm³/cm³)

6. (cm³/cm³)

Soil Properties Lookup Table N (unitless) M (unitless)

a (1/cm)

K. (cm/h)

SCS Soil Type

VLOOKUP TABLES

0 008 0.019 0 124 0 145 0 027 0 016 0 005
Diffusivity Diffu
(e) (ii)
2 63E+06 1 37E-02 4 95E-06 1 02E+06 4 30E-02 9 00E-06
2 73E-02 9
3 50E+06 Z 0ZE-0Z 5 18E-05 1 74E+02 7 80E-02 8 80E-06
3 98E+05 5 10E-02 9 00E-06
1.16E-02 4
4 1
1 24E-01
3 98E+01 1 04E-01 1 00E-05 1 78E+03 2 50E-03 6 80E-06
92E+00 8 00E-02 9
5 89E+01 8 80E-02 9 80E-06 1 10E+02 7 80E-06
1 25E-02 4
1 56E-02 4
1 00E + 05
7 28E-02 1
186E+01 106E-01 1,23E-06
- 01E-01
71E+01 149E-02 1
2 98E-02
7 42E-02 1
9 00E-02 1
1 12E-02 5
00E+05 161E-02 7
0 235-02
4 3/E+U1 / 82E-02 8 /3E-06 8 04E-06
7 905-02 9
7.10E-02 7
7 08E+03 4 21E-02 7 69E-06

6 of 7

84662 Districtor					VLOOKUP TABLES							
84742 Di-O-buty obtained	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0.05+00	2 8E+00
85687 Butyl benzyl phthalate	5 75F+04	1.30E-02-	7 88E-06	1125+01	3.85E-08	9 39E-10	52	613 15	798 67	14,751	0.0E+00	3 5E-01
86306 N-Nitrosodiphenylamine	1 29F+03	2 12E-02	4 93E-00	2 645 -00	5 1/E-05	1 26E-06	52	09 099	839 68	13,000	0 0E+00	7 0E-01
86737 Fluorene	1 385+04	3 63E-02	7.88F-06	1 98 1	2 645 03	5 00E-06	<b>8</b> 8	632 28	890 45	13,000	1 4E-06	0 0E+00
86748 Carbazote	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26F-07	0 3/E-U5	2 2	570 44	870 00	12,666	0.00	1 4E-01
87583 Hexachloro-1,3-butadiene	537E+04	5 61E-02	6 16E-06	3 23 5+00	3 346-01	8 15F-03	3 %	486 15	238 00	13,977	5 7E-06	0 0E+00
97.555 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	2 2	582 15	813.20	14 000	245-03	00=+00
91203 Nanhthalana	3 81E+02	3 185-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	52	519 15	749 03	12,000	3 16-06	000+00
91941 3.3-Dichlorobenzidha	7 24 5 + 0.3	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	25	491 14	748 40	10,373	0 0E+00	1 4E-01
95476 o-Xylene	3 635+02	8 70E-02	1 005-05	3 11E+00	1 64E-07 2 13E-01	4 00E-09	52	560 26	754 03	13,000	1 3E-04	0 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92 F-05	5 20E-03	52 8	417 60	630 30	8,661	0 00+00	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 905-03	Q H	464 19	09/69	10,800	00=+00	18E-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 605-02	3 90 5-04	8 5	447 53	705 00	9,700	00+100	2 0E-01
95954 2,4,5-Trichlorophenoi	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	22	526.15	759 13	9,572	00+400	1 8E-02
100414 Gittidenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	22	483 95	719.00	10.566	00+40	20000
100425 Shrana	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	25	409 34	617 20	8.501	0 0E+00	1.05+00
105679 2 4-Dimethylphones	2005,02	7 105-02	8 00E-06	3 10E+02	1135-01	2 76E-03	25	41831	636 00	8.737	0 OE+00	1 OF+00
106423 p-Xylene	3.895+02	3 84E-02 7 69E-02	8 695-06	7 87E+03	8 205-05	2 00E-06	52	484 13	707 60	11,329	0 0E+00	7 0E-02
106467 1,4-Dichlorobenzene	6 17E+02	6 905-02	7 905-06	7 385+02	5 T4E-U1	7 66E-03	56	411 52	616 20	8,525	0 0E+00	7 0E+00
106478 p-Chloroaniline	6 61E+01	4 83E-02	1 01E-05	5.30F+03	1 36E.05	2 225 03	8 8	447.21	684 75	9,271	0 05+00	8 0E-01
107062 1,2-Dichloroethane	174E+01	104E-01	90-306-6	8 52E+03	4 015-02	3 32E-0/	£ 5	503 65	754 00	11,689	0 0 0 0	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	3 2	345.65	510 13	7,643	2 6E-05	0 0E+00
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03	2 5	412 27	517.05	000'/	00+100	2 0E-01
100003 Tolluene	1 82E+02	8 70E-02	8 605-06	5 26E+02	2 72E-01	6 63E-03	52	383 78	59179	7 930	005400	00-100
10805 Dhanal	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03	52	404 87	632.40	8.410	001100	9 00 00
111444 Bis(2-chlomothydathar	Z 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	52	455 02	694 20	10.920	00100	2 15400
115297 Endosultan	2 145-03	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	25	451 15	659 79	000'6	39.00	00000
117817 Bis(2-ethylhexyl)phthalate	1516+07	1 13E-02	4 55E-U6	9 10E-01	4 59E-04	1 12E-05	25	674 43	942 94	14,000	0 0E+00	2 1E-02
117840 Di-n-octyl phthalate	8.32F+07	1515.02	3 585 06	3 40E-U1	4 18E-06	1 02E-07	22	657 15	906 00	15,999	4 0E-06	0 0 = +00
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5 915-06	2 VOE-02	2 /4E-03	6 68E-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 57E-03	1 325-03	52	582 55	825 00	14,447	4 6E-04	0 0E+00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 425-03	£ 5	615 18	873 00	13,121	0 0E+00	1 1E+00
120832 2,4-Dichloraphenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17 6-06	3 5	480 13	725 00	10,471	0000	2 0 = 01
121142 Z,4-Dinitrotoluene	9 55E+01	2 035-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	3 15	590.00	100 - 7	11,000	0.05+00	1 1E-02
124481 Chlorodibromomethane	6 31E+01	1 965-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04	22	416 14	678.20	79,467	2 40 04	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
127 TO THE STREET OF THE TOTAL	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	25	394 40	620 20	288	7 4 4 C	00+400
156592 cis-1.2-Dichloroethytene	3 55E±03	2725-02	7 24E-06	135E-01	4 51E-04	1 10E-05	52	667 95	936 00	14,370	0 0E+00	1 15-01
156605 trans-1,2-Dichloroethylene	5.25E+01	7 07E-02	1 195.05	3 30E+03	16/E-01	4 07E-03	52	333 65	544 00	7,192	0 0E+00	3 SE-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2.20E-05	5 55 E-05	9 39E-03	52 12	320 85	516 50	6,717	0 0E+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1115.04	9 %	715.00	1078 24	17,000	2 1 1 2 4	0 0 0 0
205440 Filoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 61E-05	22	655 95	905 00	13,000	2 JE-04	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
207009 perizo(k)iluotariume 218019 Chrysens	1 23E+06	2 26E-02		8 00E-04	3 40E-05	8 29E-07	52	753 15	1019 70	16,000	2 1F-05	0.05+00
309002 Aldrin	2 45E+05	1 375 02	0 Z 1 E-U6	1 505-03	3 88E-03	9 46E-05	52	714 15	979 00	16,455	2 1E-06	000+00
319846 alpha-HCH (alpha-BHC)	1 23 6 + 03	1 42E-02	7 34 5-06	2 00F±00	6 9/E-U3 4 356-04	1 70E-04	52	603 01	839 37	13,000	4 9E-03	0 0E+00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3.05F-05	1.00E-05 7.44E-07	9 8	596 55	839 36	13,000	1 8E-03	0 0E+00
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02	, K	380 33 381 15	639.36	13,000	5 3E-04	0 0E+00
606202 Z,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07	2 2	558 00	26, 36	000',	3 /E-05	2 0E-02
02.1047 N-NILOSOGI-n-DODY/Smine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06	23	909 609	746.87	14,000	- 4 - 2 - 2 - 2 - 3 - 4 - 4 - 5 - 6 - 6 - 6 - 6 - 7 - 6 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7	0000
7439976 Memmy (elemental)	8.325+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9 51E-06	22	613 96	848 76	13,000	2 6F-03	001100
8001352 Toxanhene	3 2UE+01	3 U/ E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02	52	629 88	1750 00	14,127	0 OF+00	305.04
11096825 Arodor 1260 (PCB-1260)	2.90F+05	1 385-02	4 345-06	7 40E-U1	2 46E-04	6 00E-06	52	657 15	873 31	14,000	3 2E-04	0 0E+00
11097691 Arodor 1254 (PCB-1254)	2.00E+05	1 56E-02	5 00E-06	5 70E-02	1 89E-U1 8 20E-02	4 60E-03	52		539 37	19,000	1 OE-04	0 OE+00
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2 22E-02		4 20E-01	1 19E-02	2 00E-03	5 K	377 50	512 27	19,000	1 0E-04	00+300
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02		3 40E-01	2 13E-02	5 20E-04	3 12	345.50	475 22 482 20	18,000	1 00 04 20 04	00+00
							í	3	704	000,81	1 05-04	0 0E+001

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

						1			
		ENTER	User-defined stratum A soil vapor	permeability, k <sub>v</sub> (cm²)					
				ğ	• ¬				
		ENTER	stratum A SCS soil type		o	ENTER	Stratum C soil water-filled	porosity,	(cm <sub>3</sub> /cm <sub>3</sub> )
		ENTER	scs	soil type directly above water table	s	ENTER	Stratum C soil total	porosity, n <sup>c</sup>	(unitless)
		ENTER	Soil	directly above water table, (Enter A. B. or C.)	В	ENTER	Stratum C soil dry	bulk density, o <sub>b</sub> c	(g/cm³)
	oethene)	ENTER Lwt (cell D28)	Thickness of soil stratum C,	(Enter value or 0) hc (cm)	0	ENTER	Stratum B soil water-filled	porosity, 6,, <sup>8</sup>	(cm <sub>3</sub> /cm <sub>3</sub> )
Chemicat	Vinyl chloride (chloroethene)	NTER ENTER ENTER Totals must add up to value of L <sub>wr.</sub> (cell D28)	Thickness of soil stratum B,	(Enter value or 0) (Enter value or 0) he hc (cm)	1173 48	ENTER	Stratum B sost total	porosity, n <sup>B</sup>	(unitless)
	Vin	ENTER Totals mu	Thickness of soil	stratum A, h <sub>A</sub> (cm)	1173 48		Stratum B soil dry	bulk density, p, B	(g/cm³)
	_	ENTER	Depth below grade	to water table, Lwr (cm)	2346 96	ENTER	Stratum A soil water-filled	porosity,	(cm <sub>3</sub> /cm <sub>3</sub> )
ENTER Initiat groundwater conc , C <sub>W</sub> (µg/L)	22 33434783	ENTER Depth	below grade to bottom of enclosed	space floor, Lr (cm)	15	ENTER	Stratum A soil total	porosity.	(unitless)
ENTER Chemical CAS No (numbers only, no dashes)	75014	ENTER	Average soll/ groundwater	temperaturs, T <sub>s</sub>	16	ENTER	Stratum A soil dry	bulk density,	(g/cm³)

1 1	0 43	0.2	17	0 42	0.27	17	0 43	03
	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
	Soil-bidg	space	space	Enclosed	Floor-wall	Indoor		
	pressure	floor	floor	space	seam crack	air exchange		
	differential,	length,	width,	height,	width,	rate,		
	₽∆	ڙ	W	±°	≯	#		
	(g/cm-s <sup>2</sup> )	(cm)	(CI)	(CH)	(ma)	(1/h)		

			2	90	-	5
	INTER	ENTER	ENTER	ENTER	ENTER	
C m	Averaging			Target	Target hazard	
	me for	Exposure	Exposure	nsk for	quotient for	
_	arcinogens,	duration,	frequency,	carcinogens,	noncarcinogens,	
	AT <sub>NC</sub>	<del>()</del>	Ħ	፳	돼	
(yrs)	(yrs)	(yrs)	(days/yr)	(unitless)	(nutless)	

Used to calculate risk-based groundwater concentration

## CHEMICAL PROPERTIES SHEET

, I	Г
Reference conc , RfC (mg/m³)	
Unit nsk factor, URF (μg/m³)*†	
Pure component water solubility, S S (mg/L)	101.0
Organic carbon partition coefficient, K <sub>c</sub> (cm <sup>3</sup> /g)	1 00 5 . 04
Critical temperature, T <sub>C</sub> (%)	5.250   250.25   432.00   4.855.04   5.351.05   5.351.
Normal bosling point, t T <sub>B</sub>	250 25
Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	5.250
Henry's law constant reference temperature, T <sub>A</sub>	25
Henry's law constant at reference temperature, H (atm-m³/mol)	1 06E-01 1 23E-06 2 71E-02
Oriflusrvity in water, D. (cm²/s).	1 23E-06
Diffusivity in air, D <sub>•</sub> (cm <sup>2</sup> /s)	1 06E-01

	ć	Stratum A	ξ	Stratum C	Stratum A	Stratum A	Stratum A	Stratum A	in the second se	Total	Air-filled	Water-filled	Floor-
Exposure	Source- building	son air-filled	son air-filled	son air-filled	total fluid	son intrinsic	son relative air	effective vapor	capillary	capillary	capillary	porosity in capillary	seam
duration,		porosity,	porosity,	porosity,	saturation,	permeability,	permeability,	permeability,	zone,	zone,	zone,	zone,	perimeter,
ħ	ל	θ,Α	B.6	ວ <b>ູ</b>	ຜູ້	ΣZ	쟣	ž	ڙ	٦	Ө <sub>в сх</sub>	θ <sub>w c2</sub>	Xorack
(sec)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sup>3</sup> /cm <sup>3</sup> )	(cm³/cm³)	(cm³/cm³)	(cm²)	(cm²)	$(cm^2)$	(cm)	(cm³/cm³)	(cm³/cm³)	(cm³/cm³)	(cm)
0071107	2221.00	0000	1 0 150	0 430	336.0	7 405 40	707.0	£ 07E-40	17.05	67.0	0.450	A00.0	2 044
9.40E+08	2331 90	0.230	061 0	051.0	200.0	/ 496-10	18.0	0.97	CO.	V 46	7 160	107.0	1,044
	Area of							Stratum	Stratum	Stratum	Capillary	Total	
	enclosed	Crack-	Crack	Enthalov of	Henry's law	Henry's law	Vapor	∢	Φ	ပ	zone	overall	
Bida		to-total	depth	vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
ventilation	woled	area	woled	ave groundwater	ave, groundwater	ave groundwater	ave soil	diffusion	diffusion	diffusion	diffusion	diffusion	path
rate,		ratlo,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient,	coefficient,	ength,
c			. ^	. I	4	ī	<u> </u>	* C	٥	) ا	٦	£,	· _
(om 3/o)	T (	1-	to o	(con/loo/	(atm-m <sup>3</sup> /mol)	SI II	(1-(10)0)	(cm <sup>2</sup> /s)	/cm <sup>2</sup> /e)	(cm <sup>2</sup> /e)	(cm <sup>2</sup> (e)	(cm <sup>2</sup> fs)	7 (
(611179)	(cm)	(numess	(CIII)	(Calillion)	darrin /inci)	(CILINITADO)	(Shorts)	(6) (6)	2 10	(2)	101	9	1
5 63E+04	9 24E+05	4 16E-04	15	4,933	2 09E-02	8 81E-01	1 77E-04	4 29E-03	1 08E-03	0 00E+00	6 02E-04	171E-03	2331 96
						Exponent of	Infinite						
			Average	Crack		equivalent	source	Infinite					
Convection	Source		vapor	effective		foundation	mdoor	source	Ē				
path		Crack	now rate	diffusion	Area of	Peclet	attenuation	pldg	nsk	Reference			
length,	conc	radius,	into bldg ,	coefficient,	crack,	number,	coefficient,	COUC.,	factor,	conc.,			
Ĵ.	Caource	Carack	o G	Dorack	Agnet	exp(Pe¹)	ಶ	Chulding	URF	RfC			
(cm)	(mg/m³)	(cm)	(cm <sub>3</sub> /s)	(cm <sup>2</sup> /s)	(cm²)	(unitless)	(unitless)	(mg/m³)	(µg/m³) <sup>-1</sup>	(mg/m³)			
7,	8 81E+02	010	5 70E.01	4 29E.03	3 84E+02	1 78E+02	5.515-06	4 86F-03	8 4F-05	ĄŅ			
15	8 81E+02	0 10	5 70E-01	4 29E-03	3 84E+02		1 78E+02		551E-06 4	5 51 E-06 4 86 E-03	5 51E-06 4 86E-03 8 4E-05	5 51E-06 4 86E-03 8 4E-05	5 51E-06 4 86E-03 8 4E-05

#### RESULTS SHEET

RISK-BASE	RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	ER CONCENTR	ATION CALC	ULATIONS	INCREMENTAL	INCREMENTAL RISK CALCULATIONS
1		:	,	1	Incremental	Hazard
Joopu	Indoor	Risk-based	Pure	Final	nsk from	quotient
exposure	exposure	ındoor	component	Indoor	vapor	from vapor
groundwater	groundwater	exposare	water	exposare	intrusion to	intrusion to
conc,	conc.	groundwater	solubility,	groundwater	indoor air,	indoor air.
carcinogen	noncarcinogen	conc,	S	conc,	carcinogen	noncarcinoden
(µg/L)	(πg/L)	(µg/L)	(J/6r/)	(µg/L)	(unitless)	(unitless)
5 96E+00	NA	5 96E+00   2 76E+06	2 76E+06	5 96E+00	AN	AN

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

					VLOOKUP TABLES	S						
formy //	(4)	Soil Properties Lookup	Lookup Table	, f 3/2 3,	3,3,3,							
2 61	1.	N (urillus	M (Unitess)	0. (CIII ) O	or (CIII /CIII )	Mean Grain Diameter (Cm)						
		•	0 000	200	8000	0.009						
	404	2 4	200	- c	0.093	0010						
- 1			895 O	543	8/00	0.020						
•			1960	041	0.057	0.040						
200	29 / 0 145		0.627	0.40 84.0	0045	0 044						
			0.324	960	8 5	0 020						
		137	0 270	0.46	0 034	0.0046						
			0 083	0.26	0.00	0 003						
_		0 123	0 187	0 43	0 089	0 0028						
_	45	-	0 291	0.45	290 0	0 011						
SL 4	42 0 0 75	5 189	0 471	041	0 065	0 030						
1								1	1			
				Chemic	Chemical Properties Looks in Table	an Table						
	Organic			Pure		Henry's	Henry's			Enthalox of		•
	carbon			component		law constant	law constant	Normal		vaporization at	Ĭ	
	partition	Δ	Diffusivity	water	Henry's	at reference	reference	boiling	Critical	the normal	ısk	Reference
	coefficient	-=	in water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,	conc
	, Ke	D.,	, O.w.	v (	Ī į	I (1)	<u>د</u> ۋ	<u>۔</u> ۾	ບ ເ ⊢ ຄຸ		CRF.	ည်း က်
CAS NO Chemical	(S) (S)	(cm-/s)	(cm/s)	(mg/L)	(unitless)	(atm-m/mol)	(j)	¥	( <del>,</del> K)	(cal/moi)	(mg/m²)	(mg/m²)
50293 DDT	2 63E+06	i6 1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 105-06	52	533 15	720 75	11.000	9.7E-05	00+00
50328 Benzo(a)pyrene	1 02E+06	į	90 <del>-3</del> 00 6	1 62E-03	4 63E-05	1 13E-06	25	715 90	969 27	15,000	2 1E-03	0 0 0 0
51285 2,4-Dinitrophenol	1 00E-02		9 08E-06	2 79E+03	1 82E-05	4 44E-07	52		827 85	15,000	0 0E+00	7 0E-03
53703 Dibenz(a,h)anthracene	3 80E+06			2 49E-03	6 03E-07	1 47E-08	25		990 41	16,000	2 1E-03	00+300
56235 Carbon tetrachloride	1 74E+02		8 80E-06	7 93E+02	1 25E+00	3 05E-02	25		556 60	7,127	1 5E-05	00+300
56553 Benz(a)anthracene	3 98E+05	٠O.	9 00E-06	9 40E-03	137E-04	3 34E-06	52		1004 79	15,000	2 1E-04	00=+00
#9000 ACTION TO THE PROPERTY OF THE PROPERTY O	1 20E+05		4 37E-06	5 60E-02	1 995-03	4 855-05	25		885 73	13,000	3 7E-04	0 0E+00
Seesa gamma-HCH (Lindane)	1075+03	_ ,	7.345-06	6 80E+00	5 74E-04	1 40E-05	52		839 36	13,000	3 7E-04	00+400
	A 00E-04	4 1 25E-02	7 075-06	1 955-01	6 19E-04	1515-05	25		842.25	13,000	4 6E-03	00+00
67641 Acatona	5.75F-01		1 14 E-05	1 005+03	1 59 1-03	2 A R P C C	0.40	320 20	751 00	000,01	001100	145+01
	3 98E+01	•	1 00 05	7 92E+03	1 50E-01	3 66E-03	32.53		536 40	866.6	235-05	0 OF+00
67721 Hexachloroethane	1 78E+03	3 2 50E-03	6 80E-06	5 00E+01	1 59€-01	3 88E-03	25			9,510	4 0E-06	000+00
71363 Butanol	6 92E+00		9 30E-06	7 40E+04	3 61E-04	8 80E-06	25			10,346	0 OE+00	3.5E-01
71432 Benzene	5 89E+01	₩		1 75E+03	2 28E-01	5 56E-03	25			7,342	8 3E-06	0.00
71556 1,1,1-Trichloroethane	1 10E+02	· ·	8 80E-06	1 33E+03	7 05E-01	1 72E-02	72			7,136	0.000	1 06+00
72435 Methowichlor	1235+04	7 1 25E-02	4 74E-06	2 50E-01	3 08E-04	751E-06	25			12,000	000+00	1 15-03
72548 DDD	1 00 5 + 06		4 46E-06	4 90E-02	1 64F-04	1 38E-U3 4 00E-06	6 ¥	20 102	848 49	14,000	0.05+00	1 85-02
72559 DDE	4 47E+06		5 87E-06	1 20E-01	8 61E-04	2 10E-05	25.25		86038	13,000	9.7E-05	00+00
74839 Methyl bromide	1 05E+01	7	1 21E-05	1 52E+04	2 56E-01	6 24 E-03	25			5.714	00+00	5 05-03
75014 Vinyl chloride (chloroethene)	1 86E+01	_	1 23E-06	2 76E+03	111E+00	2 716-02	25			5,250	8 4E-05	0 0E+00
75092 Methylene chloride	1 17E+01	ξ- ,	1 17E-05	1 30E+04	8 98E-02	2 19E-03	52			6,706	4 7E-07	3 0E+00
75150 Carbon disuride	4 57E+01		1 00E-05	1 19E+03	1 24E+00	3 02E-02	25			6,391	00+00	7 0E-01
75274 Bromodichloromethene	20,40	7 - 49E-02	1 085-03	5 10E+03	2 19E-02	5 34E-04	22	362.35	00 989	9,4,9	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	00+1100
75343 1.1-Dichloroethane	3 16E+01		1 05E-05	5 06E+03	2 30E-01	5.6115-03	2, 23	330.55		7,000	00+10	5.05-01
75354 1,1-Dichloroethylene	5 89E+01	. ເກ	1 04E-05	2,25E+03	1 07E+00	2 61E-02	22 52	304 75	576 05	6.247	505-05	00+00
76448 Heptachlor	1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69		13,000	1 3E-03	00+300
77474 Hexachlorocyclopentadiene	2 00E+05		7 21E-06	1 80E+00	111E+00	2 715-02	25	512 15		10,931	0 OE+00	7 0E-05
78591 Isophorone	4 68E+01	(C)	6,76E-06	1.20E+04	2 72E-04	6 63E-06	25	488 35	715.00	10,271	2 7E-07	0 0E+00
788/5 1,2-Dichloropropane	4 37E+01	~ r	8 73E-06	2.80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7.590	00+90	4 OE-03
79016 Trohlomethere	3 01E+01	7 405-02	8 80E-00	4 42E+03	3 /4E-02	9 125-04	3. S	386 15	602 00	8,322	2 de 4	00+400
79345 1.1.2.2-Tetrachloroethane	9338+01		7 90F-06	2 97F±03	1415-02	3 44E-04	2,5	410.50		900 8	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	00 HO
83329 Acenaphthene	7 08E+03	. 4	7 69E-06	4 24E+00	6 36E-03	1.55E-04	25	550 54		12,155	0 0E+00	2.1E-01
								)   		į	ı	

84669 0.000	100				VLOOKUP TABLES							
84742 Dischiptophinalate	2 88E+02	2 565-02	6 355-06	1 08E+03	185E-05	4 51E-07	52	567 15	757 00	13,733	0.0E+00	2 8E+00
85687 Buty benzy outhalate	5 75F+04	4 30E-02 1 74E-03	7 83E-06	7 505+01	3 85 - 08	9 39E-10	52	613 15	798 67	14,751	0.05+00	3 SE-01
86306 N-Nitrosodiphenylamine	1295+03	3 12 F-02	4 635-06	3 616+00	01/11/0	1 26E-06	52	650 60	839 68	13,000	0 0E+00	7 0E-01
86737 Fluorene	1 38E+04	3 63E-02		1 98 1	2 615.03	5 005-06	ខ្ល	632.28	890 45	13,000	1 4E-06	0 0 0 0
86748 Carbazole	3 39E+03	3 905-02	7 03E-06	7 48E+00	6 26 F-07	1 53E-03	9 %	570 44	870.00	12,666	00110	1 4E-01
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34 E-01	8 15E-03	3 %	486 15	738.00	10,977	2 75 05	00+400
87855 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	22	582 15	813 20	14.000	345.05	005+00
90002 2,4,6- Inchlorophenol 91203 Namhthalana	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	22	51915	749 03	12,000	3 15-06	0 0E+00
91941 3.3-Dichlombenzidine	2 UNE+U3	5 90E-02	7.505.06	3 10E+01	1 985-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	1 4E-01
95476 o-Xylene	3 635+02	8 70F-02	4 70F-05	3 11E+00	164E-07	4 00 5-09	52	560 26	754 03	13,000	1 3E-04	0 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02		2 60F+04	4 97F-05	2 ZUE-U3	82 8	417 60	630 30	8,661	0000	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02		1 56E+02	7 79E-02	1 90 8-00	S 12	454,19	597 60	10,800	000	1860
95578 2-Chlorophenol	3 88E+02	5 01E-02		2 20E+04	1 60E-02	3 90 F-04	3 %	455 57	70500	9,700	00+00	2 00-01
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02		1 20E+03	1 78E-04	4 346-08	3 K	526 15	759 13	3,572	00+100	1 86-02
98953 Nitrobenzene	6 46E+01	7 60E-02		2 09E+03	9 84E-04	2 40E-05	22	483 95	719.00	10.566	001100	2000
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20	8.501	0 0E+00	1 0F+00
105870 of Demothschool	/ /6E+02	7 10E-02		3 10E+02	1 135-01	2 76E-03	52	418 31	636 00	8,737	0 0E+00	1 0E+00
106423 D-Xviene	2 09E+02	5 84E-02	8 695-06	7 87E+03	8 20E-05	2 00E-06	22	484 13	707 60	11,329	0 0E+00	7 0E-02
106467 1,4-Dichlorobenzene	6 17F+02	6 90F-02	7 905.06	7 205-02	3.14E-01	7 665-03	9 :		616 20	8,525	0 0E+00	7 0E+00
106478 p-Chloroaniline	6 61E+01	4 83E-02	1015-05	5 305+03	1 365.05	2 435-03	ន	447 21	684 75	9,271	0 0E+00	8 0E-01
107062 1,2-Dichloroethane	1 74E+01	1 04E-01	90-306 6	8 52E+03	4 01E-02	9 285-04		303 b3	0940	11,689	0 0 10 0	1 4E-02
108054 Vinyl acetate	5 25E+00	8 505-02	9 20E-06	2 00E+04	2 105-02	5 12E-04	3 %	345.65	519 13	7 0	20100	0.05+00
108383 m-Xylene	4,07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 346-03		412 27	617.05	000''		7 OE-01
108883 Joluene	1 82E+02	8 70E-02		5 26E+02	2 72E-01	6 63E-03		383 78	591 79	7 030	001100	7 05 01
1089U/ Chlorobenzane	2 19E+02	7 30E-02		4 72E+02	1 52E-01	3 71E-03	22	404 87	632 40	0.530	00.40	2000
111444 Bis/2 chlomodi. Alaka.	2 88E+01	8 205-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07		455 02	694 20	10.920	0000	2 1F+00
115207 Endos than	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	52	451 15	629 78	006	3 35-04	0 0E+00
117817 Bis(2-ethylhexylxohthalate	1516+07	3 515.02	4 55E-U5	5 10E-01	4 59E-04	1,12E-05	52	674 43	942 94	14,000	0.0E+00	2 1E-02
117840 Di-n-octyl phthalate	8 32E+07	1515-02		3 40E-01	9 10E-UD	1 02E-07		657 15	806 00	15,999	4 0E-06	0 OE+00
118741 Hexachlorobenzena	5 50E+04	5 42E-02		6 20F+00	5.415-02	1 325 03	3 5	704 09	862,22	15,000	0 0E+00	7 0E-02
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6.515-05	0 K	362.35	825 00	14,447	4 6E-04	0 DE+00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03	g K	013 IB	8/300	13,121	00000	1 1E+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 305-04	3 17E-06	3 5	480 13	708 47	10,4/1	00+400	2 0E-01
121142 2,4-Dinitrotokiene	9 55E+01	2 035-01	7 06E-06	2 70É+02	3 80E-06	9 27E-08	2	590 00	814 00	13,467	00 to 00 to	70-31-0
124481 Chlorodibromomethane	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21 5-02	7 83E-04		416 14	678 20	0008	2 4F-05	00+00
12/104 Tellacilloroelliylene 129000 Pyrene	1 555+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02		394 40	620 20	8,288	5 8E-07	0 0E+00
156592 cis-1.2-Dichlomethylene	3.558+01	7 36E-02	1135.05	1 356-01	4 516-04	1 10E-05	52	667 95	936 00	14,370	0 0E+00	1 1E-01
156605 trans-1,2-Dichloroethylene	5.25E+01	7 07E-02	1 10 1 10	5 30E +03	2 0/E-U1	4 07E-03		333 65	544 00	7,192	0 0E+00	3 5E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 665-06	2 20E-05	6.565-05	50 EUG 4		320 85	516 50	6,717	0 OE+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1 11F-04	S K	715.00	10/8 24	17,000	2 15 4 2 15 42	0 0E+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 355-06	2 06E-01	6 605-04	161E-05		655.95	905.00	13,000	2 15-04	0 OE+00
20/089 Benzo(k)nuoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07		753 15	1019 70	16,000	2 1E-05	
SOODS Aldrin	3 48E+03	2 48E-02	6.21E-06	1 60E-03	3 88E-03	9 46E-05	52	714 15	979 00	16,455	2 16-06	0 0F+00
319846 white-HCH (alobe-RHC)	2 45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04		603 01	839 37	13,000	4 9E-03	0 OE+00
319857 beta-HCH (beta-BHC)	1 26F+03	1 42E-02	7 345-06	2 00E+00	4 355-04	1 06E-05		596 55	839 36	13,000	1 8E-03	0 0E+00
542756 1,3-Dichloropropene	4 57E+01	6.26F-02	100 8-05	2 AOE-01	3 USE-US 7 36E 04	7 44E-07	52	596 55	839 36	13,000	5 3E-04	0 0E+00
606202 2,6-Dinitrotoliuene	6 92E+01	3 27F-02	7.265-06	1 825+03	3.065.08	1 (/E-02		381 15	587 38	2,000	3 7E-05	2 0E-02
621647 N-Nitrosodl-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23 F-05	2 255 06		558 OO	770 00	12,938	1 9E-04	0 0E+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9.515-06		308 50 613 06	7458/	11,000	2 08-03	0 0 0 0
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 14 E-02	3 6	629 R8	1750.00	13,000	2 6E-03	0 0E+00
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06		657.15	873 33	14.12/	0.0E+00	
11096825 Aroclor 1260 (PCB-1260)	2 90E+05	1 38E-02		8 00E-02	1895-01	4 60E-03	25 4	402 50	539.37	90,4	2 17 15 1	00-100
1109/091 Arodor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	25	377 50	512 27	19.000	- 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10	
120/4112 Alexan 1016 (PCB-1016) 53469219 Aredor 1242 (PCB-1242)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	25 3	340 50	475 22	18,000	- 00.04 - 00.04	00E+00
Z	L	70-141 7	3315-00	3 40E-01	2 135-02	5 20E-04	25	345,50	482 20	18,000	1 0E-04	00=+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 12 September, 1998

용

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

ENTER

ENTER

YES

		ENTER	User-defined stratum A	soil vapor	permeability, k,	(cm²)	
,		ENTER	stratum A SCS		(used to estimate OR soil vapor	permeability)	S
		ENTER		SCS	soil type directly above	water table	s
		ENTER	Sol	stratum	directly above water table,	(Enter A, B, or C)	8
		ENTER (Lw. (cell D28)	Thickness of soil	stratum C,	(Enter value or 0)	(cm)	0
Сһөтіса	Chloroform	NTER ENTER Totals must add up to value of L w7 (cell D28)	Thickness of soil	stratum B,	stratum A, (Enter value or 0) (Enter value or 0) NA ho	(cm)	1173 48
ĺ		ENTER Totals mu	Thickness	of soil	stratum A, n <sub>A</sub>	(cm)	1173 48
·	_	ENTER	Depth	below grade	to water table,	(cm)	2346 96
Initial groundwater conc , Cw (µg/L)	24 15217391	ENTER	below grade to bottom	of enclosed	space noor, LF	(cm)	15
Chemical CAS No (numbers only, no dashes)	67663	ENTER	Average soil/	groundwater	temperature, T <sub>s</sub>	(၃)	16

042 027 17 043
1/
0.2
0 43
1.2

ENTER
Stratum C
soil water-filled
porosity,  $\theta_{w}^{c}$ (cm<sup>3</sup>/cm<sup>3</sup>)

ENTER Stratum C soil total porosity,

ENTER Stratum C soil dry bulk density, p<sub>b</sub><sup>c</sup> (g/cm³)

ENTER
Stratum B
soil water-filled
porosity,  $\theta_w^B$ (cm³/cm³)

ENTER Stratum B soil total porosity,

ENTER Stratum B soll dry bulk density, p<sub>b</sub>

ENTER
Stratum A
soil water-filled
porosity,
bui.

ENTER Stratum A soil total porosity,

ENTER Stratum A soll dry bulk density, pb<sup>†</sup> (g/cm³)

ENTER	Target hazard quotient for	noncarcinogens, THO	(nutless)		Jsed to catculate risk-based groundwater concentration
ENTER	Target risk for	carcinogens, TR	(nuitless)	1 05-06	Used to catcu groundwater
ENTER	Exposure	frequency.	(days/yr)	350	
ENTER	Exposure	duration, FD	(yrs)	30	
ENTER	Averaging time for	noncarcinogens,	(yrs)	30	
ENTER	Averaging time for	carcinogens, AT <sub>c</sub>	(yrs)	70	

## CHEMICAL PROPERTIES SHEET

					_	_
	Reference	conc.	RC	(mg/m <sub>3</sub> )		
r S	캶	factor,	Ŗ	(µg/m³).1		
Pure component	water	solubility,	ဟ	(mg/L)		
Organic carbon	partition	coefficient,	ጓ <sub>ዩ</sub>	(cm <sup>3</sup> /g)		
	Cntical	temperature	င္	( <del>K</del> )		
Norma	boting	boint,	ᄹ	( <del>)</del>		3
Enthalpy of vaporization at	the normal	boiling point,	ΔH <sub>ν</sub> <sub>δ</sub>	(cal/mol)		000
Henry's law constant	reference	temperature,	F.	(၃)		50
Henry's law constant	at reference	temperature,	π,	(atm-m³/mol)		10/E.01 100E.05 2 2 C 03
	Diffusivity	in water,	<u>,</u>	(cm,/s)		1000
:	Diffusivity	in all,	ວ້ ີ	(cm²/s)		10,01

Diffusion path length,	233196
U 294  Total  Doverall  effective diffusion  coefficient,  Doff  (cm²/s)	1 69E-03
Capillary Capillary Zone effective effective diffusion coeffficient, D°f cm²/s)	6 00E-04
Stratum C effective diffusion coefficient, Def c (cm²/s)	Reference conc., RfC (mg/m³)
Stratum  Stratum  B  effective diffusion coefficient,  D** (cm²/s)	1 07 <u>E-03</u> Unit nsk factor, URF (µg/m³)**
Stratum A effective diffusion coefficient, D" A (cm²/s)	Infinite source bldg conc., Chalding (190/m²)
Vapor viscosity at ave soil temperature, hrs	177E-04 Infinite source indoor attenuation coefficient, α (untiless)
Henry's law constant at ave groundwater temperature, H'rs (unitless)	Exponent of equivalent foundation Peclet number, exp(Pe <sup>5</sup> ) (unitless)
H $[$	2 47E-03 Area of crack, Arack (cm²)
<u> </u>	Crack effective diffusion coefficient, Dorse (cm²/s)
Crack depth below grade, Zanck (cm)	Average vapor flow rate into bldg , Ques (cm³/s)
O.230 Crack- to-total area ratio, n (unitless)	Crack radius, fank (cm)
Area of enclosed space below grade, As	Source vapor conc. Cource (µg/m³)
Bldg ventilation rate, Qualidra (cm <sup>3</sup> /s)	Convection path length,  Lp  (cm)
	Area of

#### RESULTS SHEET

NCREMENTAL RISK CALCULATIONS	Incremental Hazard risk from quotient
INCR	ST .E.
LATIONS:	Fina!
ATION CALCU	Pure
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	Risk-based Pure
GROUNDWATE	Indoor
RISK-BASED	Indoor

Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)	NA
Incremental risk from vapor intrusion to indoor ar, cardinogen (unitless)	NA
Final Indoor exposure groundwater conc, (µg/L)	1 86E+02
Pure component water solubility, S (µg/L)	7 92E+06
Risk-based indoor exposure groundwater conc , (µg/L)	1 86E+02
indoor exposure groundwater conc , noncarcinogen (µg(L)	NA
Indoor exposure groundwater conc , carcinogen (µg/L)	1 86E+02

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

Commission   Com				Soil Properties Lookup T	able									
1,000   1,00	SCS Soil Type	K, (cm/h)		N (unitless)		θ <sub>s</sub> (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)						
1	υi	020	0 008	1 09	0 083	0 38	0 068	0 0092						
1		0.26	0 019	131	0 237	0 41	0 095	0 0 0 1 6						
13   10   10   10   10   10   10   10	, L	104	0 036	1 56	0 359	0 43	0.078	0 020						
13   0.07   0.01   0.02   0.02   0.02   0.03   0.00   0.	2.0	4. 05 9. 05	0 124	2 28	0 561	041	0 057	0 040						
13   0.69   1.4   0.72   0.80   0.0	C W	24.0	0 -43	7 7	0 197	) 1	0.045	0.044						
Chamical Processing   Contro	i co	2 5	0.050	7 7	/ CC C	9 6	5 6	0.025						
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	<u> </u>	0.25	0.016	137	0.220	0.33	0 -00	0.0048						
Chain   Chai	Sic	0 02	0 002	1.09	0 0 83	0.26	0000	0.000						
Oranic control of the control of t	SICL	0 07	0 0 0 0	1 23	0 187	0 43	0 0 0 0	9500 0	_					
Common	3. S.	0 45 4 42	0 020	141	0 291	0.45	0 067	0 011						
Cypering				23	2			2000						
Cleaning   Cleaning											•	 	1 1 1	     
Company   Comp						Chemica	1 Properties Loc	okup Table						
Charticular   Charticular			Organic			Pure		Henry's	Henry's			Enthalpy of		
Chemical   Configuent   Diffusible   Diffu			carbon		•	component		law constant	law constant	Normal		vaporization at	Unit	
Chemical (mf/g)			partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	boiling	Critical	the normal		Reference
Charles   Char		_	coefficient,	in air,	in water,	_	law constant	temperature,	temperature,		temperature,	boiling point,		conc,
Chemical C			ع ع	റ് '	o	σ	Ì	Ŧ,	Ļ	۳	<sup>L</sup> o		S.F.	D
DOT         Constitution         2 558-64         3 DE-02         4 58E-04         5 10E-03         <			(cm²/g)	(cm <sub>2</sub> /s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/mol)	(၁)	(g (y	(°K)		(mg/m³) 1	(mg/m³)
Accomply (2007)	+00000A		L	L	i i	1								
4,Emblishmennen         1 (RE-0)         2 (RE-0)	50353 DOI:		1 025+06	1 3/E-02	4 450 a	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9.7E-05	0 OE+00
Disputation of the control o	51285 2 4-Dinitrophenol		1 00E-02	2 73E-02	90-200	2 705-03	4 03 11-03	1 155-06	8 8	06 50	969 27	15,000	2 15-03	00+00
Characteristic   Chicaristic    53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5.18E-06	2.49E-03	6 03F-07	1 44E-07		27 CD9	827 85	15,000	0.05+00	7 OE-03	
Bench plantifunemen         SBEE-16         STEC-20         STEC-30         STEC-30 <td>56235 Carbon tetrachloride</td> <td></td> <td>1 74E+02</td> <td>7 80E-02</td> <td>8 80E-06</td> <td>7 93E+02</td> <td>1 25E+00</td> <td>3 05E-02</td> <td></td> <td>349.90</td> <td>558.60</td> <td>727</td> <td>בלים ל הקלים ל</td> <td>00+</td>	56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02		349.90	558.60	727	בלים ל הקלים ל	00+
1000-cday    100	56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	137E-04	334E-06		708 15	1004 79	15.000	2 1E-04	00+100
1/15-20   1/15	57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05		624 24	885 73	13,000	3 75-04	000+00
Objective that the part of the	58899 gamma-HCH (Lindane,		1 07E+03	1 42E-02		6 80€+00	5 74E-04	1 40E-05		596 55	839 36	13,000	3 7E-04	0 0E+00
Sex. 2004 of 50 Geo. 10         53 Geo. 20         73 E-0.0         73 E	60571 Dieldrin		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	151E-05	25	613 32	842 25	13,000	4 6E-03	0 0E+00
Option of the production	65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10,000	0 0E+00	1 4E+01
Section of the control of the cont	67663 Chlomosen		5 75E-01	1 24E-01	1.14E-05	1 00E+08	1 59E-03	3 88E-05	25	329 20	508.10	6,955	00+300	3 55-01
bistance between the selection of selection	67721 Hexachloroethane		1785+01	2 505-03	80E-08	7 82E+03	10-110-1	3 500-03	2, 2	334 32	536 40	6,988	2 3E-05	00=+00
Benzene         6 89E+01         8 80E-02         9 80E-03         175E+03         2 28E-03         2 5 352 40	71363 Butanol		6 92E+00	8 00E-02	9 305-06	7 40E+04	3.615-04	3 58E-U3	6 K	458 OU	695 00	9,510	4 OE-06	0.05+00
1.11.1.Trichlorosethane         1.0E+02         8 BGE-02         8 BGE-03         1.35E+03         7 O5E-04         1.72E-02         25         347.21         56.00         7.10B         0.0E+00           Menthrin         1.22E+04         1.25E+04         1.25E+03         1.25E+04         1.25E+03         1.2	71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5.566-03	3 52	353.24	562 16	7.342	20,00	004400
Findful         125E-04         125E-04         125E-04         125E-04         125E-04         125E-04         125E-04         125E-05         126E-05         25E-01         308E-04         75E-06         25         115         36         25         115         36         20         66-00         0	71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	000+00	100+00
Methoxychlor         9.77E-04 156E-02 (16E-02)         4.6E-06 (16E-04)         4.6E-04 (16E-04)         1.58E-05 (16E-04)	72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7.51E-06	25	718 15	986 20	12,000	0 0 0 0	1 1E-03
ODE         47E-05         100E-06         158E-02         47Fe-06         150E-04         400E-06         25         639 90         863 77         14,000         6E-03           DDE         47E-05         150E-04         120E-04         26E-01         21E-05         120E-04         26E-01         21E-05         25E-07         25E-07         25         659 26         432 00         5,714         00E-00           Methyl bromide         10EE+01         12E-05         12E-05         17E-02         25         259 26         432 00         5,714         00E-00           Methyl bromide (chloroethene)         16EE+01         10E-05         17E-05         17E+02         27E+03         27E-02         25         259 26         432 00         5,714         00E-00           Methyl bromide (chloroethene)         16EE+01         10E-02         17E-01         17E-03         17E-03         17E-02         27E-03	72435 Methoxychlor		9.77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05		651 02	848 49	14,000	0 0E+00	1 8E-02
Methyl bromide         1 (15E-0)         1 (15E-0)         1 (15E-0)         1 (15E-0)         2 (10E-0)         3 (10E-0)	72650 000		1 00E+06	1 69E-02	4 76E-06	9 00E-02	164E-04	4 00E-06		639 90	863 77	14,000	6 9E-05	0 0E+00
Virial production of the control of control	74839 Methyl bromide		4 47 11400	7 200 02	3 07 11-00	1 525-01	8 67 11-04	2 10E-05	52 52	636 44	86038	13,000	9 7E-05	0,0E+00
Methylane chloride         17E-01         17E-02         13E+04         89E-02         2.19E-03         2.5 29.2         2.5 29.2         2.5 29.2         2.5 20         8.5 20         9.5 20         8.5 20         9.5 20         8.5 20         9.5 20	75014 Vinvi chloride (chloroet	(ana)	4 86 H + 0.4	1.06E-04	1 23E-05	1 32E+04	4 11E±00	6 24E-U3	522	27671	467 00	5,714	0.05+00	5 0E-03
Carbon disulfide         457E+01         100E-05         119E+03         124E+00         302E-02         25 310         302E-02         25 310         302E-02	75092 Methylene chloride	•	1 17E+01	1016-01	1 175-05	1 30F+04	8 98F-02	2 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	3 K	213 00	510 00	007'0	20-11-0	00+100
8 71E+01         1 49E-02         1 03E-02         2 19E-02         5 3E-04         25         42.5 6         606 00         9,79 1 10E-06           Archanghane         5 50E+01         2 98E-02         1 06E-05         6 74E-02         1 60E-03         2 5 36 16         6 86 86         7,000         1 8E-06           Peathane         5 50E+01         2 98E-02         1 06E-05         6 74E+03         6 56E-02         1 60E-03         2 5 30 16         6 88 8         7,000         1 8E-05           Peathane         5 50E+01         2 90E-02         1 07E-02         2 90E-01         2 90E-02         2 61E-02         2 5 30 56         6 88 8         7,000         1 8E-05         9 0E-00           Syclopentadiene         1 12E-02         1 80E-03         1 10E-02         2 71E-02         2 71E-02         2 71E-02         2 71E-02         3 84 84 31         7 15 00         1 32 00         6 6.00           Syclopentadiene         2 30E-03         1 80E-04         1 11E-02         2 71E-04         2 71E-02         2 71E-02         3 84 84 31         7 15 00         1 7 5 00         1 7 5 00           Syclopentadiene         5 30E-03         1 80E-04         1 11E-02         2 71E-04         2 71E-04         2 80E-05         3 84 84 31         1 7 5 0	75150 Carbon disulfide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	2.13E-03	3 %	3450	552.00	6,700	001100	2 OE+00
yorganishme         5 50E+01         2 98E-02         1 06E-03         1 60E-03	75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	534E-04	25	422 35	695.00	9.479	115-06	005+00
sethane         316E+01         742E-02         105E-05         506E+03         230E-01         561E-02         25         330 55         523 00         6,895         0 0E-00           sethylene         5 89E+01         9 00E-02         104E-05         2.25E+03         107E+00         2 61E-02         25         314 75         576 05         6.247         5 0E-05           cyclopentadiene         1 12E-02         5 00E-05         1 80E-01         1 11E-00         1 11E-02         1 11E-02 <td>75274 Bromodichloromethans</td> <td></td> <td>5 50E+01</td> <td>2 98E-02</td> <td>1 06E-05</td> <td>6 74E+03</td> <td>6 56E-02</td> <td>1 60E-03</td> <td>25</td> <td>363 15</td> <td>585 85</td> <td>7 000</td> <td>1 8E-05</td> <td>0 OE+00</td>	75274 Bromodichloromethans		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7 000	1 8E-05	0 OE+00
bethylene         5 89E+01         9 00E-02         1 04E-05         2.25E+03         1 07E+00         2 61E-02         25         304 75         576 05         6,247         5 0E-05           cyclopentadiene         1 41E+06         1 12E-02         5 69E-06         1 80E-01         1 1 1 E-02         2 71E-02         2 5 12.15         746 00         1 3,000         1 3E-03         0 0E+00           cyclopentadiene         2 00E+05         1 61E-02         7 21E-06         1 80E+00         1 1 1 E+00         2 71E-02         2 5 12.15         746 00         1 0,931         0 0E+00           propara         4 58E+01         7 82E-02         6 75E-06         1 20E-04         2 72E-04         6 63E-06         2 48 85         715 00         7 500         0 0E+00           propara         4 37E+01         7 82E-02         8 73E-04         2 75E-04         6 63E-06         2 75C-00         7 500         7 500         0 0E+00           propara         4 37E+01         7 80E-02         8 75E-04         2 75E-04         6 63E-06         3 46E-04         2 7 86E-05         7 500         7 500         0 0E+00           propara         1 66E+02         7 10E-06         4 22E-03         3 44E-04         2 7 86E-06         4 16E-05         1 7 E-04	75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5.61E-03	25	330 55	523 00	568,8	0 0E+00	5 0E-01
cyclopentadiene         1 4 1E+06         1 12E-02         5 69E-06         1 80E-01         4 47E-02         1 09E-03         25         603 69         846 31         1 3,000         1 3E-03         6 69E-06         1 80E-00         1 11E+00         2 71E-02         2 71E-02         2 5 12,15         7 46 00         1 0,931         0 0E+00           spropane         4 68E+01         6 23E-02         6 76E-06         1 20E+04         2 72E-04         6 63E-06         2 7 88 55         715 00         1 0,931         0 0E+00           propane         4 37E+01         7 82E-02         8 73E-06         2 72E-04         6 63E-06         2 7 86-06         7 590         0 0E+00           propane         4 37E+01         7 80E-02         8 73E-06         4 22E-01         1 7 8E-04         2 5 369 52         572 00         7 590         0 0E+00           propane         1 80E+02         9 10E-06         4 4 2E+03         3 7 4E-04         2 5 369 52         560 20         7 505         1 7 E-05         6 600           propertion         1 6E+02         7 90E-06         4 2 2E-01         1 03E-04         2 5 369 52         560 50         7 505         1 7 E-05         6 600         1 0 E-05         1 0 E-05         1 0 E-05         1 0 E-05         1 0	75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2.25E+03	1 07E+00	2 615-02	25	304 75	576 05	6,247	5 0E-05	0 0E+00
cyclopentadiene         2 00E+05         1 61E-02         7 21E-06         1 80E+00         1 11E+00         2 71E-02         2 512.15         746 00         10,931         0 0E+00           cyclopentadiene         2 00E+05         1 61E-04         2 72E-04         6 63E-06         25         488 35         715 00         10,271         2 7E-07         0 0E+00           spropane         4 58E+01         7 82E-02         8 73E-06         4 22E-04         1 15E-01         2 80E-03         25         369 52         572.00         7,590         0 0E+00           system         1 80E+02         8 10E-06         4 42E+03         3 74E-02         9 12E-04         25         386 15         602 00         8,322         1 6E-05         6           system         1 66E+02         7 90E-02         9 10E-06         4 22E-01         1 03E-02         2 36 36         5 44 20         7,556         1 7E-05         6           achlorosthane         9 33E+01         7 10E-02         7,90E-06         2 97E+03         1 4 1E-02         3 44E-04         25 550 54         803 15         1 2,155         0 0E+00	76448 Meptachior		1415+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	1 3E-03	0 0E+00
4.00E+01 0 20E-02 0 70E-04 1 20E+04 2 7/2E-04 6 63E-06 25 488 35 715 00 10.271 2 7E-07 propane 4.00E+01 7 82E-02 8 73E-06 2 80E+03 1 15E-01 2 80E-03 25 369 52 572,00 7,590 0 0E+00 arcethane 5 01E-02 8 80E-06 4 22E+03 3 74E-02 9 12E-04 25 386 15 602 00 8,322 1 6E-05 rightne 1 66E+07 7 90E-02 9 10E-06 1 10E+03 4 22E-01 1 03E-02 25 360 36 544 20 7,50E 1 7E-06 architorethane 9 33E+01 7 10E-02 7,90E-06 2 97E+03 1 41E-02 3 44E-04 25 419 60 661.15 8,996 5 8E-05 me 7 08E+03 4 21E-02 7 69E-06 6 38E-03 1 58E-03	7974 Hexachiorocyclopentax	ene tene	2 00E+05	1 61E-02	7 21E-06	1 805+00	111E+00	2716-02	25	512.15	746 00	10,931	00=+00	7 0E-05
ane $+3.12+0.1$ $+0.22-0.2$ $0.75-0.0$ $0.02-0.0$	78875 1 2-Dichlomores		4.68E+01	5 23E-02	6 755-06	1 20E+04	2 72E-04	6 635-06	8 8	488 35	715 00	10,271	2 7E-07	0 0E+00
1 66E+02 7 90E-02 9 10E-06 1 10E+03 4 22E-01 103E-04 25 360 36 61.15 8,996 5 8E-05 0ethane 9 33E+01 7 10E-02 7 69E-06 4 24E+00 6 36E-03 1 55E-04 25 550 54 803 15 12.155 0 0E+00	79005 1,1,2-Trichloroethane		5016+01	7 80E-02	8 80F-06	4 42E+03	3.74E-02	2 80E-03	0 K	309 32	972.00	D&C' /	1 65-06	4 OF 03
cethane         9 33E+01         7 10E-02         7,90E-06         2 97E+03         1 41E-02         3 44E-04         25         419 60         661.15         8,996         5 8E-05           7 08E+03         4 21E-02         7 69E-06         4 24E+00         6 36E-03         1 55E-04         25         550 54         803 15         1 2,155         0 0E+00	79016 Trichloroethylene		1 66E+02	7 90E-02	9 10E-06	1 10 - 403	4 22E-01	1 03E-02	3 %	360.36	544 20	7.505	75-06	0 0E+00
7 08E+03 4 21E-02 7 69E-06 4 24E+00 6 36E-03 155E-04 25 550 54 803 15 12.155 0 0E+00	79345 1,1,2,2-Tetrachioroeths	ne me	9 33E+01	7 10E-02	7.90E-06	2 97E+03	1 41E-02	3 44E-04	32 1	419 60	661.15	8,996	585-05	000+000
	83329 Acenaphthene		7 08E+03	4 21E-02		4 24E+00	6 365-03	1 55E-04	25	550 54	803 15	12,155	000-00	2 1E-01

2000			!		VLOOKUP TABLES							•
84742 Die Heinyprinalate	2 68E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 But/d benzyl obthalate	3 35E+04	4 38E-02	/ 86E-06	1 12E+01	3855-08	9 39E-10	S 5	613 15	798 67	14,751	음 번 번 번	35501
86306 N-Nitrosodiphenytamine	1.29E+03	3 12E-02	6.35F-06	3.51F+01	2 17 E-03	1 20E-06	0 %	637.78	900 45	2000	00 ut 100 t	/ OE-01
86737 Fluorene	1 38E+04	3 63E-02	7 88E-06	1 98E+00	2 61E-03	6.37E-05	3 2	570 44	870 00	12.666	0.000	145-01
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	25	627 87	999 00	13,977	5 7E-06	0 0 0
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0 0E+00
88062 2.4.6-Trehlorohend		3 185-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	52	582 15	813.20	14,000	3 4E-05	0000
	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98 F-07	7 7 0E-00 4 83E-04	8 %	019 10	749 40	000,21	3 11-06	00000
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 11E+00	1 64E-07	4 005-09	2 2	560 26	754 03	13,000	135-04	00+00
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	52	417 60	630 30	8,661	0 0E+00	7 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	52	464 19	697 60	10,800	0.0E+00	186-01
95578 2-Chlorophenol	8 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	52	453 57	705 00	9,700	0 0E+00	2 0E-01
95954 2,4,5-Trichtorophenol	1 60E+03	2 91E-02	7 035-06	1 20€+03	1 78F-04	3 30E-04	3 %	44/ 33 526 15	750 13	3,5/2	20+100	1 8E-02
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	3 52	483 95	719 00	10,566	00000	2 00-03
100414 Ethylbenzene	3 63E+02	7 50E-02		1 69E+02	3 23E-01	7 88E-03	25	409 34	617 20	8,501	0 0E+00	1 0E+00
100425 Styrene 105629 2 4-Demothshope	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03	52	41831	636 00	8,737	0 0E+00	1 0E+00
106423 p-Xydene	3 895+02	2 84E-02	8 595-05	/ 8/E+03	8 20E-05 3 14E-01	2 00E-06 7 66E 03	<b>5</b> 2	484 13	707 60	11,329	0 OE+00	7 0E-02
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02		7 38E+01	9.96E-02	2.436-03	8 %	41132	616.20	8,525	904400	7 UE+00
	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	8 8	503 65	754 00	11.689	000+00	1 45-02
107062 1,2-Dichtoroethane	1 74E+01	1 04E-01	9 90E-06	8 52E+03	4 01 E-02	9 78E-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10 <b>E</b> -02	5 12E-04	52	345 65	519 13	7,800	0 0E+00	2 0E-01
108883 Tolings	4 0/=+02	/ UOE-02	7 80E-06	1 61E+02	3015-01	7 34E-03	52	412 27	617 05	8,523	0 0E+00	7 0E+00
	2 19E+02	7.30F-02	8 70F-08	3 20ET02 4 72E±02	2 / ZE-01 3 52E-01	5 53E-U3	2 2	383 78	591 79	7,930	8 9 9 9 9 9 9	4 0E-01
108952 Phenol	2 88E+01	8 20E-02	9 105-06	8 28E+04	1 63E-05	3 985-07	8 %	404 8/	632.40	0,410	000+00	2 0E-02
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1.80E-05		451 15	659 79	076,0	30.00	2 15+00
115297 Endosultan	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1.12E-05		674 43	942 94	14,000	0 0E+00	2 1E-02
117817 Bis(2-ethylhexyl)phthalate	1 51E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-08	1 02E-07	52	657 15	806 00	15,999	4 0E-06	0 0E+00
118741 Hevachlomberzene	8 32E+0/	1 515-02	3.585-06	2 00E-02	2 74E-03	6 68E-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
120127 Anthracene	2 95E+04	3 24E-02	7.745-06	6 20E+00	541E-02	1 32E-03 8 51E-05	8 8	582 55 615 18	825 00	14,447	4 6E-04	00 H 00 O
120821 1,2,4-Trichtorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03	8 %	486 15	725.00	12,51	001100	1 1E+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06		482 15	708 17	11,000	00000	1 15.02
121142 2,4-Dinitrotoluene		2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08		990 00	814 00	13,467	1 9E-04	0 0E+00
124481 Chlorodibromomethane	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04		416 14	678 20	8,000	2 4E-05	0 0E+00
120000 Pyrana	1 55E+02	7 205-02	8 20E-06	2 00E+02	7.546-01	1 84E-02		394 40	620 20	8,288	5 8E-07	0.0E+00
156592 cis-1.2-Dichlomethylene	3.556+01	2 / ZE-02 7 36E-02	1 135-05	1 35E-01	4 5315-04	1 10E-05	52	667 95	936 00	14,370	S+H0 0	1 16-01
156605 trans-1,2-Dichloroethylene		7 07E-02	1 19E-05	6 30F+03	3 85 5-01	9 395-03		333 63 320 86	544 00	7,192	0 0 0 0 0	3 5E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06	25	809.15	1078 24	17,017	2 15-04	7 OE+07
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02		1 50E-03	4 55E-03	1 11E-04		715 90	969 27	15.000	2 16-04	00±0 00±0
206440 Fluoranthene	1 07E+05	3 02E-02		2 06E-01	6 60E-04	1 615-05		655 95	905 00	13,815	0 0E+00	1 4E-01
21 PO 1 Character	1 235+06	2 26E-02	5 565-06	8 00E-04	3 40E-05	8 29E-07	52	753 15	1019 70	16,000	2 1E-05	0 0E+00
309002 Aldrin	2 45F+06	1 325-02	4 86F-06	1 80 11-03	3 88E-03 6 67E na	9 46E-U5		714 15	979 00	16,455	2 1E-06	0 0E+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02		2 00E+00	4 35E-04	1.05E-05		596 55	8393/	13,000	4 9E-03	0 0 1 0 0
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07	2 22	596 55	839.36	13,000	5 3E-03	00+400
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	177E-02		381 15	587 38	7,000	3 7E-05	2 0E-02
501547 N Missouri a paracitation	6 92E+01	3 27E-02		1 82E+02	3 06E-05	7 46E-07		558 00	770 00	12,938	1 9E-04	0 0E+00
1024573 Hentachlor enoxide	8 325+04	1 325-02	4 22E.08	3 00E-03	9 235-05	2 25E-06	52 5	509 60	746 87	11,000	2 0E-03	0 0E+00
7439976 Mercury (elemental)		3 07E-02		5 62E-02	4 67E-01	1.145-02		679.88	848 /6 1750 00	13,000	2 6E-03	0.000
8001352 Toxaphene	2 57E+05	1 16E-02		7 40E-01	2 46E-04	6.005-06		657 15	873.31	14,127	30,000	3 0 0 0 0
11096825 Arador 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	52	402 50	539 37	19,000	1 00.04	00+00
11097691 Aroclor 1254 (PCB-1254)	2 00E+05	1 56E-02		5 70E-02	8 20E-02	2 00E-03	52	377 50	512 27	19,000	1 00.04	0 OE+00
126/4112 Arador 1016 (PCB-1016) 53469219 Arador 1242 (PCB-1242)	3 30E+04	2 22E-02 2 14E-02	5 42E-06 5 31E-06	4 20E-01	1 19E-02 2 13E-03	2 90E-04	8	340 50	475 22	18,000	1 0E-04	00E+00
Arrest the Australia comment of the Comment		1	00150	3 405-01	Z 13E-0Z	3 2UE-14	Q	345 5U	482 20	18,000	1 0E-04	0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 1.2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

T.	ENTER User-defined stratum A soli vapor permeability, k, (cm²)		
	0 S	7	_
	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	C ENTER	Stratum C soil water-filled porosity, $\theta_w^{C}$ $(cm^3/cm^3)$
	ENTER SCS soil type directly above	ENTER	soil total soil total porosity, n <sup>c</sup> (unitless)
	ENTER Soll stratum directly above water table, (Enler A, B, or C)	ENTER	soll dry soll dry bulk density, p <sub>b</sub> <sup>c</sup> (g/cm³)
eue	ENTER Tuckness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Stratum B	Sulfaturing soil water-filled porosity, $\theta_w^B$ $(cm^3/cm^3)$
ChemicalTrichloroethylene	INTER ENTER ENTER  Totals must add up to value of L <sub>WY</sub> (cell D28)  Thickness Thickness of soil of soil of soil stratum B, stratum C, atum A, (Enter value or O) (Enter value of h <sub>A</sub> h <sub>B</sub> h <sub>C</sub> (cm)	117348 ENTER Stratim B	soil total porosity, n <sup>8</sup> (unitless)
	ENTER Totals mu Thickness of soil stratum A, h,	1173 48 ENTER Stratum B	soil dry soil dry bulk density, $ ho_b^B$ (g/cm³)
	ENTER Depth below grade to water table, Lwr (cm)	2346 96 ENTER	soil water-filled porosity, bull $\theta_w^A$ $\theta_w^A$ $(cm^3/cm^3)$
ENTER Initial groundwater conc , Cw (Jug/L)	ENTER Depth below grade to bottom of enclosed space floor, Lr (cm)	15 ENTER Stratum A	_
Chemical CAS No (numbers only, no dashes)	ENTER Average soil/ groundwater temperature, T <sub>S</sub> (°C)	16 ENTER Stratum A	soil dry bulk density, Pb <sup>A</sup> (g/cm³)

	0.43	0.5	17	0.42	0.27	17	0 43	03
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
space	Sorl-bldg	space	space	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	Space	seam crack	air exchange		
hickness,	differentlal,	length,	width,	height,	width,	rate,		
L Sec	ΦD	ŗ,	WB	ะ	3	띪		
(сш)	(g/cm-s²)	(cm)	(cm)	(cm)	(cm)	(1/h)		
15	40	961	961	488	01	0.45		

risk-based	Used to catculate risk-based	-			
1	1 0E-06	350	30	30	70
(unitless)	(unitless)	(days/yr)	(yrs)	(yrs)	(yrs)
JH.		Ь	<b>a</b>	AT	ΑT <sub>C</sub>
oncarcinogens,	_		duration,	noncarcinogens,	cardinogens,
quotient for		Exposure	Exposure	time for	time for
Target hazard	Target			Averaging	Averaging
ENTER		ENTER	ENTER	ENTER	ENTER
0.1	488	961	961	40	15

#### 2 of 7

CHEMICAL PROPERTIES SHEET

Reference conc., RfC	0 0E+00
Unit nsk factor, URF	1.7E-06
Pure component water solubility, S	1 10E+03
Organic carbon partition coefficient, K <sub>sc</sub>	1 66E+02
Cntical temperature, Tc	544 20
Normal boling point, T <sub>B</sub>	360 36
Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$	7,505
Henry's law constant reference temperature, T <sub>R</sub>	25
Henry's faw constant at reference temperature, H	1 03E-02
Diffusivity in water, D., (cm²/s)	9 10E-06
Diffusivity in alt, D <sub>a</sub> (cm <sup>2</sup> /s)	7 90E-02

Exposure	Sourca- building	Stratum A soil air-filled	Stratum B soil air-filled	Stratum C soil air-filled	Stratum A effective total fluid	Stratum A soil intrinsic	Stratum A soil relative arr	Stratum A soil effective vapor	Thickness of capillary	Totat porosity in capillary	Air-filled porosity an capalary	Water-filled porosity in capillary	Floor- wall seam
durætlon, t	separation, L <sub>T</sub>		porosity, <sub>0</sub> 8	porosity, 6 <sub>a</sub> c	saturation, S <sub>te</sub>	permeability, k	permeability, k <sub>ra</sub>	permeability,	zone, L.,	Zone,	zone,	zone,	penmeter, X
(sec)	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm³/cm³)	(cm <sup>2</sup> )	(cm <sup>2</sup> )	(cm²)	(cm)	(cm <sup>3</sup> /cm <sup>3</sup> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sup>3</sup> /cm <sup>3</sup> )	(cm)
9 46E+08	2331 96	0 230	0 150	0 130	0 365	7.49E-10	0 797	5 97E-10	17 05	0 42	0 126	0 294	3,844
										`			
	Area of enclosed	Crack-	Crack	Enthalov of	Henry's law	Henry's law	Vanor	Stratum	Stratum	Stratum	Capillary	Totai	
Bldg	space	to-total	depth	vaporization at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
ventilation	woled	area	pelow	ave groundwater	ave groundwater	ave groundwater	ave. sot	diffusion	diffusion	diffusion	diffusion	diffusion	path
rate,	grade,	ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient,	coefficient,	length,
Obulking	₹	۴	Zanck	ΔH <sub>v,τs</sub>	H s	H. St	μтѕ	۵	,	۵	_  	۵	ٿ
(cm <sub>3</sub> /s)	(cm²)	(nuitess)	(cm)	(cat/mol)	(atm-m³/mol)	(unitess)	(g/cm-s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm²/s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm)
5 63E+04	9 24E+05	4 16E-04	15	8,483	6 60E-03	2 78E-01	1 77E-04	3 20E-03	8 11E-04	0 00 = +00	4 52E-04	1 28E-03	233196
						Exponent of	Infinite						
	ć		Average	Crack		equivalent	source	Infinite					
CONSCION	Source	ć	vapor	errective		toundation	tadoor	source	ž				
paru	vapor	במב במבי	llow rate	diffusion	Area of	Peciet	attenuation	pldg	пsk	Reference			
length,	conc,	radius,	into bidg.,	coefficient,	crack,	number,	coefficient,	COLIC,	factor,	conc '			
<u>.</u>	Catouros	fcrack	o o	Dalla	Acrack	exp(Pe <sup>1</sup> )	ಶ	Couliding	URF	R S			
(cm)	(mg/m³)	(cm)	(cm <sub>3</sub> /s)	(cm <sup>2</sup> /s)	(cm²)	(unitiess)	(unitless)	(µg/m³)	(µg/m³) ¹	(mg/m <sub>3</sub> )			
15	2.78E+02	0 10	5 70E-01	3 20E-03	3.84E+02	1 05E+03	4 76E-06	1 32E-03	1.7E-06	ΨZ			

ALCULATIONS:
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NCENTR
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RISK-BASED G

INCREMENTAL RISK CALCULATIONS

Hazard quotlent from vapor intrusion to indoor air, noncarcinogen (untiless)	NA
Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	NA
Final indoor exposure groundwater conc (ug/L)	1.08E+03
Pure component water solubility, S S (µg/L)	1 10E+06
Risk-based indoor exposure groundwater conc, (µg/L)	1 08E+03
indoor exposure groundwater conc , noncarcinogen (µg/L)	NA
Indoor exposure groundwater conc, carcinogen (µg/L).	1 08E+03

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

			Only Described to the Control of the	1000		VLOOKUP TABLES	LES				,		
SCS Soil Type	K <sub>s</sub> (cm/h)	α (1/cm)	N (unitiess)	M (unitless)	θ. (cm³/cm³)	e, (cm³/cm³)	Mean Grain Diameter (cm)						
O	0.20		1 09	0 083	0 38	0 068	0.0092						
<u>. د</u>	0.26	0 0 19	131	0 237	0.41	0 095	0 016						
<u>.</u>	\$ 5	0 036	156	0 359	0 43	0 078	0 050						
7 C	14 59 20 20	0 124	2 28	0 561	0 41	0 057	0 040						
ပ္သ	0 12	0.143	1 23	0 187	0.40 0.38	0.045	0 044						
SCL	131	0 028	1 48	0 324	0 39	0 100	0 029						
-S	0 25	0 016	1 37	0.270	0.46	0 034	0 0046						
200	0 0	0 002	1 09	0 083	0 26	0 0 0 0 0 0	6800 0						
	200	0 0 0 0	123	0 187	0.43	680 0	0 0056						
SL	4,42	0.020	1.89	0 291 0 471	0 45 0 41	0 067	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
			-						1				
					Chemic	Chemical Properties Lookup Table	okun Table						
		Organic			Pure		Henry's	Henry's			Enthalox of		
		carbon			component		law constant	law constant	Norma		vanorization at	÷	
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	polling	Critical	the normal	ž ž	Reference
	Ū	coefficient,	in air,	in water,	solubility,	law constant	temperature,	temperature,	point	temperature,	boiling point,	factor,	conc,
ON OOO		Α <sup>(2)</sup>	<b>ءً</b> و	, D.,	တ	Ì.	Ξ.	μç	rª ₹	F° ;	ΔH, Þ	유	St.
Chemical		(GH //B)	(s/_u)	(cm-/s)	(mg/L)	(unitless)	(atm-m²/mol)	(Ç)	ફ ફ	(³K)	(cal/mol)	(mg/m³)	(mg/m³)
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11000	20.75.0	u c
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	90-300 6	1 62E-03	4 63E-05	1 135-06	25	71590		500,50	9 15 03	
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 OGE-OG	2 79E+03	1 82E-05	4 44E-07	25			15,000	0 0E+00	7.05-03
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 495-03	6 03E-07	1 47E-08	25			16,000	2 1E-03	00100
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25			7,127	1 SE-05	0 0E+00
57749 Chlordana		3 98E+05	5 10E-02	9 00E-06	9 405-03	137E-04	334E-06	25		-	15,000	2 1E-04	00##00
58899 damma-HCH (Lindane)		1 075 +03	1 425-02	4 3/E-06 7 34E-06	5 50E-02	1 99E-03	4 85E-05	25			13,000	3 7E-04	0 0E+00
		2 14E+04	125E-02	4 74F-06	1.95F-01	5 19E-04	0-10-10-10-10-10-10-10-10-10-10-10-10-10	C7 12	290 22	839 36	13,000	3 7E-04	0 0E+00
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6315-05	1548-06	2, 2,			13,000	4 0E-03	0 0 E + 0 G
67641 Acetone		5 75E-01	124E-01	114E-05	1 00E+06	1 59E-03	3 88E-05	25			6.955	00+00	3.5F-01
67663 Chloroform		3 98E+01	1 04E-01	1 00E-05	7.92E+03	1 50E-01	3 66E-03	25			986,9	2 3E-05	0 0E+00
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25			9,510	4 0E-06	0 0E+00
71432 Benzene		5 92E+00	8 005-02	9305-06	7 40E+04	3 61 1 - 04	8 805-06	25			10,346	0 0E+00	3 5E-01
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1335+03	7 05E-01	3 30E-03 1 72E-02	67 4	353 24	562 16	7,342	8 31-06	000+00
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 515-06	72			12,000	00+00	1 11-03
72435 Methoxychior		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25			14,000	00000	1 8E-02
7255 DDC		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25			14,000	6 9E-05	0 DE+00
74839 Methyl bromide		1056+01	7.285-02	1215-00	1.205-01	8 51E-04	2 10E-05	25			13,000	9 7E-05	0 0E+00
75014 Vinyl chloride (chloroethene)	, e E	1 86E+01	1.20E-01	123F-06	2 76F±03	1115+00	0.24E-03	ខ្ម	2/6/7	467 00	5,714	001400	9 OE-03
75092 Methylene chlonde		1 17E+01	1 01E-01	117E-05	1 30E+04	8 98E-02	2 7 152	2, 2,			9,230	4 4 6 5 6 5 6 5 6 5 6 5 6 5 6 6 6 6 6 6	00+000
75150 Carbon disulfide		4 57E+01	1 04E-01	1 00E-05	1 19€+03	1,24E+00	3 025-02	25			6.391	0 0E+00	7.0F-01
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25			9,479	1 16-06	0 0E+00
75243 4 Pitti		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25			7,000	1 8E-05	0 0E+00
75354 1.1-Dichlomethylene		3 16E+01	7 42E-02	1 05E-05	5 065 +03	2 30E-01	561E-03	25			588,9	00==00	5 0E-01
76448 Hentachior		1416+06	1 12E-02	A 69E-05	1 ROE-01	1 U/E+00	2 61E-02	25			6,247	5 06-05	005+00
77474 Hexachlorocyclopentadiene	9	2 00F+05	1615-02	7 215-06	1 805-0	1,15+00	1 09E-03	57.0			13,000	1 3E-03	00E+00
78591 isophorone	?	4 68E+01	6 23E-02	6 76E-06	1.20E+04	2 72F-04	27.15-02	D K	21 Z T C	745 00	10,931	0 UE+00	, UE-US
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25 25			7.590	0 0E+00	4 OE-03
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25			8,322	1 65-05	00E+00
79016 Trichloroethytene		1 66E+02	7 90E-02	9 10E-06	1 10€+03	4 22E-01	1 03E-02	25			7,505	1 7E-06	0 0E+00
83329 Aceneohthere	œ.	9 33E+01	7 105-02	7 90E-06	2 97E+03	1 41E-02	3 446-04	52	419		966'8	5 8E-05	005+00
		י שפר א	<b>7</b> 0-⊒17 <b>*</b>	200	4 24≅+00	4 36E-03	1 55E-04	<b>6</b> 2	550 54	803 15	12,155	0 05 +00	2 1E-01

				>	VLOOKUP TABLES							
84742 Diethylphthalate	2 885+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0 0E+00	2 8E+00
85687 Retra barra rathelete	3 395+04	4 38E-02	7 86E-06	1 12E+01	3.85E-08	9 39E-10	52	613 15	79867	14,751	0 0E+00	3 5E-01
	1 20E+04	3 125 02	4 65E-00	2 645+00	01/6-00	1 255-06	52	660 60	839 68	13,000	0 0E+00	7 OE O1
86737 Fluorene	1 38E+04	3 635-02	7.885-06	1 986+00	2 U3E-04	5 00E-06	52	632.28	890 45	13,000	1 46-06	000
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 535-08	3 %	627.87	899.00	13 977	5 75.06	00+40
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23€+00	3 34E-01	8 15E-03	25	486,15	738 00	10,206	2 2E-05	00+00
87865 Pentachtorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	25	582 15	813 20	14,000	3 4E-05	0 0E+00
91203 Nachthaless	3 815+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	52	519 15	749 03	12,000	3 1E-06	0 0E+00
91941 3.3-Dichlorobenzidme	7.24F+02	3 30E-02	7 30E-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	000-00	14601
95476 o-Xylene	3 63 5 + 02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20F-03	8 K	350.25	/54 U3 630 30	9,000	1 35 C	0 0E+00
95487 2-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	2 2	464 19	697 60	10.800	000+00	87.0
		6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	22	453 57	705 00	9,700	0 OE+00	2 05-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9,572	0 0E+00	1 85-02
93934 Z.4.3-Inchlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 785-04	4 34E-06	52	526 15	759 13	13,000	0 0E+00	3 5E-01
100414 Ethybenzene	3 635407	7 505-02	8 50E-05	2 09E+03	984E-04	2 40E-05	52	483.95	719 00	10,566	0000	2 0E-03
	7 76E+02	7 105-02	8 00E-06	3 105+02	3.23E-01	7 88E-03	5 K	409 34	617.20	8,501	00400	100.00
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	25	484 13	707 60	11,329	00+100	7 05-00
	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	92	411 52	616 20	8,525	00000	7 OE+00
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 905-06	7 38E+01	9 96E-02	2 43E-03	52	447 21	684 75	9,271	00E+00	8 0E-01
	6 615+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	52	503 65	754 00	11,689	0.05+00	1 4E-02
107002 1,2-Dichlorbethane	1 74E+01	1 04E-01	90-306	8 52E+03	4 01E-02	9 78E-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
108034 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	22	345 65	519 13	7,800	0 0E+00	2 0E-01
108883 Tolliene	4 U/E+UZ	7 00E-02		1 51 = +02	3015-01	7 34E-03	52	412 27	617 05	8,523	0 0E+00	7 0E+00
	2 19F+02	7.30F-02	8 705-06	3 20E+02 4 72E+03	1.525-01	5 63E-03	ខ្ល	383 78	591 79	7,930	0000	4 0E-01
108952 Phenol	2 88E+01	8 20E-02	9 105-06	8 28F+04	1835-06	3 085-03	8 8	404 87	632.40	8,410	0000	2.0E-02
111444 Bis(2-chloroethyl)ether	155E+01	6 92E-02		1 72E+04	7 38E-04	1 805-05	3 15	451 15	659 79	028.0	3 35 04	2 15+00
	2 14E+03	1 15E-02	4 55E-06	5.10E-01	4 59E-04	1 12E-05	25	674 43	942 94	000.4	0 0E+00	2 1E-02
117817 Bis(2-ethylhexyf)phthalate	151E+07	3.51E-02		3 40E-01	4.18E-06	1 02E-07	25	657 15	806 00	15,999	4 0E-06	0 0E+00
117840 Den-Octyl primalate	8 32E+07	151E-02		2 00E-02	2 74E-03	6 68E-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
120127 Anthracens	2 95F±04	3 24E-02	3 91E-06	6 20E+00	5415-02	1 32E-03	52	582.55	825 00	14,447	4 6E-04	0 0E+00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23 E-06	3 00F+02	5.825-03	6 57E-U5	3 %	615 18 496 16	873 00	13,121	000	115,00
120832 2,4-Dichlorophenol	147E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 175-06	3 %	482 15	708 17		00+400	2 0E-01
121142 2,4-Dintrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27 E-08	22	590 00	814 00		195-04	00400
	631E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04	52	416 14	678 20	8,000	2 4E-05	00+00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	52	394 40	620 20		5 8E-07	0 0 0 0
159000 Pyrana 156592 des 12-Dichlossethylana	1 05E+05	272E-02	7 24E-06	135E-01	4 51E-04	1 105-05	25	667 95	936 00		0 0E+00	116-01
156605 trans-1.2-Dichlomethylene		7.075-02	1 195-03	3 30E+03	1 0/E-U1	4 07E-03	3 3	333 65	544 00	7,192	00+300	3 5E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6.56F-05	1 60 1 - 0 8	0 K	320 85 809 16	516 50		0 0E+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1116-04	22	715 90	72 696	500	2 in 4	00+100
206440 Fluoranthene	1 07E+05	3 025-02	6 35E-06	2 06E-01	6 60E-04	161E-05	52	655 95	905 00	13.815	0 0E+00	146-01
20/089 Benzo(k)fluoranthene	1 23E+06	2 26E-02		8 00E-04	3 40E-05	8 29E-07	52	753 15	1019 70		2 1E-05	0.0E+00
210019 Chiyasha 309002 Akhno	3 90E+U3	2 48E-02	6 21E-U6	1 605-03	3 88E-03	9 46E-05	25	714 15	979 00	16,455	2 15-06	0 0E+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02		2 00F+00	4 35E-03	1 /0E-04	52	603 01	839 37	13,000	4 9E-03	0 0 ± +00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44 1-07	2 2	390 33 506 55	838 36	13,000	185-03	0.05+00
542756 1,3-Dichlorapropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02	2 22	381 15	587.38		2 2E-04	0 UE+00
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02			3 06E-05	7 46E-07		558 00	770 00		1 9H-04	0.05+00
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02		9 89E+03	9 23E-05			509 60	746 87	11,000	2 0E-03	0 0 0 0
1024573 Republication epoxide	8 325+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	951E-06			848 76		2 6E-03	0 0E+00
8001352 Toxaphene	2.57E+05	1 16F-02		2 02E-02 7 40E-01	2 46E-04	1 14E-02	52 52		1750 00		00=+00	3 05-04
11096825 Arodor 1260 (PCB-1260)	2 90E+05	138E-02		8 00E-02	1 89E-01	6 00E-06 4 60E-03	0 K	657 15 402 50	67331	14,000	3254	0000
11097691 Arador 1254 (PCB-1254)	2 00E+05	1 56E-02		5 70E-02	8 20E-02	2 00E-03	3 23		539 57 512 27	19,000	10E-04	00000
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2 22E-02		4 20E-01	1 19E-02	2 90E-04	22		475 22	18,000	1 GF 24	00+100
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2.14E-02	531E-06	3 40E-01	2 13E-02	5 20E-04	22	345 50	482 20	18,000	유 2 2	00±400

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

YES

		ENTER	User-defined stratum A soll vapor permeability, k,	
			o R	7
		ENTER	a He	C
		ENTER	SCS soil type directly above	S
		ENTER	Soil stratum directly above water table,	8
	hane	ENTER ILwr (cell D28)	Thickness of soil stratum C, (Enter value or 0)	0
Chemical	1,1,2-Trichloroethane	ENTER ENTER ENTER Totals must add up to value of L <sub>w1</sub> (cell D28)	Thickness Thickness Thickness of soil of soil of soil stratum B, stratum C, stratum A, (Enter value or 0) (Enter value or 0) h, he he he	1173 48
		ENTER Totals mu	Thickness of soil stratum A,	1173 48
·		ENTER	Depth below grade to water table, Lwr	2346 96
ENTER Initial groundwater conc. Cw (µg/L)	26 19434783	ENTER Depth	below grade to bottom of enclosed space floor, Lr	15
ENTER Chemical CAS No (numbers only,	79005	ENTER	Average soll/ groundwater temperature, T <sub>s</sub>	16

Stratul Soil wate
$\theta_w^A$ $\theta_b^B$ $(cm^3/cm^3)$ $(a/cm^3)$
ENTER EN
L <sub>B</sub> W <sub>B</sub>

			width, rate,	× ER	(cm) (1/h)	01 0.45	VTER	M hazard	tient for	dnogens,	마	unitless)
	Enctosed Flo		height, w		(cm)	488	ENTER			_		(unitless)
	space	floor	width.	We	(cm)	1 196	ENTER			frequency,		(days/yr)
3	space	floor	length,	<u>.</u> "	(cm)	961	ENTER		Exposure	duration,	<u> </u>	(yrs)
	Soil-bldg	pressure	differential,	ΔP	(g/cm-s²)	40	ENTER	Averaging	time for	noncarcinogens,	ATNC	(yrs)
1	space	floor	thickness,	Lorack	(cm)	15	ENTER	Averaging	time for	carcinogens,	ΑTc	(yrs)

Used to calculate risk-based groundwater concentration 1 0E-06

## CHEMICAL PROPERTIES SHEET

8 . <sub>[</sub>	ြု
Reference conc , R/C (mg/m³)	0 00
Unit risk factor, URF (µg/m³) ¹	1 6E-05
Pure component water solubility, S	4 42E+03
Organic carbon partition coefficient, $K_{\infty}$ (cm $^3$ /g)	5 01E+01
Critical temperature, T <sub>c</sub> (°K)	602 00
Normal boling point, T <sub>B</sub>	386 15
Enthalpy of vaporization at the normal bosiling point, AH, a	8,322
Henry's law constant reference temperature, T <sub>R</sub>	25
Henry's law constant at reference temperature, H	9 12E-04
Diffusivity In water, D <sub>w</sub> (cm²/s)	8 80E-06
Diffusivity in air,  D.  (cm²/s)	7.80E-02

	041	. 5 1 14
Floor-wall seam perimeter,	3,844	Diffusion path length, La (cm)
Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 294	Total  overall effective diffusion coefficient, D***  (cm²/s)
Aur-filled porosity in capillary zone, $\theta_{\mathbf{k},\mathbf{c}\mathbf{z}}$	0.126	Capullary Zone affective diffusion coefficient, Doff (cm²/s) 4 79E-04
Total porosity in capillary zone, $n_{ca}$	0.42	Stratum C effective diffusion, D <sup>eff</sup> c (cm²/s) Reference conc., RfC (mg/m³)
Thickness of capillary zone, Let (cm)	17 05	Stratum B effective diffusion coefficient, D***    Unit   isk   factor,   URF     URF
Stratum A soil soil effective vapor permeability, k, (cm²)	5 97E-10	Stratum A effective diffusion coefficient, Deff (cm²/s) 3 17E-03 Infinite source bldg. conc., Cuadana (µg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub> (cm²)	0 797	Vapor viscosity at ave soil temperature, p.rs (q/cm-s) (q/cm-s) infinite source indoor attenuation coefficient, a (unitless)
Stratum A soil intrinsic permeability, k (cm²)	7 49E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless) 2.33E-02 Exponent of equivalent foundation Peciet number, exp(Pe') (unitless)
Stratum A effective total fluid saturation,  Ste (cm <sup>3</sup> /cm <sup>3</sup> ).	0 365	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol) 5.53E-04 Area of crack, A <sub>crack</sub> (cm²)
Stratum C soil all-filled porosity, $\theta_{\bullet}^{c}$ $(\alpha n^{3}/2 m^{3})$	0 130	Enthalpy of vaporization at ave groundwater temperature, ΔH, τs (cal/mol) 9,507  Crack effective diffusion coefficient, Dead (cm²/s)
Stratum B soil air-filled porosity, $\theta_n^8$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade,  Zoset (cm)  15  Average vapor flow rate into bidg ,  Quot (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, e <sub>a</sub> * (cm³/cm³)	0 230	Crack- to-total area ratio, T (unitiess) 4 16E-04 Crack radius, crack (cm)
Source- building separation, L <sub>7</sub>	2331 96	Area of enclosed space below grade, Ae (cm²)  9.24E+05  Source vapor conc , Caores (μg/m³)
Exposure duration, t	9 46E+08	Bidg. ventilation rate, Qbuideno (cm <sup>3/s</sup> )  Convection path length, Lp (cm)

K-BASED GROUNDWATER CONCENTRATION CALCULATIONS
RISK-BASED GRO

INCREMENTAL RISK CALCULATIONS

Pure Final nicemental Hazard nicemental Hazard component indoor vapor from vapor water exposure intrusion to indoor air, indoor air, s conc.   Carcinogen noncardinogen (ug/L) (ug/L) (unitiess)   (unitiess)	Final incremental	Pure Final incremental incremental incremental risk from component indoor vapor water exposure intrusion to solubility, groundwater intrusion to indoor air, S conc, carcinogen (μg/L) (μg/L) (μg/L) (unitless)
	Pure component water solubirty, S S (µg/L)	Risk-based Pure indoor component exposure water groundwater solubility, conc, (ug/L) (ug/L) (ug/L)
Pure component water solubirty, S S (μg/L)	<b> </b>	Risk-based indoor exposure groundwater conc, (ug/L)
	Risk-based indoor exposure groundwater conc. (µg/L)	_ i L

Reference conc, RfC (mg/m³)

		- 1	erties L	okup Table		VLOOKUP TABLES	ES					
SCS Soll Type	К, (стил)	- 1	N (unitless)	M (unitless)	θ <sub>a</sub> (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)					
<u>ပ</u> ပ	0.50	800 0	109	0 083	0 38	0 008	0 0092					
<u>.</u>	9 7	0.019	131	0 237	0 41	0,095	0 016					
S J	4 50	0.036	900	0 359	5 4 4 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5	0.078	0 0 50					
∵ o	29 70	0 145	2 68	0.031	0 0	0.045	0.040					
၁	0 12	0 027	1 23	0 187	0 38	0 100	0 025					
SCL	# 6 6	6500	148	0 324	0 39	0 100	0 029					
<u> </u>	0 02	0.016	137	0.270	0 46	0 034	0 0046					
SICE	0 0 0	0010	2 2	0 187	0 43	680 0	0 0056					
18. 18.	0 45	0 020	141	0 291	0 45	790 0	1100					
		250	5	ř	<del>,</del>	con n	0.00	ı	1			
					Ö	-			1			
		Organic			Chemic	Chemical Properties Lookup Table	okup Table	1			1	
		carbon			component		law constant	nenry s law constant	Normal		Enthalpy of	-
		partition	Offusivity	Diffusivity	water	Henry's	at reference	reference	Douling	Critical	the normal	15 A
		coefficient,	in air,	ın water,	solubility,	law constant	temperature,	temperature,		temperature,	boiling point,	
CAS No		να (cm <sup>3</sup> /c)	(cm <sup>2</sup> /e)	D.,	s (104)	T F	₹ [-] 	r é	<b>e</b> {	မုန	ΔH <sup>ν</sup> ±	URF
		(Bring)	(5111.78)	(SII /S)	(mg/L)	(unitless)	(atm-m-/mol)	( <u>)</u>	<u> </u>	(3K)	(cat/mol)	(ma/m <sub>3</sub> )
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	90E-06	1 62E-03	4 63E-05	1 13E-06	25	715 90	969 27	15,000	2 15-03
51263 Z,4-Dinitrophenol		1 00E-02	2 73E-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	52	605 28	827 85	15,000	0 05+00
56235 Carbon tetrachloride		174F+02	7.80F-02	8 80F-06	2 49E-03	6 03E-0/	1 47E-08	52	743 24	990 41	16,000	2 1E-03
56553 Benz(a)anthracene		3 98E+05	5 10E-02	90-H00 6	9 40E-03	1 37E-04	3.345-06	3 52	708 15	1004 79	/2L'/	1 5E-US
57749 Chlordane		1 20E+05	1.18E-02	4 37E-06	5 60E-02	1 99E-03	4 B5E-05	22 23	624 24	885 73	13,000	3 75-04
58899 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 75-04
60571 Dieldrin		2,14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1.51E-05	25	613 32	842 25	13,000	4 6E-03
67641 Acetone		6 00E-01	5 36E-02	7.97E-06	3 50E+03	6 31E-05	154E-06	25	720 00	751,00	10,000	0.000
67663 Chloroform		3 98E+01	1045-01	1 00E-05	7 92E+03	1 50F-03	3 88E-U3 3 66E-U3	2 22	32920	508 10	6,955	0 0E+00
67721 Hexachloroethane		1 78E+03	2 50E-03	90-308 9	5 00E+01	1 59E-01	3 88E-03	25.	458 00	939 40	9.510	4 OF 08
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 615-04	8 80E-06	52	390 88	563 05	10,346	0.00
/1432 Benzene 71556 1 1 1 Trichlessone		5 89E+01	8 80E-02	9 80E-06	175E+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342	8 3E-06
72208 Endrin		1 23F+04	1 25F-02	8 80E-06	1 33E+03	7 USE-01	172E-02	25	347 24	545 00	7,136	0 0 0 0 0
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1.588-05	2 5	651.02	986 20	12,000	0.05+00
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	164E-04	4 00E-06	<b>52</b> 52	639 90	863.77	14,000	6 95-05
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44	86038	13,000	9 7E-05
74839 Methyl bromide	1	1 05E+01	7 28E-02	121E-05	1 52E+04	2 56E-01	6 24E-03	52	276 71	467 00	5,714	0 0E+00
75092 Methylene chloride	(eue	1 80E+U1	1065-01	1235-06	2 76E+03	1 11E+00	2 71E-02	25	259 25	432 00	5,250	8 4E-05
75150 Carbon disulfide		4 57E+01	1041-01	1 00F-05	1 195-103	0 90E-02	2 19E-03	52 15	313 00	510 00	6,706	4 7E-07
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34 F-04	25.	422.35	932 00 896 00	0,39	1 1E-06
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74 €+03	6 56E-02	1 60 E-03	3 50	363.15	585.85	000.7	1 8 1 05 1 05
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 305-01	5 61E-03	25	330.55	523 00	, coo.	000+00
75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2.25E+03	1 07E+00	2 61E-02	125	304 75	576 05	6,247	5 0E-05
7648 Heptachlor		1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	1 3E-03
7474 Hexachlorocyclopentaciene 78501 technome	ane	2 005+05	1 61E-02	7 21E-06	1 80E+00	1 11E+00	2715-02	25	512 15	746 00	10,931	0 0E+00
78875 1.2-Dichloropropane		4 37E+01	7 82F-02	8 735-06	2 80F+03	1155.04	2 805-03	25	488 35	71500	10,271	2 7E-07
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3.74E-02	2 COC-03	57	386 15	572 00	7,590 8,322	1 65-05
79016 Trichtoroethylene		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	S2 S2	36036	544 20	7,505	1 7E-06
79345 1,1,2,2-Tetrachtoroethane	•	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	25	419 60	661 15	8,996	5 85-05
63329 Acenaphinene		7 08E+03	4 21E-02	7.69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0 0E+00

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RASSO Dictional Library	t				VLOOKUP TABLES							•
84742 Oloching philadate	2 205-02	2 56E-02	6355-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13,733	0.0E+00	2 8E+00
85687 Buth benzy officials	5 755+04	4 36E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10	52	613 15	798 67	14,751	0000	3 56-01
86306 N-Nitrosodinhaovlamina	1 205-104	3 125 02	4 05 11-06	2,595+00	9 1/E-03	1 26E-06	8	09 099	839 68	13,000	0 0E+00	7 0E-01
86737 Fitnerene	1 38 5 +04	3 62 5 02	1 985 05	10+316	2 05E-04	5 00E-06	52	632 28	890 45	13,000	1 4E-06	00=+00
86748 Carbazole	3 3 6 1 1 2 3	3 005 02	7 200 7	1 386 +00	2 61E-03	6 37E-05	52	570 44	870 00	12,666	0 0E+00	1 4E-01
87683 Hexachloro-1.3-butadiene	5.37E+04	5 615-02	6 16E-06	3 235+00	3.34E-0/	1 535-08	5 2	627.87	899.00	13,977	5 7E-06	0 0E+00
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1.00F-08	2 44F-08	0 K	480 15 482 15	138 00	907.01	2 ZE-05	00+400
88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	22	519 15	749 03	12,000	3 15-08	00+00
91203 Naphthalene	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	00+300	145-01
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	674E-06	3 11E+00	1 64E-07	4 00E-09	25	560 26	754 03	13,000	1 3E-04	0 0E+00
93476 0-Aylene	3 63E+02	8 70E-02	1 00E-05		2 13E-01	5 20E-03	52	417 60	630 30	8,661	0.0E+00	7 0E+00
93437 Z-Metnyiphenol (o-cresol) 95501 1 2-Dichlomborano	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	25	464 19	697 60	10,800	0 0E+00	185-01
95578 2-Chlomohanot	3 RAE+02	5 045 02	7 90E-06	1 565+02	7 79E-02	1 90E-03	22	453 57	705 00	6,700	0 0E+00	2 0E-01
95954 2.4.5-Trehlorophenot	1 605-02	2015-02	7 035.06	1 205+04	1 60E-02	3 90E-04	52	447 53	675 00	9,572	00400	1 8E-02
98953 Nitrobenzene	6 46E+01	7 60F-02	867576	2 095+03	40-04 0-04 0-04	4 34 H-UG	8 8	526 15	759 13	13,000	00100	3 5E-01
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69F+02	3 23 12.01	2 40E-03	8 8	483.95	19 00	30,566	90 100	2 0E-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76F-03	2 2	418 31	636.00		00+100	00+10
	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	25	484 13	707 60	11 329	004400	20-10.
	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 665-03	<b>5</b> 9	411 52	616.20	8.525	000+00	7.05+00
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	52	447 21	684 75	9.271	0 0E+00	8 OF-01
1064/8 p-Chloroantine	6 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	25	503 65	754 00	11,689	0 0 0 0 0	1 4E-02
107 UGZ 1,Z-Dichloroethane	1 74E+01	1045-01	9 90E-06	8 52E+03	4 01E-02	9 78E-04	52	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m.V.Jene	00+107	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	22	345 65	519 13		0 0E+00	2 0E-01
108883 Tobiese	4 07 07	7 OUE-02	7 80E-06	1615+02	3015-01	7 34E-03	52	412 27	617 05		0.0E+00	7 0E+00
108907 Chlorobenzene	204020	4 70E-02	8 505-05	5 26E+02	2 72E-01	6 63E-03	52	383 78	591 79		0 0E+00	4 0E-01
	2 985+02	30007	6 70E-05	4 /ZE+0Z	1 52E-01	3 71E-03	25	404 87	632 40	8,410	0 0E+00	2 0E-02
111444 Bis/2-chloroethyllether	1555+01	6 92E-02	7 535 06	4 725 404	1 035-05	3 98E-07	52	455 02	694 20	10,920	0 05+00	2 1E+00
115297 Endosuttan	2 14E+03	1 15E-02	4 55E-06	5 105-01	7 30E-04 4 59E-04	1 805-05	52	451 15	659 79		3 35-04	0 0E+00
117817 Bis(2-ethythexyi)phthalate	1 51E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1.02E-07	3 %	657 15	942.94	500,4	0.0E+00	2 1E-02
117840 Di-n-octyl phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 74 E-03	6 68E-05	3 %		863 22	12,838	4 UT-UB	0 DE +00
	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 415-02	1 32E-03	22	582 55	825.00	14 447	4 55-04	20-10 V
	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6515-05	22	615 18	873 00	13,121	00100	1 1 1 1 00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03	52	486 15	725 00	10,471	00100	2 0E-01
	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06	25	482 15	708 17		000-00	1,1E-02
121142 Z,4-Unitrototuene 124481 Chlomalinomometron	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	52	290 00	814 00		1 9E-04	0 0E+00
127184 Tetrachlomethylene	0 31E+01	1 365-02	1 055-05	2 60E+03	3 215-02	7 83E-04	52	416 14	678 20	8,000	2 4E-05	0 0E+00
129000 Pyrene	1 055+05	2 22E-02	7 24E-08	2 WE + 02	7.040-01	1845-02	52	394 40	620 20		5 8E-07	0 0E+00
156592 as-1,2-Dichloroethylene	3.55E+01	7.36F-02	1 13 F-05	1 33E-01	1 675.01	1 10E-05	5 5	667 95	936 00		0.000	16-01
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 305+03	3 85F-01	9 395-03	6 K	333 03	544 00	7,192	0000	3 5E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60 1-06	3 %	320 03 809 15	00 910		0.01100	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06		4 55E-03	1115-04	3 2	715.90	969 27	000,74	2 년 년 2 년 2	00+400
206440 Fluoranthene	1 07E+05	3 02E-02	8 35E-08	2 06E-01	6 60E-04	1 61E-05	52	655 95	905 00	13.815	0.08+00	1 4F-01
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07	22	753 15	1019 70	16.000	2 1E-05	0 0F+00
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05	52	714 15	979 00	16,455	2 1E-06	0.05+00
SUBURY Alann	2.45E+06	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	52	603 01	839 37	13,000	4 9E-03	00=+00
3-19040 dipila-non (dipila-non)	1 255 +03	142E-02	7.34E-06	2 00E+00	4 35E-04	1 06E-05	52	596 55	839 36	13,000	185-03	0 05+00
542756 1 3-Dichlomorphane	4 575+03	6 26E-02	2000	2 405-01	3 05 - 20 - 2	7 445-07	52	596 55	839 36	13,000	5 3E-04	0 0E+00
606202 2 6-Dinitateliene	6 97E+01	3 275.02	1 00E-US	2 80E+03	7 26E-01	1 77E-02	25	381 15	587 38	7,000	3 7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamina	2 40F+01	5.45F-02	8 17F-06	0 89E+02	3.005-03	/ 46E-0/	52	558 00	770 00	12,938	1 95-04	0 0E+00
	8 32E+04	1 32E-02	4 23E-06	2.005-01	3 90 = 04	2 235-08 9 51E-08	0 4	509 60	745 87	1,000	2 0E-03	0 05+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 146-02	3 5	679.88	448 (6 4750 00		2 6E-03	00=+00
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	25	657 15	873.31		3 25 64	3 UE-04
11096825 Arador 1260 (PCB-1260)	2 90E+05	138E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	52	402 50	539.37	19,000	10H2	
11097691 Arador 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	22	377 50	512 27	19,000	1 OF 04	00+00
52469219 Amotor 1242 (PCB-1242)	3 30E+04	2 22E-02	5 421-06	4 20E-01	1 19E-02	2 905-04	52	340 50	475 22	18,000	1 0E-04	
(3031-30 ) 4031 1000-10 51 400000	5 50E 104	70-14: 7	3315-00	3 405-01	Z 13E-02	5 20E-04	22	345 50	482 20	18,000	1 0E-04	0 0E+00
					4							,

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and Initial groundwater conc below)

YES

,		ENTER	User-defined stratum A soil vapor permeablity, k, (cm²)
r			ate OR
		ENTER	stratum A SCS Soil type (used to estimate soil vapor permeability)
		ENTER	SCS soil type drectly above water table
•		ENTER	Soil stratum directly above water table, (Enter A, B. or C)
	lene	ENTER I Lw1 (cell D28)	Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)
Chemical	Tetrachloroethylene	INTER ENTER ENTER Totals must add up to value of L <sub>W7</sub> (cell D28)	Thickness   Thickness   Thickness   Thickness   Of soil   Of soil   Of soil   Of soil   Of soil   Of soil   Of soil   Of soil   Of soil   Of soil   Of soil   Of soil   Of soil   Of stratum A, (Enter value or 0)   (Enter value or 0)   Of the part of stratum A, (Enter value or 0)   Of the part of soil   Of
		ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub> (cm)
_		ENTER	Depth below grade to water table, Lwr (cm)
ENTER Initial groundwater conc , Cw (µg/L)	18 24217391	ENTER Depth	below grade to bottom of enclosed space floor, Lr (cm)
ENTER Chemical CAS No (numbers only, no dashes)	127184	ENTER	Average soul groundwater temperature, T <sub>S</sub> (°C)

	2	>		7.0	770		0.43	1	03
ENTER Enclosed	ENTER	ENTER Enclosed	ENTER Enclosed	ENTER	ENTER	ENTER			
space	Soil-bidg	space	space	Enclosed	Ftoor-wall	Indoor			
floor	pressure	floor	floor	space	seam crack	air exchange			
hlckness,	differentiat,	length,	width,	height,	width,	rate,			
Lenk	4	LB BB	₩	ī,	3	쫎			
(cm)	(g/cm-s²)	(cm)	(ED)	(cm)	(Eg	(1/F)			

ENTER
Stratum C
soli water-filled
porosity,
e,c

ENTER Stratum C soil total porosity, n<sup>c</sup>

ENTER Stratum C soil dry bulk density, Pb<sup>C</sup> (g/cm³)

ENTER
Stratum B
soil water-filled
porosity,  $\theta_w^B$ (cm³/cm³)

ENTER Stratum B soll total porosity,

ENTER Stratum B soil dry bulk density, p<sub>b</sub>

ENTER
Stratum A Str≈
soil water-filled
porosity,

€w^A

ENTER Stratum A soil total porosity,

ENTER Stratum A soil dry bulk density,  $ho_b^A$ (g/cm³)

Used to calculate risk-based	Used to calcu				
1	1 0E-06	350	30	30	7.0
(unitiess)	(unitless)	(days/yr)	(yrs)	(Ars)	(yrs)
된	Œ	Ш	<b>a</b>	ATrc	ATc
noncarcinogens,	carcinogens,	frequency,	duration,	noncardinogens,	carcinogens,
quotient for	risk for	Exposure	Exposure	time for	time for
Target hazard	Target			Averaging	Averaging
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
0.1	488	196	961	40	15

### CHEMICAL PROPERTIES SHEET

Unit Reference rate conc.  factor, conc.,  URF RfC  (µg/m³)¹ (mg/m³)	
Pure component water solubility, S (mg/L)	
Organic carbon partition coefficient, K <sub>e</sub> (cm³/g)	
Critical temperature, T <sub>c</sub> (*K)	
Normal boiling point, t T <sub>B</sub>	
Enthalpy of vaponzation at the normal boiling point, ΔΗ <sub>ν,b</sub> (cal/mol)	
Henry's law constant reference temperature, T <sub>R</sub>	
Henry's law constant at reference temperature, H (atm-m³/mol)	
Diffusivity in water, D, (cm²/s)	
Diffusiwity in air, D. (cm²/s)	1 1 1 1

depth   dept			Stratum A	Ş	Stratum C	Stratum A	Stratum A	Stratum A	Stratum A		Total	Air-filled	Water-filled	Floor-
1		Source- building	air-filled	air-filled	soil air-filled	effective total fluid	soil	soil relative air	soil effective vapor	Thickness of capillary	porosity in capillary	porosity in capillary	porosity in capillary	wall seam
Crack	ń	apalation,	porosity,	parosity,	porosity,	saturation, S	permeability,	permeability,	permeability.	zone,	<b>20</b> 06,	zone,	zone,	penmeter,
Crack	- 1	(cm)	(cm³/cm³)	(cm <sup>3</sup> /cm³)	(cm³/cm³)	(cm³/cm³)	(cm²)	^թ (cm²)	cm²)	ያ (E)	л <sub>ок</sub> (ст³/ст³)	(cm³/cm³)	θ <sub>w cz</sub> (cm³/cm³)	Xorack (Cm)
Crack Crack Enthalpy of Henry's law Henry's law Vapor A B C Zone overall to-total depth vaporization at constant at constant at viscosity at effective equivalent source infinite effective effective equivalent source infinite effective effective equivalent cradius, into bldg coefficient, crack, number, coefficient, conc., factor, conc., factor, com²(s) (cm²/s) (unitiess) (		2331 96	0 230	0,150	0 130	0 365	7 49E-10	767.0	5 97E-10	17 05	0 42	0.126	0 294	3,844
Crack Creck Enthalpy of Henry's law Henry's law Vapor A B C Zone overall to-total depth vaporization at constant at constant at viscosity at effective coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, conficient, conficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, conc., factor, conc., coefficient, carack, cm number, coefficient, conc., factor, conc., cm /stp. (mg/m²) (unitless) (cm²/s) (cm²/s) (mg/m²) (unitless) (cm²/s) (mg/m²) (mg/m²) (mg/m²)		Area of							Stratum	Stratum	Stratum	Capillary	Total	
area         below size, groundwater ave groundwater ave groundwater ave groundwater ave groundwater ave groundwater ave groundwater ave groundwater ave soil diffusion and diffusion diffusion diffusion diffusion diffusion coefficient, coefficien	•	anclosed space	Crack- to-totat	Crack	Enthalpy of vaporization at	Henry's law co≅stant āt	Henry's law	Vapor viscosity at	A A de de de de de de de de de de de de de	B B	O di	zone	overall	Š
ratio, grade, temperature, ratio, grade, temperature, temperature, temperature, temperature, temperature, temperature, temperature, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, coefficient, crack, flow rate diffusion Area of Peciet attenuation bidg risk Reference radius, into bidg, coefficient, crack, number, coefficient, conc., factor, conc., factor, conc., cm²/s) (unitiess) (unitiess) (up/m³)* (unitiess) (up/m³)* (unitiess) (up/m³)* (unitiess) (up/m³)*         Coefficient, coefficient, coefficient, crack, cm²/s) (unitiess) (unitiess) (up/m³)* (mg/m³)*         Coefficient, coefficient, coefficient, com²/s) (unitiess) (unitiess) (up/m³)* (mg/m³)*		pelow	area	woled	ave, groundwater	ave groundwater	ave groundwater	ave soil	diffusion	diffusion	diffusion	diffusion	diffusion	Diffusion
1   Z <sub>crest</sub>   ΔH <sub>V.TS</sub>   H <sub>TS</sub>   H <sub>TS</sub>   H <sub>TS</sub>   H <sub>TS</sub>   D <sub>orf</sub>	grade,	ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient,	coefficient,	length,	
(unitless)         (cm)         (cm) <sup>4</sup> (s)         (cm <sup>2</sup> (s)         (		₽,	F	Zonack	ΔH, τs	H <sub>TS</sub>	H' <sub>TS</sub>	μτs	<sub>₩</sub> 0	ູ້ ດີ	<b>ں</b> اور	D ۾	ם,,,	تـ ا
4 16E-04   15   9,492   1 12E-02   4 71E-01   1 77E-04   2 92E-03   7 38E-04   0.00E+00   4 11E-04   1.16E-03     Average Crack Average Crack flow rate diffusion Area of Peclet attenuation bldg insk Reference radius, into bldg, coefficient, crack, number, coefficient, conc., factor, conc., factor, conc., factor, conc., factor, conc., (unitless) (unitless) (up/m³)* (mg/m³)* (mg/m³)*	- [	(cm <sup>2</sup> )	(unitless)	(cm)	(cal/mol)	(atm-m³/moi)	(unitless)	(g/cm-s)	(cm²/s)	(cm²/s)	(cm²/s)	(cm²/s)	(cm <sup>2</sup> /s)	(cm)
Average     Crack     Exponent of Infinite       vapor     effective     equivalent     source     Infinite       Crack     flow rate     diffusion     Area of     Peclet     attenuation     bldg     risk       radius, into bldg, coefficient, crack, radius, into bldg, coefficient, crack, radius     crack, number, coefficient, conc., factor, factor, coefficient, conc., factor, factor, coefficient, crack, or (pairs)     (cm²/s)     (cm²/s)     (unitless)     (μg/m³)     (μg/m³)	ြိ	Ь	4 16E-04	15	9,492	1 12E-02	4 71E-01	1 77E-04	2 92E-03	7 38E-04	0.00 <b>E</b> +00	4 11E-04	1.16E-03	2331 96
Average Crack equivalent source Infinite vapor effective foundation indoor source Unit  Crack flow rate diffusion Area of Peclet attenuation bidg risk radius, into bidg, coefficient, crack, number, coefficient, conc., factor,  Γαακ Q <sub>bol</sub> D <sup>αακ</sup> A <sub>crack</sub> exp(Pe <sup>†</sup> ) α C <sub>bulking</sub> URF  (cm) (cm <sup>2</sup> /s) (cm <sup>2</sup> /s) (unitless) (μg/m <sup>3</sup> ) (μg/m <sup>3</sup> )							Exponent of	Infinite						
Crack flow rate diffusion Area of Peclet attenuation bldg risk radius, into bldg, coefficient, crack, number, coefficient, conc., factor, $C_{\rm crack}$ $C_{\rm coeff}$ $C_$		Soling		Average	Crack		equivalent	Source	Infinite	;				
radius, into bidg , coefficient, crack, number, coefficient, conc., factor, factor, $\Omega_{\rm col}$		vapor	Crack	flow rate	diffusion	Area of	Paclet	Indoor	source	בי כם	Ooferen			
Franck Quod Decade Aurack exp(Pe $^{\dagger}$ ) $\alpha$ Counterg URF (cm $^{3}$ s) (cm $^{2}$ s) (cm $^{2}$ s) (cm $^{2}$ ) (unitiess) (unitiess) (up/m $^{3}$ ) (ug/m $^{3}$ ) (up/m $^{3}$ ) (up/m $^{3}$ )		couc,	radius,	into bidg,	coefficient,	crack,	number,	coefficient,	SOUC.	factor.	conc			
(cm) (cm <sup>3</sup> /s) (cm <sup>2</sup> /s) (cm <sup>2</sup> ) (unitiess) ( $\mu g/m^3$ ) ( $\mu g/m^3$ ) ( $\mu g/m^3$ )		Cnource	crack	Q	Dasak	Acrack	exp(Pe <sup>f</sup> )	ಶ	C. Chullette	URF	Rfc			
	- 1	(µg/m³)	(cm)	(cm <sub>3</sub> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> )	(unitless)	(unitiess)	(µg/m³)	(µg/m³)-1	(mg/m <sub>3</sub> )			
	•	4 / 15 102	2	200	Z 3ZE-03	3 84 = + 112		4 57F-1F	2 125.03	5 AE 07	ž			

#### RESULTS SHEET

RISK CALCULATIONS

Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unifiess)

INCREMENTAL	Incremental risk from vapor intrusion to indoor ar, carcinogen (undless)
JLATIONS	Final indoor exposure groundwater conc, (µg/L).
ATION CALC	Pure component water solubility, S (µg/L)
R CONCENTR	Risk-based indoor exposure groundwater conc, (µg/L)
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	Indoor exposure groundwater conc., noncarcinogen {ug/L}.
RISK-BASEI	indoor exposure groundwater conc , carcinogen (µg/L)

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

197E+03 | 2 00E+05 | 1 97E+03

¥

1 97E+03

																Enthalpy of	vaponzation at Unit	the normal risk	_		(cavmol) (hg/m²)	11,000 9 7E-05					15,000 2 1E-04			_	_				7,342 8 3E-06 7 136 0 0E-00			14,000 6 9E-05			5,250 6 4E-05					_			10,937 0 0E+00	7.500 0.05±00				0.39 C 0.68.0
														1		<u></u>	odex		ure,	۲- و د د		720 75	969 27	827 85	990 41	556 60	1004 / 9	835,/3	842.25	751.00	508 10	536 40	695 00	563 05	562 16	986 20	848 49	863 77	86038	467.00	432 00 510 00	552.00	696.00	585.85	585.85	523 00	576 05	84631	745 00	715 00	972.00	544.20	66115	•
														1			Normal	boiling		اء ج	2	533 15	715 90	605 28	743 24	349 90	26.20	596 55	613.32	720.00	329 20	334 32	458 00	390 88	347 24	718 15	651 02	639 90	636 44	276 71	212 00	319 00	422 35	363 15	363 15	330 55	304 75	603 69	512.15	360 53	386 15	360.36	419.60	200
																Henry's	law constant	reference	temperature,	≃ ز	ò	25	52	25	52	27.	<b>67</b>	2 5	25	25	52	25	25	52	3 2	52	122	25	52	22	C 4	22 22	25	52	25	25	52	52	27 2	0 K	3 %	35.55	3 %	;
S.	Mean Grain Diameter (cm)	2000	0.016		0.00	4	1000	0.00	0.029	di co	0.000	00000	0 030		up Table	Henry's	law constant	at reference	temperature,	(lom/ <sub>c</sub> m-mte/	(2011)	8 10E-06	1 13E-06	4 44E-07	1 47E-08	3 05E-02	0.04E-0.0	1 40F-05	1.51E-05	1 54E-06	3 88E-05	3 66E-03	3 88E-03	8 80E-06	1 72 F-02	7.51E-06	1 58E-05	4 00E-06	2 10E-05	6.24E-03	20-31-22	3 02E-02	5345-04	1 60E-03	1 60E-03	5 61 E-03	2 61E-02	1 09E-03	27.1E-02	2 B/DE-03	9 12E-04	1035-02	3 445-04	
VLOOKUP TABLES	θ, (cm³/cm³)	α	0 095	0.000	0.057	200	5 6	9 6	3 6	1000	9800	0.000	0 065		Chemical Properties Lookup Table			Henry's	law constant	H. H. H. H. H. H. H. H. H. H. H. H. H. H	(2000)	3 32E-04	4 63E-05	1 82E-05	6 03=-07	1 275-04	1 99 1.04	5 74E-04	6.19E-04	6 31E-05	1 59E-03	1 50E-01	1 59E-01	3615-04	7 05E-01	3 08E-04	6 48E-04	1 64E-04	8615-04	2 56E-01	8.98F-02	1 24 €+00	2 195-02	6 56E-02	6 56E-02	2 305-01	1 07E+00	4 47E-02	2.72E-04	1 15F-01	3 74E-02	4 22E-01	1 41E-02	!!!!
	θ, (cm³/cm³)	0.38	0.00	0.42	0.41	0 43	r e	9 6	0.39	98	0.43	4.0	0 4 5		Chemica	Pure	component		uty	o ([/ow/	i h	2 50E-02	1 62E-03	2 79E+03	2 49E-U3	0.40E-03	5 50 F-02	6 80E+00	1 95E-01	3 50E+03	1 005+06	7 92E+03	5 00 0 + 01	7 40E+04	1 33E+03	2 50E-01	4 50E-02	9 00E-02	1.20E-01	1 52E+04	1 30E+04	1 19E+03	3 10E+03	6 74E+03	6 74E+03	5 06E+03	2.25E+03	1 80E-01	1 20E+04	2 80F+03	4 42E+03	1 10E+03	2 97E+03	
ookup Table	M (unitiess)	0 083	0 237	0.359	0.561	0.627	781.0	20.0	0.324	0.083	0 187	200	0 471	1				Diffusivity	in water,	(cm²/s)		4 95E-06	900E-06	9.06E-06	3 18E-06	9005-00	4 37F-06	7346-06	4 74E-06	7 97E-06	1 14E-05	1 00E-05	6 80E-06	9 30E-06	8 80E-06	4 74E-06	4 46E-06	4 76E-06	38/E-U6	1.21E-05	1 17E-05	1 00E-05	1 03E-05	1 06E-05	1 06E-05	1 05E-05	1 U4E-U5	7 245-06	6.76E-06	8 73E-06	8 80E-06	9 10E-06	7 90E-06	
Soil Properties Lookup Table	N (unitless)		131	55	2.28	2 6 6	1 23	7	- +		1 23	4.	189				;	Diffusivity	ii gi	(cm <sup>2</sup> /s)		1 37E-02	4 30E-02	2 73E-02	2 02E-02	5 10E-02	1 18E-02	1 42E-02	1 25E-02	5 36E-02	1 24E-01	1.04E-01	2 50E-03	8 00E-02	7 805-02	1 25E-02	1 56E-02	1 69E-02	1 445-02	7 28E-02	1 01E-01	1 04E-01	1,49E-02	2 98E-02	2 98E-02	7 42E-02	9 OGE-02	1.615.02	6 235-02	7 82E-02	7 80E-02	7 90E-02	7.10E-02	
S	a (1/cm)	0 008	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.038	0 124	0 145	0 027	950	0.016	0.005	0.010	0 0 0 0	0.075		(	Organic	carbon	partition	coefficient,	(cn <sup>3</sup> /a)	ì	2 63 5 + 06	1 025 + 06	1 00E-02	3 000 100	3.98F+05	1 20E+05	1 07E+03	2 14E+04	6 00E-01	5 75E-01	3 98E+01	1 78E+03	5 895+01	1 10E+02	1 23E+04	9 77E+04	1 00E +06	4 47 11 40 6	1 86F+01	1 17E+01	4 57E+01	8 71E+01	5 50E+01	5 50E+01	3 16E+01	3.89E+01	2005405	4 68E+01	4 37E+01	5 01E+01	1 66E+02	9 33E+01	
	K, (cm/h)	0.20	0.26	104	14.59	29 70	0 12	7 -	- 0	0 02	0 0	0.45	4 42							nical				00000	dda		•	(dane)					ø		tane					(orgethene)	9			othane	thane	<b>e</b> !	<del>p</del> un	hentadiene		ane	ane		roethane	
	SCS Soil Type										SICL									CAS No Chemical		50293 DDT	50528 Benzo(a)pyrene	51255 Z,4-Ulnitrophenol 53703 Dibenz(e biserbracese	56235 Carbon tetrachloide	56553 Benz(a)anthracene	57749 Chlordane	58899 gamma-HCH (Lindane)	60571 Dieldrin	65850 Benzoic Acid	67641 Acetone	67663 Chloroform	67721 Hexachloroethane	71432 Benzene	71556 1,1,1-Trichloroethane	72208 Endrin	72435 Methoxychlor	72548 DDD	74839 Methyl browids	75014 Vind chloride (chloroethene)	75092 Methylene chloride	75150 Carbon disulfide	75252 Bromoform	75274 Bromodichloromethane	75274 Bromodichlorome	75343 1,1-Dichloroethane	76448 Hostochtor	77474 Hexachlorocyclopentadiene	78591 Isophorone	78875 1,2-Dichloropropane	79005 1,1,2-Trichloroethane	79016 Trichloroethytene	79345 1,1,2,2-Tetrachloroethane	

00E+00 00

84662 Diethylphthatate	2 88E+02	2 56E-02	6 35E-06		VLOOKUP TABLES 185E-05	4.515-07	ž	567 16	757 00	13 722	00750	100,100
84742 Di-n-butyl phthatate	3 395+04	4 38E-02	7 86E-06	1 12E+01	3 855-08	9.39E-10	3 %	613.15	798.67	14.75	00+00	3 50 04
85687 Butyl benzyl phthalate	5 75E+04	1 74E-02	4 83E-06	2 69E+00	5 17E-05	1.26F-06	3 %	660.60	83058	5	001100	2,00,00
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	\$ 00E-06	22	632 28	890.45	13.00	1 4F.08	00000
36/37 Fluorene	1385+04	3 63E-02	7 88E-06	1 98E+00	261E-03	6 37E-05	25	570 44	870 00	12.666	0.0F+00	1.45-01
60/48 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	25	627 87	899 00	13,977	5 7E-06	0 0E+00
87865 Pentachiometrical	53/E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0 0E+00
88062 2.4.6-Trohlomphenol	3 81E+02	3 185-02	6 105-06	1 95E+03	100E-06	2 44E-08	25	582 15	813 20	14,000	3 4E-05	0 0E+00
91203 Naphthalene	2 00E+03	5 90F-02	7.505-06	3 10E+02	3 195-04	7 78E-06	52	519 15	749 03	12,000	3 1E-06	0 0E+00
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 11E+00	1 64E-07	4 00E-04	o x	560 26	754 03	10,373	0 0E+00	1 4E-01
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	22	417 60	630 30	8.661	0 0E+00	7 0E+00
95487 Z-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	52	464 19	697 60	10,800	00+00	186-01
95578 2-Chlosophand	6 17E+02	6 905-02	7 90E-08	1 56E+02	7 79E-02	1 90E-03	52	453 57	705 00	9,700	000+00	2 05-01
95954 2.4.5-Trichtorophenol	3 66E+UZ	2010-02	9.46E-06	2 20E+04	1 60E-02	3 90 0 0 4	52	447 53	675 00	9,572	0.00	1 8E-02
98953 Nitrobenzene	6.46F+01	2 STE-02	7 03E-05	1 20E+03	1 78E-04	4 34E-06	52	526 15	759 13	13,000	00=+00	3 5E-01
100414 Ethylbenzene	3 63E+02	7 50E-02	7 805-05		3 23 F-04	2 40E-05	52 6	483 95	719 00	10,566	0 0E+00	2 0E-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76F-03	3 %	409 34	617.20	6,501	000+00	1000
105679 2,4-Dumethylphenol	2 09E+02	5 84E-02	8 69E-06		8 205-05	2 00E-06	25	484 13	707 60	11 120	00+400	7 00 00
105423 p-Xylene	3 895+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03	<b>5</b> 0	411 52	616 20	8.525	00=100	7 0F+00
105479 n Chimmalina	6 17E+02	6 905-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03	52	447 21	684 75		0 0E+00	8 0 0 0 0 1
107062 1.2-Dichlomethans	1 746+01	4 83E-02	1 01E-05	5 305+03	1 36E-05	3 32E-07	52	503 65	754 00		0 0E+00	1 4E-02
108054 Vinyl acetate	5.258+00	8 50F 02	9905-06	5 52E+U3	4 01E-02	9 785-04	22	356 65	561 00	7,643	2 6E-05	0 0E+00
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1615+02	3.015-01	5 12E-04	S 1	345 65 412 27	519 13		0 0E+00	2 0E-01
108883 Toluene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6635-03	3 K	12.21	60170	8,523	0 UE+00	7 0E+00
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71 E-03	3 12	404.87	632.40		001100	4 UT-0-10
	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	52	455 02	694 20		004400	2 15.00
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	25	451 15	629 79		335-04	00+100
11525/ chdosulan 117817 Bis(2-ethylbexd)obitbalate	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	52	674 43	942 94		0 0E+00	2 1E-02
	8 32E+07	1515-02	3 58E-06	3 40E-01	4 18E-06	1 02E-07	25	657 15	806 00		4 0E-06	0 0E+00
118741 Hexachtorobenzene	5 50E+04	542F-02	5 915-06	2 00E-02	6 44E-03	6 681-05	52	704 09	862 22		0 0E+00	7 0E-02
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05	8 8	582 55	825 00		4 6E-04	0 0 0 0
120821 1,2,4-Trichlorobenzens	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03		486 15	725.00	13,121	001100	1 15-00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 175-06		482 15	708 17		00+00	115.07
121142 Z,4-Dinitrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08	25	590 00	814 00		195-04	0.000
12446 I Chlorodioromomentarie 127184 Tetrachloroethylene	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04	52	416 14	678 20	8,000	2 4E-05	0 OE+00
	1 055+05	7 20E-02	8 20E-06	2 00E+02	7.546-01	1 84E-02		394 40	620 20		5 8E-07	0 0E+00
156592 cis-1.2-Dichloroethylene	3.555+01	7 365-02	1 135-05	1 355-01	4 515-04	1 10E-05	52 5	667 95	936 00		0 OE+00	1 1E-01
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 195-05	6.30E+03	3 85 F-01	9 305-03		333 65	544 00	7,192	00E+00	3 5E-02
	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-08		809 15	318 30 1078 24		00100	7 0E-02
	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	111E-04		715 90	969 27		2 11 2	00+100
205440 Filoranthene	1.07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 61E-05		655 95	905 00		0 0E+00	146-01
218019 Chrysone	3 986406	20-02	5 50E-06	8 00E-04	3 405-05	8 29E-07		753 15	1019 70		2 1E-05	0 0E+00
309002 Aldrin	2.45F+06	1.325-02	4 865-06	1 805-03	3 88E-U3	9 46E-05		714 15	979 00			0 0E+00
319846 alpha-HCH (alpha-BHC)	1 23E+03	1 42E-02	7 34E-06	2 00F+00	4.35F.04	1,060,08		503 01	839 37	13,000		0 0E+00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06		3 05E-05	7.445-07		390 33 596 56	839.36			000
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02	23.13	381 15	587.38	200,5	375.04	001100
50 5547 N. Miltonardi e ecentralia	6 92E+01	3 27E-02	8	1 82E+02	3 06E-05	7 46E-07		558 00	770 00			0.05+00
1024573 Hentachlor enoxide	2 40E+01	3 45E-02	8 1/E-06	9 89E+03	9 23E-05			509 60	746 87			0 0E+00
7439976 Mercury (elemental)	5 20 1-01	3 07E-02	3 5	2 00E-01	3 905-04	951E-06	52	613 96	848 76			0 0E+00
8001352 Toxaphene	2 57E+05	1 16E-02		7 40F-01	2 46E-04	1 14E-02	8 8	62988	1750 00	_	0 0E+00	3 0E-04
11096825 Arodor 1260 (PCB-1260)	2 90E+05	1 38E-02	32	8 00E-02	1 89E-01	4 60E-03	9 5	037 13 402 40	67331		3.25.04	000
11097691 Aroclor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	22	377.50	512.27	000	4 5 5 5	0.000
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	22	340 50	475 22	000		00+100
334032 13 MONO 1242 (LCB-1242)	3 30E+04	2 14E-02	531E-06	3 40E-01	2 13E-02	5 20E-04	55	345 50	482 20	18,000		00=+00
					6 of 7							- \
					, ;							,

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

S YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

ENTER Initial groundwater conc ,

Chemical CAS No

ENTER

YES

			ENTER		Jser-defined	stratum A	soil vapor	permeability,	ٹد	(cm²)								
					_			유			L							
			ENTER	Soil	stratum A	SCS	soil type	(used to estimate	soil vapor	permeability)	O		ENTER	Stratum C	soil water-filled	porosity.	ပ စိ	
			ENTER				scs	soil type	-	water table	s		ENTER	Stratum C	soil total	porosity,	ပို့	
			ENTER			Soil	stratum	directly above	water table,	(Enter A, B, or C)	æ		ENTER	Stratum C	soil dry	bulk density,	ပ်	
_	athana		ENTER	L wr (cell D28)	Thickness	of soil	stratum C,	(Enter value or 0)	2	(cm)	0		ENTER	Stratum B	soll water-filled	porosity,	<b>6</b> ,70	
Chemical	1.1.2.2.Tetrachloroethane	001001011111	ENTER	Totals must add up to value of LwT (cell D28)	Thickness	of soil	stratum B,	(Enter value or 0)	₽*	(cm)	1173 48	:	ENTER	Stratum B	soil total	porosity,	<b>"</b> c	
	-		ENTER	Totals mus			of soil			(cm)	1173 48		ENTER	Stratum B	soil dry	bulk density,	a d	
	_		ENTER			Depth	below grade	to water table,	Lw1	(cm)	2346 96		ENTER	Stratum A	soil water-filled	porosity,	<b>∀</b> ,¥	
С <sub>W</sub> (µg/L)	2228 043478		ENTER	Depth	below grade	to bottom	of enclosed	space floor,	ٹ	(cm)	15		ENTER	Stratum A	soil total	porosity,	٧ <sub>C</sub>	
(numbers only, no dashes)	79345		ENTER		Average	soll/	groundwater	temperature,	r.	(၃)	16		ENTER	Stratum A	sort dry	bulk density,	<b>√</b> d	

027 17 043	ENTER ENTER	Floor-wall Indoor	æ	width, rafe,	₹	(cm) (1/h)
0.42	ENTER	Enclosed	space	height,	r	(E5)
17	ENTER Enclosed	space	floor	width,	W	(cm)
0.2	ENTER	space	floor	length,	ٿ	(CH)
0.43	ENTER	Soil-bldg	pressure	differential,	ΔP	(g/cm-s <sup>2</sup> )
15	ENTER Enclosed	space	floor	thickness,	Loreck	(cm)

Stratum C soil dry bulk density, Pb G (9/cm³)

Stratum B soil dry bulk density, p<sub>b</sub> (g/cm³)

(cm3/cm3)

(unitless)

ρ<sub>6</sub>Α (g/cm³)

(cm<sub>3</sub>/cm<sub>3</sub>)

Jsed to calculate risk-based groundwater concentration	Used to calc. groundwater				
-	1 0E-06	350	30	30	70
(unitless)	(unitless)	(days/yr)	(yrs)	(yrs)	(yrs)
歼	圧		۵	ATrc	
noncardinogens,	carcinogens,	frequency,	duration,	noncarcinogens,	carcinogens,
quotient for	nsk for		Exposure	time for	
Target hazard	Target			Averaging	Averaging
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER

### CHEMICAL PROPERTIES SHEET

Reference conc , RfC (mg/m³)
Unit risk factor, URF (µg/m³)-1
Pure component water sotubility, S S (mg/L)
Organic carbon partition coefficient, K <sub>cc</sub> (cm³/g)
Critical temperature, T <sub>c</sub> (*K)
Normal boiling point, T <sub>B</sub>
Enthatpy of vaportzation at the normal botting point, AH, s. (cal/mol)
Henry's law constant reference temperature, T <sub>R</sub>
Henry's law constant at reference temperature, H
Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)
Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)

	Stratum A	A Stratum B	C mitarity	Stratum A	A militaria	Otrotion A	Ctroton A		\$			í
Source-				effective	soil	soil	Sol	Thickness of	Dorosity in	All-filled	Water-filled	- 100 j
pullding	tg an-filled	ar-filled	ar-filled	total fluid	Intrinsic	relative air	effective vapor	capillary	capillary	capillary	capillary	Seam
separat			porosity.	saturation,	permeability,	permeability,	permeability,	zone,	zone,	zone	Zone.	perimeter
ځ	<b>∀</b> წ	a <b>e</b>	ပ <b>ွ</b>	<i>ູ</i> ້ ເ	¥	ž	¥	ٹ	Ę,	θ.		×
(cm)	(cm³/cm³)	3) (cm³/cm³)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sup>2</sup> )	(cm <sup>2</sup> )	(cm <sub>2</sub> )	(cm)	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(cm <sub>3</sub> /cm <sub>3</sub> )	(CII)
2,000	-	ŀ	0,00									
2331 96	96   0.230	0.150	0 130	0 365	7,49E-10	0 797	5 97E-10	17.05	0.42	0 126	0 294	3,844
								l				
Area of							Stratum	Stratum	Stratum	Capillary	Total	
enclos	ed Crack-		Enthalpy of	Henry's law	Henry's law	Vapor	∢	æ	O	ZONG	overall	
sbace		depth	vaporizatlon at	constant at	constant at	viscosity at	effective	effective	effective	effective	effective	Diffusion
ventllation below		woled	ave groundwater	ave, groundwater	ave groundwater	ave soil	diffusion	diffusion	diffusion	diffusion	diffusion	nath
grade,	, ratio,	grade,	temperature,	temperature,	temperature,	temperature,	coefficient,	coefficient,	coefficient,	coefficient	coefficient,	lenath.
₹	E	Zonack	ΔH <sub>v,TS</sub>	H <sub>Ts</sub>	H.rs	ราน	# O	,		, , ,	0وال ً	
(cm <sup>2</sup> )	(unitless)	(cm)	(cal/mot)	(atm-m³/mol)	(unitless)	(g/cm-s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	r (Wo
	-	ļ										
9 24E+05	05   4 16E-04	15	10,480	1 98E-04	8 36E-03	1 77E-04	2 90E-03	7 95E-04	0 00E+00	4 94E-04	1 23E-03	233196
					Exponent of	Infinite						
		Average	Crack		equivalent	source	Infinite					
Source	•	vapor	effective		foundation	indoor	SOUTCE	Chi				
vapor	r Crack		diffusion	Area of	Peclet	attenuation	pld	ASI	Reference			
COLIC		into bidg,	coefficient,	crack,	number,	coefficient,	conc ,	factor,	COLIC			
Caouros	Corack	q	Dereck	Aorack	exp(Pe <sup>f</sup> )	ಶ	Chulding	URF	RfC			
(µg/m³)	3) (cm)	(cm <sup>3</sup> /s)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> )	(unitless)	(unitless)	(m/bn)	(µg/m³) <sup>-1</sup>	(ma/m <sub>3</sub> )			
		ŀ							<b>)</b>			
8.36E+00	00 0 10	5 70E-01	2 90 <b>E-</b> 03	3,84E+02	2 15E+03	4 67E-06	3 91E-05	5 85-05	¥			

RISK-BASEI	IISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	ER CONCENTR	MTION CALC	ULATIONS	INCREMENTAL	INCREMENTAL RISK CALCULATIONS
Indoor exposure groundwater conc , carcinogen (µg/L)	Indoor exposure groundwater conc, noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc, (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc.,	incremental nsk from vapor infrusion to indoor air, carcinogen (untiless)	Hazard quotient from vapor intrusion to Indoor air, noncarcinogen (untiess)
1 07E+03	NA	1 07E+03	07E+03   2 97E+06	1 07E+03	AN	WAN

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

						VLOOKUP TABLES	ES.						
			Soil Properties Lookup Table	ookup Table									
Section 1998	(CIIVII)	d (1/cm)	N (unitiess)	M (unifiess)	e, (cm-/cm-)	9, (cm²/cm²)	Mean Grain Diameter (cm)						
<u>, ਰ</u>	3 6	900	- 1	0.003	000	8000	0.0092						
! <u></u>	2 5	0000	- t	0 250	- 6	0.030	9000						
<u> </u>	14 50	25.0	- 6	0 00	9 4		0.020						
	67.00	445	2.20	0.00	2 0	2000	0.040						
S	5 2	0 0 0 7 2 2	233	0.427	7 6	0 0 0	0.00 c						
SCL	131	0 0 0	148	0 324	900	9 0	0.000						
<u></u> S	0.25	0 016	137	0 270	0.46	0 034	0.0046						
Sic	0 02	0 005	1 09	0 083	0.26	0 0 0 0	00000						
SICL	0 07	0 0 0 0	1 23	0 187	0 43	0 089	0 0026						
StL	0.45	0 020	141	0 291	0.45	0 067	0 011						
SL	4 42	0 075	1 89	0 471	0 41	0 065	0 030						
		1					1	,		•	1		
		i			Chemic	Chemical Properties Lookup Table	okup Table						
		Organic			Pure		Henry's	Henry's			Enthalpy of		
		carbon	:	;	component		law constant	law constant	Normal		vaponzation at	ş S	
		partition	Diffusivity	Driffusivity	water	Henry's	at reference	reference	boiling	Critical	the normal	risk	Reference
		coemcient,	ਜ਼ ਗ੍ਰਾ. ਹ	in water,	solubility,	iaw constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,	conc,
CAS No		νος (cm <sub>3</sub> /α)	(cm <sup>2</sup> /e)	(cm <sup>2</sup> /e)	0 (	E ###	H 13/220	<u>~</u> 6	a ç	r á		J.	
	l	(6/ 11/6)	(cm /s)	(cm /s)	(mg/t.)	(anitiess)	(atm-m*/mol)	(C)	Ş.	( <sup>2</sup> K)	(cai/mol)	(mg/m³)	(mg/m³)
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05	00=+00
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	90E-06	1 62E-03	4 63E-05	1 135-06	25	71590	969 27	15.000	2 1F-03	00+00
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0E+00	7 0E-03
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743,24	990 41	16,000	2 1E-03	0 0E+00
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	1 SE-05	001100
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 405-03	1 37E-04	3 34E-06	25	708 15	1004 79	15,000	2 1E-04	0 0 1
57749 Chordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	52	624 24	885 73	13,000	3 7E-04	0 0E+00
Socas gamma-HCH (Lindane)		1 07E+03	1 42E-02	7,34E-08	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04	00+300
ACCEPTO DISTRIBUTION OF A STATE O		2 14E+04	1 25E-02	4 74E-06	195E-01	6 19E-04	1 51E-05	25	613 32	842 25	13,000	4 6E-03	0 0E+00
67641 Acetoro		5 00 m-0	5 36E-02	7.97E-06	3 50E+03	6 31E-05	1,54E-06	55	720 00	751 00	10,000	0 0E+00	1 45 +01
67663 Chlomform		3 08 E±01	124501	1 145-05	1 005+06	1 59E-03	3 88E-05	. 25	329 20	508 10	6,955	0 OE+00	3 5E-01
67721 Hexachiocosthane		1 78E+01	- C-10-10-1	60-300 -	/ 82E+03	10000	3 66E-03	25	334 32	536 40	6,988	2 3E-05	O 0E+00
71363 Butanol		6 92 11+00	8 00F-03	90-308 6	2 40E+01	- 55 E-0.	3 68 E-03	22.53	458 00	695 00	9,510	4 0E-06	0 0E+00
71432 Benzene		5 89E+01	8 805-02	9 80E-06	1 75E+03	2 28E-01	5.56E-03	25.	353.24	563 US	7 345	0 0E+00	00100
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7.136	000+000	100+00
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7.51E-06	25	71815	986 20	12,000	00+00	1 15-03
72435 Methoxychlor		9 77E+04	1 565-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0 0E+00	1 8E-02
72348 UDU		1 005+06	169E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05	0.05+00
74830 Methyl banda		4 4/E+06	1 44E-02	5875-06	1 20E-01	8 61E-04	2 10E-05	72	636 44	860 38	13,000	9 7E-05	0 0E+00
75014 Vinvi chiadde (chlomathene)	(aua	1 865+01	1 08E-02	1 235 06	1 525+04	2.56E-U1	6 24E-03	25	276 71	467 00	5,714	0 0E+00	5 0E-03
75092 Methylene chloride	( <u>P</u>	1 17F+01	1035-01	1 175-05	2 /6E+U3	1 11E+00	2 (14-02	25	259 25	432 00	5,250	8 4E-05	00+00
75150 Carbon disulfide		4 57E+01	1.04E-01	1 00 0 -05	1 19E+03	1.24E+00	3 12F-03	3 %	200	552.00	9,700	) OF 10 C	3 UE+000
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3.10E+03	2 19E-02	5 34E-04	52	422 35	00 969	9,479	115-06	0 0E+00
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 8E-05	0 0E+00
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	25	330 55	523 00	6,895	0 0E+00	5 0E-01
76448 Hentschlor		2 69E+01	9 UUE-UZ	1 C4 T C	2.25=+03	1 07 E+00	2 61E-02	25	304 75	576 05	6,247	5 0E-05	0 0E+00
77474 Hexachlorovylopentadiene	9	2 005105	1815.02	7 245 06	1 80E-00	4 47E-02	1 09 5-03	25	603 69	846 31	13,000	135-03	00-100
78591 Isophorone	2	4 68E+01	6 23F-02	6.76E-06	1 20E+04	2 72E-04	2 / TE-02	C t	512 TS	746 00	10,931	2 7 5	7 05-05
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80F-03	25.55	369.52	572.00	7 590	0.0F+00	4 OF-03
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	22	386 15	602 00	6,322	1,6E-05	00+100
79016 Trichloroethylene		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25	360 36	544,20	7,505	1 7E-06	0 0E+00
79345 1,1,2,2-Tetrachloroethane	ġ.	9 33 1 + 01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	25	419 60	661 15	8,996	5 8E-05	0 0E+00
83329 Acenaphinene		7 08E+03	4 21E-02	7,69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0 0E+00	2 1E-01

84662 Diethylphthalate	2 88F+02	2.56E-02	945.06	1 095403	VLOOKUP TABLES	i i	;	!	į	!		-
84742 Di-n-butyl phthalate	3 39E+04	4 385-02	7 865-06	1 126.101	00-200 0 000 00	4 51E-07	8	567 15	757 00	13.733	0 0 0 0	2 8E+00
85687 Butyl benzyl phthalate	5 75E+04	1 74F-02	4 83E-56	2 605100	2 030-100	9.39E-10	5 52	613 15	798 67	14,751	0 0E+00	3 55-01
	1 29E+03	3 12E-02	6.355.06	2 515+01	206104	1 265-06	ខ	660 60	839 68	13,000	0.05+00	7 0E-01
86737 Fluorene	1 38E+04	3 635-02	7 BBF-06	1 985+00	2.615-03	3 COE-08	S &	632.28	890.45	13,000	1 4E-06	00+00
86748 Carbazole	3 39E+03	3 905-02	7 03E-06	7 48E+00	6.26E-07	1 53 F-08	3 2	570 44 677 87	00000	2,000	005400	1 4E-01
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	3345-01	8 15F-03	3 %	486 15	738 00	13,977	3 /E-06	001100
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08	22	582 15	813.20	14.000	3.47-05	005+00
99U62 Z.4.6-Trichtorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	52	519 15	749 03	12,000	3 15-06	0.0E+00
93941 3.3-Dichlombanzidina	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04	52	491 14	748 40	10,373	0 0E+00	1 4E-01
95476 o-Xviene	3.635+02	8 70E-02	0,74E-06	3 11E+00	164E-07	4 00E-09	25	560 26	754 03	13,000	13E-04	0 0E+00
95487 2-Methylphenol (o-cresol)	9 125+01	7 40F-02	8.30F-06	2 60F+04	4 925.05	5 20E-03	32	417 60	630 30	8,661	0 0E+00	7 0E+00
95501 1,2-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79F-02	1 20E-06	8 2	464 19	697 60	10,800	8 4 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	185-01
95578 2-Chlorophenol	3 B8E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90 = 04	2 2	403.07	705 00	9,700	0.05+00	2 0E-01
	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 785-04	4 34E-06	25	526 15	759 13	3,572	00+100	1 8E-02
	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	25	483 95	719 00	10.566	00400	205-03
100414 Ednylbenzene 100425 Strimps	3 63E+02	7 50E-02		1 69E+02	3 23E-01	7 88E-03	52	409 34	617 20	8,501	00+00	1 0E+00
105679 2 4 Demoth data and	7 765+02	7 10E-02		3 10E+02	1135-01	2 76E-03	52	418 31	636 00	8,737	0.000	1 0E+00
106423 p-Xviene	2 USE + UZ	2 84E-02	8 695-06	7 87E+03	8 20E-05	2 00E-06	52	484 13	707 60	11,329	0 0E+00	7 0E-02
106467 1,4-Dichlorobenzene	6 17F+02	6 90E-02		1 85E+02 7 38E+04	3.14E-01	7 665-03	56	411 52	616 20	8,525	0 0E+00	7 0E+00
106478 p-Chloroaniline	6 61E+01	4 83E-02	1015-05	5.30F±03	3 30E-02	2 2 2 5 5 2 5	8 8	447 21	684 75	9,271	0 0E+00	8 0E-01
107062 1,2-Dichloroethane	174E+01	1 04E-01	90E-06	8 52E+03	4 015-02	3 32E-07	5 K	503 65 356 68	754 00	11,689	0 0E+00	1 4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 105-02	5 12E-04	3 2	345.65	510 13	7,043	2 65-05	0.05+00
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	301E-01	7 34E-03	25	412 27	617.05	, 500, 8,533	00100	7.05-01
108883 Toluene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 635-03	22	383 78	591 79	7.030	00+100	00107
10890/ Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03	22	404 87	632.40	8 410	0.05+00	2000
111444 Div/2 shippenship and a	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	52	455 02	694 20	10.920	0.05+00	2 1F+00
115207 Endoesiffen	1556+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	52	451 15	659 79	000'6	336-04	0 OE+00
		1 15E-02	4 55E-U6	5 10E-01	4 59E-04	1 12E-05	52	674 43	942 94	14,000	0 0E+00	2 1E-02
117840 Din-octyl phthalate	8 32F+07	1515.02	3 505-06	3 40 501	4 18E-U6	1 02E-07	52	657 15	806 00	15,999	4 0E-06	0 0E+00
118741 Hexachlorobenzene	5 50E+04	5 42F-02	5 915.06	2 VOE-02	2 (4E-U3	6 68E-05	52	704 09	862 22	15,000	0 0E+00	7 0E-02
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34F-02	2 4 1 E-02	1325-03	8 8	582 55	825 00	14,447	4 6E-04	0 0E+00
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5825-02	1475-03	Q H	615 18 486 45	873 00	13,121	0 0 0 0 0 0	1 1E+00
120832 2,4-Dichtorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1305-04	3 17E-06	3 %	482 15	70 97	10,477	0,0E+00	2 05-01
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27 E-08	3 5	590.00	814 OO	2001	00100	1 15-02
124481 Chlorodibromomethane	6 31E+01	1 96E-02		2 60E+03	3 21E-02	7 83E-04	22	416 14	678.20	8,000	2 4F-04	005+00
127 low Tetrachioroeurylene 120000 Pyrene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	52	394 40	620 20	8,288	5 8E-07	00000
15500 r yrane 156592 cis-1 2-Derblorosthylone	1 05E+05	2725-02	7.24E-06	135E-01	4 515-04	1 10E-05		667 95	936 00	14,370	0 0E+00	1 15-01
158605 trans-1.2-Dichlomethylene	5.25F±01	7.075-02	135500	3 500 +03	167E-01	4 07E-03		333 65	544 00	7,192	0 0E+00	3 5E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1905-02	5 66F-06	2 20E-03	3 03E-01	9 39E-03		320 85	516 50	6,717	0 0E+00	7 0E-02
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02		1 50E-03	4 55 F-03	1 11 11 04		809 15	1078 24	17,000	2 1E-04	0 0E+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 605-04	1815.05	C t	713.90	969.27	15,000	2 1E-04	0 0E+00
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02		8 00E-04	3 40E-05	8 29E-07		753 15	905 00	13,815	0 0 0 0 0	14E-03
218019 Chrysene	3 98E+05	2 48E-02		1 60E-03	3 88E-03	9 46E-05		714 15	07.676	16,000	2 TE-03	00+100
309002 Alann	2 45E+06	1 32E-02		1 80E-01	6 97E-03	1 70E-04	55	603 01	839.37	13,000	4 95-03	00+400
319857 beta-HCH (beta-BHC)	1 235+03	1 425-02	7.345-06	2 00E+00	4 35E-04	1 06E-05	52	596 55	839 36	13,000	1 8E-03	0 0 0 0 0
542756 1 3-Dichlomomene	4 575+03	142E-02	7.34E-06	2 40E-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5 3E-04	0 0 0 0
606202 2.6-Dinitrotaluene	6 92E+01	3 275-02	7 261 06	2 80E+03	7 26E-01	1 77E-02		381 15	587 38	7,000	3 7E-05	2 0E-02
621647 N-Nitrosodi-n-propylamine	2 40F+01	5.45E-02	8 17E.06	0 805+02	3 06E-05	7 46E-07		558 00	770 00	12,938	1 9E-04	0 0E+00
1024573 Heptachlor epoxide	8 32E+04	132F-02		2 00E-01	3 000 04	2 25E-06		509 60	746 87	11,000	2 0E-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02		5 62F-02	4 67E-04	401E-06	8 8	613 96	848 76	13,000	2 6E-03	0 0E+00
8001352 Toxaphene	2 57E+05	1 16E-02		7 40E-01	2 46F-04	20-14E-02		629 63	1750 00	14,127	0 0E+00	3 0E-04
11096825 Arador 1260 (PCB-1260)	2 90E+05	1 38E-02		8 00E-02	1 89E-01	4 60E-03	3 5	407 50	530 27	14,000	3 2E-04	0 0E+00
11097691 Araclor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03	2 52	377 50	512.27	000,61	2 2 2 3 3	0.05+00
12674112 Arodor 1016 (PCB-1016)		2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 90E-04	32	340 50	475 22	18,000	2 - 1 2 - 1 2 - 2 3 - 4 4 - 4 5 - 4 5 - 4 5 - 4 5 - 4 5 - 4 5 - 6 5 - 6	001100
53458219 Model 1242 (F.CD-1242)	3 30E+04	2 14E-02	5 31E-06	3 40E-01	2 13E-02	5 20E-04	52	345 50	482 20	18,000	1 96 4	00=+00

7 of 7

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

S R

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

YES

VERSION 12 September, 1998

		ENTER	stratum A soil vapor permeability, k,	(cm²)	
			R		]
		ENTER Soit stratum A	SCS soil type (used to estimate soil vapor	permeability)	ENTER Stratum C soil water-filled porosity, $\theta_{s,c}$
		ENTER	SCS soul type directly above	water table	ENTER Stratum C soil total porosity, n <sup>c</sup>
		ENTER	Soil stratum directly above water table.	(Enter A, B, or C)	ENTER Stratum C soil dry bulk density, P.c.
	рапе	ENTER f Lwr (cell D28) Thickness	of soul stratum C, (Enter value or 0) h <sub>C</sub>	0	ENTER Stratum B soil water-filled porosity, $\theta_w^{\delta}$
Chemical	1,2-Dichloropropane	NTER ENTER ENTER Totals must add up to value of L <sub>WT</sub> (cell D28) Thuckness Thuckness	of soil stratum B, (Enter value or 0) h <sub>B</sub>	1173.48	ENTER . Stratum B soil total porosity, n8
:		ENTER Totals mu	Thickness of soil stratum A,	1173 48	ENTER Stratum B soil dry bulk density, P P (a/cm³)
		ËNTER	Depth below grade to water table, Lwr	2346 96	ENTER Stratum A soil water-filled porosity,
ENTER In:thal groundwater conc , Cw (ug/L)	27 78888889	ENTER Depth below grade	to bottom of enclosed space floor, Le	15	ENTER Stratum A soil total porosity, n^ (untless)
ENTER Chemical CAS No (numbers only, no dashes)	78875	ENTER Average	soul/ groundwater temperature, T <sub>S</sub>	16	ENTER Stratum A soil dry bulk density, P.A (g/cm³)

							2	5
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
space	Soll-bldg	sbace	sbace	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
thickness,	differential,	length,	width,	height	width.	rate		
Lorect	ΔP	ٿ	W	Ť	*	ER.		
(cm)	(g/cm-s <sup>2</sup> )	(EES)	(cm)	(cm)	(E5)	(1/0)		

ENTER
Stratum C
soil water-filled
porosity,
θ<sub>w</sub><sup>c</sup>
(σπ³/cm³)

ENTER Stratum C soil dry bulk density, Pac (g/cm³)

ENTER
Stratum B
soil water-filled
porosity,  $\theta_a^a$ (cm<sup>3</sup>/cm<sup>3</sup>)

	Jsed to catculate risk-based proundwater concentration	Used to catcu				
	-	1 0E-06	350	30	30	70
	(unitless)	(unitless)	(days/yr)	(yrs)	(yrs)	(yrs)
	된		Ш	<u>a</u>	ATNE	AT <sub>c</sub>
	noncardnogens,	s,	frequency.	duration,	noncarcinogens,	carcinogens,
	quotient for		Exposure	Exposure	tme for	trme for
	Target hazard	Target			Averaging	Averaging
	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
0	0.1	488	961	961	40	15

		920	-		رد (	l	63
		Refere	COUC	35	(mg/m <sub>3</sub> )		4 0E-
	รี้	rısk	factor,	AR.	(µg/m³) 1		0 0E+00
E E	component	water	solubility,	ဟ	(mg/L)		2 80E+03
Organic	carbon	partition	coefficient,	ጜ	(cm <sub>3</sub> /g)		4 37E+01
		Critical	temperature,	٦,	(%K)		572 00
	Normal	polling	point,	ᄩ	( <b>"</b> K)		369 52
Enthalpy of	vaporization at	the normal	boiling point,	ΔHv <sub>b</sub>	(cal/moi)		7,590
neury's	law constant	reference	temperature,	ħ.	(°C)		25
Scher	law constant	at reference	temperature,	I	(atm-m³/mol)		2 80E-03
		Diffusivity	In water,	₫	(cm <sup>2</sup> /s)		8 73E-06
		Diffusivity	ın aır,	០ឺ	(cm <sup>2</sup> /s)		7 82E-02

Floor- wall seam penmeter, Xone (cm)	3,844	Diffusion path length, Le	233196	
Water-filled porosity in capitlary zone, $\theta_{w,\alpha}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 294	Total overall effective diffusion coefficient, Doff (cm <sup>2</sup> /s)	1 27E-03	
Aur-filled porosity in capillary zone, $\theta_{a,cc} $ (cm <sup>3</sup> /cm <sup>3</sup> )	0 126	Capillary zone fifective diffusion coefficient, Do <sup>#</sup> c (cm²/s)	4 55E-04	
Total porosity In capillary zone, n <sub>ex</sub>	0 42	Stratum C C effective diffusion coefficient, D <sup>eff</sup> c (cm <sup>2</sup> /s)	0 00E+00	Reference conc , RfC (mg/m³)
Thickness of capillary zone, La (cm)	17 05	Stratum B B effective diffusion coefficient, D (cm <sup>2</sup> /s)	8 08E-04	Unit nsk factor, URF (µg/m³)*1
Stratum A soil effective vapor permeability, k, (cm²)	5 97E-10	Stratum A A effective diffusion coefficient, D A (cm²/s)	3 17E-03	Infinite source bldg conc , Charang (19/m³)
Stratum A soil relative air permeability. k <sub>w</sub> (cm²)	0 797	Vapor viscosity at ave soil temperature, µrs (g/cm-s)	177E-04	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)
Stratum A soul intrinsic permeability, k	7 49E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)	7 52E-02	Exponent of equivalent foundation Peclet number, exp(Pe) (unitiess)
Stratum A effective total fluid saturation,  S <sub>b</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0 365	Henry's law constant at ave groundwater temperature, Hrs (atm-n³/mol)	1 79E-03	Area of crack, Ausci (cm²)
Stratum C soil air-filled porosity, $\theta_{\bullet}^{c}$ (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, $\Delta H$ , $rs$ ( $at(mo)$ )	8,566	Crack effective diffusion coefficient, Domet (cm. <sup>2</sup> /s)
Stratum B soil aur-filled porosity, $\theta_{\bullet}^{B}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zonak (cm)	15	Average vapor flow rate into bdg., Q <sub>sed</sub> (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_{\bullet}^{A}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitless)	4 16E-04	Crack radius, fract (cm)
Source building separation, L <sub>T</sub> (cm)	2331 96	Area of enclosed space below grade, Ae (cm²)	9 24E+05	Source vapor conc , Cecus (Hg/m³)
Exposure duration, t (sec)	9 46E+08	Bidg ventilation rate, Q <sub>butana</sub> (cm <sup>3</sup> /s)	5 63E+04	Convection path length, Ly (cm)

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RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS

INCREMENTAL RISK CALCULATIONS

Hazard	from vapor	Intrusion to	Indoor air,	noncarclnoden	(nuitless)		ΔĬΑ
Incremental risk from	vapor	intrusion to	indoor air,	carcinogen	(unitiess)		ΔM
Final	indoor	exposure	groundwater	conc,	(hg/L)	•	1 17F+04
Pura	component	water	solubility,	S	(µg/L)		2 80E+06
Risk-based	Indoor	exposnre	groundwater	conc,	(дд/L)		1 17E+04
Indoor	exposure	groundwater	conc,	noncarcinogen	(µg/L)		1.17E+04
Indoor	exposite	groundwater	conc,	carcinogen	(hg/L)		¥

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

See - O	8, (cm²/cm²)         6, (cm²/cm²)         Mean Grain Diameter (cm)           3         0.38         0.069         0.016           9         0.43         0.089         0.044           1         0.41         0.055         0.044           1         0.43         0.057         0.046           1         0.43         0.057         0.046           2         0.03         0.100         0.025           3         0.100         0.005         0.0046           0         0.43         0.045         0.0046           0         0.43         0.045         0.0046           0         0.43         0.045         0.0046           0         0.43         0.045         0.0046           0         0.43         0.045         0.0046           0         0.43         0.044         0.044           0         0.43         0.046         0.0046           0         0.43         0.046         0.044           0         0.43         0.046         0.0046           0         0.045         0.046         0.0046           0         0.045         0.0470         0.044	6, (cm²(cm²)         0, (cm²(cm²)         0, (cm²(cm²)         0, (cm²(cm²)         0.092         0.092         0.002         0.002         0.002         0.002         0.002         0.002         0.002         0.002         0.002         0.002         0.002         0.002         0.002         0.003         0.003         0.003         0.003         0.003         0.004         0.003         0.004         0.003         0.004         0.003         0.003         0.003         0.003         0.004         0.003         0.004         0.003         0.003         0.003         0.004         0.003         0.003         0.003         0.004         0.003         0.003         0.004         0.003         0.004         0.003         0.004         0.003         0.004         0.003         0.003         0.003         0.003         0.004         0.003         0.003         0.004         0.003         0.003         0.003         0.004         0.004         0.003         0.003         0.003         0.004         0.003         0.003         0.003         0.003         0.003         0.003         0.003         0.003         0.003         0.003         0.003         0.003         0.003         0.003         0.003         0.003         0.003	9, (cm³/cm³)         9, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm³)         0, (cm³/cm²/cm³)         0, (cm³/cm³)         0, (cm³/cm²/cm³)         0, (cm³/cm²/cm²/cm²/cm²/cm²/cm²/cm²/cm²/cm²/cm²
an Diameter (cm)  0 0092  0 016  0 004  0 004  0 004  0 004  0 0025  0 0026  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  1 0 0036  0 0011  0 0036  0 0011  1 0 0036  0 0011  1 0 0036  0 0011  1 0 0036  0 0011  1 0 0036  0 0011  1 0 0036  0 0011  1 0 0036  0 0011  1 0 0036  0 0011  1 0 0036  0 0011  1 0 0036  0 0011  1 0 0036  0 0011  1 0 0036  0 0011  1 0 0036  0 0011  1 0 0036  0 0011  1 0 0036  0 0011  1 0 0036  1	Main Diameter (cm)	an Diameter (cm)  0 00992  0 016  0 0046  0 0046  0 0046  0 00056  0 00056  0 0011  0 0011  0 0012  0 0012  0 0013  0 0015  0 0015  0 0015  0 0015  0 0016  0 0046  0 0046  0 0046  0 0046  0 0056  0 0011  0 0011  0 0011  0 0011  0 0012  0 0012  0 0014  0 0029  0 0046  0 0046  0 0046  0 0046  0 0046  0 0046  0 0011  0 00011  0 00011  0 00011  0 00011  0 0001  0 0001  0 0001  0 0001  0 0001  0 0001  0 0001  0 0001	### To be considered from the control of the contro
an Diameter (cm)  0 0092  0 016  0 004  0 004  0 004  0 004  0 0025  0 0026  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0036  0 0011  0 0010  0 0026  0 0011  0 0010  0	## Diameter (cm)  0 0092  0 016  0 0044  0 0029  0 0046  0 004	## Diameter (cm)  0 0092  0 016  0 004  0 004  0 004  0 004  0 004  0 0025  0 00039  0 00039  0 0011  0 004  0 004  0 004  0 0029  0 00039  0 0011  0 004  0 004  0 004  0 004  0 004  0 004  0 004  0 004  0 004  0 004  0 004  0 005  0 001  0 0029  0 0011  0 0029  0 0039  0 0011  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0011  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0029  0 0011  0 0011  0 0029  0 0011  0 0029  0 0011  0 0029  0 0029  0 0029  0 0011  0 0029	### To be considered from the control of the contro
Henry's law constant tentence temperature, T <sub>R</sub> (°C) 25 25 25 25 25 25 25 25 25 25 25 25 25	Henry's  law constant Normal tenference bolling temperature, bolling temperature, bolling temperature, bolling temperature, bolling temperature, bolling temperature, bolling temperature, bolling temperature, bolling temperature, bolling temperature, bolling temperature, bolling temperature, bolling temperature, bolling temperature, bolling temperature, c'K)  25 533 15 25 642 24 25 743 24 25 743 24 25 743 24 25 748 15 25 651 02 25 651 02 25 639 90 25 63	Henry's law constant Normal reference bolling critical terference bolling critical terference bolling critical for T <sub>R</sub> (°C) (°K) (°K) (°K) (°C) (°C) (°C) (°C) (°C) (°C) (°C) (°C	Henry's Enthalpy of Iaw constant Normal temperature, bolling or critical the normal temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, bolling point, temperature, point, temperature, bolling point, temperature, temp
	10.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	Critical temperature.  Tc (°K)  Tc (°K)  5 969.27  827.85  969.27  827.85  969.27  827.85  969.27  827.85  969.27  827.85  969.27  827.85  969.77  886.73  886.73  886.73  886.73  886.73  886.73  886.73  886.36  686.90  686.90  686.90  686.90  686.90  686.90  686.90  686.90  686.90  686.90	Enthalpy of vaporization at temperature, boiling point, T <sub>c</sub> AH <sub>vib</sub> (Ai <sub>c</sub> ) (calfmol)

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

8

YES

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

VERSION 12 September, 1998

		ENTER	User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm²)
			К
		ENTER	stratum A SCS SCS Soil type (used to estimate soil vapor permeability)
		ENTER	SCS soil type directly above water table
		ENTER	Soil stratum directly above water table, (Enter A, B, or C)
•	sthylene	ENTER (Lwr (cell D28)	Thickness Thickness  Thickness Thickness of soil of soil of soil of soil of soil of soil of soil of soil of soil of soil of statum B, stratum C, stratum A, (Enter value or 0) (Enter value or 0)  In the hamber of the condition of the condition of the condition of soil of
Chemical	trans-1,2-Dichloroethylene	NTER ENTER ENTER Totals must add up to value of L <sub>wr</sub> (cell D28)	Thickness of soil soil stratum B. (Enter value or 0) hs (cm)
	tra	ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub> (cm)
_	,	ENTER	Depth below grade to water table, Lwr (cm)
ENTER Initial groundwater conc , C <sub>W</sub>	23 575	ENTER Depth	below grade to bottom of enclosed space floor, Lr (cm)
ENTER Chemical CAS No (numbers only,	156605	ENTER	Average soil/ groundwater temperature, T <sub>s</sub> (°C)

ENTER Stratum C soil water-filled porosity,  \$\text{9}_{\text{c}}^{\text{c}}	(cm./cm²)	0.3		
ENTER Stratum C soul total porosity,	(nurthess)	0 43		
ENTER Stratum C soil dry bulk density, pc	(g/cm <sup>-</sup> )	17	ENTER	Indoor
ENTER Stratum B soil water-filled porosity, e., b., b., b., b., b., b., b., b., b., b	(cm /cm <sup>-</sup> )	027	ENTER	Floor-wati
ENTER Stratum B soll total porosity, n <sup>8</sup>	(numiness)	0 42	ENTER	Enclosed
ENTER Stratum B soil dry bulk density,	( III)(6)	1,	ENTER Enclosed	space
ENTER Stratum A soil water-filled porosity, $\theta_{\mu}^{A}$	(411)	0.5	ENTER	space
ENTER Stratum A soit total porosity, n <sup>A</sup>	(connects)	0.43	ENTER	Soil-bidg
ENTER Stratum A soil dry bulk density, Po fotom?		15	ENTER	space
	I į			

floor	pressure	floor	floor	space	seam crack	air exchange
ckness,	differential,	length,	width,	height,	width,	rate,
L Care	Φ	בר	w <sub>B</sub>	ľ	*	Ħ
(cm)	(g/cm-s²)	(cm)	(cm)	(cm)	(cm)	(11/1)
15	40	961	961	488	01	0.45
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	
Averaging	Averaging			Target	Target hazard	
me for	time for	Exposure	Exposure	nsk for	quotient for	
inogens,	noncardinogens,	duration,	frequency,	cardinogens,	noncardinogens,	
ΑT <sub>C</sub>	AT <sub>NC</sub>	8	Ш	돲	된	
(yrrs)	(yrs)	(yrs)	(days/yr)	(unitiess)	(unitless)	

Used to calculate risk-based groundwater concentration 1 of 7 1 0E-06 30

		ф				i	Г
		Referenc	conc.	R	(mg/m <sub>3</sub> )		7 00 00
	Ç	nisk	factor,	Ŗ.	(mg/m³)		007300
9	component	water	solubility,	တ	(mg/L)		8 30E±03
Organic	carbon	partition	coefficient,	يّد	(cm <sub>3</sub> /g)		5 25E±01
		Critical	temperature,	ို	( <b>%</b> )		518 50
	Normal	boillng	point,	卢	(°K)		320 AK
Ellisalpy of	vaportzation at	the normal	bailing point,	۵H۷	(cal/mol)		6 717   320 85   518 50   5 25E±01   6 30E±02   0 0E±00   ± 0 E 02
2011	law constant	reference	temperature,	Ļ.	(၁)		25
30	law constant	at reference	temperature,	I	(atm-m³/mol)		7 07E-02   1 19E-05   9 39E-03
					(cm <sup>2</sup> /s)		1 19E-05
		Diffusivity	in air,	<b>១</b>	(cm <sup>2</sup> /s)		7 07E-02

Floor-wall seam permeter,	3,844	Diffusion path length, L <sub>d</sub> (cm)	2331 96	
Water-filled porosity in capillary zone, $\theta_{w,\alpha}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 294	Total overs# effective diffusion coefficient, D"r (cm²/s)	1 14E-03	
Air-filled porosity in capillary zone, $\theta_{\Phi, \alpha} = (cm^3/cm^3)$	0 126	Capillary zone zone effective diffusion coefficient, Deff cm²/s)	4 06E-04	
Total porosity in capillary zone, n <sub>cx</sub> (cm³/cm³)	0 42	Stratum C c effective diffusion coefficient, D <sup>eff</sup> c (cm²/s)	0.00E+00	Reference conc., RtC (mg/m³)
Thickness of capitary zone, L <sub>e</sub>	17 05	Stratum B B effective diffusion coefficient, Deff cm²/s)	7 26E-04	Unit nsk factor, URF (µg/m³)-1
Stratum A soil effective vapor permeabirity, k,	5 97E-10	Stratum A effective diffusion coefficient, D <sup>eff</sup> (cm²/s)	2 87E-03	Infinite source bldg conc , Chacan (µg/m³)
Stratum A soil relative air permeability, k <sub>w</sub>	0 797	Vapor viscosity at ave soil temperature, µrs (g/cm-s)	177E-04	Infinite source indoor attenuation coefficient, $\alpha$ (unitiess)
Stratum A soll intrinsic permeability, k	7 49E-10	Henry's law constant at ave groundwater temperature, H'75 (untiless)	2.73E-01	Exponent of equivalent foundation Peclet number, exp(Pe') (unitless)
Stratum A effective total fund saturation,  S <sub>to</sub> (cm³/cm³)	0 365	Henry's law constant at ave groundwater temperature, Hrs (atrn-m³/mol)	6 48E-03	Area of crack, Area (cm²) 3.84E+02
Stratum C soil air-füled porosity, $\theta_a^c$ (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, AH, 15 (cal/mol)	7,073	Crack effective diffusion coefficient, Done (cm²/s)
Stratum B soul air-filled porosity, $\theta_{\bullet}^{B}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zasak (cm)	15	Average vapor flow rate into bidg , Qua (cm³/s)
Stratum A soil air-filled porosity, $\theta_a^A$ (cm³/cm³)	0 230	Crack- to-total area ratio, n (unitless)	4 16E-04	Crack radlus, rasek (cm)
Source- building separation, L <sub>T</sub>	2331 96	Area of enclosed space below grade, A <sub>B</sub>	9 24E+05	Source vapor conc , Charte (µg/m³)
Exposure duration, t	9 46E+08	Bidg ventilation rate, Quadro (cm <sup>3</sup> /s)	5.63E+04	Convection path length, L <sub>p</sub> (cm)

#### RESULTS SHEET

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INCREMENTAL RISK CALCULATIONS:

Incremental	risk from	vapor	intrusion to	indoor air,	carcinogen	(nuitless)	ΑN	
i	Finai	indoor	exposure	groundwater	conc,	(µg/L)	5 97E+04	
ı	Pure	component	water	solubility,	S	(µg/L)	90+30€	
i	Risk-based	indoor	exposure	groundwater	conc,	(µg/L)	5.97E+04	
-	indoor	exposure	groundwater	conc,	noncarcinogen	(µg/L)	5 97E+04	
	Indoor	exposnre	groundwater	conc,	carcinogen	(µg/L)	ΑN	

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

Hazard quotient from vapor Intrusion to indoor air, noncarcinogen (unitless) 7 0E-00 0 0E+00 0 0E+00 0 0E+00 0 0E+00 0 0E+00 1 4E-01 3 5E-01 0 0E+00 0 0E+00 0 0E+00 1 1 E-03 1 3 0E-03 1 0E-00 0 0E+00 0 0

						VLUUNUP I ABLES	0					
SCS Soil Type	K (cm/h) n (1/cm)	Ø.	Soil Properties Lo	verties Lookup Table	(cara)(cara)	o (constant)	i i					
	ı	Į	ı,	M (uruess)	o, (CIII /CIII )	ı	wean Grain Diameter (cm)					
, <u>ರ</u>	0.20	2000	2 :	0.083	038	0 068	0 0092					
<u>.</u>	1 22	800		0.237	400	0.080	0.016					
T <sub>S</sub>	2 2	2,50	9 6	6000	2 4	9 (0	0.020					
· so	20 70	145	07.7	1000	140	2000	0.040					
SC	0 12	0.027	2 5	0 187	0 43	0.043	0.044					
ಶಿರ	131	0 059	1 48	0 324	0.39	9 0	620.0					
<u>22</u>	0.25	0 016	1 37	0 270	0.46	0034	0 0046					
SIC	0 02	0 005	1 09	0 083	0.26	0 0 0 0	0 0038					
SICT	0 07	0 010	1 23	0 187	0.43	0 089	0 0056					
30 30 30	0.45	0 020	141	0 291	0 45	0 067	0 011					
36	4 42	0 075	200	0 471	0 41	0.065	0 030					
					Chemic	Chemical Properties Lookin Table	o Table					
	Organic	윧			Pure		Henv's	Henny's			Enthalmy of	
	carbon	5			component		law constant	law constant	la en con		vanoritation of	±
	partition		Diffusivity	Diffusivity	water	Henry's	at reference	reference	polling	Critical	the normal	¥ 1 ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ±
	coefficient		in air,	ın water,	solubility.	law constant	temperature,	temperature,	point,	temperature,	boiling point,	_
	¥°.		٥	₫,	ω	Ì	I '	<b>⊢</b> ≝	F,	٦,	ΔΗν	URF
CAS No Chemical	(cm <sub>2</sub> /g)	۱	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(nuttess)	(atm-m³/mol)	(Ç)	ફ	(K)	(cal/mol)	(µg/m³) <sup>-1</sup>
50293 DDT	260	2 63E+08	1 37E-02	4 95E-06	2 50E-02	3326-04	8 10E-05	አ	533 15	27.007	900	2000
50328 Benzo(a)pyrene	100	1 02E+06	4 30E-02	90E-06	1 62E-03	4 63F-05	1 13E-06	24 K	715 0	060 27	000,11	9 - 10 - 10 - 10 - 10 - 10 - 10 - 10 - 1
51285 2,4-Dintrophenol	-	1 00E-02	2 73E-02	90-E-06	2 79E+03	1.82F-05	4 44F-07	25	7 13 90 80 80 8	809 21	15,000	215-03
53703 Dibenz(a,h)anthracene	80	3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25.	743 24	990.41	13,000	2.1E-03
56235 Carbon tetrachlonde	174	74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3.05E-02	25.	349.90	556 FO	7 177	4 50.05
56553 Benz(a)anthracene	366	3 98E+05	5 10E-02	9 00E-06	9 40E-03	1376-04	3 345-06	25		1004 79	15,000	2 4 H 5
57749 Chlordane	1 20	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3 7F-04
58899 gamma-HCH (Lindane)	107	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25		839.36	13,000	3.7E-04
60571 Dieldrin	2 14	2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	25	613	842.25	13,000	4 6E-03
65850 Benzolc Acid	Ð9	6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10.000	0.05+00
67641 Acetone	5.7	5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	6.955	0 0 0 0 0
67663 Chloroform	396	3 98E+01	104E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	52	334 32	536 40	886'9	2 3E-05
21252 Billion	178	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	52	458 00	695 00	9,510	4 0E-06
71437 Remand	692	6 92E+00	8 00E-02	9 305-06	7 40E+04	3616-04	8 805-06	25	390 88	563 05	10,346	0 0E+00
71556 1 1 -Tochloroethane	9 6	105+01	20-10-02	90 100 6	1 /55+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342	8 3E-06
72208 Endin		23F+04	1 255-02	4 74F-08	2 50E-03	10-H20 /	1 /2E-02 7 F1E 06	25	347 24	545 00	7,136	0,0E+00
72435 Methoxychlor	116	77E+04	1 56E-02	4 46E-06	4 50E-02	6 48F-04	1.58E-05	2,4	651 03	986 20	12,000	001.00
72548 DDD	8	90+300	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 005-06	3, 5,	639 90	863 77	14,000	00100
72559 DDE	4 47	47E+06	1 44E-02	5 87E-06	1 20E-01	8 616-04	2 10E-05	25	636 44	860.38	13,000	200 mg a
74839 Methyl bromide	-	05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	25	276 71	467 00	5 7 14	0.05+00
75014 Vinyl chlonde (chloroethene)		86E+01	1 06E-01	1 23E-06	2 76E+03	1 115+00	2 71E-02	25	259 25	432 00	5.250	8 4E-05
75092 Methylene chloride	1 17	17E+01	1015-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	313 00	510 00	6,706	4 7E-07
75150 Carbon disulfide	4 57	57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	25	319 00	552 00	6,391	0 0E+00
75252 Bromoform	871	716+01	1 49E-02	1 03E-05		2 19E-02	5 34E-04	25	422 35	696 00	9,479	1 15-06
152/4 Bromodichioromethane	8 6	50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 8E-05
75343 1,1-Dichloroethane	3.16	16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	25	330 22	523 00	6,895	0 0E+00
75334 1,1-Dichloroethylene	283	5 89E+01	9 005-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	52	304 75	576 05	6,247	5 0E-05
TATA Mecoallone along and and and and and and and and and and		1415+00	1,25-02	3 63 11 06	1 80E-01	4 475-02	1 09E-03	52	603 69	846 31	13,000	1 3E-03
78591 Isonhomon		4 68F+01	6 23E-02	6 78E-06	1 2011-00	2 725.04	2 /1E-02	25	512.15	746 00	10,931	0 0E+00
78875 1.2-Dichloropropane	4 37	37E+01	7 82F-02	8 73F-06	2 801103	1 15 1.01	2 80 103	C 14	0000	15 00	10,271	2 7E-07
79005 1,1,2-Trichloroethane	501	01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 125-04	25.	386 15	5/2 00 5/12 00	080,7	0.0E+00
79016 Trichloroethylene	166	1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	52	360 36	544 20	7.505	1 7F-06
79345 1,1,2,2-Tetrachloroethane	6 6	33E+01	7 10E-02	7 90E-08	2 97E+03	1 41E-02	3 445-04	25	419 60	661 15	966'8	5 85-05
83329 Acenaphthene	7 08	08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0.0E+00

VLOOKUP TABLES

Reference conc. RfC (mg/m³)

84742 Di-n-butyl phthalate         339E-04         4 38E-02           86687 Netyl benrsyl phthalate         575E-04         1 72E-02           86737 Flucrane         1 39E+04         3 85E-02           86737 Flucrane         1 39E+04         3 65E-02           86738 Carbazole         3 39E+04         3 65E-02           86748 Carbazole         3 39E+04         3 60E-02           87863 Haxachlorophenol         5 37E+04         5 61E-02           87865 Pentachlorophenol         3 81E+02         3 90E-02           91203 Naphthalane         2 00E+03         3 90E-02           91403 3-Dichlorophenol         3 81E+02         3 90E-02           95476 o-Xylene         3 63E+02         3 00E-02           9548 24,5-Trichlorophenol         9 12E+02         1 94E-02           95578 2-Chlorophenol         9 12E+02         1 94E-02           95578 2-Chlorophenol         9 12E+02         1 94E-02           95578 2-Chlorophylophenol         1 60E+03         3 00E-02           95578 2-Chlorophylophenol         2 09E+02         1 06E-02           10642 3-Chlorophylophenol         2 09E+02         1 06E-02           10642 3-Chlorophylophenol         2 09E+02         1 06E-02           10642 4-Linchylophenol         2 09E+0	7 86E-06 4 83E-06 6 35E-06 7 88E-06 7 03E-06	1 12E+01	3 85E-08	9 39E-10 1 26E-06	25 25 66 25 67	613 15 660 60 632 28	798 67 839 68 890 45	13,000	0 0E+00 0 0E+00	£.01.00
sculphenylariate 575E+04 1 sculphenylariate 1,28E+03 3 e e	40~~			1 26E-06		50 60 32 28	839 68 890 45		00000	0
sodiphenylamine 129E+03 3  se	0 1- 1-	2 69E+00	5 17E-05			32 28	890 45		0010	20 no 1
138E+04 5 39E=04 5 39E=04 5 39E=04 3 81E+02 1 20E=04 2 00E=04 9 12E=01 1 40E=02 1 60E=01 1 76E+02 1 76E+03 1 76E+04 1 76E+0	7 88E-06 7 03E-06	3 51E+01	2 05E-04	5 00E-06				13 000	4 E-08	00400
3 39E +03 5 37E +04 5 92E +02 3 81E +02 2 00E +03 1 24E +02 1 24E +01 1 24E +03 1 24E	7 03E-06	1 98E+00	2 61E-03	6 37E-05		570 44	870.00		00-11-00	004400
5 37E+04 5 31E+02 5 3 81E+02 5 3 81E+02 5 3 81E+02 5 3 81E+02 7 24E+02 1 4 82E+02 7 7 6E+02 7 7 7 6E+03 3 7 6E+04 7 7 7 7 8 7 6E+03 7 7 7 7 8 7 6E+03 7 7 7 7 8 7 6E+03 7 7 7 7 8 7 6E+03 7 7 7 7 8 7 6E+03 7 7 7 7 8 7 6E+03 7 7 7 7 7 8 7 6E+03 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7		7 48E+00	6 26E-07	1 535-08		627 87	00 668		5.7E-06	0-110
3 82E+02 5 12 100E+02 5 12 100E+02 5 12 100E+02 1 12 100E+02 1 12 10 10 10 10 10 10 10 10 10 10 10 10 10	6 16E-06	3 23E+00	3 34 -01	8 15E-03		486,15	738 00	10,206	2.2E-05	20+110
3 81E+02 2 00E+02 3 63E+02 3 63E+02 1 60E+03 1 60E+03 1 60E+03 2 09E+02 2 09E+02 7 76E+02 7 86E+01 1 51E+03 1 51E+03 1 51E+03 1 51E+03 1 76E+03 1 63E+04 1 76E+03 1 76E+	6 10E-06	1 95E+03	1 00E-06	2 44E-08		582 15	813 20	14,000	3.4E-05	0 OE+00
7.20E+03 9.00E+03 9.02E+02 9.12E+02 1.60E+03 1.60E+03 1.60E+03 1.60E+03 1.60E+03 1.60E+03 1.60E+03 1.60E+02 1.70E+02 1.70E+02 1.70E+02 1.70E+03 1.70E+	6 25E-06	8 00E+02	3 19E-04	7 78E-06	25 51	519 15	749 03	12,000	3 1E-06	0 0E+00
3 624E+02 3 638E+02 3 63E+02 1 60E+03 2 63E+02 7 76E+02 7 76E+03 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	7 505-06	3 105+01	1 98E-02	4 83E-04	25 46	491.14	748 40		0.0E+00	1 4E-01
9 12E-101 9 12E-102 1 60E+02 3 63E-02 3 63E-02 7 76E+02 7 76E+02 7 76E+02 7 76E+02 1 76E+02 1 76E+02 1 76E+02 1 76E+02 1 76E+02 1 76E+02 1 76E+02 1 76E+03 1 76E+03 1 76E+04 1 76E+03 1 76	6 74E-06	3 11E+00	1 64E-07	4 00E-09	22	560 26	754 03	13,000	1 3E-04	0 0E+00
6 17E+00 8 17E+00 1 60E+01 2 64E+01 1 76E+02 2 09E+02 2 09E+02 2 09E+02 1 74E+01 1 74E+01 1 15E+00 1 15E+01 1 15E+01	00000	705507	2 13E-01	5 20E-03	52 :	417 60	630 30		0 0E+00	7 0E+00
3 88E+02 1 60E+03 3 63E+02 7 76E+02 7 76E+02 7 76E+02 7 76E+02 6 61E+01 1 74E+01 1 74E+01 1 74E+01 1 75E+02 2 19E+02 2 19E+02 2 19E+02 3 32E+07 1 51E+07 1 51E+07 1 55E+01 1 6 31E+07 1 6 31E+07 1 75E+03 3 3 3 1 1 7 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 6 6 0 1 1 1 6 6 0 1 1 1 6 6 0 1 1 1 6 6 0 1 1 1 6 6 0 1 1 1 6 6 0 1 1 1 6 6 0 1 1 1 6 6 0 1 1 1 6 6 0 1 1 1 6 6 0 1 1 1 6 6 0 1 1 1 6 6 0 1 1 1 6 6 0 1 1 1 6 6 0 1 1 1 6 6 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	7 90 1-06	1.56E+02	7 79E-03	1 205-00	5 t	464 19	697 60		0.000	1 8E-01
1 60E+03 6 46E+01 7 76E+02 7 76E+02 7 76E+02 7 99E+02 7 99E+02 7 76E+02 6 61E+01 1 74E+01 1 74E+01 1 74E+02 2 19E+02 2 19E+02 2 19E+02 1 51E+07 1 51E+07 1 51E+07 1 51E+07 1 78E+03 1 178E+03 1 178E+01 1 15E+07 2 95E+04 2 95E+04 2 95E+04 2 95E+04 2 95E+01 1 15E+02 2 95E+04 3 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	9 465-06	2 20E+04	1.60%-02	3 90E-04	2 4	403.07	00.00		0.000	2 0E-01
6 46E+01 3 63E+02 7 76E+02 2 09E+02 5 389E+02 6 17E+02 6 17E+02 6 51E+01 1 74E+01 1 82E+02 2 19E+02 1 15E+03 1 15E+01 1 55E+01 1 55E+01 1 56E+04 1 76E+03 1 76E+03 1 16E+03 1 17E+03 1 15E+01 1 15E+01		1 20E+03	1 78E-04	4 345.05	3 4	44/ 33 536 45	250 43	9,000	0.0E+00	1.8E-02
3 63E+02 7 76E+02 3.89E+02 6 17E+02 6 61E+01 1 74E+01 1 74E+01 1 82E+02 2 19E+02 2 19E+02 1 82E+00 8 22E+00 1 55E+01 1 55E+01 1 55E+01 1 55E+01 1 76E+03 1 76E+01 2 76E+01 2 76E+03 3 3 76E+01 1 76E+03 3 3 76E+01 1 76E+03 3 3 76E+01 1 76E+03 3 3 76E+01 1 76E+03 3 3 76E+01 1 76E+03 1 76E+03 3 3 76E+01 1 76E+03 1 76	· oc	2 09E+03	9.84E-04	2 405.05	2 2	350 50	710 00		0.01100	3 5E-01
7 76E+02 2.09E+02 6.17E+02 6.17E+02 6.17E+03 1.74E+03 1.74E+03 1.74E+03 1.74E+03 1.75E+02 2.19E+02 2.19E+02 2.19E+02 3.15E+03 3.17E+		1 69E+02	3 23 15-01	2 48E-03	3 4	460.90	617.00		0.05+00	2 OE-03
2 09E+02 3.89E+02 6 61E+02 6 61E+01 1 74E+01 1 74E+01 1 82E+02 2 19E+02 2 19E+02 2 19E+02 2 19E+02 3 25E+01 6 61E+07 1 51E+07 1 51E+07 1 78E+03 1 78E+03 1 78E+03 1 78E+03 1 78E+03 1 78E+03 3 35E+01 6 31E+01 1 55E+07 2 55E+01 1 55E+02 3 55E+01 1 55E+07 1 55E+	8 00E-06	3 10F+02	1.135-01	2 785-03	3 4	100 01	07 / 10	500	0.011.00	10=+00
3.896+02 6 176+02 6 176+02 6 176+02 7 526+00 7 76-92 1 826+02 7 2 196+02 7 2 196+02 7 2 196+02 7 2 196+02 7 2 196+02 7 3 1516+07 1 566+04 1 776+03 1 476+03 1 556+04 1 556+04	8.595-06	7 R7E+03	8 20E-01	2 705 06	2 4	4:00.	030 00		0.05+00	1 0E+00
6 175-02 6 175-02 6 515-01 7 255-00 1 825-02 2 195-02 2 195-02 1 555-01 1 555-01	o ec	1 RSE+03	3 14 6-03	7 665 03	62 6	484 13	707 60		0.00	7 0E-02
6 61 E + 01	7 905.08	70.100.	0.000	CO-1100 -	9 1	20 5	07 91 9		0.00+0.0	7 0E+00
174E+01 174E+01 182E+02 182E+02 19E+02 19E+02 15E+01 15E+01 15E+01 178E+03 178E+03 178E+03 178E+03 178E+03 178E+02 178E+03	100 H	5 30E+01	1 365-05	2 450-05	Q 2	12 / 44	54 /3		0.05+00	8 0E-01
10   10   10   10   10   10   10   10	90506	8 52E+03	4 01E-02	9 32E-07	2 4	356 85	524 00	1,089	0.05+00	1 4E-02
teacher 4 07E+02 7 7 182E+02 8 182E+02 8 182E+02 8 182E+02 8 182E+01 8 182E+01 8 182E+01 8 182E+01 8 182E+01 8 182E+01 8 182E+01 9 182E+	σ.	2 00F+04	2 105-02	5 125.04	3 5	346 66	540 42		Z 6E-U5	0 0E+00
enzene 2 19E+02 8  enzene 2 19E+02 7  2 88E+01 8  flancethyl)ether 155E+01 6  flan hylhexyl)phthalate 151E+07 3  yl phthalate 32E+07 1  forobenzene 2 55E+07 1  ene 2 55E+07 1  forobenzene 2 55E+07 1  forobenzene 2 55E+07 1  forobensene 3 55E+07 2  frotoluene 9 55E+01 2  forocuthylene 1 55E+02 7  Olichloroethylene 3 55E+07 7  C-Dichloroethylene 3 55E+07 7  C-Dichloroethylene 3 55E+07 7  C-Dichloroethylene 5 25E+07 7  C-Dichloroethylene 5 25E+07 7  C-Dichloroethylene 5 25E+07 7	-	1816+03	3 015-01	7 24 1 0 2	3	000	51913		0.05+00	2 0E-01
Internation   2   19E+02   2   19E+02   2   19E+02   2   19E+03   2   19E+03   3	90-109 e	5 28E+02	2726.01	20-11-0	S 5	412.27	617.05		0.000	7 OE+00
1	8 70E-06	4 72E+02	1 525-01	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	8 5	27.70	87 18		0.05+00	4 0E-01
fran   55E+01   6	9 10E-06	8 28F+04	1636-05	2 OPE-03	24 40	404.07	604.70		0.05+00	2 0E-02
tran 2 14E+03 1  hythexy/jptthalate 151E+07 3  yi phthalate 32E+07 1  lorobenzene 550E+04 5  ne 2 95E+04 3  rotolonene 178E+02 3  rotolonene 95E+01 2  rotolonene 95E+01 2  rotolonene 155E+02 3  Loroethylene 155E+07 1  Olichloroethylene 35E+07 7  2-Dichloroethylene 525E+01 7	7 53E-06	1 72E+04	7 38 E-04	1 805-05	3 %	453.02	659 70	076,01	0.0E+00	2 15 100
hythexyl/puthalate 151E+07 3  yl phthalate 8.2E+07 1  forobenzene 8.0E+04 5  dollorobenzene 178E+03 3  idonobenzene 178E+03 3  idonobende 9.5E+01 2  forotoluene 9.5E+01 2  forotoluene 1.5E+02 3  Olichloroethylene 1.5E+02 7  Olichloroethylene 3.5E+01 7  2-Dichloroethylene 5.2E+01 7	4 55E-06	5.10E-01	4 59E-04	1 12E-05	35 55	674.43	942 94		0.05-04	2 45 02
yl phthalate         8 32E+07         1           forobenzene         5 50E+04         5           ene         5 50E+04         3           ene         2 95E+04         3           ilorophenol         1 78E+03         3           trotoluene         9 55E+01         2           ibromomethane         6 31E+01         1           ioroethylene         1 55E+02         7           Dichloroethylene         3 55E+01         2           2-Dichloroethylene         5 25E+01         7	3 66E-06	3 40E-01	4.18E-06	1 02E-07	25 65	657 15	806.00		4 OF 56	0.05400
Iorobenzene         5 50E+04         5 fore+04         3 fore+04         3 fore+04         3 fore+04         3 fore+04         3 fore+04         3 fore+04         3 fore+04         3 fore+04         3 fore+04         3 fore+07         2 fore+07         <	3.58E-06	2 00E-02	2 74E-03	6 68E-05	25 70	704 09	862 22	15,000	0.05+00	7 05-03
### 295E+04 3 ####################################	5 91E-06	6 20E+00	5 41E-02	132E-03	22	22.55	825.00		4 6E-04	005700
Idhlorobenzene         178E+03         3           Idorophenol         147E+02         3           Irodoluene         9 55E+01         2           Ibromomethane         6 31E+01         1           Ioroethylene         1 55E+02         7           Dichloroethylene         3 55E+01         7           2-Dichloroethylene         5 25E+01         7	7 74E-06	4.34E-02	2 67E-03	6.51F-05	3 5	615 18	873.00		4 GE-O4	100100
147E+02   3   3   3   3   3   3   3   3   3	8 23E-06	3 00E+02	5 82E-02	1 42E-03	25 48	486 15	725.00		20100	3 05 01
trotoluene 9 55E+01 2 Ibromomethane 6 31E+01 1 Ioroethylene 1 05E+02 7 Olichloroethylene 3 55E+01 7 2-Dichloroethylene 5 25E+01 7	8 77E-06	4 50E+03	1 30E-04	3 17E-06	25.	482 15	708 17	1,00	001100	1 15 02
Ibromomethane   631E+01   1   1   1   1   1   1   1   1   1	7 08E-06	2 70E+02	3 80E-06	9 27 E-08	25	200 00	814 00		1 95-04	0.05400
forethylene	1 05E-05	2 60E+03	3 21 5-02	7 83E-04	25 41	416 14	678 20		2 4F-05	00000
1 05E+05 2 Dichloroethylene 3 55E+01 7 2-Dichloroethylene 5 25E+01 7	8 20E-06	2 00E+02	7 54E-01	1 84E-02	25 39	394 40	620 20	8.288	5 8E-07	0 0E+00
3 55E+01 7 5 25E+01 7	7 24E-06	135E-01	4 51E-04	1 106-05	25 66	667 95	936 00		0 0E+00	1 1E-01
525E+01 7	1 13E-05	3 50E+03	1 67E-01	4 07E-03	25 33	333 65	544 00		00=+00	3 5E-02
	1 19E-05	6 30E+03	3 85E-01	9 39E-03	25 32	320 85	516 50		0.05+00	7 0E-02
ie 3.47E+06 1	ທ	2 20E-05	6 56E-05	1 605-06	25 80	809 15	1078 24		2 1E-04	0 0E+00
anthene 123E+06 2	5 56E-06	1 50E-03	4 55E-03	1 11E-04	25 71	715 90	969 27		2 1E-04	0 0E+00
1 07 E+05 3	6 35E-06	2 06E-01	6 60E-04	161E-05		655 95	905 00		0 0E+00	1 4E-01
uoranthene 123E+06 2	5 56E-06	8 00E-04	3 40E-05	8 29E-07	25 75	753 15	1019 70	16,000	2 1E-05	0 0E+00
Ν,	6 21E-06	1 60E-03	3 88E-03	9 46E-05		714 15	00 626	16,455	2 1E-06	0 05+00
2 45E +06	4 86E-06	1 80E-01	6 97E-03	1 70E-04	25 60	603 01	839 37		4 9E-03	0 0E+00
C) 123E+03 1	7 34E-06	2 00E+00		1 06E-05		596 55	839 36		1 8E-03	0 0E+00
1 26E+03 1	7 34E-06	2 40E-01	3 05E-05	7 44E-07	25 59	596 55	839 36	13,000	5 3E-04	0 0E+00
A 57E+01 6	1 00E-05	2 80E+03	7 26E-01	1 77E-02	25 38	381 15	587 38		3 75-05	2 0E-02
6 92E+01 3	7 26E-06	1 82E+02	3 06E-05	7.46E-07		558 00	770 00	12,938	1 9E-04	0 0E+00
tamine 2 40E+01 5	8 17E-06	9 89E+03	9 23E-05	2 25E-06		209 60	746 87	11,000	2 0E-03	0 OE+00
8 32E+04 1.	4 23E-06	2 00E-01	3 90E-04	9 51 6-06	25 61	613 96	848 76		2 6E-03	0 OE+00
ementai) 5.20E+01 3	6 30E-06	5 62E-02	4 67E-01	1 14E-02	25 629	88 63	1750 00	_	0 0E+00	3 0E-04
2 57 E+05	4 34E-06	7 40E-01	2 46E-04	6 00E-06	25 657	7 15	873 31		3 2E-04	0 0E+00
- •	4 32E-06	8 00E-02	1 895-01	4 60E-03		12 50	539 37	19,000	1 0E-04	0 0E+00
T 60+B02 Z	3 00E-06	5 /0E-U2	8 20E-02	2 00E-03	25 377	7 50	512 27	19,000	1 0E-04	0.01
330E+04	5 42E-06	4 20E-01	1,19E-02	2 90E-04	25 340	0.50	475 22	18,000	1 0E-04	0 OE+00
53469219 Arodor 1242 (PCB-1242) 3 30E+04 2 14E-02	5 31E-06	3,40E-01	2 13E-02	5 20E-04	25 345,	5,50	482 20	18,000	1 0E-04	0 0F+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

g

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

VERSION 12 September, 1998

User-defined stratum A soil vapor permeability, (cm<sup>2</sup>) ENTER
Soil
Stratum A
SCS
Soil type
(used to estimate OR pe
soil vapor
permeabilit SCS soil type directly above ENTER water table Soil stratum directly above water table, (Enter A, B, or C) ENTER ENTER ENTER ENTER

Totals must add up to value of L<sub>wr</sub> (cell D28)

Thickness Thickness

Thickness of soil of soil

of soil stratum B, stratum C, stratum C, stratum A, (Enter value or 0) cis-1,2-Dichloroethylene Chemical (E) Thickness of soil stratum A, h<sub>A</sub> <u>E</u> Depth
below grade
to water table, ENTER 2346 96 (E) ENTER Initial groundwater conc, below grade to bottom of enclosed space floor, 95 61333333 С. (дец) Chemical CAS No (numbers only, no dashes) Average soil/ groundwater temperature, 156592 ENTER

ENTER Stratum C soil water-filled porosity, e <sub>w</sub> <sup>c</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	0.3	
ENTER Stratum C soil total porosity, n <sup>o</sup> (untless)	0 43	
ENTER Stratum C soil day bulk density, $ ho_c^c$ ( $g/cm^3$ )	17	ENTER Indoor arr exchange rate, ER
ENTER Stratum B soil water-filled porosity, $\theta_w^{B}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.27	ENTER Floor-wall seam crack width, w
ENTER Stratum B soil total porosity, n <sup>B</sup> (untless)	0.42	ENTER Endosed space height, H <sub>B</sub> (cm)
ENTER Stratum B soil dry bulk density, Pe <sup>8</sup> (g/cm³)	17	ENTER Enclosed space floor width, W <sub>B</sub>
ENTER Stratum A soil water-filled porosity, $\theta_{w}^{A}$ (cm³/cm³)	0.2	ENTER Enclosed space floor length, Le
ENTER Stratum A soil total porosity, n^A (unitless)	0.43	ENTER Soil-bldg pressure drifferential.  ΔP (g/cm-s²)
ENTER Stratum A soil dry bulk density, pa^A (g/cm³)	15	ENTER Enclosed space floor thickness, Lexx

ng Averaging ENTER ENTER Target  r time for Exposure Exposure risk for ins, noncarcinogens, duration, frequency, carcinogens, r  Afric ED EF TR  (Yrs) (Yrs) (JavsAvr) (unitless)	rek aging / s for ogens, non	ENTER Averaging time for carcinogens,	ENTER Exposure duration,	ENTER Exposure frequency,	ENTER Target risk for	ENTER Target hazard	
Averaging Target time for Exposure Exposure risk for noncarcinogens, duration, frequency, carcinogens, n AT-w ED EF TR AT-w (vrs) (dax/kr) (unites)	aging / a for ogens, non	Averaging time for carcinogens,	Exposure duration,	Exposure frequency,	Target risk for	Target hazard	
time for Exposure Exposure risk for noncarcinogens, duration, frequency, carcinogens, n ATM ED EF TR (4713) (vrs) (davs/vr) (unitess)	ofor ogens, non	time for carcinogens,	Exposure duration,	Exposure frequency,	risk for	and the for	
noncarcinogens, duration, frequency, carcinogens, r  AT <sub>NC</sub> ED EF TR (YTS) (YTS) (Junilless)	ogens, non	carcinogens,	duration,	frequency,	on our out		
AT <sub>NC</sub> ED EF TR (vrs) (vrs) (davs/vr) (uniless)					9105	noncardinogens.	
(vrs) (days/vr) (unitless)	٥	ATNC	8	<u>н</u>	, 도	ള	
	(\$.	(yrs)	(yrs)	(days/yr)	(nutless)	(unitless)	
0 30 30 350 10E-06	0	30	30	350	1 05-06	1	
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groundwater concentration

### CHEMICAL PROPERTIES SHEET

		Reference	conc.	RfC	(mg/m <sub>3</sub> )	2 5E 00
	Ç	nisk	factor,	J.R.	(µg/m³)-1	007500
Pure	component	water	solubility,	Ś	(mg/L)	3 505+03
Organic	carbon	partition	coefficient,	δŝ	(6/ <sub>6</sub> mo)	1 55F±01
		Critical	temperature,	۲	(°K)	544 00 3 55F+01 3 50F+03 0 0E+00 3 5E-00
	Normal	boiling	point,	<u>"</u>	(°K)	333 65
Enthalpy of	vaporization at	the normal	boiling point,	ΔН,	(cal/mol)	7.192
Henry's	law constant	reference	temperature,	H.	(၁့)	25
Henry's	law constant	at reference	temperature,	I	(atm-m³/mol)	4 07E-03
		Diffusivity	in water,	₫	(cm <sup>2</sup> /s)	1 13E-05
		Diffusivity	m alf,	₫	(cm <sup>2</sup> /s)	7.36E-02   1.13E-05

Floor-wall seam perimeter,	3,844	Diffusion path length, L <sub>e</sub> (cm)	2331 96	,
Water-filed porosity in capillary zone, $\theta_{w,ca}$ $(cm^3/cm^3)$	0 294	Total overall effective diffusion coefficient, $D^{ef},$ $(cm^2/s)$	1 20E-03	
Air-filled porosity in capulary zone, $\theta_{\alpha} = (cm^3/cm^3)$	0 126	Capillary Zone effective diffusion coefficient, Doff cm <sup>2</sup> (s)	4 28E-04	
Total porosity in capillary zone, $n_{ca}$	0 42	Stratum C C effective diffusion coefficient, Defc (cm²/s)	00000	Reference conc , RfC (mg/m³)
Thickness of capt lary zone, L <sub>ex</sub>	17 05	Stratum B B effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	7 60E-04	Unit risk factor, URF (µg/m³)**
Stratum A soll effective vapor permeability, k, (cm²)	5 97E-10	Stratum A A effective diffusion coefficient, De" (cm²/s)	2 98E-03	Infinite source bldg conc , Chaden (µg/m³)
Stratum A soil relative air permeability, k <sub>ro</sub> (cm²)	767.0	Vapor viscosity at ave soil temperature, µrs (g/cm-s)	1.77E-04	Infinite source indoor attenuation coefficient, a (unitless)
Stratum A soil intrinsic permeability, k (cm²)	7 49E-10	Henry's law constant at ave groundwater temperature, H'rs (unitiess)	1 15E-01	Exponent of equivalent foundation Peciet number, exp(Pe <sup>f</sup> ) (unitless)
Stratum A effective total fluid saturation, Sec. (cm²/cm³)	0 365	Henry's law constant at ave groundwater temperature, H <sub>TS</sub>	2 72E-03	Area of crack, Aesek (cm²)
Stratum C sod alr-filled porosity, $\theta_{\bullet}^{c}$ (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, $\Delta H_{\nu, TS}$ (cal/mol)	7,674	Crack effective diffusion coefficient, Dance (cm. <sup>2</sup> /s)
Stratum B soil air-filled porosity, $\theta_{\bullet}^{B}$ (cm³/cm³)	0.150	Crack depth below grade, Zonak (cm)	15	Average vapor flow rate into bidg , Qual (cm <sup>3</sup> /s)
Stratum A soil air-fitled porosity, e_a^A (cm³/cm³)	0 230	Crack- to-total area ratio, η (unitiess)	4 16E-04	Crack radius, form (cm)
Source- building separation, L <sub>T</sub>	2331.96	Area of enclosed space below grade, A <sub>e</sub>	9 24E+05	Source vapor conc, C <sub>source</sub> (µg/m³)
Exposure duration, t (sec)	9 46E+08	Bldg. ventilation rate, Quaden (cm <sup>3</sup> /s)	5 63E+04	Convection path length, Le (cm)

#### RESULTS SHEET

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INCREMENTAL RISK CALCULATIONS.

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Hazard	from vapor	indoor air,	noncarcinogen	(nutless)	AN AN
Incremental risk from	vapor intrusion to			- [	ΑΝ
Final	Indoor	groundwater	conc ,	(µg/L)	6 93E+04
Pure	component water	solubility,	ທີ	(µg/L)	3 50E+06
Risk-based	Indoor	groundwater	conc	(Hg/L)	6 93E+04
Indoor	exposure groundwater	conc,	noncarcinogen	(µg/L)	6 93E+04
Indoor	exposure groundwater	conc,	carcinogen	(µg/L.)	ΨN

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

7 0E+00 0 0E+0

9 7E-03 2 1E-03 1 5E-04 3 7E-04 3 7E-04 3 7E-04 3 7E-04 3 7E-04 0 0E+000 0 0E+00 0 0E+

11,000 15,000 15,000 17,127 15,000 13,000 10,000 10,000 10,000 10,000 10,000 11,000 12,000 13,000 13,000 13,000 13,000 13,000 10,27 11,000 13,000 10,27 11,000 10,0

						VLOOKUP TABLES	les				
150 W.C.	1		Soil Properties Lookup Table	ookup Table	4	e e					
8dk   50 000	r (cm/n)	a (1/cm)	N (unitiess)	M (vnitess)	9. (cm <sup>-</sup> /cm <sup>-</sup> )	0, (cm²/cm²)	Mean Grain Diameter (cm)				
υ <u>(</u>	0 20	9000	1 09	0 083	0 38	0 068	0 0092				
<u> </u>	0.26	0 019	131	0 237	041	0 095	0 0 1 6				
, <u>.</u>	5 5	0.036	156	0.359	043	0.078	0 020				
3 0	# C	0 145	2.28	0.561	140	0.057	0.040				
ပ္သ	5 5	0.00	1 23	0.027	2 0	200	9000				
SCL	1 5	9200	4.5	0 324	9 6	9 5	0700				
S	0.25	0.016	137	0.220	0.46	0 0	8200				
SIC	0 05	0 002	1 09	0.083	0.26	0.070	0 0038				
SICL	0.07	0 0 0 10	123	0 187	0 43	0 083	0 0056				
SIL	0 45	0 020	1.41	0 291	0 45	290 0	0 011				
St	4 42	0 075	189	0 471	0 4 1	0 065	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				
		]			Chemic	Chemical Properties Lookup Table	okup Table				
		Оправис			Pure	•	Henry's	Henry's			Enthalp
		carbon			component		law constant	law constant	Normal		vaponzati
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	boiling	Critical	the non
		coefficient,	ın air,	in water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	bolling p
		د و	<b>"</b>	֓֞֞֞֞֞֞֞֞֞֞֞֞֞֞֞֓֞֓֓֞֞֞֞֓֓֞֞֞֓֓֞֩֞֩֞֓֓֞֩֞֞֩֞	ဟ	Ì	<b>.</b>	۳.	卢	ť	Δħ
CAS No Chemical		(cm²/g)	(cm <sup>2</sup> /s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/mol)	(၃)	£	(R	(саутс
50293 DDT		2 63E+06	1 37E_02	4 05E-06	2 505.03	3 225.04	90	4	90 003	4000	
50328 Benzo(a)purene			4 305 02	90 300 0	20-50E-02	3 325-04	8 10E-08	3 2	55.5	62072	
51285 2 4-Dintrophend		1 00E-03	2 735.02	90-100 6	1 62E-03	4 63E-U3	1 135-06	8 8	715 90	969 27	
53703 Others (a Nanthracene	œ	3.80F±06	2 02F-02	3 00E-08	2 49F-03	1 02E-U3	4 445-07	C7	2772 28	827 85	
56235 Carbon tetrachloride	,	1 74E+02	7 805-02	8 80E-06	7 93E+02	1 25F+00	3.05E-02	5 K	340 00	556 EO	
56553 Benz(a)anthracene		3 98E+05	5 10E-02	90-300 6	9 40E-03	1 37E-04	3 345-06	25	708 15	1004 79	
57749 Chlordana		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	22	624 24	885 73	•
58899 gamma-HCH (Lindane)	<u>•</u>	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	•
60571 Dieldrin		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	25	613 32	842 25	•
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	•
67641 Acetone		5.75E-01	1 24E-01	1 145-05	1 00E+06	1 59E-03	3 88E-05	22	329 20	508 10	
67663 Chloroform		3 98E+01	1046-01	1 005-05	7 92E+03	1 50E-01	3 66E-03	52	334 32	536 40	
71252 Butter		1 78E+03	2 505-03	6 805-06	5 00E+01	1 59E-01	3 88E-03	52	458 00	695 00	
714.12 Renzene		5 92E+00	20-E02	930000	7 40E+04	3 575-04	8 80E-06	52 54	390 88	563 05	•
71556 1,1.1-Trichloroethane		1 10E+02	7 80E-02	8 80 E-06	1 33F+03	7.05F-01	1 725-03	0 K	300 24	302 10	
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7.516-06	3 50	718 15	986 20	•
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6.48E-04	1 58E-05	25	651 02	848 49	
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	`
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44	860 38	
74839 Methyl bromide		1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	52	276 71	467 00	
75014 Vinyl chlonde (chloroethene)	(Dene)	1 865+01	1 065-01	1 23E-06	2 76E+03	1 115+00	2 71E-02	25	259 25	432 00	
75052 Metriylerie Galorice 75150 Carbon dissifted		4 575+01	1000	77.1	1 30E+04	8 98E-02	2 195-03	25	313 00	510 00	
75252 Bramoform		8 71E+01	1 496-02	1035-05	3 105+03	2 19E-02	3 UZE-UZ 5 34E-04	C 4	319 00	552 00	
75274 Bromodichloromethane	•	5 50E+01	2 98E-02	1 06E-05	6 74F+03	6.56F-02	1605-03	2 2	363 15	585 BS	
75343 1,1-Dichloroethane	ı	3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	52	330.55	523 60	
75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	52 52	304 25	576 05	
76448 Heptachlor		1,41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	52	603 69	846 31	
77474 Hexachlorocyclopentadiene	diene	2 00E+05	1 61E-02	7.21E-06	1 80E+00	1,11E+00	2.71E-02	25	512 15	746 00	•
78591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	52	488 35	715 00	•
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 BDE-03	25	369 52	572 00	
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	
790 IG IIIGINOCOGUINEIRE		1 005+02	7 405 02	8 10E-00	1 105+03	4 ZZE-01	1 U3E-02	52	360 36	544 20	
79040 1, 1, 2, 2, 1 Buracanorem.		9 33E+01	4 21E-02	7 895-06	2 9/E+03	1 41E-02	3 44 E-04	:C :	41960	661 15	
		-	1	***	7	1	t-120 -	3	ę S	000	-

Reference conc. RfC (mg/m³)

Unit risk factor, URF

		2 BE+00	3 SHOT	7 UE-01	0.00+0.0	1 4E-01	00+400	000+00	00+300	1 4E-01	00E+00	7 0E+00	1 8E-01	2 0E-01	1.81.02	0.000	1.05+00	100+00	7 0E-02	7 0E+00	8 OE-01	1 4E-02	0.05+00	2 OE+01	4 0E-01	2 0E-02	2 1E+00	0 0E+00	2 1E-02	0 0E+00	/ UE-02	118+00	2 0E-01	1 1E-02	0 0E+00	0 0E+00	0.011	1 15-01	2 OF-02	0.00+00	0 0E+00	1 4E-01	0 0E+00	00+400	00+400	00+90	2 0E-02	0 0E+00	0 0E+00	0 0E+00	3 0E-04	00 110 0	00+400	0 0 0 0	0.05+00
		20-10-0	00.00	00+100	4 to 0	00+200 90 17 1	2 7E-05	3 46-05	3 1E-06	0 0E+00	13E-04	00+00	00+00	00000	004100	00+100	00000	000+00	0.05+00	0 0E+00	900	001400	CO-107	200	0 0E+00	0 0E+00	0 0E+00	3 3E-04	0 0E+00	4 0E-06	0 0E+00	100400	000+000	0 0E+00	1 9€-04	2 4E-05	5 8E-07		0 OE+00	2 1E-04	2 1E-04	0.00	2 15-05	2 in 0 2	ราช เการ	535-04	3 7E-05	195-04	2 0E-03	2 6E-03	0 05 +00	3 2E-04	 	106-04	105-04
		10,730	10,74	3,000	13,000	12 077	10.206	14,000	12,000	10,373	13,000	8,661	10,800	9,700	2/4,6	10.566	8,501	8,737	11,329	8,525	9,271	11,689	7,045	8,523	7,930	8,410	10,920	000'6	14,000	15,999	13,000	13.121	10,471	11,000	13,467	8,000	8,288	14,370	6.717	17,000	15,000	13,815	16,000	10,433	13,000	13,000	2,000	12,938	11,000	13,000	14,127	000,41	19,000	18,000	18,000
	00 737	708.07	830.00	890.45	0000	899 00	738 00	813 20	749 03	748 40	754 03	630 30	99/60	705 00	759 13	719 00	617 20	636 00	707 60	616 20	584 75	704 00	519 13	617.05	591 79	632 40	694 20	629 79	942.94	806 00	825.00	873 00	725 00	708 17	814 00	678 20	620 20	544 00	516 50	1078 24	969 27	905 00	07 650	979 00	839.36	839 36	587 38	770 00	746 87	848 76	1750 00	539.37	512 27	475 22	482 20
	587 15	613 15	660 60	632 28	570 44	627.87	486 15	582 15	519 15	491 14	560 26	36 / 14	404 19 52 53 5	40307	526 15	483 95	409 34	41831	484 13	20114	503 66	368.85	345.65	412 27	383 78	404 87	455 02	451 15	674 43	55/15	582.55	615 18	486 15	482 15	290 00	416 14	394 40	333.65	320 85	809 15	715 90	655 95	703 75	803.03	596.55	596 55	381 15	558 00	209 60	613.96	629 68	402.50	377 50	340 50	345 50
	25	2 2	32	22	3 15	25	8	52	52	52	52	2 2	3 4	3 %	2.5	S 19	52	53	52	<b>Q</b> ;	Q #	3 %	3 5	52	25	25	52	123	15 E	3 K	3 15	2 2	52	52	25	52	2 5	3 42	22 22	52	\$2	£ 1	8 H	3 %	32	52	25	52	52	S2 5	8 8	2 2	:22	52	52
	4.51F-07	9 395-10	1 26E-06	5 00E-06	6.37E-05	1 53E-08	8 15E-03	2 44E-08	7 78E-06	4 83E-04	4,00E-09	1 205 08	1 205-00	3 905-03	4 34E-06	2 40E-05	7 88E-03	2 76E-03	2 00E-06	7 00E-03	2 43E-03	9 78F-04	5 12E-04	7 34E-03	6 63E-03	3 71E-03	3 98E-07	1 80E-05	1 125-05	1 02E-07 6 68E-05	1 32E-03	6 516-05	1 42E-03	3 17E-06	9 27E-08	7 83E-04	1 100.02	4 07E-03	9 39E-03	1 60E-06	111E-04	1 61E-05	0.285-07	1 70F-04	1 06E-05	7 44E-07	1 77E-02	7 46E-07	2 25E-06	951E-06	1.14E-02	4 60E-03	2 00E-03	2 90E-04	5 20E-04
VLOOKUP TABLES	1 85E-05	3 85E-08	5 17E-05	2 05E-04	2 61E-03	6 26E-07	3 34E-01	1 00E-06	3 19E-04	1 98E-02	1 64E-07	4 925-01	7 79E-02	1 605-02	1 78E-04	9 84E-04	3 23E-01	1 13E-01	8,20E-05	10-11-0	1.36F-05	4 01E-02	2 10E-02	3 01E-01	2 72E-01	1 52E-01	1 63E-05	7 38E-04	4 380-04	2 74F-03	5 41E-02	2 67E-03	5 82E-02	1 30E-04	3 80E-06	3 21 E-02	4 51F-04	1 67E-01	3 85E-01	6 56E-05	4 55E-03	9 40E-04	3 88 1-03	6 97 E-03	4 35E-04	3 05E-05	7 26E-01	3 06E-05	9 23E-05	3 90E-04	2 46E-04	1 895-01	8 20E-02	1 196-02	2 13E-02
_	1 08E+03	1 12E+01	2 69E+00	3 51E+01	1 98E+00	7 48E+00	3 23E+00	1.95E+03	8 00E+02	3 105+01	3 TTE+00	2 50F±04	1.56F+02	2 20E+04	1 20E+03	2 09E+03	1 69E+02	3 10E+02	1 855-03	7 395 +04	5 30 0 + 03	8 52E+03	2 00E+04	1 61E+02	5 26E+02	4 72E+02	8 28E+04	1 /2E+04	2 10E-01	2 00 -02	6 20E+00	4 34E-02	3 00E+02	4 50E+03	2 70E+02	2 60E+03	1.35F-01	3 50E+03	6 30E+03	2 20E-05	1 50E-03	2 00E-03	1 60 E-03	1 80E-01	2 00E+00	2 40E-01	2 80E+03		9 89E+03	Z 00E-01	7 40F-01	8 00E-02	5 70E-02	4 20E-01	3 40E-01
	6 35E-06	7 86E-06	4 83E-06	6 35E-06	7 88E-06	7 035-06	6 16E-06	6 10E-08	6 25E-06	7 505-06	1 005.05	8.30F-06	7.90E-06	9.46E-06	7 03E-06	8 60E-06	7 80E-06	8 00E-06	8 69E-06	7 90E-06	1 01E-05	90-B06 6	9 20E-06	7 80E-06	8 60E-06	8 70E-06	9 10E-06	4 55 C O	4 33E-00	3 58 106	5 91E-06	7 74E-06	8 23E-06	8 77E-06	7 06E-06	1 05E-05	7 24 6-06	1 13E-05	1 19E-05	5 665-06	5 56E-06	5 58E-06	6 21E-06	4 86E-06	7 34E-06	7 34E-06	1 00E-05	7 26E-06	8 17E-06	4 23E-06	4 34E-05	4,32E-06	5 00E-06	5 42E-06	5 31E-06
	2 56E-02	4 38E-02	1 74E-02	3 12E-02	3 635-02	3 90E-02	5 61E-02	5 60E-02	3 18E-02	9 90E-02	8 70E-02	7 40E-02	6 905-02	5 01E-02	2 91E-02	7 60E-02	7,50E-02	7 10E-02	5 84E-02 7 69E-02	8 90F-03	4 83E-02	1 04E-01	8 50E-02	7 00E-02	8 70E-02	7 30E-02	8.201-02	1 15E-02	3.53E-02	1515-02	5 42E-02	3 24E-02	3 00E-02	3 46E-02	2 03E-01	1 96E-02	2 72E-02	7 36E-02	7 07E-02	1 90E-02	2 26E-02	3 UZE-UZ	2 48E-02	1 32E-02	1 42E-02	142E-02	6 26E-02	3 27E-02	5 45E-02	3 07E-02	1 16E-02	1 38E-02	1 56E-02	2 22E-02	2 14E-02
	2 88E+02	3 395+04	5 75E+04	1 29E+03	1.38E+04	3 39E+03	5 37E+04	5 92E+02	381E+02	7 245 403	3 63 6402	9 12E+01	6 17E+02	3 88E+02	1 60E+03	6 46E+01	3 63E+02	7 76E+02	3 895+02	6 17E+02	6 61E+01	174E+01	5 25E+00	4 07E+02	1 82E+02	2.19E+02	2 88E+01	2 14 E+03	1.51F+07	8 32E+07	5 50E+04	2 95E+04	1 78E+03	147E+02	9 55E+01	1 55E+01	1 05E+05	3 55E+01	5 25E+01	3 47E+06	1.23E+06	1 235+06	3 98E+05	2 45E+06	1 23E+03	1 26E+03	4 57E+01	6 925+01	2 405+01	5 205+04	2 57E+05	2 90E+05	2 00E+05	3 30E+04	3 30E+04
	84662 Diethylphthalate		85687 Butyt benzyl phthalate		86737 Fluorene	86748 Carbazole	87683 Hexachloro-1,3-butadiene	67000 Pentachiorophenol	60002 2,4,0-1 Inchiprophenol	91241 3.3.Dichlombenzidine	95476 o-Xviene	95487 2-Methylphenol (o-cresol)	95501 1,2-Dichlorobenzene	95578 2-Chlorophenol	95954 2,4,5-Trichlorophenol	98953 Nitrobenzene	100414 Ethylbenzene	100425 Styrene	106423 p-Xylene	106467 1.4-Dichlorobenzene	106478 p-Chtoroantline	107062 1,2-Dichloroethane	108054 Vinyi acetate	108383 m-Xylene	108883 Toluene	10890/ Chlorobenzene	111444 Ris(2-chloroethyllother	115297 Endosulfan	117817 Bis(2-ethylhexyl)ohthalate	117840 Di-n-octyl phthalate	118741 Hexachlorobenzene	120127 Anthracene	120821 1,2,4-Trichlorobenzene	120832 Z,4-Dichlorophenol	121147 Z,4-Dinibotoluene 194481 Chlorodibosmomethere	127184 Tetrachlornethylene	129000 Pyrene	156592 cis-1,2-Dichloroethylene	156605 trans-1,2-Dichloroethylene	193395 Indeno(1,2,3-cd)pyrene	20332 Benzo(b)filoranthene	207089 Benzo(k)fluoranthene	218019 Chrysene	309002 Aldnn	319846 alpha-HCH (alpha-BHC)	319857 beta-HCH (beta-BHC)	542/56 1,3-Dichloropropene	COCACA A MINISTERIAL CONTRACTOR	1024573 Hentachlor encylde	7439976 Mercury (elemental)	8001352 Toxaphene	11096825 Aroclor 1260 (PCB-1260)	11097691 Arador 1254 (PCB-1254)	12674112 Aroclor 1016 (PCB-1016) 53460219 Aroclor 1242 (PCB-1242)	33469213 AIOGOT 1242 (F.OD*1242)

? SHEET DATA ENT

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

8

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and inital groundwater cond below)

YES

VERSION 1 2 September, 1998

User-defined stratum A soit vapor permeability. ENTER
Soll
Stratum A
SCS
SOLS
SOLS
soll type
(used to estimate OR pb.
soil vapor SCS soil type directly above ENTER water table Soit stratum directly above water table, (Enter A, B, or C) ENTER ENTER ENTER ENTER
Totals must add up to value of L<sub>WT</sub> (cell D28)
Thickness Thickness
Thickness of soi of soi of soi stratum B, stratum C, stratum A, (Enter value or 0) (Enter value or 0) (E5 1,1-Dichloroethylene Chemical 1173 48 (E) Thickness of soil stratum A, 1173 48 č (E) Depth below grade to water table, ENTER 2346 96 (cm) ţ ENTER Inital groundwater conc , C<sub>w</sub> below grade to bottom of enclosed space floor, 21 87434783 ENTER Depth (cm) (numbers only, groundwater temperature. Chemical CAS No no dashes) 75354 Average ENTER ဉ

ENTER Stratum C soil water-filled porosity, e <sub>w</sub> <sup>c</sup> (cm³/cm³)	0.3	
ENTER Stratum C soil total porosity, n <sup>c</sup> (unitiess)	0.43	6 9 9
ENTER Stratum C soil dry bulk density, Pc (g/cm³)	17	ENTER Indoor ar exchange rate, ER (1/h)
ENTER Stratum B soll water-filled porosily, $\theta_w^6$ $(cn^3/cm^3)$	0 27	ENTER Floor-wall seam crack width, w (cm)
ENTER Stratum B soil total porosity, n <sup>8</sup> (untless)	0.42	ENTER Enclosed space height, He
ENTER Stratum B soul dry bulk density, Po (g/cm <sup>3</sup> )	17	ENTER Enclosed space floor width, W <sub>B</sub>
ENTER Stratum A soll water-filled porosity, $\theta_{w}^{A}$ $(cm^{3}/cm^{3})$	0.2	ENTER Endosed space floor fength, Le (cm)
ENTER Stratum A soli total porosity, n <sup>A</sup> (untiless)	0.43	ENTER Soil-bidg pressure drifferential, AP (g/cm-s²)
ENTER Stratum A soil dry bulk density. Pa (g/cm³)	15	Entrer Enclosed space floor thickness, Leach (Cm)

ENTER
Stratum A
soil dry
bulk density,

							ł
15	40	961	961	488	0.1	0.45	П
Averaging		ENTER	ENTER	ENTER	ENTER		
trine for	tune for	Exposure	Exposure	larget nsk for	Target hazard quotient for		
carcinogens, AT.	200	duration,	frequency,	carcinogens,	noncaranogens,		
0 7	<u>S</u>	<b>a</b> (	t	ř	ğ.		
(yrs)	(yrs)	(yrs)	(days/yr)	(unitless)	(unitless)		
70	30	J.	350	90 90 +			
		3	POS	00-00	-		
			-	Used to calcu	Used to calculate risk-based		
				groundwater	aroundwater concentration		

law constant law constant vaporization at Normal Diffusivity at reference reference the normal boiling Critical partition water risk Reference nwater, temperature, temperature, boiling point, temperature, coefficient, solubility, factor, conc.  D <sub>w</sub> H  T <sub>R</sub> D <sub>M</sub> T <sub>R</sub> T <sub>C</sub> K <sub>C</sub> (cal/mol) (°C) (cal/mol) (°K) (°K) (m³/g) (mg/L) (µg/m³)¹¹ (mg/m³)¹  (mg/L) (µg/m³)¹¹ (mg/m³)¹  (mg/L) (µg/m³)²¹			2 K II D C	Jeiny s	Eninally of			Organic	e n		
at reference         reference         the normal         boiling         Critical         partition         water         risk         I           temperature, temperatu			law constant	law constant	vaporization at	Normai		carbon	component	ž	
temperature, temperature, boiling point, temperature, coefficient, solubility, factor, H T <sub>R</sub> AH <sub>vb</sub> (atm-m³/mol) (°C) (cal/mol) (°K) (°K) (cm³/g) (mg/L) (μg/m³) <sup>-1</sup> 2.61E-02   25   6,247   304.75   576.05   5.89E+01   2.25E+03   5.0E-05	_	sivity	at reference	reference	the normal	boiling	Critical	partition	water	ĄsĻ	Reference
H T <sub>R</sub> ΔH <sub>vb</sub> T <sub>B</sub> T <sub>C</sub> K <sub>GC</sub> S URF (atm-m³/mol) (°C) (cal/mol) (°K) (°K) (cm³/g) (mg/L) (μg/m³) <sup>-1</sup> (2.61E-02   2.61E-02   2.61E-03   5.0E-05   5.0E-05   5.0E-05	•	/ater,	temperature,	temperature,	boiling point,	polut,	temperature,	coefficient,	solubility,	factor,	conc.
(atm-m³/mol) (°C) (cal/mol) (°K) (°K) (cm³/g) (mg/L) (µg/m³)-1 2.61E-02   25   6,247   304.75   576.05   5.89E+01   2.25E+03   5.0E-05		ď	I	T,	۵H٬	Ľ°	٦°	ጜ	ဟ	J.R.	RfC
2.61E-02 25 6.247 304.75 576.05 5.89E+01 2.25E+03 5.0E-05		cm²/s)	(atm-m³/mol)	(၁)	(cal/mol)	(%)	( <sup>9</sup> K)	(cm <sub>3</sub> /g)	(mg/L)	(µg/m³).1	(mg/m <sub>3</sub> )
2.61E-02 25 6,247 304.75 576.05 5.89E+01 2.25E+03 5											
		04E-05	2.61E-02	25	6,247	304 75	576 05	5 89E+01	2 25E+03	5 0E-05	0 0E+00

Floorwall seam perimeter,	3,844	Diffusion path length, L <sub>d</sub> (cm)
Water-filled porosity in capillary zone, $\theta_w = (cm^3/cm^3)$	0 294	Total overall effective diffusion coefficient, Deff (cm²/s)
Air-filled porosity in capillary zone, $\theta_{a,ca}$ (cm³/cm³)	0 126	Capillary zone effective diffusion coefficient, D*ft cm²/s) 5.12E-04
Total porosity in capillary zone,	0.42	Stratum C c effective diffusion coefficient, D*** (cm²/s) 0.00E+00  Reference conc, RfC Mg/m³)
Thickness of capillary zone, Let (cm)	17.05	Stratum B effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s) 9 22E-04 Unit nsk factor, URF (µg/m³)-1
Stratum A soil effective vapor permeability, k, (cm²)	5 97E-10	Stratum A effective diffusion coefficient, De"A (cm²/s) 3 65E-03 Infinite source bidg conc. Coucting (µg/m³)
Stratum A soil relative air permeability, k <sub>w</sub> (cm²)	0 797	Vapor viscosity at ave soil temperature.  Hrs (g/cm-s)  177E-04  Infinite source indoor attenuation coefficient,  a (untiless)
Stratum A soil untrinsic permeability, k	7 49E-10	Henry's faw constant at ave groundwater temperature, H'rs (unitiess)  7 88E-01 Exponent of equivalent foundation Peciet number, exp(Pe <sup>1</sup> ) (unitiess)
Stratum A effective total fluid saturation,  Su  (cm²/cm³)	0 365	Henry's taw constant at ave groundwater temperature, Hrs (atm-m³/mol)  1.87E-02  Area of crack, Acre (cm²)
Stratum C soil air-filled porosity, $\theta_a^c$ (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, AH, 75 (cal/mol) 6,353 Crack effective diffusion coefficient, Description (cm²/s) 3 65E-03
Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zonet (cm)  15  Average vapor flow rate into bldg , Quad (cm <sup>3</sup> /s)
Stratum A soil air-fithed porosity, $\theta_{\mathbf{u}}^{A}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.230	Crack- to-total area ratio,  1 (unitless) 4 16E-04 Crack radius,
Source- building separation, Lr (cm)	2331 96	Area of enclosed space below grade,  As  (cm²)  9 24E+05  Source vapor conc, Cource (ug/m³)
Exposure duration, r (sec)	9,46E+08	Bidg ventilation rate, Quezno (cm³/s)  Convection path length, L (cm)

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS

INCREMENTAL RISK CALCULATIONS:

Incremental nsk from	vapor	intrusion to	indoor air,	carcinogen	(nuttess)
Final	ındoor	exposure	groundwater	conc ,	(hg/L)
Pure	component	water	solubility,	S	(µg/L)
Risk-based	indoor	exposure	groundwater	couc,	(hg/L)
Indoor	exposure	groundwater	conc,	noncarcinogen	(hg/L)
Indoor	exposure	groundwater	conc,	carcinogen	(hg/L)

Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitiess)

ERROR SUMMARY BELOW. - (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

						VLOOKUP TABLES	LES				
:			Soil Properties Lookup Table	ookup Table				_			
SCS Soil Type	K, (cm/h)	a (1/cm)	N (unitless)	M (unitless)	8, (cm³/cm³)	0, (cm³/cm³)	Mean Grain Diameter (cm)				
ပ (	0 20	0 008	1 09	0 083	0 38	0 068	0 0092				
<u>ر</u> . <u>د</u>	0 26	0.019	131	0 237	0 41	0 095	0 0 16				
<u>؛</u> ب	2	0 036	1 56	0 359	0.43	0 078	0 020				
2 (	14 59	0 124	2 28	0 561	0 41	0 057	0 040	-			
σ.	29 70	0 145	2 68	0 627	0.43	0 045	0 044				
ာ္က	0 12	0 027	1 23	0 187	0 38	0 100	0 025				
SCL	1 31	0 059	1 48	0 324	0 39	0 100	0 02				
SO S	0 25	0 016	1 37	0.270	0.46	0 034	0 0046				
000	0 02	0 005	1 09	0 083	0.26	0 0 0 0	0.0039				
SIGL	0 07	0 0 0 0	123	0 187	0.43	0 089	0 0056				
2  - 	0 45	0 0 0 0 0 0 0	141	0 291	0 45	290 0	0 011				
78.	4 42	0.075	1 89	0 471	0.41	0 065	0 030				
							i				
					Chemic	Chemical Properties Lookup Table	okup Table		İ		
		Organic			Pure		Henry's	Henry's			Enthalov,
		carpon			component		law constant	law constant	Noma		oternous v
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	pollino	Cutical	the norms
	_	coefficient,	in aır,	ın water,	solubility,	law constant	temperature,	temperature.	point	temperature	polinia no
		Ϋ́8	ď	مً	ဟ	'n	I	ļ.	Ļ	Ţ.	AH.
CAS No Chemical		(cm³/g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(ma/L)	(unitiess)	(atm-m³/mol)	ເບິ	Ş	ع د	(CE/)40)
50293 DOT		00.1100.0		Lagr							Loan India
		005200	20-27	4 90E-06	Z 20E-0Z	3 325-04	8 10E-06	52	533 15	720 75	11
SUSZB BENZO(2)pyrene		1 02E +06	4 30E-02	90-300 6	1 62E-03	4 63E-05	1 13E-06	25	715 90	969 27	15
51265 Z.4-Uinirophenoi		1 00E-02	2 73E-02	90-390 6	2 79E+03	1 82E-05	4 44E-07	52	605 28	827 85	51
53/U3 Ulbenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	9
55235 Carbon tetrachlonde		1 74E+02	7 80E-02	8 805-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7
Dood Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	137E-04	3 34E-06	25	708 15	1004 79	15
57/49 Chordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 B5E-05	25	624 24	885 73	13
58899 gamma-HCH (Lindane)	_	1 07E+03	1 42E-02	7 34E-06	6 80E+00	574E-04	1 40E-05	52	596 55	839 36	<u> </u>
605/1 Dieldrin		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	151E-05	25	613 32	842 25	. E
62550 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	631E-05	1 54E-06	25	720 00	751 00	5
67641 Acetone		5 75E-01	1 24 <b>E-</b> 01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	. "
67653 Chloroform		3 98E+01	104E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	. 40
67/21 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	52	458 00	695 00	· თ
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3.61E-04	8 80E-06	25	390 88	563 05	. 55
71432 Benzene		5 89E+01	8 80E-02	9 80 €-06	1 75E+03	2 28E-01	5 56E-03	52	353 24	562 16	7
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	~
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	718 15	986 20	12
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	<b>1</b>

	Organic			Pure		Henry's	Henry's			Enthalpy of		
	Carbon		: :	component	:	law constant	law constant	Normal		vaponzation at	Ę	
	parunon	Lames Mary	Umusivity	water	Henrys	at reference	reference	polling	Critical	the normal	놟	Reference
	coemaen,	n air,	in water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,	conc.
		o <b>"</b> '	<u>,</u>	ഗ	'n	I	Ť,	<b>₽</b>	Ļ	ΔH,	Ŗ	P. C
CAS No Chemical	(cm <sub>3</sub> /g)	(cm <sup>2</sup> /s)	(cm²/s)	(mg/L)	(unitiess)	(atm-m³/mol)	(၁)	ફ	(°K)	(cal/mol)	(mg/m <sup>3</sup> )	(тв/ш3)
50293 DDT	2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10F-06	36	523.16	720.75	45	100	
50328 Benzo(a)pyrene	1 02E+06	4 30E-02	90-300 6	1 62E-03	4 63E-05	1135.08	3 %	2.4.7	57 050	000,15	00 L	0 OE+00
51285 2,4-Dinitrophenol	1 00E-02	2 73E-02	90-390 6	2 79E+03	1 82E-05	4 445-07	3 %	805 20	303.24	000,6	20 10 0	00.400
53703 Olbenz(a,h)anthracene	3 80E+06	2 02E-02	5 18E-06	2 49E-03	6.03E-07	1 475-08	3 %	743 24	00 170	000'61	0.05+00	/ UE-03
56235 Carbon tetrachlonde	1 74E+02	7 80E-02	8 80E-06	7 93F+02	1255+00	20506	C 70	47.04	4 0 6 6	000,51	2 1E-03	0.05+00
56553 Benz(a)anthracene	3 98E+05	5 10E-02	9 00E-06	9 405-03	1375.04	3 345 06	67	249.00	996 60	7,127	1 55-05	0 0E+00
57749 Chlordane	1 20E+05	1 186-02	4 37E-06	5 60E-02	1 996-03	4 855-05	6 K	CL 507	1004 /9	15,000	2 1E-04	001100
58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5.74E-04	1405-05	3 %	506 55	95 059	5,000	2 C	0.00
60571 Dieldrin	2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 195-04	1516-05	25 25	613.32	842.25	000,55	1 2	00+100
65850 Benzoic Acid	6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54 E-06	25.	720 00	751 00	13,000		100
67641 Acetone	5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	\$2 52	329.20	508 10	00000	200	9 50 04
67663 Chloroform	3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	52 52	334 32	536 40	889.4	235.00	00500
67721 Hexachloroethane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00	695 00	9.510	4.0E-06	001100
71363 Butanol	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3.81E-04	8 80E-06	25	390 88	563 05	10.346	00+H0	3.55.03
71432 Benzene	5 89E+01	8 80E-02	90506	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7.342	8 3F.Ds	005
71556 1,1-Inchloroethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	52	347 24	545 00	7,136	0 0E+00	10 H
72208 Endrin	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	718 15	986 20	12,000	0 0E+00	1 1F-03
/ 2435 Methoxychlor	9775+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	00±+00	1 8E-02
/2548 UUU	1 00E+06	1695-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05	0 0E+00
74020 Macha Library 24020 Machan	4 4/E+06	144E-02	5 87E-06	1 205-01	8 61E-04	2 10E-05	25	636 44	860 38	13,000	9 7E-05	00E+00
74000 Methyl Dromide	1 05=+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	25	276 71	467 00	5,714	0 0E+00	5 0E-03
2001 4 Viryl Citoride (Chloroethene)	1 865-101	106E-01	1 23E-06	2 76E+03	1116+00	2 71E-02	25	259 25	432 00	5,250	8 4E-05	0.000
75450 Combon document	1176+01	101E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	22	313 00	510 00	6,706	4 7E-07	3 0E+00
75252 Demodration	4 5/E+01	1045-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	25	319 00	552 00	6,391	0 0E+00	7 0E-01
75274 Bernedichloremethers	0 / 1 E+0.1	1 49E-02	1 035-05	3 10E+03	2 19E-02	5 34E-04	52	422 35	00 969	9,479	1 15-06	000+00
75242 4 4 Distinguished	9 200-03	2985-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	52	363 15	585 85	2,000	1 8E-05	0 0E+00
John J. Dichemontario	2 105+01	/ 42E-02	1 025-03	5 06E+03	2 30E-01	5 61E-03	25	330 28	523 00	6,895	0 0E+00	5 OE-01
76446 Hantschild	2 68E+01	9 00 = -02	1045-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6,247	5 OE-05	0 0E+00
	1 415+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	13E-03	0 0E+00
7474 Hexachiorocyclopentagiene	2 00E+05	161E-02	7 21E-06	1 80E+00	1 11E+00	2716-02	25	512 15	746 00	10,931	0 0E+00	7.0F-05
/ 8591 Isophorone	4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10,271	2.7F-07	000+00
/88/5 1,2-Uichioropropana	4 37E+01	7 82E-02	8 735-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7 590	0.0E+00	4 OF 03
79005 1,1,2-Inchloroethane	5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	52	386 15	602 00	8 322	18.18 20.18.18	2025
79016 Inchloroethylene	1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25	360 36	544 20	7.505	175.06	000
79345 1,1,2,2-Tetrachloroethane	9 335+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	52	419 60	661 15	966		0000
83329 Acenaphthene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	52	550 54	803 15	12 155	00+100	71100
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									12,000 3.18										11,329 0 0E						7,930 0.08					15,000 000			~	13,467 198 8,000 2,48			7,192 0 06		15,000 2.18	_		13,000 2 10					11,000 2 06		14,12/ U GE			10 1 000,81
	757 00	798 67	839 68	890 45	870 00	899 00	738 00	813.20	778 40	754 03	630 30	697 60	705 00	675 00	759 13	719 00	617 20	030 00	616 20	684.75	754 00	561 00	519 13	617 05	591 79	694 20	629 79	942 94	806 00	825.00	873 00	725 00	708 17	814 00 678 20	620 20	936 00	544 00	516 50 1078 24	969 27	905 00	1019 70	979 00	839.36	839 36	587 38	270 00	746.87	848 76	1/50 00	539.37	543 37	27.7.5
	25 567 15	25 613 15	25 660 60	25 632 28	25 570 44	25 627 87	25 486 15	20 002.13		25 560 26		25 464 19	25 453 57	25 447 53	25 526 15	25 483 95	25 409 34	25 418 31	25 464,13	25 447 21	25 503 65	25 356 65	25 345 65	25 412 27	25 383 78	25 455 02	25 45115	25 674 43	25 657 15	25 582 55	25 615 18	25 486 15	25 482 15	25 590 00	25 394 40	25 667 95	25 333 65	25 320 85 25 809 15	25 715,90	25 655 95		25 603.01			25 381 15	25 558 00	25 509.60	25 613 96	25 629 88	25 402 50	25 377 50	25 37.50
	4 51E-07	9 39E-10	1 26E-06	5 00E-06	6 37E-05	1 53E-08	8 15 F.C.	2784.7	4 835-04	4 00E-09	5 20E-03	1 20E-06	1 90E-03	3 90E-04		2 40E-05	7 88E-03	2 705-05	7 66E-03	2 43E-03	3 32E-07	9 78E-04	5 12E-04	7 34E-03	8 65E-03	3 98E-07	1 80E-05	1 12E-05	1 02E-07	1 32 F-03	6 51E-05	1 42E-03	3 17E-06	9 Z/E-08 7 83F-04	1 84E-02	1 10E-05	4 07E-03	9 59E-03	1 116-04	1 61E-05	8 29E-07	1.705-04	1.06E-05	7 44E-07	1 77E-02	7 46E-07	2 25E-06	9515-06	1 14E-02	4 60E-03	2 00 5 03	Z 00E-03
VLOOKUP TABLES	1 85E-05	3 855-08	5 17E-05	2 05E-04	2 61 E-03	6 265-07	30-1140 t	3 105-04	1.98F-02	1 64E-07	2 13E-01	4 92E-05	7 79E-02	1 60E-02	1 78E-04	9 84E-04	3 23E-01 1 13E-01	8 20E-05	3 14E-01	9 96E-02	1 36E-05	4 01E-02	2 10E-02	3 01E-01	1.525-01	1 63E-05	7 38E-04	4 59E-04	4 18E-06	5.41E-02	2 67E-03	5 82E-02	1 30E-04	3 21E-02	7 54E-01	4 51E-04	1 67E-01	5 56E-05	4 55E-03	6 60E-04	3 40E-05	5 97E-03	4 35E-04	3 05E-05	7 26E-01	3 06E-05	9,23E-05	3 90 5-04	2 46F-04	1 89E-01	8 20E-02	0 20E-02
	1 085+03	1 12E+01	2 695+00	357E+01	1 985+00	7 48E+00	3 23E+00	8 OOF +02	3 10 = +01	3 11E+00	1 78E+02	2 50E+04	1 56E+02	2 20E+04	1 20E+03	2 09E+03	1 69E+02	3.10E+02 7.87E+03	1 85E+02	7 38E+01	5 30E+03	8 52E+03	2 00E+04	1615+02	3 28E+U2 4 72E+02	8 28E+04	1 72E+04	5 10E-01	3.40E-01	6 20E+00	4 34E-02	3 00E+02	4 50E+03	2 60E+03	2 00E+02	135E-01	3 50E+03	2 20E-05	1 50E-03	2 06E-01	8 00E-04	1 80E-01	2 00E+00	2,40E-01	2 80E+03	1 82E+02	9 89E+03	2 00E-01	3 62E-02 7 40E-01	8 00E-02	5 70 1.02	3 / 0 = 0 2
	5 355-06	7 86E-C6	4 83E-06	5 33E-06	7 881-06	00-110-0	6 10E-06	6 25E-06	7 50E-06	6 74E-06	1 00E-05	8 30E-06	7 90E-06	9 46E-06	7 035-06	8 605-06	7 80E-06	8 695.06	8 44É-06	7 90E-06	1 01E-05	90-306 6	9 20E-06	7 80E-06	8 70E-06	9 10E-06	7 53E-06	4 55E-06	3 56E-06	5 91E-06	7 74E-06	8 23E-06	8 77E-06	105E-05	8 20E-06	7 24E-06	1 13E-05	5 66E-06	5 56E-06	6.35E-06	5 56E-06	4 86E-06	7 34E-06	7 34E-06	1 00E-05			4 235-06	0 30E-06			2000
	Z 36E-02	4 38E-UZ	1 /4E-02	3 12E-02	3 635-02	3 90E-02	5.605.02	3 18F-02	5 90E-02	1 94E-02	8 70E-02	7 40E-02	6 90E-02	5 01E-02	2 916-02	7 60E-02	/ 50E-02 7 10E-02	5 84F-02	7 69E-02	6 90E-02	4 83E-02	1 04E-01	8 50E-02	7 UUE-02	7 30E-02	8 20E-02	6 92E-02	1 15E-02	351E-02	5 42E-02	3 24E-02	3 00E-02	3 46E-02	1 96E-02	7 20E-02	2 72E-02	7 36E-02	1 90E-02	2 26E-02	3 02E-02	2 26E-02	1 32E-02	1 42E-02	1 42E-02	6 26E-02	3 27E-02	5 45E-02	325-02	3 07 E-02 1 16F-02	1 38E-02	1 56F-02	2000
1	2 88E+02	3 39E+04	5 /5E+04	50+367	1,38E+04	201000	5 925+02	3.815+02	2 00E+03	7 24E+02	3 63E+02	9 12E+01	6 17E+02	3 88E+02	1 60E+03	6 46E+01	3 53E+U2 7 76F+02	2 09F+02	3 89 0 + 02	6.17E+02	6 61E+01	1 74E+01	5 25E+00	4 U/E+UZ	2 19E+02	2 885+01	1 55E+01	2.14E+03	151E+07 8 32E+07	5 50E+04	2 95E+04	1 78E+03	1475+02	6 31E+01	1 55E+02	1 05E+05	3 55E+01	3 47E+06	1 23E+06	1 07E+05	1 23E+06	2.45E+06	1 23E+03	1 26E+03	4 57E+01	6 92E+01	2 40E+01	8 32E+04	2.57E+05	2 90E+05	2 00E+05	2 000-403
	84502 District and Section 2007			occool installiceComplianty(arrange	SO13/ FILDFERIE	50740 Calbazole 97693 Decomplete 1.3 http://org	87865 Pentachlorophenol			91941 3,3-Dichlorobenzidine	95476 o-Xylene	95487 2-Methylphenoi (o-cresol)	95501 1,2-Dichlorobenzene	95578 2-Chlorophenol	95954 2,4,5-Trichlorophenol	96953 Nitrobenzene	1004 14 Eurylpenzene 100425 Styrene		106423 p-Xylene	106467 1,4-Dichlorobenzene			100034 Vinyl acetate	JOSES TALLIANS		108952 Phenol	111444 Bis(2-chloroethyl)ether	(15297 Endosultan	i i /o i / bis(z-emyinexyi)primalate i 17840 Di-n-octvi obtbalate	118741 Hexachlorobenzene	20127 Anthracene	120821 1,2,4-Trichlorobenzene	20832 Z,4-Dichlorophenol 21142 2 4-Dinitrophisms	24481 Chlorodibromomethane	127184 Tetrachloroethylene	29000 Pyrene	15559Z cis-1,Z-Dichloroethylene 155605 trans-1 2 Dichloroethylene	193395 Indeno(1,2,3-cd)pyrene	205992 Benzo(b)fluoranthene	206440 Fluoranthene	207089 Benzo(k)ftuoranthene 218019 Chrysona	309002 Aldrin	319846 alpha-HCH (alpha-BHC)	319857 beta-HCH (beta-BHC)	542756 1,3-Dichloropropene	606202 2,6-Dintrotoluene		1024373 Heptachior epoxide 7430076 Marzini (alamantat)	8001352 Toxaphene	11096825 Aroclor 1260 (PCB-1260)	11097691 Aroclor 1254 (PCB-1254)	(בסים בסים ומסמת ומסוב (בסים)

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 12 September, 1998

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and untial groundwater cond below)

					ENTER		User-defined	stratum A	Soil Vapor	permeability.	<u>ئ</u> ر بر	(cm²)		
										용			•	_
					ENTER	Soil	stratum A	SCS	soil type	ate		permeability)		ပ
					ENTER				SCS	soul type	directly above	water table		S
					ENTER			Soul	stratum	directly above	water table,	(Enter A, B, or C)		80
				ane	ENTER	'Lwr (cell D28)	Thickness	of soil	stratum C,	(Enter value or 0)	Ę	(cm)		0
			Chemical	1,2-Dichloroethane	ENTER	Totals must add up to value of Lwn (cell D28)	Thickness	of soil	stratum B,	stratum A, (Enter value or 0) (Enter value or 0)	Ę	(cm)		1173 48
					ENTER	Totals mu		Thickness	of soil	stratum A,	£	(cm)		117348
			_	 	ENTER			Depth	below grade	to water table,	Lwt	(cm)		2346 96
ENTER	groundwater conc.,	.3	(µg/L)	21 96826087	ENTER	Depth	below grade	to bottom	of enclosed	space floor,	נ	(cm)		15
ENTER	Chemical CAS No	(numbers only,	no dashes)	107062	ENTER		Average	/iros	groundwater	temperature,	⊩.	(Ç)		16

	_	
ENTER Stratum C soll water-filled porosity, $\theta_{w}^{c}$ (cm³/cm³)	03	
ENTER Stratum C soil total porosity, n <sup>c</sup> (untless)	0.43	
ENTER Stratum C soul dry bulk density, P.c (g/cm³)	17	ENTER
ENTER Stratum B sool water-filled porosity, $\theta_m^8$ $(cm^3/cm^2)$	0 27	ENTER
ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	0 42	ENTER
ENTER Stratum B soil dry bulk density, Pa (g/cm³)	1.7	ENTER
ENTER Stratum A soil water-filled porosity, $\theta_u^A$ (cm³/cm³)	0.2	ENTER Enclosed
ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	0 43	ENTER
ENTER Stratum A soil dry bulk density, p <sub>A</sub> (g/cm³)	15	ENTER Enclosed

				-	170	, ,	4	?
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
Enclosed		Enclosed	Enclosed					
space	Soil-bldg	space	space	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
thickness,	differential,	length,	width,	height,	width,	rate,		
Long	٩٥	ٿ	W	f	*	8		
(cm)	(g/cm-s²)	(cm)	(cm)	(cm)	(cm)	(1/h)		
							i	
15	40	961	961	488	0.1	0 45	$\Box$	
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER			
Averaging	Averaging			Target	Target hazard			
time for	time for	Exposure	Exposure	nsk for	quotient for			
cardinogens,	noncarcinogens,	duration,	frequency,	carcinogens,	noncarcinogens,			
ΑT <sub>C</sub>	AT <sub>NC</sub>	9	뀨	Œ	歼			
(yrs)	(yrs)	(yrs)	(days/yr)	(unitless)	(unitiess)			

Used to calculate risk-based groundwater concentration 1 of 7

Reference conc., RfC (mg/m³)	0.05+00
Unit risk factor, URF (µg/m³)-1	2 6E-05
Pure component water solubility, S	561 00 1.74E+01   8 52E+03   2 6E-05   0 0E+00
Organic carbon partition coefficient, K <sub>oc</sub> (cm <sup>3</sup> /g)	1.74E+01
Critical temperature, T <sub>c</sub> (°K)	561 00
Normal boiling point, T <sub>B</sub>	356 65
Enthalpy of vaportzation at the normal boiling point, ΔΗν, α (cal/moi)	7,643
Henry's law constant reference temperature, T <sub>R</sub>	25
nenry's law constant at reference temperature, H (atm-m³/mol)	9 78E-04
Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	9 90E-06 9 78E-04
Diffusivity in air, D.	1 04E-01

Floor-wall seam perimeter,	3,844	Diffusion path length, La	2331 96	
Water-filled porosity in capillary zone, $\theta_{w,ct}$ $(cm^3/cm^3)$	0 294	Total  overall  effective  diffusion  coefficient,  D***  (cm²/s)	1 71 <b>E-</b> 03	
Air-filled porosity in capillary zone, $\theta_a = (cm^3/cm^3)$	0 126	Capillary zone effective diffusion coefficient, $D^{eff}$ (cm <sup>2</sup> /s)	627E-04	
Total porosity in capillary zone, n <sub>et</sub>	0.42	Stratum C C $C$ effective diffusion coefficient, $D^{\rm eff}_{\rm C}$ $(cm^2/s)$	0 00 + 00	Reference conc , RfC (mg/m³)
Thickness of capillary zone, L <sub>cz</sub>	17 05	Stratum B B effective diffusion coefficient, D <sup>eff</sup> (cm²/s)	1 09E-03	Unit isk factor, URF (µg/m³) 1
Stratum A soil effective vapor permeability, k, (cm²)	5 97E-10	Stratum A A effective diffusion coefficient, Deff (cm²/s)	4 22E-03	Infinite source source bldg conc , Charam (µg/m³)
Stratum A soal retative air permeability, k <sub>re</sub> (cm²)	0.797	Vapor viscosity at ave soil temperature, hrs (g/cm-s)	1 77E-04	Infinite source indoor attenuation coefficient, a (unitless)
Stratum A sod intrinsic permeability, k,	7 49E-10	Henry's law constant at ave groundwater temperature, H' <sub>TS</sub> (untiless)	2 64E-02	Exponent of equivalent foundation Peclet number, exp(Pe¹) (unitless)
Stratum A effective total fluid saturation, S <sub>se</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0 365	Henry's law constant at ave groundwater temperature, H <sub>1s</sub> (atm-m²/mol)	6 27E-04	Area of crack, Area (cm²)
Stratum C soil alr-filed porosity, $\theta_a^c$ (cm³/cm³)	0130	Enthalpy of vaporization at ave groundwater temperature, $\Delta H_{\nu, TS}$ (cal/mol)	8,457	Crack effective diffusion coefficient, Drack (cm²/s)
Stratum B soil air-filled porosity, $\theta_a^B$ (cm³/cm³)	0 150	Crack depth below grade, Zond	15	Average vapor flow rate into bldg., Qual (Cm <sup>3</sup> /s)
Stratum A soll air-filled porosity, $\theta_a^A$ (cm³/cm³)	0 230	Crack- to-total area ratio, η	4 16E-04	Crack radius, fract (cm)
Source- building separation, L <sub>T</sub>	2331 96	Area of enclosed space below grade, A <sub>B</sub>	9 24E+05	Source vapor conc, Course (µg/m³)
Exposure duration, t	9 46E+08	Bidg ventilation rate, Quaters (cm <sup>3</sup> /s)	5 63E+04	Convection path length, L. (cm)

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#### RESULTS SHEET

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INCREMENTAL RISK CALCULATIONS

Hazard	from vapor	ot noisonini	indoor air,	noncarcinogen	(nutless)	
Incremental risk from	vapor	DI HOISIDH IO	indoor alr,	carcinogen	(unitless)	
Final	indoor	exposite	groundwater	conc,	(hg/L)	
Pure	component	water	solubility,	တ	(µg/L)	
Risk-based	indoor	exposite	groundwater	conc,	(µg/L)	
Indoor	exposure	groundwater	conc,	noncarcinogen	(µg/L)	
Indoor	exposure	groundwarer	conc.	carcinogen	(H8/F)	

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

						VLOOKUP TABLES	LES					
SCS Soil Type	K. (cm/h)	α (1/cm) So	Soil Properties Lookup Table N (uniflees) M (uniflees)	ookup Table M (uprtless)	6 (cm <sup>3</sup> /cm <sup>3</sup> )	o (com <sup>3</sup> /cm <sup>3</sup> )						
	Š	Įg	8	0000	00.00	מינים מינים	Medil Grani Danierer (CII)					
ಕ	0.26	0 0 19	13.	0 237	0.50	8 6	0 0092					
<u>ب</u>	\$	0 036	1.56	0.359	0.43	9200	200					
ഴ്ച	14 59	0 124	2 28	0.561	0.41	2500	0.50					
<u>s</u>	29 70	0 145	2 68	0 627	0 43	0 045	0 044					
သွ	0 12	0 027	1 23	0 187	0 38	0 100	0 025					
J.S.C.	131	6900	1 48	0 324	0 39	0 100	0.029					
<u> </u>	0 25	0 016	1.37	0 270	0.46	0 034	0 0046					
	0 05	0 005	109	0 083	0.26	0.070	0 0039					
100	0 0 0	0 0 10	123	0 187	0 43	0 089	0 0056					
<u> </u>	0 45	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	141	0 291	0 45	0 067	0 011					
	4 45	0.075	1 89	0 471	0 41	0 065	0 030					
					Simodo	Chaminat Branchist Land	A DELLA					
		Organic				ar Properties Loo	okup i able				1	
		cathon			toggamon		Tenrys	Heritys			Enthalpy of	
		partition	Diffusivity	Differentia	- Material	2000	law constant	law constant	Normal		vaponzation at	
	-	Coefficient	in air	Condense		nerny s	at reference	reference	_	Cutical	the normal	risk R
	-	¥		D.	southing.	law Constant	remperature,	temperature, T		temperature,	bolling point,	factor,
CAS No Chemical		(g),(d)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mo/L)	(southess)	(atm=m³/mol)	<u>«</u> €	چ چ	ပ ၌		4 E
		18			1	(OIIIIGSS)	(lou) (leting)	3	2	(K)	(cal/mol)	(mg/m²)
50293 DDT		2 63E+06	137E-02	4 95E-06	2 50E-02	3 32E-04	8 105-06	25	533 15	720.75	11	975.05
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 135-06	32	715.90	969 27	000.51	215.03
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 OGE-OG	2 79E+03	1 82E-05	4 44E-07	22	605 28	827 B5	000,51	0.05+00
53703 Dibenz(a.h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16 000	2 1F-03
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	1.5F-05
55233 Benz(a)anthracene		3 98E+05	5 10E-02	9 OOE-06	9 40E-03	1376-04	3 34E-06	52	708 15	1004 79	15,000	2 15-04
		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	52	624 24	885 73	13,000	3.7E-04
Socse gamma-HCH (Lindane)		1 0/E+03	1 42E-02	7 34E-06	6 80E+00	574E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04
GABAN BANANIA		2 145+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	25	613 32	842 25	13,000	4 6E-03
67641 Acators		6 00E-01	5 365-02	7 9/E-06	3 50E+03	6 31E-05	1 54E-06	52	720 00	751 00	10,000	00+300
67663 Chlomform		3 005-01	1246-01	1 145-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	6,955	0 0E+00
67721 Hexachinmethane		1 785403	10401	1 00E-05	/ 92E+03	1505-01	3 66E-03	25	334,32	536 40	6,988	2 35-05
71363 Butanol		6 925+00	2 30E-03	90,306.0	2 40E+01	1995-01	3 885-03	25	458 00	695 00	9,510	4 0E-06
71432 Benzene		5 89E+01	8 80F-02	90-00	1 755 + 04	3 5 TE-04	8 805-06	52	390 88	563 05	10,346	. 00+30 0
71556 1,1,1-Trichloroethane		1 10E+02	7.80E-02	8 80F-06	1.335+03	7.05E-01	3 305-03	Q 1	353.24	562 16	7,342	8 3E-06
72208 Endnn		1 23E+04	1 25E-02	4.74E-06	2.50F-01	3.085-04	7 515.06	67 %	34/24	545 00 20 00 20 00	7,136	0 0E+00
72435 Methoxychior		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48F-04	1 58 H	C 7	65100	380 20	12,000	0 0E+00
72548 DDD		1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	3 %	839.00	940 43	14,000	0 UE+00
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	32	636 44	860.38	13,000	0 35-03
74839 Methyl bromide		1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	52	276 71	467 00	5,714	20-10-0
75014 Vinyl chloride (chloroethene)	ê	1 86E+01	106E-01	1 23E-06	2 76E+03	1 11E+00	2 71E-02	52	259.25	432 00	5.250	8 4F-05
75092 Methytene chlonde		1 17E+01	1016-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	52	313 00	510 00	6,706	4 7E-07
75757 Bromoform		4 5/E+01	104E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	25	319 00	552 00	6,391	0 0E+00
75274 Bromodichloromethene		5 47E+07	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34 E-04	52	422 35	00 969	9,479	1 1E-06
75343 1.1-Dichloroethane		3 165+01	7 425 02	1 00 0 0	20+340	6 56E-0Z	1 60E-03	: 22 :	363 15	585 85	7,000	1 8E-05
75354 1.1-Dichloroethylene		5.896+01	9 00 11 02	1 04 11 05	2 255-103	2 30E-01	5615-03	52	330 55	523 00	6,895	0 05+00
76448 Heptachlor		141E+06	1 12F-02	5.696-06	1 ROF-01	4 475-02	2015-02	52.5	304 75	576 05	6,247	5 0E-05
77474 Hexachlorocydopentadiene	<b>9</b>	2 00E+05	1 61E-02	7 21E-06	1 80E+00	1 115+00	1 0 m 1 c	C 40	60300	346 31	13,000	1 36-03
78591 isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63F-06	3 %	488.35	716.00	10,931	0 0E+00
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 805-03	25	369.52	572.00	7,201	2 /E-0/
79005 1,1,2-Trichloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	\$2 52	386 15	602 00	8,322	1 6E-05
79016 Inchloroethytene 70345 1 1 2 2 Tetrachloroethans		1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25	360 36	544 20	7,505	175-06
78343 1,1,2,2-1 euacmoroemane 83329 Acenaphthene		9 33E+01 7 08E+03	7 10E-02 4 21E-02	7 90E-06 7 69E-06	2 97E+03	1 41E-02	3.44E-04	25	419 60	661 15	966'8	5 8E-05
		3	40-11-7 t	22-162	70±247 4	0 30E-03	1 55E-44	52	550 54	803 15	12,155	0 OE+00

BASSO Districtorists	01000	000	90 0		VLOOKUP TABLES	F C C C C C C C C C C C C C C C C C C C	i C			;		
R4740 Din to the appropriate	2 305 +04	20-005	0 33E-00	1001100	- 65E-05	4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	9 4	567 13	00 /6/	13,733	00=100	2 8E+00
85687 But bery phisiate	5 35E+04	1 74E-02	4 B3E-06	2 895+00	5 525-08	9 39E-10	8 4	013.13	/40 P/	14,751	0 0E+00	3 55.01
86306 N-Mitrosodiohendamine	1 29E+03	3 125-02	6.356-06	3.516+01	2.05E-04	5.005-06	3 15	632.28	800 45	000,51	1,41,00	20.00
86737 Fluorene	1 38E+04	3 635-02	7 88E-06	1 98E+00	2 61E-03	6.37E-05	3 50	570 44	870.00	12,666	1 415-06	2000
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7.48E+00	6 26E-07	1 53E-08	22	627 87	899 00	13.977	5.7F-06	0 OF+00
87683 Hexachloro-1,3-butadiene	537E+04	5 61E-02	6 16E-06	3 23E+00	3 34E-01	B 15E-03	25	486 15	738 00	10,206	2 2E-05	0 OE+00
87865 Pentachlorophenol	5 92E+02	5 60 5-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08		582 15	813.20	14,000	3 4E-05	0 OE+00
88062 2,4,6-Trichlorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06		519 15	749 03	12,000	3 1E-06	0 0E+00
91203 Naphthalene 01041 3 3-Dichtorobensidios	2 00E+03	5 90E-02	/ 50E-06	3 1105+01	1 98E-02	4 83E-04	22 K	491 14	748 40	10,373	00=+00	1 4E-01
95476 o-Xylene	3 63F+02	8 70F-02	1.00F-05	1 78F+02	2 135-01	5 20E-03		360 26 417 60	734 U3	3,000	2 00 TO 00	00±000
95487 2-Methylphenol (o-cresol)	9.12E+01	7.40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	35	464 19	697.60	10,00	00+00	י מיים ל
95501 1,2-Dichlorobenzene	6 17E+02	6 905-02	7 90E-06	1 56E+02	7 79E-02	1 905-03		453 57	705 00	9.700	0.000	2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04		447 53	675 00	9,572	00+00	1.8E-02
95954 2,4,5-Trichlorophenol	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06	25 55	526 15	759 13	13,000	0 0E+00	3 SE-01
98953 Mitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 405-05	25	483 95	719 00	10,566	00=300	2 0E-03
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23 E-01	7 88E-03	25	409 34	617 20	8,501	0 0E+00	1 0E+00
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2.76E-03	8	41831	636 00	8,737	0 0 0 0 0	1 0E+00
1030/9 Z,4-Uimemyiphenol	2.09E+02	5 84E-UZ	8 69E-06	/ 8/E+03	8 20E-05	2 00E-06		484 13	707 60	11,329	00E+00	7 0E-02
106467 1 4-Dichlomberzene	3 09E+02	6 00E-02	7 00 00	7 285 +0.2	3 (4E-0)	7 005-03	6 4	2011.02	616.20	8,525	0.05-00	7 05+00
108478 o Chlomanillo	6.6111+01	4 83E-02	201E-05	5 30E+03	3 30E-02	3 325-03	3 %	503 65	25,00	177'6	005	ָהָ בְּי
107062 1,2-Dichloroethane	174E+01	1 04E-01	90E-06	8 52E+03	4 01E-02	9 78E-04	3 2	356 65	561.00	7,643	2 6F-05	0 0F+00
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	22	345 65	519 13	7,800	0 DE+00	2 OE-01
108383 m-Xylene	4 07E+02	7 00E-02	7 80E-06	161E+02	3 01E-01	7 34E-03	25 4	12 27	617 05	8,523	0.0110	7 0E+00
	1 82E+02	8 70E-02	8 605-06	5 26E+02	2 72E-01	6 63E-03	25	383,78	591 79	7,930	0 0E+00	4 0E-01
108907 Chlorobenzene	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 715-03	25 4	404 87	632 40	8,410	0.00	2 0E-02
108952 Phenol	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07		455 02	694 20	10,920	0 0E+00	2 1E+00
111444 Bis(2-chioroethyl)ether	1 55E+01	6 92E-02	7 53E-06	172E+04	7 38E-04	1 80E-05	25 4	451 15	626 29	000'6	3 3E-04	0 0E+00
115297 Endosultan 117817 Bis/2 Athulhous)-https://	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 595-04	1 12E-05	55	674 43	942 94	14,000	0 0E+00	2 1E-02
117840 Deportulation	1,015+0/	3 3 1 5 - 0 2	3 55E-U5	3 40E-01	4 18E-06	1 U2E-07	9 1	557.15	00 908	15,999	4 0E-06	0 OE+00
118741 Hexachlorobenzene	5 50E+04	5.425-02	5 9 1 1 .0 6	6 20E+00	5 415-03	1 325-03	3 %	582 55	825.00	10,000	0 0E+00	70-107
120127 Anthracene	2 95F+04	3 245-02	7.74F-06	4 34 F-02	241E-02	6.51E-05	3 4	362 33 615 18	873.00	44,4	4 05-04	004
120821 1,2,4-Trichlorobenzene	1 78E+03	3 005-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03		486 15	725 00	10.471	0 OF +00	2 OF 01
120832 2,4-Dichlorophenal	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06	25	482 15	708 17	11,000	00+00	1 1E-02
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3,80€-06	9 27E-08		290 00	814 00	13,467	1 9E-04	0 OE+00
124481 Chlorodibromomethane	6 31E+01	1 96E-02	1 05E-05	2.60E+03	3 21E-02	7 83E-04		416 14	678 20	8,000	2 4E-05	0 0E+00
12/184 Letrachioroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7.54E-01	1845-02		394 40	620 20	8,288	5 8E-07	0 0E+00
159000 Pyteme	3 555.03	7.755.02	7.24E-00	1355-01	4 57E 64	1105-05	2 6	567.95	936 00	14,370	0.05+00	1 15-01
156605 trans-1.2-Dichlomethylene	5.258+01	7 07E-02	1.191.05	5 30F+03	3 855-01	4 U/E-US		333 85 320 85	544 00	6 747	201400	3 3E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06	3 25	809 15	1078 24	12,000	2 (E-04	0 0E+00
205992 Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1 11E-04		715 90	969 27	15,000	2 1E-04	00+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 61E-05		655 95	905 00	13,815	0 0E+00	1 4E-01
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07	25 7	753 15	1019 70	16,000	2 1E-05	0 0E+00
218019 Chrysene	3 98E+05	2 48E-02	621E-06	1 60E-03	3 88E-03	9 46E-05		714 15	979 00	16,455	2 1E-06	00+400
30900Z Aldrin	2.45E+06	1 32E-02	4 86E-06	180E-01	6 97E-03	1 70E-04		603 01	839 37	13,000	4 9E-03	000+00
2-10040 dipra-non (alpha-ono)	1.265±03	1 425-02	7.345-05	2 UUE+00	4 33E-04	1 065-05		595 55	639 36	3,000	1 85-03	9 4 40
542756 1.3-Dichleropropena	4 57F+01	6.26F-02	1 00F-05	2 40E-01	7 26F-01	1 775-02	3 5	381.15	587.38	200	3 7F-05	2 OF 02
606202 2,6-Dinitratoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 OSE-05	7 46E-07		558 00	770 00	12.938	1 9E-04	0 OE+00
621647 N-Nitrosodt-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 255-06		509 60	746 87	11,000	2 0E-03	0 0E+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3,90E-04	9 51 E-06		613 96	848 76	13,000	2 6E-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6,30E-06	5 62E-02	4 67E-01	1 14E-02	25 6	629 88	1750 00	14,127	0 0E+00	3 0E-04
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06		657 15	87331	14,000	3 2E-04	0 0E+00
11096825 Arocior 1260 (PCB-1260)	2 90E+05	1 385-02	4 32E-06	8 DOE-02	1 89E-01	4 60E-03			539 37	19,000	1 0E-04	001100
105/65/ Aloctor 1016 (PCB-1034)	2 305+04	1 30E-02	5 42E-06	3 70E-02	1 105-02	2 00E-03	0 K	377.50	312.2/	200'8	- Cm-0-	
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02	531E-06	3 40E-01	2 136-02	5 20E-04	9 45	345.50	482 20	18,000	1 0F-04	000-400
7 N N	1	[ ] ]	) 	]	10.10		3	3	24	2	; j	;

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (onter "X" in "YES" box)

YES

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

		ENTER	User-defined stratum A soll vapor permeability, k, (cm²)	
		ENTER Soil	stratum A SCS scul type (used to estimate OR soil vapor permeability)	0
		ENTER	SCS soil type directly above water table	S
		ENTER	Soil stratum drectly above water table, (Enter A, B. or C)	В
	onde	ENTER Lwr (cell D28)	Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	0
Chemical	Carbon tetrachlonde	INTER ENTER ENTER Totals must add up to value of Lwr (cell D28)	Thickness Thickness of soil stratum B, stratum C, (Enter value or 0) (Enter value or 0) h <sub>p</sub> h <sub>C</sub> (cm)	1173 48
		ENTER Totals mu	Thickness of soil stratum A,	1173 48
·		ENTER	Depth below grade to water table, Lwr (cm)	2346 96
ENTER Initial groundwater conc, Cw (ug/L)	22 1126087	ENTER Depth	below grade to bottom of enclosed space floor, L <sub>ξ</sub> (cm)	15
ENTER Chemical CAS No (numbers only,	56235	ENTER	Average soil/ groundwater temperature, T <sub>\$</sub>	16

ENTER Stratum C soil water-filled porosity, $\theta_n^c$ $(\alpha m^3)_{cm^3}$	03	
ENTER Stratum C soil total porosity, n <sup>c</sup> (unitless)	0 43	
ENTER Stratum C soil duy bulk density, P.C (g/cm³)	17	ENTER
ENTER Stratum B soil water-filled porosity, for the form of the fo	0.27	ENTER
ENTER Stratum B soil total porosity, n <sup>8</sup>	0.42	ENTER
ENTER Stratum B soil dry bulk density, p.e. (g/cm³)	17 1	ENTER
ENTER Stratum A soul water-filled porosity, $\theta_w^A$ $(\alpha n^3/cm^3)$	02	ENTER
ENTER Stratum A soil total porosity, n <sup>A</sup> (unittess)	0 43	ENTER
ENTER Stratum A soil dry bulk density, Pb (g/cm²)	15	ENTER

0 43												
17	ENTER	Indoor	rate,	ER	(1/h)	0.45						
0.27	ENTER	Floor-wall	width,	*	(cm)	0.1	ENTER	Target hazard	quotient for	noncardnogens,	윤	(unitless)
0.42	ENTER	Enclosed	height,	Ŧ,	(сш)	488	ENTER	Target	nsk for	carcinogens,	또	(unitless)
17	ENTER	space	width,	*	(cm)	961	ENTER		Exposure	frequency.	监	(days/yr)
0.5	ENTER	space	length,	ני	(cm)	1961	ENTER		Exposure	duration,	<b>⊕</b>	(yrs)
0.43	ENTER	Soil-bidg pressure	differential,	ΦΔ	(g/cm-s²)	40	ENTER	Averaging	time for	noncardinogens,	AT	(yrs)
6	ENTER Enclosed	Space	thickness,	Lond	(cm)	15	ENTER	Averaging	time for	cardinogens,	ATc	(vrs)

Target hazard	quotient for	noncarchogens,	(unifless)	-	Used to calculate risk-based	groundwater concentration
Target	nsk for	carcinogens,	(unitiess)	1 0E-06	Used to calcu	groundwater
	Exposure	frequency.	(days/vr)	350		_
	Exposure	duration,	G (8)	98		
Averaging	time for	noncardnogens,	(yrs)	30		
Averaging	time for	carcinogens,	) (§1.6)	7.0		

1017

						_
					(mg/m³)	0.05+0.0
	ij	risk	factor,	URF	(μg/m³) <sup>-1</sup>	1 5F-05
Pure	component	water	solubility,	Ø	(mg/L)	7 93E+02
Organic	carbon	partition	coefficient,	ጜ	(cm <sub>3</sub> /6)	174E+02
		Critical	temperature,	Ľ	(°K)	349 90 556 60 1 74E+02 7 93E+02 1 5F-05   0 0F+00
	Normal	balling	point,	<u>"</u>	(%)	349 90
Enthalpy of	vaporization at	the normat	boiling point,	۵H۷	(cal/mol)	7.127
Henry's	law constant	reference	temperature,	Ľ.	(၃)	25
Henry's			temperature,		(atm-m³/mol)	7 80E-02 8 80E-06 3,05E-02
		Diffusivity	ın water,	മ്	(cm <sup>2</sup> /s)	8 80E-06
		Diffusivity	in air,	្នំ	(cm <sup>2</sup> /s)	7 80E-02

Floor-wall seam perimeter,	3,844	Diffusion path length, La (cm)	
Water-filled porosity in capillary zone, $\theta_w \approx (cm^3/cm^3)$	0 294	Total overall effective diffusion coefficient, Def , (cm²/s)	
Aur-filed porosity in capillary zone, $\theta_{\mathbf{k},\mathbf{c}}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 126	Capillary  zone effective diffusion coefficient, Def c (cm²/s)	
Total porosity in capillary zone,	0 42	Stratum C c effective diffusion, D=c (cm²/s)  Reference	AN
Thickness of capillary zone, L <sub>2</sub>	17 05	Stratum B B effective diffusion coefficient, O== (cm²/s) 7 99E-04 7 99E-04 Insk factor, URF (μg/m²)-1	1 5E-05
Stratum A soil effective vapor permeability, K	5 97E-10	Stratum  A  effective diffusion coefficient,  Deff  (cm²/s) 3.16E-03  infinite source bidg conc. Chalang (ug/m³)	4 03E-03
Stratum A soul relative air permeability.	0 797	Vapor viscosity at ave soil temperature, µrs (g/cm-s) (g/cm-s) Infinite source indoor attenuation coefficient, α	4 72E-06
Stratum A soil intrinsic permeability, k <sub>s</sub>	7 49E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)  8 53E.01  Exponent of equivalent foundation Peciet number, exp(Pe <sup>f</sup> )	1 15E+03
Stratum A effective total fluid saturation, S <sub>tr</sub>	0 365	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol)  2 02E-02  Area of crack, Area (cm²)	3 84E+02
Stratum C soil alr-filled porosity, $\theta_a^c$ $(cm^3/cm^3)$	0 130	Enthalpy of vaporization at ave. groundwater temperature, AH, 1s (caVmol)  7.798  Crack effective diffusion coefficient, Dana (cm²/s)	3 16E-03
Stratum B soil all-filled porosity, $\theta_{\mathbf{a}}^{B}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zasat (cm)  15  Average vapor flow rate into bldg , Qasa (cm³/s)	5 70E-01
Stratum A soil air-filled porosity, $\theta_a^A$ (cm³/cm³)	0 230	Crack- to-total area ratio,  1 (unitless)  4 16E-04   Crack radius, rank (cm)	010
Source- building separation, L <sub>T</sub>	2331 96	Area of enclosed space space below grade, As (cm²) Source vapor conc.	8 53E+02
Exposure duration, t	9.46E+08	Bldg ventilation rate,  Quadro (cm³/s)  Convection path length,  Lo (cm)	15

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NCREMENTAL RISK CALCULATIONS	Hazard quotlent from vapor intrusion to indoor alr, noncarcinogen (uniteess)	NA
INCREMENTAL R	Incremental risk from vapor intrusion to Indoor air, carcinogen (unifiess)	NA
JLATIONS	Final indoor exposure groundwater conc, (µg/L)	4 02E+01
ATION CALCI	Pure component water solubility, S S S	7 93E+05
R CONCENTR	Risk-based indoor exposure groundwater conc. (μg/L)	4 02E+01
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	Indoor exposure groundwater conc , noncarcinogen (µg/L)	NA V
RISK-BASE	Indoor exposure groundwater conc, carcinogen (µg/L)	4 02E+01

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

4 of 7

						VLOOKUP TABLES	ES					
SCS Soll Type	K (cm(h)	S (Tital) Sc	vertues L		3, 3,	6 16						
0	, 20	1	1	-	o, (an /an )	6, (cm /cm )	Mean Grain Diameter (cm)					
<u></u>	0.20	0.00	109	0.083	038	8900	0 0092					
<u></u>	1 5	9200		0.250	7 7	0 000	0.016					
LS	14 59	0 124	2 28	550	? •	00/0	0.020					
so.	29 70	0 145	2 68	0 627	. 40	0 045	0 0					
SC	0 12	0 027	1 23	0 187	0.38	0.100	0.025					
SCL	131	0 059	1 48	0 324	0 39	0 100	0.029					
īn (	0 25	0 016	1 37	0.270	0.46	0 034	0 0046					
300	0 05	0 005	1 99	0 083	0 26	0 0 0 0 0 0	0 0038					
מנר.	0 0 2	0 010	1 23	0 187	0 43	0 089	0 0056					
0 0	0.45	0 020	141	0 291	0 45	0 067	1100					
70	4 42	0 075	1 89	0471	0 41	0 065	0 0 0 0					
		Constant			Chemica	Chemical Properties Lookup Table	kup Table	:				
		Cathon			Fure		Henry's	Henry's			Enthalpy of	
		calcul	7		component		law constant	law constant	Normal		vaponzation at	Ç
		parullon	Curusivity	Cimustvity		Henrys	at reference	reference	bodang	Cutical	the normal	ırsk P
		X X	ā c	m water,	solubility,	taw constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,
CAS No Chemical		(cm <sup>3</sup> /a)	(cm²/s)	(cm²(s)	, (low)	C (visitlese)	n (cm/cm-mte)	∞ ز	an §	ပ ဗ		URF
		, 6,	(21,12)	(67.15)	(TIRG/L)	(numess)	(aun-m./mol)	( <u>C</u>	2	(K)	(cat/mol)	(mg/m²)
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11 000	9,75,05
50328 Benzo(a)pyrene		1.02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 13E-06	25	715 90	969 27	15 000	2 11 0
51285 2,4-Dinitrophenol		1 00E-02	2 73E-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	52	605 28	827 85	15,000	0 OF +00
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	52	743 24	990 41	16,000	2 1F-03
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 B0E-06	7 93E+02	1 25E+00	3 05E-02	52	349 90	556 60	7.127	1 5E-05
55553 BenZ(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 345-06	25	708 15	1004 79	15,000	2 1E-04
57749 Chiordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3 7E-04
55539 gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 B0E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04
OUDING COOP		2 145+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	151E-05	25	613 32	842 25	13,000	4 6E-03
67544 Action		6 00E-01	5.36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10,000	0 0E+00
67662 Chimmen		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	6,955	0 OE+00
67794 Chichologram		3 98E+01	1 04E-01		7.92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6,988	2 3E-05
5//21 nexactionement		1 78E+03	2 505-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00	695 00	9,510	4 0E-06
71432 Because		6 92E+00	8 00E-02	9.305-06	7 40E+04	3 616-04	8 80E-06	52	390 88	563 05	10,346	0 OE+00
71556 1 1 1-Trichlymethane		1 100 100	7 BOE 02	90-H08-6	1 /5E+03	2 28E-01	5 56E-03	52	353 24	562 16	7,342	8 3E-06
72208 Endin		1 235+04	1 265 03	9 90E-08	1 33E+03	7 05E-01	1 72E-02	22	347 24	545 00	7, 136	0 OE+00
72435 Methoxychlor		9 77 6+04	1 565.02	4 4 4 1 1 0 0	4 50E 03	3 085-04	7.51E-06	52	718 15	986 20	12,000	0 0E+00
72548 DDD		1 OOF+06	1 KGE-02	4.40E-00	4 300-02	0 40E-04	1 58E-05	ន	651 02	848 49	14,000	0 0E+00
72559 DDE		4 47E+06	1 44E-02	5.875-06	1 205-01	- A-11-04	4 000-08	6 8	25.50	863 77	14,000	6 95-05
74839 Methyl bromide		1 05 5+01	7 28E-02	121E-05	1 52E+04	2.56F-01	5 - 10 E - 0	7.0	376 44	860 38	D00,ET	9 7E-05
75014 Vinyl chlonde (chloroethene)	ne)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1.11E+00	2715-02	3 K	250 25	467 00	5/14	0.05+00
75092 Methylene chlonde		1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 195-03	3 %	313.00	510.00	0.720	8 47-05 10-17-05
75150 Carbon disulfide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3.025-02	3 52	310	250.00	a,705	4 (E-U/
75252 Bromoform		8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34 E-04	52	422 35	696 00	9.72	1100
75274 Bromodichloromethane		5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	52	363 15	585.85	7,000	7. F.
75343 1,1-Dichloroethane		3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5.61E-03	2,5	330 55	523.00	000'/	1 8E-05
75354 1,1-Dichlaroethylene		5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 615-02	25	304.75	576.05	C60,0	00+100
76448 Heptachlor		1 41E+06	1 125-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	846.31	13,000	1 36.03
77474 Hexachlorocyclopentadiene	92	2 00E+05	161E-02	7 21E-06	1 80E+00	111E+00	2 71E-02	25	512 15	746 00	10.931	001100
/8591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10.271	2 7E-07
700/5 1.2-Didnoropropare		4 3/E+U1	/ 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	22	369 52	572 00	7,590	0 0E+00
79005 1,1,2-Indhiorethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8,322	1 6E-05
79345 1.1.2 2-Tetrachloroethane		1 00E+02	7 10E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	52	360 36	544 20	7,505	1 7E-06
83329 Aceraphthene		7 08E+03	4 21E-02	7 69F-06	2 97E+03	141E-02	3 446-04	25	419 60	661 15		5 8E-05
				20.	70.747	0 205-03	1 33E-V4	67	550 54	803 15	12,155	0 0E+00

	2 8€+00	3 5E-01	7 0E-01	0 0 0 0	1 4E-01	00+100	00 00 +00	00=+00	1 4E-01	0.01+00	1 81-01	2 000	1,85-02	3 5E-01	2 0E-03	1 05-100	7 0F-02	7 0E+00	8 0E-01	1 4E-02	0 0 0 0 0	7 OE+OU	4 00.01	2 0E-02	2 15+00	00=+00	2 1E-02	0 0E+00	00100	1 1m+00	2 0E-01	1 1E-02		0 0 0	11E-01	3 5E-02	7 0E-02	00 100	1 4E-01	0 00+00	0 0E+00	00+111	00+00	2 0E-02	0 0E+00	0 0E+00	0 0E+00	3 0E-04	0 OF +00	00 = 0	0 0E+00 0 0E+00
	00100	0 0E+00	0 0E+00	1 4E-06	0.05+00	2 2E-05	3 4E-05	3 16-06	0.05+00	00.10	00+100	00+00	0 0E+00	0.00	0.000	00+400	00+400	001100	000+00	00=+00	2 6E-05	201	00=+00	0.05+00	0 0E+00	3 3E-04	0 0E+00	4 0E-06	4 6F-04	0 0E+00	0 0E+00	0011-00	2 4 H 5 4	5 8E-07	0 0E+00	0 0E+00	0 0F +00	2 1E-04	0 0E+00	2 1E-05	2 1E-06	20-118 t	5 3E-04	3 7E-05	1 9E-04	2 0E-03	2 6E-03	3 25-04	1 OE-04	1 0E-04	1 0E-04 1 0E-04
	13,733	14,751	13,000	13,000	12,666	10.206	14,000	12,000	10,373	13,000	10.800	9.700	9,572	13,000	10,566	6,501	11,329	8,525	9,271	11,689	7,643	8 523	7,930	8,410	10,920	9,000	14,000	15,999	14 447	13,121	10,471	11,000	73,467	8,288	14,370	7,192	6,717	15.000	13,815	16,000	16,455	13,000	13.000	7,000	12,938	11,000	13,000	721,41 000.41	19,000	19,000	18,000 18,000
	757 00	798 67	839 68	890 45	90000	738 00	813 20	749 03	754.03	630.30	697 60	705 00	675 00	759 13	719 00	07 /10	707 60	616 20	684 75	754 00	510 100	617.05	591 79	632 40	694 20	629 79	942 94	862 22	825 00	873 00	725 00	708 17	678.20	620 20	936 00	544 00	516 50	969 27	905 00	1019 70	979 00	639 3/ 839 36	839.36	587 38	770 00	746 87	848 76	1/50 00	539 37	512 27	475 22 482 20
	567 15	613 15	09099	632 28	627.87	486 15	582 15	519 15	49 14	417 60	464 19	453 57	447 53	526 15	483 95	418 34	484 13	411 52	447 21	503 65	345 65	412 27	383 78	404 87	455 02	451 15	674 43	704 09	582 55	615 18	486 15	482 15	290 00 416 14	394 40	667 95	333 65	320 85	715 90	655 95	753 15	714 15	500 CT	596 55	381 15	558 00	209 60	613 96	629 88	402 50	377 50	340 50 345 50
	25	25	52	8 8	3 5	32	52	32	8 8	2.53	52	25	25	52	72	3 %	22 22	26	25	52	6 K	25.	25	25	52	52	52	S 5	32 52	52	25	52	9 %	32	25	52	23 K	2 2	52	52	52 5	6 K	25	25	55	52	5 5	52 K	<b>3</b> 23	25	55 25
	4 51E-07	9 39E-10	1 26E-06	5 00E-05	1.535-08	8 15E-03	2 44E-08	7 78E-06	4 005-04	5 20E-03	1 20E-06	1 90E-03	3 90E-04	4 34E-06	2 40E-05	2 76F-03	2 00E-06	7.66E-03	2 435-03	3 32E-07	9 70E-04	7 34E-03	6 63E-03	3 71E-03	3 98E-07	1 80E-05	1.12E-05	1 025-07	1 32E-03	6 51E-05	1 42E-03	3 17E-06	3.27 E-U6 7.83F-04	1 84E-02	1 10E-05	4 07E-03	9,39E-03	1 11E-04	1 61E-05	8 29E-07	9 46E-05	1.085-05	7 44E-07	1 77E-02	7 46E-07	2 25E-06	9 51E-06	1 14E-02	4 60E-03	2 005-03	2.90E-04 5.20E-04
VLOOKUP TABLES	1 85E-05	3 85E-08	5 17E-05	2 615 03	6.26E-07	3 34E-01		3 19E-04	1 64F-07	2 13E-01	4 92E-05	7 795-02	1 60E-02		9 84E-04 3 23E-01	1 13E-01	8 20E-05	3 14E-01	9 96 E-02	136E-05	2 10F-02	3 01 15-01	2 72E-01	1 52E-01	1 63E-05	7 38E-04	4 595-04	4, i8⊑-06 2 74E-03	5 41E-02	2 67E-03	5 82E-02	1 30E-04	3 21E-02	7 54E-01	4 515-04	167E-01	3 85E-U1	4 55E-03	6 60E-04	3 40E-05	3 88E-03	4.358-04	3 05E-05	7 26E-01	3 06E-05	9 23E-05	3 90E-04	2.46E-04	1 89E-01	8 20E-02	1 19E-02 2,13E-02
>	1 08E+03	1 12E+01	2 695+00	3 3 EF + 0.1	7 48E+00	3 23E+00	1 95E+03	8 00E+02	3 115+00	1 78E+02	2 60E+04	1 56E+02	2 20E+04	1,20E+03	2 09E+03	3 10E+02	7 87E+03	1 85E+02		5 30E+03	2 00E+04	1 61E+02	5 26E+02	4 72E+02	8 28E+04	1 72E+04	5 10E-01	2 00E-02	6 20E+00	4 34E-02	3 00E+02	2 20E+03	2 60E+03	2 00E+02	1 35E-01	3 50E+03	2 20F-05	1 50E-03	2 06E-01	8 00E-04	1 605-03	2 OOF +00	2 40E-01	2 80E+03	182E+02	9 89E+03	2 005-01	7 40E-01	8 00E-02	5 70E-02	4 20E-01 3 40E-01
	6 35E-06	7 86E-06	4 83E-06	7 885-06	7 03E-06	6 165-06	6 10E-06	6 25E-06	6 745-06	1 00E-05	8 30E-06	7 90E-06	9 46E-06	7 03E-06	8 50E-06 7 80E-06	8 00E-06	9 69E-06	8 44E-06	7 90E-06	1 OTE-05	9 20E-06	7 BOE-06	8 60E-06	8 70E-06	9 10E-06	7 535-06	4 55E-U6	3 58E-06	5 91E-06	7 74E-06	8 23E-06	2 / E-06	105E-05	8 20E-06	7 24E-06	1 13E-05	- 19E-05 566F-06	5 56E-06	6 35E-06	5 56E-06	0.21E-06	7 34E-06	7 34E-06	1 00E-05	7 26E-06	8 17E-06	4 23E-06	4 34E-06	4 32E-06	5 00E-08	5,42E-06 5 31E-06
	2 56E-02	4 38E-02	1 74E-02	3 635-02	3 90E-02	5 61E-02	5 60E-02	3 18E-02	1 94E-02	8 70E-02	7 40E-02	6 90E-02	5 01E-02	2 91E-02	7 50E-02	7 105-02	584E-02			4 835-02	8 50E-02	7 00E-02	8 70E-02	7 30E-02	8 20E-02	6.92E-02	1 15E-02	1515-02	5 42E-02	3 24E-02	3 00E-02	3 40E-02	1 96E-02	7 20E-02	2 72E-02	7.36E-02	1 905-02	2 26E-02	3 02E-02	2 26E-02	2.48E-U2	1 42E-02	1 42E-02	6 26E-02	3 27E-02	5 45E-02	325-02	1 165-02	1 385-02	1 56E-02	2 22E-02 2 14E-02
	2 88E+02	3 39E+04	5 /5E+04 4 25E+03	1.29E+03	3 39 03	5 37E+04	5 92E+02	3 81 E+02	7 24E+02	3 63E+02	9 12E+01	6 17E+02	3 88E+02	1 60E+03	3.63E+01	7 76E+02	2 09E+02	3 89E+02	6 17E+02	1746+01	5 25E+00	4,07E+02	1 82E+02	2 19E+02	2 88E+01	1 55E+01	2 14E+03	8 32E+07	5 50E+04	2 95E+04	1 78E+03	9 555 401	6 315+01	1 55E+02	1 05E+05	3 55 0 1	3 47E+06	1 23E+06	1 07E+05	1 23E+06	3.98E+05	1 23E+03	1 26E+03	4 57E+01	6 92E+01	2 40E+01	8 32E+04	2 57E+05	2 90E+05	2 00E+05	3 30E+04 3 30E+04
	84662 Diethytphthalate	64742 Unrabutyl phthalate	88306 N.Nitranderbeardering		_	87683 Hexachloro-1,3-butadiene	87855 Pentachlorophenol	99002 2,4,0-1ffcnlorophendi 91203 Naphthalana	91941 3.3-Dichlorobenzidine	95476 o-Xylene	95487 2-Methylphenol (o-cresol)	95501 1,2-Dichlorobenzene	95578 2-Chlorophenol	95954 2,4,5-Trichlorophenol	100414 Ethythenzene		105679 2,4-Dimethytphenol		106467 1,4-Dichlorobenzene	1047 a p-Charanae		108383 m-Xylene				115444 Bis(z-chloroethyl)ether			118741 Hexachlorobenzene		120821 1,2,4-Trichlorobenzene	121142 2 4-Districtoriums		127184 Tetrachloroethylene	129000 Pyrene	136392 cts-1,Z-Uichioroethylene	193395 Indeno(1,2,3-cd)pvrene	205992 Benzo(b)fluoranthene	206440 Fluoranthene	207089 Benzo(k)fluoranthene	2 (8018) CHI yeare	319846 alpha-HCH (alpha-BHC)	319857 beta-HCH (beta-BHC)	542756 1,3-Dichloropropene		521647 N-Nitrosodi-n-propylamine	7439976 Mercury (elements)	8001352 Toxaphene	11096825 Aractor 1260 (PCB-1260)	11097691 Arador 1254 (PCB-1254)	12674112 Aroclor 1016 (PCB-1016) 53469219 Aroclor 1242 (PCB-1242)

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

		ENTER	User-defined stratum A soil vapor permeability.
		ENTER	stratum A SCS SCS soil type (used to estimate OR soil vapor permeability)
		ENTER	SCS soil type directly above water table
		ENTER	Soil stratum directly above water table, (Enter A, B, or C)
		ENTER Lwt (cell D28)	Thickness of soil stratum C. (Enter value or 0) he (cm)
Chemical	Benzene	INTER ENTER ENTER Totals must add up to value of LwT (cell D28)	Thickness   Thickness   Thickness   Thickness   Of soil   Of soil   Of soil   Of soil   Of soil   Of soil   Of soil   Of soil   Of stratum C,   Stratum C,   Stratum C,   Stratum C,   Of st
		ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub> (cm)
	_	ENTER	Depth below grade to water table, Lwr (cm)
ENTER Intral groundwater conc. Cw (µg/L)	219	ENTER Depth	below grade to bottom of enclosed space floor, Lr (cm)
ENTER Chemical CAS No (numbers only, no dashes)	71432	ENTER	Average soul groundwater temperature, Ts (°C)

ENTER ENTER Stratum C Stratum C soil total soil water-filled porosity, porosity,  n c	043 03						1
ENTER Stratum C soil dry bulk density, P. <sup>C</sup> (g/cm³)	17	ENTER	Indoor	ar exchange	rate,	<b>H</b>	(1/h)
ENTER Stratum B soll water-filled porosity, g, <sup>8</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	0.27	ENTER	Floor-wall	seam crack	width.	×	(cm)
ENTER Stratum B soil total porosity, n <sup>8</sup>	0 42	ENTER	Enclosed	space	height,	ī	(cm)
ENTER Stratum B soil dry bulk density, Pe. <sup>8</sup> (g/cm³)	17	ENTER Enclosed	sbace	floor	width,	M <sub>W</sub>	(cm)
ENTER Stratum A soul water-filled porosity, θ,* (απ³/απ³)	0.2	ENTER	space	floor	length,	r,	(cm)
ENTER Stratum A soil total porosity. n <sup>A</sup> (unitless)	0 43	ENTER	Soil-bidg	pressure	differental,	δР	(g/cm-s²)
ENTER Stratum A soil dry bulk density, Pb (g/cm³)	15	ENTER Enclosed	space	floor	thickness,	Žiast,	(cm)

15	40	961	961	488	0.1	0.4
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	:
Averaging	Averaging			Target	Target hazard	
L.	tme for	Exposure	Exposure	nsk for	quotient for	
carcinogens,	noncarcinogens,	duration,	frequency,	cardinogens,	noncargnogens,	
	AT <sub>NC</sub>	9	Ш	Œ	된	
١	(yrs)	(yrs)	(days/yr)	(unitless)	(unitless)	
	30	30	350	1 0E-06	-	
				Used to calct	Jsed to calculate risk-based	
				groundwater	aroundwater concentration	

#### CHEMICAL PROPERTIES SHEET

						_
		Reference	conc	R.C	(mg/m <sub>3</sub> )	00.00
	į	핥	factor,	URF	(mg/m <sub>3</sub> )	90 10 0
Pure	component	water	solubility.	တ	(mg/L)	4 755.00
Organic	carbon	partition	coefficient,	ጜ፟	(cm <sub>3</sub> /g)	10000
		Critical	temperature,	T <sub>c</sub>	<b>(</b>	560 16
	Normal	Joiling	point,	ᆸ	( 왕	453 DA
Enthalpy of	vaporization at	the normal	boiling point,	ΔH <sub>v,b</sub>	(cal/mol)	25 7 342 353.24 563.16 E BOCADA 4.7552403 1 0.35 06 1.00
Henry's	law constant	reference	temperature,	F.	(၁၀)	25
Henry's	law constant	at reference	temperature,	I	(atm-m³/mol)	A ROE-02 Q ROE-06 5 5 5E-03
				₫	(cm <sub>2</sub> /s)	S SOF OR
		Diffusivity	in air,	<b>់</b>	(cm <sup>2</sup> /s)	A ROF_02

Floor- wall seam perimeter, Xosax (cm)	3,844	Diffusion path langth, La (cm)
Water-filled porosity in capillary zone, $\theta_w = (cm^3/cm^3)$	0 294	Total overall effective diffusion coefficient, Def (cm²/s)
Air-filled porosity in capillary zone, $\theta_{a,c}$ (cm $^3$ /cm <sup>3</sup> )	0 126	Capt'ary zone effective diffusion coefficient, Def a (cm²/s)
Total porosity in capillary zone, ne can³/cm³)	0 42	Stratum C effective difficient, Deff c (cm²/s)  Reference conc , RfC (mg/m³)
Thickness of capillary zone, Let (cm)	17 05	Stratum B B effective diffusion coefficient, D <sup>eff</sup> s (cm <sup>2</sup> /s) 9 05E-04 Unit risk factor, URF (ug/m³) <sup>-1</sup>
Stratum A soil effective vapor permeability, k, (cm²)	5 97E-10	Stratum A effective diffusion coefficient, Doff A (cm²/s) 3.57E-03 Infinite source bldg conc, Cuesting (µg/m³)
Stratum A soil relative air permeability, k <sub>rg</sub>	0 797	Vapor viscosity at ave soil temperature, μτs (g/cm-s) (g/cm-s) (177E-04 Infinite source indoor attenuation coefficient, α (unitless) 5 (44E-06 Infinitess)
Stratum A soil intrinsic permeability, k	7 49E-10	Henry's law constant at ave groundwater temperature. H'rs (unitless) 1 53E-01 Exponent of equivalent foundation Peciet number, exp(Pe') (unitless) 5 13E+02
Stratum A effective total fluid saturation, $S_{ca}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 365	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol) 3.64E-03 Area of crack, Area (cm²) 3.84E+02
Stratum C soil air-filled porosity, e_c (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, ΔH <sub>4.75</sub> (cal/mol) 8,061 Crack effective diffusion coefficient, D <sub>chack</sub> (cm <sup>2</sup> /s) 3.57E-03
Stratum B soil au-filled porosity, $\theta_a^B$ (cm³/cm³)	0 150	Crack depth below grade,  Zonat (cm)  15  Average vapor flow rate into bidg ,  Qua  (cm³/s)
Stratum A soil air-filled porosity, $\theta_a^{\Lambda}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitiess) 4 16E-04 Crack radius, fast (cm)
Source- building separation, L <sub>T</sub>	2331 96	Area of enclosed space below grade, Ae (cm²)  Source vapor conc., Crource (Hg/m³)
Exposure duration, t (sec)	9 46E+08	Bldg ventilation rate, Quadro (cm. <sup>3</sup> /s)  Convection path length, L <sub>p</sub> (cm)

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NCREMENTAL RISK CALCULATIONS	Hazard	quotient	from vapor	infrusion to	indoor air,	noncarcinogen	(nutless)	AN.
INCREMENTA	incremental	risk from	vapor	Intrusion to	indoor air,	carcinogen	(unitless)	Ϋ́
ULATIONS		Final	Indoor	exposure	groundwater	conc,	(hg/L)	3 79E+02
ATION CALC		Pure	сотролеп	water	solubility,	ဟ	(µg/L)	1 75E+06
er concentr		Risk-based	indoor	exposure	groundwater	couc,	(hg/L)	3 79E+02
IISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS		Indoor	exposare	groundwater	conc.,	noncarcinogen	(µg/L)	NA
RISK-BASE		Indoor	exposare	groundwater	conc ,	carcinogen	(μg/L)	3 79E+02

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

	Mean Grain Diameter (cm)	0 0092	0.016	0 0 0 0	0.040	0 0 0 4 4	0 025	0 028	0 0046	0 0039	95000	0.011
	θ, (cm³/cm³) Mean G	890 0	0 095	0.078	0 057	0.045	0 100	0 100	0 034	0 0 0 0	0 089	290 0
	θ, (cm³/cm³) θ	0 38	0 41	0 43	0 41	0 43	0 38	0 39	0 46	0 26	0 43	0 45
okup Table	M (untless)	0 083	0 237	0 359	0 561	0 627	0 187	0 324	0 270	0 083	0 187	0 291
Soil Properties Lookup Table	N (unitless)	1 09	131	1 56	2 28	2 68	1 23	1 48	1 37	1 09	1 23	<u>4</u>
S	a (1/cm)	0 008	0 0 19	0 036	0 124	0 145	0 027	0.059	0 0 16	0 005	0 0 10	0 0 0 0 0 0
	K, (cm/h)	0 20	0.26	104	14 59	29 70	0 12	131	0.25	0.02	200	0 45
	SCS Soil Type											

				Chamic	Chamical Propedies Louise Table	7 Hatto						
	Organic			Pure		Henry's	Henry's			Enthatry of		
	carbon			component		law constant	law constant	Normal		vaporization at	į	_
	partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	boiling	Cntical	the normal	황	Reference
	coefficient,	in air,	ın water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,	conc.
	، پړ	ດ້	<u>,</u> *	ဟ	İ	I	Ľ,	卢	T <sub>o</sub>	ΔH,δ	URF	S S
CAS No Chemical	(cm³/g)	(cm²/s)	(cm <sub>2</sub> /s)	(mg/L)	(unitless)	(atm-m³/mot)	(ၞ	(አ	( <del>)</del> ()	(cal/mol)	, ( <sub>ти</sub> /вн)	(mg/m³)
100000		1		!			•					
50293 DDI	2 63E+06	137E-02		2 50E-02	3 32E-04	8 10E-06		533 15	720 75	11,000	9 7E-05	0.00
50328 Benzo(a)pyrene	1 02E+06	4 30E-02	9 00E-08	1 62E-03	4 63E-05	1 13E-06	25	715 90	969 27	15.000	2 1F-03	00E+00
51285 2,4-Dinitrophenol	1 00E-02	2 73E-02	9 OSE-O6	2 79E+03	1 82E-05	4 44E-07		605 28	827.85	15,000	0010	7.0E-03
53703 Dibenz(a,h)anthracene	3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 035-07	1 47E-08	25	743 24	990.41	16,000	2 1E.03	00100
56235 Carbon tetrachlonde	1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7 127	1 5 E C	00+400
56553 Benz(a)anthracene	3 98E+05	5.10E-02	9 00E-06	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	15,000	2 1E-54	00.100
57749 Chlordane	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13 000	7 7 6	00+100
58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 405-05	25	596 55	839.36	13 000	3 7E-04	00+100
60571 Dieldrin	2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05		613 32	842 25	13,000	4 6E-03	001100
65850 Benzoic Acid	6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	•	720 00	751 00	10,000	0 0E+00	1 4E+01
6/641 Acetone	5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	22	329 20	508 10	6.955	0000	3.58-01
67663 Chloroform	3 98E+01	104E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6,988	2.3E-05	0.05+00
67721 Hexachloroethane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 595-01	3 88E-03	25	458 00	695 00	9,510	4 0F-06	001100
71363 Butanol	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3615-04	8 80E-06	25	390 88	563 05	10.346	0.00	3.5F-01
71432 Benzene	5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7.342	8 3F-06	0 0F+00
71556 1,1,1-Trichloroethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0 0E+00	1 OF +00
72208 Endrin	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	718 15	986 20	12,000	0.00	1 1F-03
72435 Methoxychlor	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0 OE+00	1 8E-02
72548 DDD	100E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05	0 0E+00
72559 DUE	4 47E+06	1 44E-02	587E-06	1 20E-01	8 615-04	2 10E-05	25	636 44	860 38	13,000	9 7E-05	0 0E+00
74839 Mathyl bromide	1 05E+01	7 28E-02	1215-05	1 52E+04	2 56E-01	6 24E-03	25	276 71	467 00	5,714	0 OE+00	5 0E-03
75003 Mathidae - Lieda	1 855+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2716-02	52	259 25	432 00	5,250	8.4E-05	0 OE+00
75450 Cathon demistra	10401	1000	17/5-05	1 305+04	8 98E-02	2 19E-03	52	313 00	510.00	6,706	4 7E-07	3 0E+00
7555 Bromoform	40/040	100	1 000-00	1 19E+03	1 245+00	3 02E-02	25	319 00	552 00	6,391	0 0E+00	7 0E-01
75774 Romodichlocomethene	6 7 E 40 1	20-00-0	000	3 TUE+03	2 195-02	5 34E-04	52	422,35	00 969	9,479	1 1E-06	0 0E+00
75343 1 1-Dichlomethane	3 16 E+01	2 98E-02	1 00 100	6 745+03	6 56E-02	1 60E-03	52	363 15	585 85	7,000	18E-05	0 0E+00
75356 1 1-Dichlomathylana	10110	20-124	000	0 00000	2 30E-01	5 6 1 E-03	52	330 22	523 00	6,895	0 0E+00	5 0E-01
76448 Hentachlor	0.090401	9 005-02		2 25E+03	1 0/E+00	2 61E-02	25	304 75	576 05	6,247	5 0E-05	00+900
17474 Househimmer Managerian	0011100	1000	00000	1 805-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	1 3E-03	0 0E+00
17474 Texaciliorocyclopeniagiene	Z UNE+US	1615-02	7.21E-06	1 80E+00	1 115-00	2 71E-02	22	512 15	746 00	10,931	0 0E+00	7 0E-05
Androngon I soprome	4 68E+01	6 23E-02	6 76E-08	1 20E+04	2.72E-04	6 63E-06	52	488 35	715 00	10,271	2 7E-07	0.05+00
78875 1,2-Dichloropropane	4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7,590	0.05+00	4.0F-03
79005 1,1,2-1 richloroethane	5.01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 125-04	25	386 15	602 00	8.322	16F-05	0.05+0.0
79016 Trichloroethylene	1 66E+02	7 90E-02	9 105-06	1 10E+03	4 22E-01	1 03E-02	25	360 36	544 20	7.505	1 7E-06	00+100
79345 1,1,2,2-Tetrachloroethane	9 33	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	22	41960	661 15	966'8	5.88-05	200
83329 Acenaphthene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12.155	0.05+00	2 18 2
											;	- !

				7	VLOOKUP TABLES							
	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07	52	567 15	757 00	13.733	0.05+00	2 8E+00
	3,39E+04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10	52	613 15	798 67	14.751	0 OF+00	3.5F-03
	5 75E+04	1.74E-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06	52	660 60	839 68	13,000	000+00	7 2
	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	5.00E-06	52	632 28	890 45	13.000	1 4F-06	2040
	138E+04	3 63E-02	7 88E-06	1 98E+00	2 61E-03	6 37E-05	52	570 44	870 00	12.666	0 OE+00	4 F-0-1
86748 Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 26E-07	1 53E-08	52	627 87	899 00	13,977	5 7E-06	0 OE+00
87683 Rexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	334E-01	8 15E-03	52	486 15	738 00	10,206	2 2E-05	0 0E+00
88062 2 4 6-Trichlorophenol	3 845-402	3 185 02	6 25E 06	1 955+03	1 0015-06	2 44E-08	S 5	582,15	813 20	14,000	3 4E-05	00=+00
91203 Naphthalene	2 00E+03	5 90E-02	7.50F-06	3 10F+01	1 98 F-03	4 835-04	8 %	51915	749 03	12,000	3 16-06	00 i
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 745-06	3 11E+00	1,64E-07	4 00E-09	25	560.26	754 03	10,3/3	2 UF+00	1 4E-01
95476 o-Xylene	3 63E+02	8 70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03	22	417 60	630 30	8,661	0.00+00	4 00
	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 205-06		464 19	697 60	10,800	00+100	1 8E-01
95501 1,2-Dichlarobenzene	8 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03		453 57	705 00	9,700	0 0E+00	2 0E-01
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	52	447 53	675 00	9,572	00±±00	1.8E-02
	1 60E+03	2 91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06		526 15	759 13	13,000	0 0E+00	3 SE-01
98903 Nifrobenzene 100414 Ethylhensene	6,46E+01 3,83E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	8	483 95	719 00	10,566	0 0E+00	2 0E-03
100425 Styrene	7 76 1 + 02	7 10E-02	8 00E-06	1 09E+02	3 23E-01	7 881-03	2 2	409 34	617 20	8,501	0 05+00	1 0E+00
	2 095+02	5 84F-02	8 69F-06	7 875+03	8 20E-01	2 705-03	6 2	41831	636 00	8,737	0.000	1 OE+00
	3 89€+02	7 695-02	8 44 E-06	1 855+02	3 14 F-01	2 UUE-UG 7 BBE-U3	6 %	484 13	707 60 616 30	11,329	0 00+00	7 0E-02
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9.96F-02	2 43F-03		447.94	684.75	0,250	00+100	00+00
	6 61E+01	4 83E-02	1,01E-05	5 30E+03	1 36E-05	3 32E-07	3 52	503 65	754 00	11,689	00400	4 P. 02
	174E+01	1 04E-01	90-306 6	8 52E+03	4 01E-02	9 78E-04	25	356 65	561 00	7.643	2 6F-05	0.01+00
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04	22	345 65	519 13	7.800	00=+00	2 OE-01
	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01E-01	7 34E-03		412 27	617 05	8,523	0 0E+00	7 0E+00
	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6 63E-03		383 78	591 79	7,930	0 0E+00	4 0E-01
	2 19E+02	7 30E-02	8 70E-06	4 72E+02	1 52E-01	3 71E-03	52	404 87	632 40	8,410	0 0E+00	2 0E-02
10895 Phenol	2.88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07		455 02	694 20	10,920	0 OE+00	2 1E+00
	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05		451 15	629 79	9,000	3 3E-04	0 00+00
11029/ Endostinan 117817 Bis/Outh/New/Inhthelate	2 14E+03	1 155-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	52	674 43	942 94	14,000	0 0E+00	2 1E-02
	8.32E+07	1515-02	3.58F-06	3,40E-01	2 74E-05	1 02E-07		657 15	806 00	15,999	4 OE-06	005+00
	5 50E+04	5.42F-02	5915-06	6 20F+00	5.415.02	1 325.03	3 %	704.03 Rep ER	77 700	000,01	0.0E+00	7 05-02
120127 Anthracene	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6.51F-05		505 33 615 18	873.00	1 6	4 65-04	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
120821 1,2,4-Trichlorobenzene	1 78E+03	3 DOE-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03		486 15	725.00	10 471	0.01+00	20.00
	1 47E+02	3 46E-02	8 77E-06	4,50E+03	1 30E-04	3 17E-06		482 15	708 17	11.000	0 0E+00	1 15.02
	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-08	9 27E-08		590 00	814 00	13,467	1 9E-04	0 0E+00
124481 Chlorodibromomethane	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04		416 14	678 20	8,000	2 4E-05	0 0E+00
12000 Dyrana	1 35 - 102	7 205-02	8.205-06	2 00E+02	7.54E-01	184E-02		394 40	620 20	8,288	5 8E-07	0 0 0 0
156592 cis-1.2-Dichloroethylene	3.55E+01	7.36F-02	1135-05	3 505+03	1.676-01	0.000	5 5	333 65	936 00	14,3/0	0.05+00	1 15-01
156605 trans-1,2-Dichloroethylene	5 25E+01	7 07E-02	1 19E-05	6 30E+03	3.85E-01	9.395-03		333 83 320 85	718.50	r, 132 6.717	001100	2000
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06		809 15	1078 24	17,000	2 1E-04	0 0E+00
	123E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1 11E-04		715 90	969 27	15,000	2 1E-04	0 OE+00
	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 61E-05		655 95	905 00	13,815	0 0E+00	14E-01
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40 5-05	8 29E-07	52	753 15	1019 70	16,000	2 1E-05	0 0E+00
309002 Aldrin	3.985+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05		714 15	979 00	16,455	2 1E-06	00=+00
319846 alcha-HCH (alcha-BHC)	1 23 5 + 03	142F-02	7.34E-06	1 80E-U1	6 35E-03	1 /0E-04	8 8	603 01 606 65	839 37	13,000	4 9ff-03	0000
319857 beta-HCH (beta-BHC)	1.26E+03	1 42E-02	7.34 F-06	2 40F-01	305505	7 445-07		390 33 606 66	939.36	13,000	- au-03	100
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1000-05	2 80E+03	7 26E-01	1 77F-02		380 33 381 15	587.38	2,000	20 C T C C	201100
	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3 06E-05	7 46E-07	52	558 00	220 00	12,938	1 9E-04	0 0E+00
	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06		209 60	746 87	11,000	2 0E-03	0 0E+00
	8 32E+04	132E-02	4 23E-06	2 00E-01	3 90E-04	9 51E-06	52		848 76	13,000	2 6E-03	0 0E+00
	5 20E+01	3 07 E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02			1750 00	14,127	0 OE+00	3 0E-04
41006925 Amalan 4260 (DCB 4260)	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	52	657 15	873 31	14,000	3 2E-04	0 0E+00
11097691 Arodor 1254 (PCB-1254)	2 00E+05	1.500-02	4 32E-06	8 UUE-02	1 89E-01	4 60E-03	8 8	402 50	539 37	19,000	1 0E-04	0000
12674112 Aroclor 1016 (PCB-1016)	3 30E+04	2 22F-02	5.42F-06	4 20E-02	1 195-02	2 905-03	0 K	3// 50	7777	19,000	100 c	00+100
53469219 Aroclor 1242 (PCB-1242)	3 30E+04	2 14E-02	531E-06	3 40E-01	2 135-02	5 20E-04	25	345 50	475 22 482 20	18,000	1 08-04	005+00

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

		ENTER	User-defined stratum A soil vapor permeability.  K, (cm²)
		ENTER	stratum A SCS soil type (used to estimate OR soil vapor permeability)
		ENTER	SCS soll type directly above water table
		ENTER	Soil stratum directly above water lable, (Enter A, B, or C)
		ENTER Lwr (cell D28)	Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)
Снетіса	Chloroform	NTER ENTER ENTER Totals must add up to value of L wr (cell D28)	Thickness Thickness of soil stratum B, stratum C, (Enter value or 0) (Enter value or 0) h <sub>c</sub> (cm) (cm) (cm)
		ENTER Totals mu	Thickness of soil stratum A, h, (cm)
		ENTER	Depth below grade to water table, Lwr (cm)
ENTER Initial groundwater conc., C.w. (µg/t.)	6 357051282	ENTER Depth	below grade to bottom of enclosed space floor, L; (cm)
ENTER Chemical CAS No (rumbers only, no dashes)	67663	ENTER	Average soil/ groundwater temperature, Ts (°C)

ENTER Stratum C soil water-filled porosity, $\theta_w^c$ (cm³/cm³)	03		
ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	0 43		
ENTER Stratum C soil dry bulk density, P. <sup>C</sup> (g/cm³)	17	ENTER Indoor aar exchange rate, ER (1/h)	0.45
ENTER Stratum B soul water-filled porosity, B <sub>w</sub> (cm³/cm³)	0.27	ENTER Floor-wall seam crack width, w (cm)	0.1
ENTER Stratum B soil total porosity, n <sup>8</sup> (unitless)	0 42	ENTER Enclosed space height, He	488
ENTER Stratum B soil dry bulk density, p <sub>b</sub> <sup>8</sup> (g/cm³)	17 T	ENTER Enchosed space floor width, We (cm)	961
ENTER Stratum A soll water-filled porosity, $\theta_a^A$ $(cm^3/cm^3)$	0.2	ENTER Enclosed space floor length, Le	961
ENTER Stratum A soil total porosity, n^ (unitless)	0 43	ENTER Soil-bldg pressure differential, $\Delta P$ (g/cm-s²)	04
ENTER Stratum A soil dry bulk density, p. <sup>A</sup> (g/cm³)	15	ENTER Enclosed space floor fluckness, Louet (cm)	15

Target hazard quotient for	noncarchogens, THQ	(unitless)	<b></b>	Used to calculate risk-based groundwater concentration 1 of 7
Target nsk for	cardnogens, TR	(unitless)	106-06	Used to calcu groundwater
Exposure	nequency, EF	(days/yr)	350	
Exposure	curation, ED	(yrs)	30	
Averaging time for	AT <sub>IC</sub>	(Ms)	30	
Averaging time for	ATc.	(yrs)	20	

ENTER

ENTER

ENTER

ENTER

#### CHEMICAL PROPERTIES SHEET

		Reference	, 2000	RfC	(mg/m <sub>3</sub> )	00.100
	ž	nsk	factor,	F.	(µg/m <sub>3</sub> )-1	20 35 0
Pura	component	water	solubility,	s	(mg/L)	7 025103
Organic	carbon	partition	coefficient,	ጽ <sub>ያ</sub>	(cm <sub>3</sub> /g)	2 08 - 101
		Critical	temperature,	<del>ئ</del>	S.	536 40
	Norma	boiling	point,	<del>ب</del>	(%)	22 A25
Enthalpy of	vaporization at	the normal	boiling point,	ΔH <sub>v,b</sub>	(cai/mol)	6 988 334 32 536 40 3 98E+111 7 92E+13 3 2E 06 1 0 0E+00
Henry's	law constant	reference	temperature,	۳ ۲		25
Henry's	law constant	at reference	temperature,	I	(atm-m³/mol)	1 04E-01 1.00E-05 3 86E-03
		Diffusivity	in water,	₫	(cm <sup>2</sup> /s)	1.005-05
				<b>់</b>		1 04E-01

Floor- wall seam perimeter, Xonet (cm)	3,844	Diffusion path length, La	1509	
Water-filled porosity in capillary zone, $\theta_w = (cm^3)cm^3)$	0 294	Total overall effective diffusion coefficient, $D^{eff}$ $(cm^2/s)$	1 04E-03	
Air-fil'ed porosity in capillary zone, $\theta_a = (cm^3/cm^3)$	0 136	Capillary Zone affective diffusion coefficient, Doffic (cm²/s)	7.36E-04	
Total porosity in capitlary zone, n <sub>ex</sub>	0 43	Stratum C effective diffusion coefficient, D <sup>eff</sup> c (cm <sup>2</sup> /s)	6 40E-04	Reference conc , RfC (mg/m³)
Thickness of capilary zone, La	17 05	Stratum B B effective diffusion coefficient, D (cm²/s)	1 07E-03	Unt nsk factor. URF (µg/m³) 1
Stratum A soil effective vapor permeability, k	6 98E-10	Stratum A effective diffusion coefficient, Def (cm²/s)	4 22E-03	Infinite source bldg. conc , Chanary (μg/m³)
Stratum A soli relative air permeability, k <sub>ra</sub> (cm²)	0.746	Vapor viscosity at ave soil temperature, prs	177E-04	Infinite source indoor attenuation coefficient, a (unitless)
Stratum A soll intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (untitess)	1 04E-01	Exponent of equivalent foundation Peclet number, exp(Pe <sup>1</sup> ) (unitless)
Stratum A effective total fluid saturation, $S_{a}$	0 419	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol)	2 47E-03	Area of grack, Area (cm²) 3.84E+02
Stratum C sod aur-filled porosity, $\theta_{\Phi}^{c}$ (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, AH, 13 (cal/mol)	7,492	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)
Stratum B soul aur-filled porosity, $\theta_a^{\ B}$ (cm $^3$ /cm $^3$ )	0 150	Crack depth below grade, Zonack (cm)	15	Average vapor flow rate into bldg , Q <sub>col</sub> (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitiess)	4 16E-04	Crack radius, forest (cm)
Source- building separation, L <sub>T</sub>	1509	Area of enclosed space below grade, Ae Ae	9 24E+05	Source vapor conc. Cases (µg/m³)
Exposure duration, t (sec)	9 46E+08	Bldg. ventilation rate, Queens (cm <sup>3</sup> /s)	5 63E+04	Convection path length, L, (cm)

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INCREMENTAL RISK CALCULATIONS:

Hazard quotient	from vapor	intrusion to	indoor air,	noncarcinogen	(unitless)
Incremental nsk from	vapor	entrusion to	indoor air,	carcinogen	(unitless)
Final	indoor	exposing	groundwater	couc '	(Hg/L)
Pure	component	water	solubility,	S	(µg/L)
Risk-based	indoor	exposure	groundwater	conc,	(µg/L)
indoor	exposnre	groundwater	conc.,	noncarcinogen	(µg/L)
Indoor	exposare	groundwater	conc ,	carcinogen	(Hg/L)

ERROR SUMMARY BELOW (DO NOT USE RESULTS+F ERRORS ARE PRESENT)

:		Soil Propert	Soil Properties Lookup Table			
SCS Soil Type	K, (απ/h) α (1/απ)	m) N (unitless)	s) M (unitless)	θ, (cm³/cm³)	6, (cm³/cm³)	Mean Grain Diameter (cm)
	0.50		:80 0 60		0 068	0 0092
ń		-	31 0 23		0 095	0.016
. (		_			0 078	0.020
n.					0 057	0 040
ı			268 0627		0.045	0.044
ပ္					0 100	0.025
SCL		1 059 1	48 0324		0 100	9000
		1 016	37 0 270		0 034	0 0046
SIC		1 000	09 0 083		0 0 0 0	00030
걸.	0 200	0 010	23 0 187	0 43	680 0	0 0056
⊒.		•	41 0.291		0 067	0.011
7	4 42 0	-	89 0 471		0.065	0600

				A 15115	Circlinda Froperides Cookup 1808							_
	Organic			Pure		Henrys	Henry			Pothoday, of		
	carbon			component		law constant	law constant	Normal		vanorization af	Ē	-
	partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	poiling	Crifical	the normal	<u> </u>	Reference
	coefficient,	in air,	in water,	lfy.	law constant	temperature,	temperature,		temperature,	boiling point,	factor,	conc.
	، و	o <b>"</b> '	<u>,</u>	Ø	Ī	I	۳ <u>ـ</u>	ᄩ	ပုံ	Ą,	J.S.	
CAS No Chemical	(cm./g)	(cm <sup>2</sup> /s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/mol)	(၃)	( <sub>K</sub> )	(K)	_	(mg/m³)	(mg/m³)
HOG 60003												
50233 DOI	2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11.000	9.7F-05	0.01
20228 Benzo(a)pyrene	1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 13E-06	25	715.90	469 27	15,000	2 4 1 0 2	00.00
51285 2,4-Dinitrophenol	1 00E-02	2 73E-02	90-3906	2 79E+03	1 82E-05	4 44E-07	25	605 28	R27 85	000,41	0.05+00	001100
53703 Dibenz(a,h)anthracene	3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47F-08	3,	743.24	200	000'5	0.00	20-03
56235 Carbon tetrachloride	1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3.05E-02	3 %	34000	14 086	16,000	2 15 43	0000
56553 Benz(a)anthracene	3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34F-06	3 %	708 15	1004 20	171,7	1 25 03	00+100
57749 Chlordane	1 20E+05	1 185-02	4 37E-06	5 60E-02	1 99E-03	4 85F-05	3 %	624 24	885 73	13,000	4 - 1 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 -	00=100
58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	35	596 55	830.35	13,000	100	00=+00
60571 Dieldrin	2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1.516-05	•	613 32	842 28	2,000	100	00+100
65850 Benzolc Acid	6 005-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 545-06		720.00	751 00	20,50		00 H + 00
67641 Acetone	5.75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88 E-05	, K	320 20	200	0000	0000	1440
67663 Chloroform	3.98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3.66E-03	3 2	334 32	200 10	000	0 0E+00	10 HO
67721 Hexachloroethane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1.59E-01	3 885-03	3 %	45 CO	900	0,300	20-35 7	0.00
71363 Butanol	6 92E+00	8 00E-02	9.30E-06	7 40E+04	3.61E-04	8 BOE-06	3 %	300 80	00 060	010,6	4 UE-U5	0 0E+00
71432 Benzene	5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28F-01	5 565 03	3 2	25.00	0000	10,345	0.05+00	25-01
71556 1,1,1-Trichforoethans	1 10E+02	7 80E-02	8 80E-06	1.33F+03	7 05E-01	1 73 5 03	67	935.24	91.700		8 3E-06	0 0E+00
72208 Endrin	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3.08F-04	7 515-08	9 8	740 44	945.00		0 05+00	1 OE +00
72435 Methoxychlor	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48F-04	1 585-05	0 8	7.10.10	07.926		0 0E+00	1.1E-03
72548 DDD	1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 645-04	1 50E-03	9 8	70 109	848 49	14,000	0 0E+00	1 8E-02
72559 DDE	4 47E+06	1 44E-02	5.87E-06	1 20E-01	8 615-04	2 405-05	6 5	038.80	863 77	14,000	6 9E-05	00+400
74839 Methyl bromide	1 05E+01	7 28E-02	1 21E-05	1 52E+04	2.56E-01	6.246.03	C 2	44 050	860 38	13,000	9 7E-05	0 0E+00
75014 Vinyl chloride (chloroethene)	1 86E+01	1 065-01	1 23E-06	2.76E+03	1.115+00	2 715-03	3 %	1007	46, 00	5,714	0 0E+00	5 0E-03
75092 Methylene chlonde	1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 195-03	3 4	313.00	432.00	052,6	8 4E-05	0 0E+00
75150 Carbon disuffide	4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3.025-02	2 6	310.00	00.016	9,706	4 /E-07	3 0E+00
75252 Bromoform	8 71E+01	1 49E-02	1.03E-05	3 10E+03	2 19E-02	5 34E-04	3 1/2	47235	932 00	186,0 676,0	00±400	/ 0E-01
75274 Bromodichloromethane	5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1.605-03	3 %	363 15	20 20 3	0.00	1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 UE+00
75343 1,1-Dichloroethane	3 16E+01	7 42E-02	105E-05	5 06E+03	2 30E-01	5 61E-03	35	330.55	523.00	900,7	CO 100	001400
75354 1,1-Dichloroethylene	5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2.61E-02	35.	304 75	578.05	0,030	00400	ביים מיים
76448 Heptachlor	1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 095-03	3 %	603.69	5000	147'0	2 UE-U5	0.05+00
77474 Hexachlorocyclopentadiene	2 00E+05	1 61E-02	7 21E-06	1 80E+00	1115+00	2 715-02	3 %	512.15	746.00	13,000	1 35-03	0 0E+00
78591 Isophorone	4.68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	A 63E-05	3 %	7007	14000	10,931	0.05+00	7 DE-05
78875 1,2-Dichloropropane	4 37E+01	7 82E-02	8 73E-06	2 80E+03	1151-01	2 805-03	3 2	400 50	2000	10,2/UT	2.7E-07	0 0E+00
79005 1,1,2-Trichloroethane	5 01E+01	7 80E-02	8 80E-06	4 42F+03	3.74E.00	2 505-03	8 8	208 32	9/200	7,590	0 0E+00	4 0E-03
79016 Trichloroethylene	1.66€+02	7 90F-02	9 105-06	1 105±03	20,000	9 125-04	8 8	386 15	602 00	8,322	1 6E-05	0 0E+00
79345 1,1,2,2-Tetrachloroethane	9 33E+01	7.10F-02	7 90E-06	2 975+03	1 415 00	1 03E-02	8 8	360 36	544 20	7,505	1 7E-06	0.05+00
83329 Acenaphthene	7 08E+03	4 21F-02	7 695.06	4 245400	20-31 t-1	44.0 44.0	ខា	419 60	661 15		5 8E-05	0 0E+00
		!		3	2000	#7-UCC	ş	350 35	803 15	12,155 (	0 OE+00	2 15-01

2 88E+02	2 56E-02 6 35E-06	V 108E+03	VLOOKUP TABLES 1 85E-05	4 51E-07	25 567	51 75 51 51	757 00	_	
7 86E-06	_	2E+01	3 85E-08	9 39E-10		3 15	37		3 5 5 - 01
4 83E-06 2	2 69	69E+00	5 17E-05	1 26E-06		660 60	839 68	13,000 0 0E+00	
6 35E-06 3	en .	51E+01	2 05E-04	5 00E-06		632 28		13,000 1 4E-06	36 0.0E+00
- 1	- 1	201100	2 615-03	63/E-05		570 44		_	_
- 40	- (*)	23F+00	3.34E-01	8 15E-03		027 O7 485 15	738.00	13,9// 5/E-06	
60E-02 6	-	95E+03	1 00E-06	2 44E-08		582 15			004400
9	_	3 00E+02	3 19E-04	7 78E-06		519 15		12,000 3 1E-06	, 0
~		3 10E+01	1 98E-02	4 83E-04	25 49	49114			
1 94E-02 6 74E-06		3 11 = +00	164E-07	4 00E-09		560 26	754 03	_	
7 40E-02 8 30F-06		2 60F+04	2,13E-01 4 92E-05	3 ZUE-U3 1 20E-08	25 46	417 50		8,661 0.0E+00	
, ~		1 56E+02	7 795-02	1 90 5-03	25 45	453.57		10,800 005.0	185-01
60		2 20E+04	1 60E-02	3 90E-04		447 53			
_		1 20E+03	1 785-04	4 34Ē-06	25 52	526 15			3 55-01
**		2 09E+03	9 84E-04	2 40E-05	25 48	3 95			
7 50E-02 7 80E-06		1.69E+02	3 23E-01	7 88E-03	25 40	409 34			
σο 1		3 10E+02	1 13E-01	2 76E-03	25 41	418 31			
		7 87E+03	8 20E-05	2 00E-06	25 48	484 13		11,329 0 0E+00	
/ 69E-02 8 44E-06		1 85 = +02	3,14E-01	7 665-03	26 41	1 52			-
- •		7 38E+01	30-396 F	2 43E-03		447.21		9,271 0 0E+00	
0.35-02		3 30E+03	1 2011 00	3325-07	25 50	503 65	754 00		
		2 DOF +04	2 10E-02	5 12E-04		335 63 345 65			00E+00
00E-02 7		1 61E+02	3 01E-01	7 34E-03		412.27		8.523 O DE+00	Ī
8 70E-02 8 60E-06		5 26E+02	2 72E-01	6 63E-03	25 38	3 78		7.930 0.0F+00	
		4 72E+02	1 52E-01	3 71E-03	25 40	404 87			
8 20E-02 9 10E-06		8 28E+04	1 63E-05	3 98E-07	25 45	455 02		_	
		1 72E+04	7 38E-04	1 80E-05		451 15			
4.		5 10E-01	4 59E-04	1 12E-05		674 43	942.94	_	
351E-02 366E-06		3 40E-01	4 18E-06	1 02E-07	52 52	657 15		15,999 4 0E-06	
, u,		6 20E+00	5 4 1 E-02	1.32F-03		582.55		3,000 0 0E+00	0 0E+00
		4 34E-02	2 67E-03	6.51E-05		615 18			
		3 00E+02	5 82E-02	1 42E-03		486 15			
æ)		4 50E+03	1 30E-04	3 17E-06	25 48	482 15		_	
		2 70E+02	3 80E-06	9 27E-08		290 00	•		
1 96E-02 1 USE-03		2 60=+03	3.215-02	7 83E-04	25 41	416 14	678 20	8,000 2 4E-05	
7 20E-02 0 20E-08		1 356-01	240-0-1	1 105.05	25.00	394 40 567 06		8,288 58E-07	27 0 0E+00
		3.50F+03	1675-01	4.07E-03	2, 20	333.65			
		6 30E+03	3.85E-01	9.396-03		320.85		6.717 0.0E+00	
		2 20E-05	6 56E-05	1 605-06		809 15			_
2 26E-02 5 56E-06		1 50E-03	4 55E-03	1 115-04		715 90		15,000 2 1E-04	_
02E-02 6		2 06E-01	6 60E-04	1615-05		655 95			
		8 00E-04	3 40E-05	8 29E-07		753 15			
2 48E-02 6 21E-06		1 60E-03	3 88 -03	9 46E-05		71415			
4		1 80E-01	6 97E-03	1 70E-04	25 60	603 01	839 37 1		33 0 0E+00
1 42E-02 7 34E-06		2 00E+00	4 35E-04	1 06E-05		6 55			
1 42E-02 7 34E-06		2 40E-01	3 05E-05	7 44E-07		596 55	36	13,000 5 3E-04	
6 26E-02 1 00E-05		2 80E+03	7 26E-01	177E-02		15			
_		1 82E+02	3.065-05	7.46E-07		558.00			
45E-02 8		9 89E+03	9 23E-05	2.25E-06	25 50	509 60 509 60		11,000 2 0E-03	• •
4		2 00E-01	3 906-04	9515-08		613.96	. 92		
. ф		5.62E-02	4 67E-01	1 14E-02				-	
4		7 40E-01	2 46E-04	6 00E-06					
4		8 00E-02	1 89E-01	4 60E-03		402 50	37		
60		5 70E-02	8 20E-02	2 00E-03	25 37	377 50	•	_	
2 22E-02 5 42E-06		4 20E-01	1.19E-02	2 90E-04		340 50		-	
2 14E-02 5 31E-06		3 40E-01	2 13E-02	5 20E-04	25 34	345 50	482 20 1	-	

DATA ENTR

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1 2 September, 1998

×

YES

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

		ENTER	User-defined stratum A soil vapor permeability, k, (cm²)
			8
		ENTER	htmate full(y)
		ENTER	SCS soul type directly above water table
		ENTER	Soul stratum directly above water table. (Enter A, B, or C)
	ane	ENTER If L.wr (cell D28)	Thuckness Thuckness of soil stratum B, stratum C, (Enter value or 0) (Enter value or 0) he hc (cm) (cm) (cm)
Chemical	Trichloroethylene	NTER ENTER ENTER TOTALS (Cell D28)	
		ENTER Totals mu	Thickness of soil stratum A, h, (cm)
		ENTER	Depth below grade to water table, Lwr (cm)
ENTER Initial groundwater conc , Cw (ug/L)	82 77423077	ENTER Depth	below grade to bottom of enclosed space floor.  Le  (cm)
ENTER Chemical CAS No (numbers only, no dashes)	79016	ENTER	Average soul groundwater temperature, T <sub>S</sub> (°C)

0 43 0								
17	ENTER	Indoor	air exchange	rate,	8	(1/h)		0.45
0.27	ENTER	Floor-wall	seam crack	width,	*	(cm)		0.1
0 42	ENTER	Enclosed	sbace	height,	ī	(cm)		488
17	ENTER Enctosed	space	floor	width,	W	(cm)	j	961
0.2	ENTER	space	floor	length,	٦	(cm)		961
0 43	ENTER	Soil-bldg	pressure	differential,	PΔ	(g/cm-s²)		40
15	ENTER Enclosed	space	floor	thickness,	Losek	(cm)		15

ENTER
Stratum C
soil water-filled
porosity,  $\theta_{\omega}^{c}$   $(cm^3/cm^3)$ 

ENTER Stratum C soil total porosity.

ENTER Stratum C soil dry bulk density, Poc (g/cm³)

ENTER
Stratum B
soil water-filled
porosity,  $\theta_{w}^{s}$ (cm<sup>3</sup>/cm<sup>3</sup>)

ENTER Stratum B soil total porosity, n<sup>8</sup>

ENTER Stratum B soil dry bulk density, Pall (g/cm³)

ENTER Stratum A soil total porosity,

ENTER Stratum A soil dry bulk density, p<sub>o</sub><sup>A</sup> (g/cm³)

ENTER Target hazard	quotient for noncardnogens,	Unitless)		Jsed to calculate risk-based groundwater concentration
ENTER Target	risk for carcinogens,	(unitless)	1 0E-06	Used to calcu groundwater
ENTER	Exposure frequency,	(days/yr)	350	
ENTER	Exposure duration,	(yrs)	30	
ENTER Averaging	time for noncarcinogens, AT	(yrs)	30	
_	m.	- 1	Н	
ENTER Averaging	time for carcinogens, AT.	(yrs)	100	

						_
	Reference	conc	R <sub>C</sub>	(mg/m <sub>3</sub> )		00=+00
5	nisk	factor	J.R.	(μα/m <sub>3</sub> ) <sup>-1</sup>		1 7 <b>E-</b> 06
component	water	solubility,	ß	(mg/L)		1 10E+03
carbon	partition	coefficient,	Ϋ́	(cm <sub>3</sub> /g)		1 66E+02
	Critical	temperature,	ڻ ۲	(°K)		544 20
Normal	polling	point,	ra La	(k)		360 36
vaportzation at	the normal	boiling point,	ΔH <sub>v,b</sub>	(cal/mol)		7,505
law constant	reference	temperature,	۳	(၁)		25
aw constant	at reference	temperature,	I	(atm-m³/mol)		1 03E-02
	Diffusivity	in water,	₫	(cm <sup>2</sup> /s)		9 10E-06
:	Diffusivity	in air,	ٔ 'م	(cm <sup>2</sup> /s)		7 90E-02
	law constant law constant vaporization at Normal carbon component	law constant law constant vaporization at Normal carbon component Unit y Diffusivity at reference reference the normal boiling Critical partition water risk P	law constant vaporization at Normal carbon component Unit reference the normal boiling Critical partition water risk femperature, coefficient, solubility, factor,	law constant law constant vaporization at Normal carbon component Unit y Diffusivity at reference reference the normal boiling Critical partition water risk in water, temperature, temperature, boiling point, point, temperature, coefficient, solubility, factor, D* H T <sub>R</sub> $\Delta H_{\nu b}$ Ta T <sub>C</sub> $K_{\infty}$ S URF	law constant law constant vaporization at Normal carbon component Unit y Diffusivity at reference reference the normal boiling Critical partition water risk is in water, temperature, temperature, boiling point, point, temperature, coefficient, solubility, factor, $D_*$ H $T_R$ $\Delta H_{v,b}$ $T_B$ $T_C$ $K_{co}$ $S$ URF $(cm^3/s)$ (atm-m³/moi) (°C) (cal/moi) (°K) (°K) $(cm^3/s)$ ( $cm^3/s$ ) $(mg/L)$ $(\mu cy/m^3)^{-1}$	law constant law constant vaporization at Normal carbon component y Diffusivity at reference reference the normal boiling Critical partition water in water, temperature, temperature, boiling point, temperature, coefficient, solubility, $D_w$ H $T_R$ $\Delta H_{v,b}$ $T_B$ $T_C$ $K_{cc}$ $S$ $(cm^2/s)$ $(atm-m^3/mot)$ $(^{\circ}C)$ $(cal/mot)$ $(^{\circ}K)$ $(^{\circ}K)$ $(cm^3/g)$ $(mg/L)$ $($

Floor- wall seam perimeter, X <sub>crack</sub>	3,844	Diffusion path length, L. L. (cm)	1509	
Water-filled porosity in capillary zone, $\theta_{w,cz}$	0 294	Total overall effective diffusion coefficient, $D^{er}_{T}$ (cm²/s)	7 86E-04	
Aur-füled porosity in capillary zone, $\theta_{\bullet, cz}$	0 136	Capillary Zone effective diffusion coefficient, Doffice (cm²/s)	5 55E-04	
Fotal porosity in capultary zone,	0 43	Stratum C effective diffusion coefficient, D <sup>eff</sup> c (cm <sup>2</sup> /s)	4 82E-04	Reference conc . RfC (mg/m³)
Thickness of capillary zone, Le	17 05	Stratum B B effective diffusion coefficient, D eff (cm²/s)	8 11E-04	Unit nsk factor, URF (µg/m³)*
Stratum A soil effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, D" (cm²/s)	3 20E-03	Infinite source bidg conc , Charac (µg/m³)
Stratum A soll relative air permeability, k <sub>rg</sub> (cm²)	0 746	Vapor viscosify at ave soil temperature, Ins.	1 77E-04	Infinite source indoor attenuation coefficient, $\alpha$ (unitiess)
Stratum A soll intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unrifess)	2 78E-01	Exponent of equivalent foundation Pecter number, exp(Pef) (unitless)
Stratum A effective total fluid saturation, S <sub>b</sub>	0419	Henry's law constant at ave. groundwater temperature, Hrs (atmm³/mol)	6 60E-03	Area of crack, Acrack (cm <sup>2</sup> ) 3 84E+02
Stratum C soll air-filled porosity, $\theta_a^c$ $(cm^3/cm^3)$	0130	Enthalpy of vaporization at ave groundwater temperature, AH, 75 (cal/mol)	8,483	Crack effective diffusion coefficient, Dome (cm²/s)
Stratum B soil air-filled porosity, $\theta_{a}^{B}$ (cm³/cm³)	0150	Crack depth below grade, Zenet (cm)	15	Average vapor flow rate into bldg , Qual (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_{\mathbf{a}}^{A}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitless)	4 16E-04	Crack radius, france (cm)
Source- bullding separation, L <sub>T</sub>	1509	Area of enclosed space below grade, A <sub>e</sub>	9 24E+05	Source vapor conc , C <sub>source</sub> (µg/m³)
Exposure duration, r (Sec)	9 46E+08	Bldg ventilation rate, Q <sub>butano</sub> (cm <sup>3</sup> /s)	5 63E+04	Convection path length, L <sub>p</sub> (cm)

9	ž.	lodoce Joseph
Đ		Dased-Velv
component		ındoor
water		exposure
solubility,	L	groundwater
S		
(J/g	Ċ (	(hg/L)

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

		İ				ביייים ביייים	
		,	Soil Properties Lookup Table	Lookup Tabte			
SCS Soil Type	K, (cm/h)	a (1/cm)	N (unitless)	M (unitless)	0, (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)
0	0.20	0 008	1 09	0 083	0 38	9900	0 0092
ಕ .	0.26	0 019	131	0 237	0 41	0 095	0.016
	\$	0 036	1 56	0 359	0 43	0.078	0 020
S	14 59	0 124	2 28	0 561	0 41	0 057	0.040
w	29 70	0 145	2 68	0 627	0.43	0 045	0.044
OS .	0 12	0 027	1 23	0 187	0 38	0 100	0 025
SCL	131	0 059	1 48	0 324	0 39	0 100	0.029
<u></u>	0.25	0 016	1 37	0 270	0 46	0 034	0 0046
Sic	0 02	0 005	1 09	0 083	0 26	0.070	0 0038
SICL	0 0 0	0 0 0 1 0	1 23	0 187	0 43	0 089	0 0056
TIS.	0.45	0 0 0 0 0 0 0 0	1 41	0 291	0 45	190 0	0 011
SL	4 42	0 075	1 89	0 471	0 41	0 065	0 030

				Chemic	Chemical Properties Lookup Table	p Table						
	Organic			Pure		Henry's	Henry's			Enthalpy of		
	carbon			component		law constant	law constant	Nomal		vaponzation at	Chret	
	partition	Duffusivity	Diffusivity	water	Henry's	at reference	raference		Critical	the normal	i ¥	Reference
	coefficient,	ın air,	in water,	solubility,	law constant	temperature,	temperature	point.	temperature.	boiling point.	factor	CONC
	، الإ	<b>å</b>	<b>*</b> *	တ	Ì	Ŧ	F	_ <b>_</b>	L	ΔH,	품	S.
CAS No Chemical	(g/,tup)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m³/mol)	(၃)	(K)	(k)	(cal/mol)	(mg/m³) 1	(mg/m³)
50293 DDT	2 63E+06	1 37F-02	4 95F-06	2 505-02	3 32E-04	20.301.8	ä	200	16 OCF	44.00		100
50328 Benzo(a)nvrene	1.025±08	4 30E 02	80-100-0	10000	4 52 5 65	001010	62 5	200	0707	000,11	3 / 5-05	00+400
51285 2 4-Dinitrophesol	1005.00	2 225 02	90 190 0	נט-170 נ	4 651-00	1135-06	S :	73.99	969 27	15,000	2 1E-03	0 0 0
53703 Dibon(a b) mit money	20-202	2 / 3E-02	9 UPE-08	2 /95+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0.05+00	7 0E-03
Solves Dipenz(a,n)anumacene	3 805+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	52	743 24	990 41	16,000	2 1E-03	0 0E+00
55235 Carbon tetrachionde	1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	256 60	7,127	1 SE-05	00+00
oboos Benz(a)anthracene	3 985+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	15,000	2 1E-04	0 0E+00
57749 Chordane	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3 7E-04	0 0E+00
58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 405-05	25	596 55	839 36	13,000	3 7E-04	0 OE+00
60571 Dieldnin	2 14E+04	125E-02	4 74E-06	1 95E-01	6 19E-04	151E-05	25	613 32	842 25	13,000	4 6E-03	0 0E+00
65850 Benzolc Acid	6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 546-06	25	720 00	751 00	10,000	0 0E+00	146+01
67641 Acetone	5 75E-01	124E-01	1 14E-05	1 00E+06	1 595-03	3 88E-05	25	329 20	508 10	6,955	00+300	3.5E-03
67663 Chloroform	3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	22	334 32	536 40	6.988	2,3E-05	0.00+00
67721 Hexachloroethane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00	695 00	9.510	4 0E-06	0 0F+00
71363 Butanol	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 B0E-06	52	390 88	563 05	10.346	0.05+00	3.58.01
71432 Benzene	5 89E+01	8 80E-02	9 80E-06	175E+03	2 28E-01	5 56E-03	25	353 24	562 16	7.342	8 3E-06	005+00
71556 1,1,1-Trichloroethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0 0E+00	100+00
72208 Endrin	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	718 15	986 20	12,000	00E+00	1 1E-03
72435 Methoxychlor	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14.000	0 0E+00	1 8E-02
72548 DDD	1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05	0 0E+00
72559 DDE	4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2.10E-05	25	636 44	860 38	13,000	9 7E-05	0 0E+00
74839 Methyl bromide	1 05E+01	7 28E-02	1216-05	1 52E+04	2 56E-01	6 24E-03	52	276 71	467 00	5,714	0 0E+00	5 0E-03
/5014 Vinyl chlonde (chloroethene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2 71E-02	25	259 25	432 00	5,250	8 4E-05	0 0E+00
/5092 Methylene chloride	1 17E+01	1.0111-01	1 17E-05	1 30E+04	8 98E-02	2 195-03	25	313 00	510 00	9,706	4 7E-07	3 0E+00
75150 Carbon disuitide	4 57 E+01	1046-01	1 00E-05	1 19E+03	1 24€+00	3 02E-02	22	319 00	552 00	6,391	0.05+00	7 0E-01
75252 Bromotorm	8 715+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422 35	00 969	9,479	1 1E-06	0 0E+00
752/4 dramodichioromethane	5 505+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	52	363 15	585 85	7,000	1 8E-05	0 0E+00
75345 I, I-Didnioroemane	3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	52	330 22	523 00	6,895	0 0E+00	5 0E-01
/ 5354 1, 1-Dichloroemylene	5 89E+01	9 DOE-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	22	304 75	576 05	6,247	5 0E-05	0 0E+00
76448 Reptachior	141E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	52	603 69	846 31	13,000	1 3E-03	0 0E+00
77474 Mexachlorocyclopentadiene	2 00E+05	1615-02	7 21E-06	1 80E+00	1 11E+00	2 7 1E-02	52	512 15	746 00	10,931	000+00	7 OE-05
78591 Isophorone	4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 635-08	25	488 35	715 00	10.271	2 7F-07	00+400
78875 1,2-Dichloropropane	4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	52	369 52	572 00	7.590	0.05+00	4 00.02
79005 1,1,2-Trichloroethane	5 01E+01	7 80E-02	8 BOE-06	4 42E+03	3 74E-02	9 12E-04	52	386 15	602 00	8.322	1 6F-05	000+00
79016 Tnchlaroethylene	1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	25	360 36	544 20	7.505	175.06	004100
79345 1,1,2,2-Tetrachloroethane	9 33  +01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	25	419 60	681 15	966 8	5 8 5 0 5	00+100
83329 Acenaphthene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	52	550 54	803 15	12 155	00+100	215.02
										<u>:</u>	,	1 4

2 88E+102 3 39E+104 5 75E+104 1 29E+03 3 39E+04 5 37E+104	2 566-02 4 386-02 1 746-02 3 126-02 3 636-02 5 816-02	6 35E-06 7 86E-06 4 83E-06 6 35E-06 7 7 03E-06 6 46E-06	1 08E+03 1 12E+01 2 69E+00 3 51E+01 1 98E+00 7 48E+00	1 85E-05 3 85E-08 5 17E-05 2 05E-04 2 61E-03 6 26E-07	4 51E-07 9 39E-10 1 26E-06 5 00E-06 6 37E-05 1 53E-08						2 8E+00 3 5E-01 7 0E-01 0 0E+00 1 4E-01 0 0E+00
	9 61E-02 5 60E-02 3 18E-02 5 90E-02 1 94E-02 8 70E-02	6 16E-06 6 10E-06 6 25E-06 7 50E-06 6 74E-08 1 00E-05	3 23E+00 1 95E+03 8 00E+02 3 10E+01 1 78E+02	3.34E-01 1.00E-08 1.90E-04 1.80E-02 1.64E-07	8 15E-03 2 44E-08 7 78E-06 4 00E-09 5 20E-03	25 25 25 25 25 25 25 25 25 25 25 25 25 2	486 15 7 562 15 8 519 15 7 7 491 14 7 7 560 26 7 7 417 60 8	738 00 813 20 749 03 748 40 754 U3 630 30	10,206 14,000 12,000 10,373 0 13,000	2 2 E 0 5 3 4 E - 0 5 3 1 E - 0 6 0 0 E + 0 0 1 3 E - 0 4 0 0 E + 0 0	0 0E+00 0 0E+00 0 0E+00 1 4E-01 0 0E+00
	7 40E-02 6 90E-02 5 01E-02 2 91E-02 7 60E-02 7 50E-02	8 30E-06 7 90E-06 9 46E-06 7 03E-05 8 60E-06 7 80E-06	2 60E+04 1 56E+02 2 20E+04 1 20E+03 2 09E+03 1 69E+02	4 92E-05 7 79E-02 1 66E-02 1 78E-04 9 44E-04 3 23E-04	1 20E-06 1 90E-03 3 90E-04 4 34E-06 2 40E-05 7 88E-03	22 22 22 22 22 22 24 24 24 25 24 24 25 24 24 25 24 25 24 25 24 25 25 25 25 25 25 25 25 25 25 25 25 25					1 8E-01 2 0E-01 1 8E-02 1 8E-02 3 SE-01 2 0E-03
	7.10E-02 5 84E-02 7 69E-02 6 90E-02 1 04E-01 8 50E-02 7 00E-02	8 00E-06 8 69E-06 8 44E-06 7 90E-06 101E-05 9 90E-06 9 80E-06 8 80E-06	3 10E-02 7 87E+03 1 85E+02 7 38E+01 5 30E+03 5 30E+03 2 00E+03 1 61E+03 1 61E+03 5 56E+03	1 13E-01 8 20E-05 8 20E-05 9 96E-02 1 36E-05 4 01E-02 2 10E-02 2 3 10E-01	2 76E-03 2 00E-06 2 00E-03 2 43E-03 3 32E-07 9 78E-04 7 78E-03 8 78E-03	18888888888 148488888					1 05-00 7 06-00 7 06-00 8 06-01 1 46-02 0 05-00 2 06-01
	8.20E-02 8.20E-02 6.92E-02 1.15E-02 3.51E-02 5.42E-02 3.00E-02 3.46E-02	3 70E-06 9 10E-06 7 53E-06 3 56E-06 3 58E-06 5 71E-06 8 27E-06 8 77E-06	4 72E+02 8 28E+04 1 72E+04 5 10E-01 3 40E-01 6 20E+00 6 20E+00 3 00E+02 4 50E+03	2.725-01 163E-05 7.38E-04 4.59E-04 4.18E-06 2.74E-03 5.82E-02 1.30E-04	9 03E-03 3 71E-03 3 98E-07 1 90E-05 1 12E-05 6 68E-05 1 51E-03 1 7E-05 3 17E-06			591 / 3 632 40 632 40 659 79 942 94 862 22 873 00 725 00 725 00			4 4 0E-01 2 0E-02 2 1E-00 0 0E+00 0 0E+00 7 0E+00 7 0E+00 1 1E+00 1 0E+00
) 4 - r 4 r r - 4 w c	2 035-01 2 035-01 2 025-02 2 725-02 7 055-02 1 905-02 2 255-02 3 025-02	7 06E-06 1.05E-06 8 20E-06 7 24E-06 1 13E-05 1 19E-05 5 66E-06 5 56E-06	2 70E-02 2 60E-03 2 00E-02 1 35E-01 3 50E-03 5 30E-03 1 50E-03 2 20E-05 1 50E-03	3 21E-05 3 21E-05 4 51E-04 4 51E-04 5 56E-01 6 56E-05 6 56E-05	9 27E-08 9 27E-08 7 83E-04 1 10E-05 4 07E-03 9 39E-03 1 10E-04 1 11E-04		-		11,000 0 8,000 8 8,000 2 14,370 0 7,192 0 6,717 0 15,000 2 13,815 0		1 1E-02 0 0E+00 0 0E+00 0 0E+00 1 1E-01 3 5E-02 7 0E-02 0 0E+00
NU000-000	2 26E-02 2 48E-02 1 42E-02 1 42E-02 6 26E-02 3 27E-02 3 07E-02 3 07E-02 3 07E-02 1 38E-02 1 56E-02 2 14E-02	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	8 00E-04 1 00E-03 1 00E-01 2 00E+00 2 40E-01 1 82E+02 9 89E+03 2 00E-01 5 62E-02 7 40E-01 6 70E-02 7 40E-01 3 40E-01 3 40E-01	3.40E-05 3.80E-03 6.97E-03 4.35E-04 3.05E-05 9.23E-05 3.90E-04 4.67E-04 4.67E-04 1.19E-02 2.13E-02	8 29E-07 9 46E-05 1 70E-04 1 06E-05 1 77E-02 7 46E-07 7 46E-07 2 25E-06 9 51E-06 1 14E-02 6 00E-08 4 60E-03 2 90E-04 5 20E-04	8	7755 15 10 774 15 9 603 01 596 55 8 598 55 8 381 15 5 509 60 7 509 60 7 628 88 11 629 88 11 637 15 8 637 15 8 402 50 5 347 50 5 442 50 6	0019 70 979 00 839 35 839 36 770 00 776 00 776 00 873 31 539 37 550 20 873 31 541 22 748 220	· ·	2 1 E 65 2 2 1 E 65 2 2 1 E 65 2 2 1 E 65 2 3 2 E 64 3 3 2 E 64 3 2 2 6 E 63 3 2 E 64 5 2 6 E 64 5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Used to calculate risk-based groundwater concentration 1 of 7

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

VERSION 12 September, 1998

	YES		<del></del> ,							
ENTER Chemical CAS No (numbers only,	ENTER Initial groundwater conc , Cw (µg/L)			Chemical		_				
79005	3 578461538	_		1,1,2-Trichloroethane	ethane					
ENTER	ENTER Depth	ENTER	ENTER Totals mu	NTER ENTER ENTER Totals must add up to value of Lwr (cell D28)	ENTER of Lwr (cell D28)	ENTER	ENTER	ENTER		ENTER
Average soil/	below grade to bottom	Depth	Thickness	Thickness of soil	Thickness of soil	ÖŞ		Stratum A	_	User-defined
groundwater temperature,	of enclosed space floor,	below grade to water table,	of soil stratum A,	stratum B, (Enter value or 0)	(Ente	stratum directly above	SCS SCS	soil type	5	soil vapor
r, é	ָ לַ	Lwi	<u></u>	_ <b></b>		water table,	directly above	soil vapor		permeability, k,
2	(cm)	(cm)	(cm)	(cm)	(cm)	(Enter A, B, or C)	water table	permeability)	ı	(cm <sub>2</sub> )
16	15	1524	670 56	96 09	792 48	O	S	Ø	L	
ENTER Stratum A	Stratum A	ENTER Stratum A	Strating B	ENTER	ENTER	ENTER	ENTER	ENTER		
soll dry	soil total	soil water-filled	Soldry	soil fotal	Stratum B	Stratum C	Stratum C	Stratum C		
bulk density,	porosity,	porosity,	bulk density,	porosity,	porosity,	bulk density,	porosity,	soll water-filled porosity.		
ď	Ē	ς Φ	ď	<b>*</b> _	6B	్డ	٧ <sub>C</sub>	ر م		
(g/cm²)	(unitless)	(cm³/cm³)	(g/cm³)	(unitless)	(cm³/cm³)	(g/cm³)	(runtless)	(cm³/cm³)		
15	0 43	0.2	17	0.42	0.27	17	0.43	03		
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER				
space	Soil-bidg	space	space	Enclosed	Floor-wall	Indoor				
floor	pressure	floor	floor	space	seam crack	air exchange				
mickness,	differential, ∆P	length,	width,	height, H-	width,	rate,				
(cm)	(g/cm-s²)	(cm)	(cm)	(cm)	(cm)	(1/h)				
15	40	961	961	488	01	0.45				
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER					
Averaging	Averaging	1	,	Target	Target hazard					
carchogens,	ume for noncarchogens.	exposure duration.	frequency	risk for	quotient for					
ATc	AT <sub>NC</sub>	<u> </u>	Ш	Ŧ	THO					
(yns)	(yrs)	(yrs)	(days/yr)	(unitless)	(nutless)					

		Henry's	Henry's	Enthalpy of			Organic	Pure		
		law constant	law constant	vaporization at	Normal		carbon	component	Š	
Diffusrvity	Diffusivity	at reference	reference	the normal	boding	Critical	partition	water	risk	Reference
In air,	in water,	temperature,	temperature,	bolling point,	point,	temperature,	coefficient,	solubility,	factor,	conc.,
ď	₫	I	Τ <sub>Α</sub>	۵H٬۳	T.	T <sub>o</sub>	ጜ፟	တ	URF	RC
(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(atm-m³/mol)	(၃)	(cal/mol)	€ ¥	કુ ક	(cm <sub>3</sub> /g)	(mg/L)	(µg/m³) 1	(mg/m³)
	:									
7 80E-02	8 80E-06	9 12E-04	25	8,322	386 15	602 00	5 01E+01	4 42E+03	03   1 6E-05   0 0E+00	0 0E+00

ten ' -		8		
Floor-wall seam penmeter, X-rack (cm)	3,844	Diffusion path length,	1509	
Water-filled porosity in capillary zone, €, α (cm ³/cm³)	0 294	Total overall effective diffusion coefficient, Do" (cm²/s)	8 24E-04	
Air-filled porosity in capi'lary zone, $\theta_{\mathbf{k}} = (cm^3/cm^3)$	0 136	Capillary zone effective diffusion coefficient, D' a (cm²/s)	5 80E-04	
Total porosity in capillary zone,	0 43	Stratum C C effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	5 10E-04	Reference conc , RfC (mg/m³)
Thickness of capillary zone, Leg (cm)	17 05	Stratum B B effective diffusion coefficient, D <sup>eff</sup> (cm²/s)	8 25E-04	Unit risk factor, URF (µg/m³)*1
Stratum A soul effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, Doff (cm²/s)	3 17E-03	Infinite source bidg conc.,  Conc.,  Cuates (µg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub> (cm²)	0 746	Vapor viscosity at ave soil temperature, HTS (g/cm-s)	1 77E-04	infinite source undoor attenuation coefficient, $\alpha$ (unitless)
Stratum A soil intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (untless)	2 33E-02	Exponent of equivalent foundation Peciat number, exp(Pe <sup>1</sup> ) (unitiess)
Stratum A effective total fluid saturation, S <sub>tr</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0419	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol)	5 53E-04	Area of crack, Area (cm²)
Stratum C soil air-filled porosity, θ <sub>a</sub> <sup>c</sup> (cm <sup>3</sup> /cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, $\Delta H_{\star}$ rs (cal/mol)	9,507	Crack effective effective diffusion coefficient, Dors (cm²/s)
Stratum B soit air-filled porosity, $\theta_a^B$ (cm³/cm³)	0 150	Crack depth below grade, 2 cast (cm)	15	Average vapor flow rate into bidg , Q <sub>est</sub> (cm <sup>3</sup> /s)
Stratum A soil air-fil'ed porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio,  n (unitless)	4 16E-04	Crack radius, form)
Source- building separation, L <sub>7</sub>	1509	Area of endosed space below grade, A <sub>B</sub>	9 24E+05	Source vapor conc, C <sub>source</sub> (µg/m³)
Exposure duration, t (sec)	9 46E+08	Bidg. ventiation rate,  Quadrana (cm <sup>3</sup> /s)	5 63E+04	Convection path length, Le (cm)

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS

INCREMENTAL RISK CALCULATIONS

Hazard	from vapor	intrusion to	indoor air,	noncarcinogen	(nuttess)
Incremental	Vapor	intrusion to	indoor air,	carcinogen	(nuitless)
- - - - -	indoor	exposure	groundwater	conc.	(μg/L)
Q	companent	water	solublirty,	ω	(μg/L)
Rick-hasad	indoor	exposare	groundwater	couc,	(µg/L)
Indoor	exposure	groundwater	conc'	noncarcinogen	(µg/îL)
Indoor	exposure	groundwater	conc ,	arcinogen	(hg/L)

ERROR SUMMARY BELOW. (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

1 28E+03

		Mean Grain Diameter (cm)	0 0092	0 0 16	0 0 0 0	0 040	00044	0 025	0 029	0 0046	0 0033	0 0056	0 0 11	
BLES		Mean Grain		10	•		10	_	_	_	_	_		
VLOOKUP TABLES		8, (cm³/cm³)	0 068	600	0 078	0 05	90	0 100	0 100	0 03	0 0 0	0 08	90 0	
		θ, (cm³/cm³)	0 38	041	0 43	041	0 43	0 38	0 39	0 46	0 26	0 43	0 45	
	ookup Table	M (unitiess)	0 083	0 237	0 359	0 561	0 627	0 187	0 324	0 270	0 083	0 187	0 291	•
	Soil Properties Lookup Table	N (unitless)	1 09	131	1 56	2.28	2 68	1 23	1 48	1 37	1 09	1 23	141	
	S	a (1/cm)	0 008	0 0 0	0 038	0 124	0 145	0 027	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 16	0 005	0 0 0 0 0 0 0	0 0 0 0 0	450
		K, (cm/h)	0 20	0.26	2	14 59	29 70	0 12	131	0.25	0 02	0 0	0 45	•

				Chemic	Chemical Properties Lookup Table	o Table						
	Organic			Pure		Henry's	Henry's			Enthalpy of		
	carbon			component		law constant	law constant	Normal		vaporization at	Š	
	partition	Diffushity	Diffusivity	water	Henry's	at reference	rafaranca	odillo.	C. Indian	the normal	) of	Deference
	coefficient,	ın air,	in water,	×	law constant	temperature,	temperature,	bo Lit	temperature.	bolling point.	factor.	conc
	₹.	<b>.</b> "	o <sup>*</sup>	ທ	Ì	<b>.</b>	۳			ΔHν	URF	£
CAS No Chemical	(cm <sub>3</sub> /g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m³/mol)	(Ç)	(k)	(K)	(cal/mol)	(µg/m³) <sup>-1</sup>	(mg/m³)
50293 DDT	2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10F-08	25	533 15	720.75	11 000	9 75.05	00.500
50328 Benzo(a)pyrene	1 02E+06	4 30E-02	9 OOF -06	1 62F-03	4 63F-05	1145-06	3,5	715.00	060 27	200,44	3 6	000
51285 2.4-Dinitrophenol	1 OOF -02	2 73E-02	9 OFF-08	2 795 +03	1 825.05	4 44E-07	2 6	200	17 000	000,61	2 12 0	00100
53703 Dibenzía hlanthracene	3 BOF+06	2 D2E-02	5 18F-06	2 49E-03	6 03E-07	4 475 09	3 4	242.50	057 00	000 9	2011	50-10-0
56235 Carbon tetrachloride	1 74E+02	7 BOE-02	8 80F-06	7 93F+02	1 25F+00	3.05E-02	2, 2,	370076	1408	15,000	2 TE-03	00+400
56553 Benz(a)anthracene	3 98E+05	5 10E-02	90-B00 6	9 40E-03	1.37F-04	3.345.06	3 %	708 15	1004 20	12. 7	2000	001
57749 Chlordane	1 20E+05	1.18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13 000	3 7F-04	00+100
58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	52	596 55	839 36	13,000	3 7E-04	00000
60571 Dieldrin	2 14E+04	1 25E-02	4 74E-06	195E-01	6 19E-04	1 515-05	25	613 32	842 25	13,000	4 6E-03	00E+00
65850 Benzoic Acid	6 00E-01	536E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10,000	·	1 4E+01
67641 Acetone	575E-01	1245-01	1146-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	6,955		3.5E-01
67663 Chloroform	3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	52	334 32	536 40	6.988		0 OE+00
67721 Hexachloroethane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 596-01	3 88E-03	25	458 00	695 00	9.510	4 0E-06	0 OE+00
71363 Butanol	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	25	330 88	563 05	10,346	_	3.5E-01
71432 Benzene	5 89E+01	8 80E-02	9 80E-06	175E+03	2 28E-01	5 56E-03	25	353 24	562 16	7,342		00=+00
71556 1,1,1-Trichloroethane	1 10E+02	7 BOE-02	8 80E-06	133E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0 0E+00	1 0E+00
72208 Endnn	1 23E+04	125E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	718 15	986 20	12,000	0 0E+00	1 1E-03
72435 Methoxychior	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0 0E+00	1 8E-02
72548 DDD	1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	52	639 90	863 77	14,000	6 9E-05	0 0E+00
72559 DDE	4 47E+06	1 445-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	52	636 44	860 38	13,000	9 7E-05	0 0E+00
74839 Methyl bramide	1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	25	276 71	467 00	5,714	0 0E+00	5 0E-03
75014 Vinyl chloride (chloroethene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1116+00	2715-02		259 25	432 00	5,250	8 4E-05	0 0E+00
75092 Methylene chloride	1 17E+01	1016-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03		31300	510 00	6,706	4 7E-07	3 0E+00
75150 Carbon disuffide	4 57E+01	1046-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	52	319 00	552 00	6,391	0 0E+00	7 0E-01
75252 Bromotorm	8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	52	422 35	00 969	9,479	1 15-06	0 0E+00
75274 Bromodichloromethane	5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	52	363 15	585 85	7,000	1 8E-05	0 0E+00
75343 1,1-Dichloroethane	3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 305-01	5 61E-03	52	330 22	523 00	6,895	0 0E+00	5 0E-01
75354 1,1-Dichloroethylene	5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	22	304 75	576 05	6,247	5 0E-05	0 0E+00
76448 Heptachlor	1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	846 31	13,000	1 3E-03	00=+00
77474 Hexachlorocyclopentadiene	2 00E+05	1 61E-02		1 80E+00	1115+00	271E-02	25	512 15	746 00	10,931	0 0E+00	7 0E-05
78591 Isophorone	4 68E+01	6 23E-02		1 20E+04	2 72E-04	6 635-06	25	488 35	715 00	10,271	2 7E-07	0 0E+00
78875 1,2-Dichloropropane	4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7,590	0 0E+00	4 OE-03
79005 1,1,2-Trichloroethane	5 01E+01	7 BOE-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8,322	1 6E-05	0000
79016 Trichloroethylene	1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 035-02	25	360 36	544 20	7,505	1 7E-06	0 0 0
79345 1,1,2,2-Tetrachloroethane	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44E-04	22	419 60	661 15	8,996	5 8E-05	0 0E+00
83329 Acenaphthene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0 0E+00	2 1E-01
												•

Di-n-butyl phthalate Butyl benzyl phthalate	4 00L 04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9.39E-10	72 72 72 72 72 72 72 73	567 15 613 15 660 50	757 00 798 67	13,733 14,751	00=+00	2 AF+00
senzyl phthalate	3.39E+04						3	2 4	1900	14,75	0.00	20.00
	5 75E+04	1 74E-02	4 83E-06	2 69E+00	5 175-05	1.26F-06	25	-	020 00	000		3 55-01
86306 N-Nitrosodiphenylamine	1 29E+03	3.12E-02	6 35E-06	3.51E+01	2.05E-04	7 00E-06	 	632.28	029 00	13,000	0.05+00	7 0E-01
86737 Fluorene	1.38E+04	3 63E-02	7 88F-06	1986+00	2.615-03	6 375-05	3 4	570 44	04040	13,000	145-06	0 0 = +00
Carbazole	3 39E+03	3 90E-02	7 03E-06	7 48E+00	6 265-07	1.535-08	5 K	627 87	00.076	12,666	0.05+00	1.4E-01
87683 Hexachloro-1,3-butadiene	5 37E+04	5 61E-02	6 16E-06	3 23E+00	334E-01	8 15E-03	25. 4	486 15	738.00	10,977	20,000	001100
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1 00E-06	2 44E-08		582.15	813.20	14,000	2 4E-03	00.00
2,4,6-Trichforophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06	25 5	51915	749 03	000,51	3.1E-05	200
91203 Naphthalene	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04		491 14	748 40	10.373	0.05+0.0	1 4F-01
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 11E+00	1 64E-07	4 00E-09		560 26	754 03	13,000	13E-04	0 0E+00
o-Xylene	3,63E+02	8 705-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03		417 60	630 30	8,661	0 0E+00	7 0E+00
95487 Z-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06		464 19	697 60	10,800	0 0E+00	1.8E-01
95501 1,Z-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03		453 57	705 00		0 0E+00	2 0E-01
900/8 2-Chiorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	25 4	447 53	675 00		0,05+00	1.8E-02
90904 Z,4,0-inchiorophenol	1 60E+03	2.91E-02	7 03E-06	1 20E+03	1 78E-04	4 34E-06		526 15	759 13		0 00+00	3 5E-01
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05		483 95	719 00		0 0E+00	2 OE-03
Ethylbenzene	3 63E+02	7 50E-02	7.80E-06	1 69E+02	3 23E-01	7 88E-03		409 34	617 20		0.000	100+00
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03		41831	636 00	8.737	0.00	200
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06		484 13	707 60		0.05+0.0	7 01 02
106423 p-Xylene	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03		411.52	616.20		200	7 00-06
1,4-Dichtorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2.435-03		447.21	59.75		200	מילים י
06478 p-Chloroaniline	6 61E+01	4 83E-02	1015-05	5.30F±03	13611-01	3 225-03		17/44	154.00		0.0E+00	8 0E-01
107062 1,2-Dichloroethane	1.74E+01	1045-01	905.06	8 52F±03	401E-03	0 705 0	0 40	203 52	00 407	11,689	0.05+00	1 4E-02
108054 Vinyl acetate	5.25 0.0	8 50E-02	90500	200000	2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1000		2000	00 190		2 65-05	0 0E+00
108383 m-Xvlene	4 075+02	7 005-02	7 80 10 06	4 645 404	2 04 5 04	0 12E-04		345 65	519 13		0 0E+00	2 0E-01
10883 Toliene	1 875-02	10000	90-109 6	7012101	3016-01	7.345-03		412 27	617 05	8,523	0.000	7 0E+00
Chloroposeon	1.025702	20-00-0	90000	Z0+397 c	Z /ZE-01	6 63E-03	25	83 78	591 79		0 0E+00	4 0E-01
Delizerie	2 195 + 02	7 30E-02	8 705-06	4 /2E+U2	1 52E-01	3 71E-03		04 87	632 40		0 00-00	2 0E-02
Primarios Diaco attendados de ac	2 88E+U1	8 20E-02	9 10E-06	8 285+04	1 63E-05	3 98E-07		455 02	694 20		0.00	2 1E+00
11:444 bis(z-chloroethyl)ether	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	25 4	451 15	659 79		3 3E-04	0 0E+00
Endosultan	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05		674 43	942 94		0 00+00	2 1E-02
Bis(Z-etnylhexyl)phthalate	1 51E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07		657 15	806 00		4 0€-06	0 0E+00
117840 UI-n-octyl phthalate	8 32E+07	1 51E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05	25 7	704 09	862 22	15,000	0 0E+00	7 0E-02
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5 91 E-06	6 20E+00	5 41E-02	1 32E-03		582 55	825 00	14,447	4 6E-04	0 OE+00
120127 Anthracene	2 95E+04	3 24E-02	7.74E-06	4 34E-02	2 67E-03	6 51E-05	25 6	615 18	873 00		0.0F+0.0	1 1 T + 50
120821 1,2,4-Trichlorobenzene	178E+03	3 00E-02	8 23 <b>E-</b> 06	3 00E+02	5 82E-02	1 42E-03		486 15	725 00		0.05+00	2 OF 51
20832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06		482 15	708 17	11,000	001100	1 1 1 1 1 1 1 1 1
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01	7 06E-06	2.70E+02	3 805-06	9 27E-08		590.00	814.00		1 9F-04	00400
Chlorodibromomethane	6 31€+01	1 96E-02	1 05E-05	2 60E+03	3 21 6-02	7 83E-04	25 4	416 14	678.20	8,000	2.4F-05	201100
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02		394 40	620 20	8.288	5.8F-07	0 0F+00
129000 Pyrene	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 10E-05		667 95	936 00		0.05+0.0	115.01
56592 cls-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		333 65	544 00	7,192	0.05+00	3.55-02
156605 trans-1,2-Dichloroethylene	5.25E+01	7 07E-02	1 19E-05	6.30E+03	3 855-01	9 39E-03		320 85	516 50		00=+00	7.0E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 60E-06		809 15	1078 24	17,000	2 1E-04	0 0E+00
Benzo(b)fluoranthene	1 23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1 11E-04		715 90	969 27	15,000	2 1E-04	0.0E+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1 61E-05		655 95	905 00	13,815	0 0E+00	1 4E-01
Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00 <b>E-0</b> 4	3 40E-05	8 29E-07		753 15	1019 70	16,000	2 1E-05	0 0E+00
A SOURCE CHINASENS	3 985+05	2 48E-02	6 21 E-06	1 60E-03	3 88E-03	9 46E-05		714 15	979 00	16,455	2 1E-06	0 OE+00
319848 slobe-HOW (slobe-DUC)	1 225+00	1 32E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04	25 6	603 01	839 37	13,000	4 9E-03	0 0E+00
319857 hete-HOH (hete-BHO)	1 261-103	425-02	1 24 1 00	2 101 01	4 30E-04	1 06E-05		596 55	839 36	13,000	1 8E-03	0 0 0 0 0 0
542756 1 3-Dishlosossos	1 20E+U3	1 42E-02	7.34E-05	2.40E-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5,3E-04	0 0E+00
606000 2 8-Dinitrotoliuma	101100 a	0,205.02	0001	Z 80E+03	/ 26E-U1	1 77E-02		381 15	587 38	7,000	3 7E-05	2 0E-02
621647 N-Nitrosodi-a-pennylamine	2 405 404	5 45E 02	00-100	201100	3 00E-U3	7 465-07		228 00	770 00	12,938	196-04	0.000
021077 Hontachlor enough	10+0+7	3450	00-11-0	9 09 0 4 0 3	9 235-05	2.25E-06		209 60	746,87	11,000	2 0E-03	0 OE+00
7430076 Mercum/(elemental)	5 20 E + O +	1 325-02	4 23E-00	2.00=-0.1	3 90E-04	9 51E-06		613 96	848 76		2 6E-03	0 0 = +00
(eletherical)	5 ZUE+01	3 0/15-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02		629 88	1750 00		0 0E+00	3 0E-04
8001332 10Xapriene 11096835 Applica 1250	25/E+05	1 16E-02		7 40E-01	2 46E-04	6 00E-06	22 82	657 15	873 31	14,000	3 2E-04	0 0E+00
1000501 Arodol 1200 (PCB-1200)	2 80 5 40 5	1 385-02	4 325-06	8 00E-02	1 89E-01	4 60E-03		402 50	539 37	19,000	1 0€-04	00E+00
1234 (1 CD-1234)	001100	1 305-02	3 UOE-US	5 /UE-02	8,20E-02	2 00E-03	25	377 50	512 27	19,000	1 0유-04	0 05+00
120/4112 Arodor 1016 (PCB-1016)	3300+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 905-04	52 52	340 50	475 22	18,000	1 0E-04	0 0E+00
53469219 Araciar 1242 (PCB-1242)	3 30E+04	2 14E-02	531E-06	3 40E-01	2 13E-02	5 205-04	25 3,	45 50	482 20	18,000	1 0E-04	100+30 0

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1 2 September, 1998

S. YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

YES

								_								_	_	1						
								ENTER		User-defined	stratum A	soil vapor	permeability,	¥	(cm²)									
													띥				_							
								ENTER	Soil	stratum A	SCS	soil type	(used to estimate	soil vapor	permeability)		IS		ENTER	Stratum C	soil water-filled	porosity,	S e	* · · · · · · · · · · · · · · · · · · ·
								ENTER				scs	soil type	directly above	water table		s		ENTER	Stratum C	soil total	porosity	٥	1000
								ENTER			Sol	stratum	directly above	water table,	(Enter A, B, or C)		U		ENTER	Stratum C	soil dry	bulk density.	్ర	(2, (om 3)
						lene		ENTER	Lwr (cell D28)	Thickness	of soil	stratum C,	(Enter value or 0)	卢	(cm)		792 48		ENTER	Stratum B	soil water-filled	porosity,	6	(rm3/cm3)
				Chemical		Tetrachloroethylene		ENTER	Totals must add up to value of Lwn (cell D28)	Thickness	of soil		(Enter value or 0)	<b></b>	(cm)		96 09		ENTER	Stratum B	soll total	porosity,	۾_	(application)
_								ENTER	Totals mu		Thickness	of soil	stratum A,	£*	(cm)		670 56		ENTER	Stratum B	soil dry	bulk density,	్కి	(a/cm³)
					_			ENTER			Depth	below grade	to water table,	Lwī	(ctm)		1524		ENTER	Stratum A	soil water-filled	porosity,	θ,	(cm <sub>3</sub> /cm <sub>3</sub> )
!	ENTER Initial	groundwater		(μg/L)	2007012000	29 3/43589/		ENTER	Depth	below grade	to bottom	of enclosed	space floor,	ť	(cm)		15		ENTER	Stratum A	soil total	porosity,	۰ د	(unifiess)
	ENTER	Chemical	(numbers only,	no dashes)	407404	12/184	:	ENTER		Average	/lios	groundwater	temperature,	<b>6</b> 3 (	ĵ.		16		ENTER	Stratum A	soil dry	bulk density,	<b>₹</b> ੴ	(a/cm <sub>3</sub> )

ATER	, elife	ater-filled	rosity	o <del>d</del>	(cm³/cm³)	03							
		Ġ.	ì			3							
				٥		0 43							
ENTER	Stratum C	Souldry	bulk density.	్ర	(g/cm³)	17		מאופא	Indoor	air exchange	rate	FR	14/17
ENTER	Stratum B	soil water-filled	porosity,		(cm³/cm³)	0.27	OBEN		Floor-wall	seam crack	width,	*	(wa)
ENTER	Stratum B	soll total	porosity,	<b>a</b> C	(unitiess)	0 42	02117		Enclosed	Space	height,	ī	(ma)
ENTER	Stratum B	soil dry	bulk density,	ాీది	(g/cm³)	17	1 1 1	Enclosed	space	floor	width,	Α	(E)
ENTER	Stratum A	soil water-filled	porosity,	۹,	(cm³/cm³)	0.2	FNTER	Enclosed	space	floor	length,	La	(cm)
ENTER	Stratum A	sort total	porosity,	ڻ د	(nutless)	0.43	FNTER	i	Soil-bidg	pressure	differential,	ΔP	(g/cm-s <sup>2</sup> )
ENTER	Stratum A	soil dry	bulk density,	<b>*</b> &	(g/cm³)	15	ENTER	Enclosed	space	floor	thickness,	Long.	(cm)

	(2	(115)	3	(CIII)	(CIN)		2
15	40	961	196	488	0.1	0 45	15
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
Averaging time for	Averaging time for	Exposure	Exposure	Target nsk for	Target hazard quotient for		
carcinogens,	noncarcinogens,	duration,	frequency,	carcinogens,	noncarcinogens		
ΑΤ <sub>C</sub>	AT	a	ᇤ	똔	J. D.F.		
(yrs)	(yrs)	(yrs)	(days/yr)	(unitless)	(unitless)		
70	8	30	350	1.0F-06	-		
				Used to calcu	Used to calculate risk-based		
				7			

groundwater concentration 1 of 7

Difficeretty	law constant	law constant	vaporization at	Normal	- C	carbon	component	S S	
empe	rature,	temperature,	boiling point,	point,	temperature, o	partition coefficient,	water solubility,	risk factor,	Keler G
	· •	æ ; ⊢ ;	۵Ť	۳,	۲°	ş,	ဟ	UR.	£.
atm-n	(atm-m²/mol)	(2.)	(cal/mol)	(*K)	( <del>,</del> ,)	(cm²/g)	(mg/L)	(mg/m³) 1	(mg/m³)
1 841	7.20E_02   8.20E_08   1.84E_02	30	00 20 4 10 10 10 10 10 10 10 10 10 10 10 10 10	UV 402	00 003	1 555+00	201	1000	00.00

Floor- wall seam penmeter, Xend	3,844	Diffusion path length, L <sub>d</sub> (cm)
Water-filled porosity in capillary zone, $\theta_{w,\alpha}$ $(cm^3/cm^3)$	0 294	Total overall effective diffusion coefficient, Deff (cm²/s)
Aur-filled porosity in capullary zone, 8. ca	0 136	Capillary zone effective diffusion coefficient, D*ff (cm²/s) 5.05E-04
Total porosity in capillary zone, $n_{cz}$	0 43	Stratum C C effective diffusion coefficient, D=c (cm²/s) 438E-04  Reference conc., RfC (mg/m³)
Thickness of capillary zone, L <sub>x</sub>	17 05	Stratum B effective diffusion coefficient, Deff (cm²/s) 7 38E-04 T 38E-04 (µg/m³)*1
Stratum A soul effective vapor permeablty, k, (cm²)	6 98E-10	Stratum  A effective diffusion coefficient, D="""  Cen2/s)  2 92E-03  Infinite source bldg. conc., Couchs (µg/m³)
Stratum A soil relative air permeabtlity, k <sub>19</sub> (cm²)	0.746	Vapor viscosity at ave soil temperature, HTS (g/cm-s) (g/
Stratum A soil intrinsic permeability, k (cm²)	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)  4 71E-01  Exponent of equivalent foundation Peciet number, exp(Pe) (unitless)
Stratum A effective total fluid saturetion,  S <sub>b</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	0.419	Henry's law constant at ave groundwater temperature, H <sub>TS</sub> (atim-m³/mol) 112E-02 Area of crack, A <sub>crack</sub> (cm²) 3.84E+02
Stratum C soil air-filled porosity, $\theta_a^c$ (cm³/cm³)	0 130	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_v$ 7s (cal/mol) $9,492$ Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s) $D^{crack}$
Stratum B soil air-filled porosity, $\theta_{a}^{B}$ $(cm^{3}/cm^{3})$	0 150	Crack depth below grade,  Zones (cm)  15  Average vapor flow rate into bidg .  Qual (cm³/s)
Stratum A soil ali-fitled perosity, $\theta_{a}^{A}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio,  T (unitless)  Crack radius, foask (cm)
Source- building separation, L <sub>T</sub>	1509	Area of enclosed space below grade, A <sub>B</sub> (cm²) 9 24E+05 Source vapor conc. C <sub>source</sub> (μg/m³) 4 71E+02
Exposure duration, r (sec)	9 46E+08	Bitdg ventitation rate, Quasa; (cm³/s)  5 63E+64  Convection path length, Lo (cm)

CALCULATIONS	Hazard quotient from vapor intrusion to indoor air, concarcinogen (unitless)	VIV.
INCREMENTAL RISK CALCULATIONS	incremental risk from vapor intrusion to indoor air, carcinogen (untless)	N/A
JLATIONS	Final indoor exposure groundwater conc, (μg/L)	1 QOE+03
ATION CALCU		1 90E+03   2 00FF+05
R CONCENTR	Risk-based Indoor exposure groundwater conc, (µg/L)	1 90E+03
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	Indoor exposure groundwater conc., noncarcinogen (µg/L)	- AZ
RISK-BASEI	Indoor exposure groundwater conc., carcinogen (µg/L)	1 905+03

-ERROR SUMMARY BELOW. (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

			Soil Properties   polytra Table	Spire Table		VLOOKUP TABLES	LES					
SCS Soil Type	K, (cm/h)	a (1/cm)	N (unitless)	M (unitiess)	θ, (cm³/cm³)	6, (cm³/cm³)	Mean Grain Diameter (cm)					
0	0.20	900 0		0 083	0.38	0 068	0 0092					
₫.,	0 26	0 0 19	131	0 237	0 41	0 095	0016					
	<u>-</u>	0 036	1 56	0 359	0.43	0.078	0 0 0 0					
2 0	14 59 2 59	0 124	2 28	0 561	041	0 057	0 040					
ပ္တ	5 5	0 145	7 7 23	0.627	0 43	0 045	0.044					
SCL	3 5	0.059	148	0 324	860	8 5	0.025					
<u> </u>	0.25	0.016	1 37	0 270	0.46	0 0 0	0 0046					
Sic	0 02	0 005	109	0 083	0.26	0 0 0 0	0 0039					
SICL	0 07	0 0 0 10	1 23	0 187	0 43	680 0	0 0056					
SI.	0 45 4 42	0 020	141	0 291	0 45	0 067	0 011					
		Organic			Primery Primery	Chemical Properties Lookup Table	okup table Heoo/s	47.00			,	
		carbon			component		aw constant	faw constant	Mornal		Entrappy or	<u> </u>
		partition	Diffusivity	Drffusivity	water	Henry's	at reference	reference	polling	Ontical	the normal	Ĕ
	J	coefficient,	ln aır,	ın water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	bosting point,	factor,
		- هر	<b>ਰ</b> '	₫,	Ø	Ì	æ'	۳	۳	T <sub>c</sub>	ΔH,	URF
CAS No		(cm./g)	(cm*/s)	(cm <sup>2</sup> /s)	(mg/L)	(vnitless)	(atm-m³/mol)	(၁)	(%)	(R)	(cal/mol)	(µg/m³) <sup>1</sup>
50293 DDT		2 63E+06	137E-02	4 95E-06	2 50E-02	3 32E-04	8 105-06	7.	533 15	72075	\$60.55	9.75.05
50328 Benzo(a)pyrene		1 02E+06	4 30E-02	9005-06	1 R2F-03	4 63E-05	1 135-08	3 4	2 4 5	0.000	200,00	0 C C C C C C C C C C C C C C C C C C C
51285 2,4-Dintrophenol		1 00E-02	2 73E-02	90-390 6	2.79E+03	1 82E-05	4 44E-07	25	605 28	827.85	15,000	0 0F+00
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	1 SE-05
50555 Senz(a)anthracene 67749 Chlordene		3 98E+05	5 105-02	9 00E-06	9 40E-03	1 37E-04	3345-06	25	708 15	1004.79	15,000	2 1E-04
5889 gamma-HCH (Lindane)		1 07E+03	1 42F-02	4 3/E-06 7 34E-08	5 80E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3 7E-04
60571 Dieldrin		2 14E+04	1 25E-02	4 74E-06	1955-01	19 HO HO	1 51 11 15	6 K	512 22	839 35	13,000	7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1546-06	25 25	720 00	751 00	3,000	2 PE PE PE PE PE PE PE PE PE PE PE PE PE
67641 Acetone		5 75E-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	52	329 20	508 10	6,955	0 0 10 0
67663 Chloroform		3 98E+01	104E-01	1 005-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6,988	2 3E-05
71363 Bitanol		1 /8E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 885-03	72	458 00	695 00	9,510	4 0E-06
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75F+03	2 28E-01	5 50E-U5	5 ¥	350.88	563 05	10,346	0 0 0 0 0 0 0 0
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25.25	347.24	545.00	7.42. 7.136.	
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	71815	986 20	12.000	000+00
72435 Methoxychlor		9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0 00 +00
72559 DDE		1 00E+06	1 695-02	4 765-06	9 00E-02	1.64E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05
74839 Methyl bromide		1 05E+01	7.28E-02	1215-05	1.525+04	256 - 04	Z 10E-05	2,5	036 44	860 38	13,000	9 7E-05
75014 Vinyl chloride (chloroethene)	Je)	1 86E+01	1 06E-01	1 23 = -06	2 76E+03	1 11E+00	2 716-02	25.	259.25	407 00	5,714	0 0E+00
75092 Methylene chlonde		1 17E+01	1015-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	31300	510 00	6.706	4 7F-07
75150 Carbon disulfide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	25	319 00	552 00	6,391	0.05+00
7524 Bromodoth		8 73E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34 E-04	52	422 35	00 969	9,479	1 15-06
75243 11-Direlomethane		3 466401	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	2,000	1 8E-05
75354 1.1-Dichlomethylene		5 89F+01	9 00F-02	1 04 F-05	2 255+03	2 30E-01	5 61 E-03	25	330 55	523 00	6,895	0 05 +00
76448 Heptachlor		1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 195-03	2, 2,	603.60	3/0 U3	6,247	5 OF 05
77474 Hexachlorocyclopentadiene	96	2 00E+05	1 61E-02	7 21E-06	1 80E+00	1 11E+00	2 71E-02	25	512 15	746.00	13,000	00,40
78591 Isophorane		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10.271	2 7F-07
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7,590	0 0E+00
79005 1,1,2-17chloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	52	386 15	602 00	8,322	1 65-05
79345 1,1.2.2-Tetrachloroethane		33E+01	7 10E-02	9 10E-06 7 90E-06	1 10E+03 2 97F+03	4 22E-01 1 41E-02	1 03E-02 3 44E-04	52 ×	360 36	544 20	7,505	1 7E-06
83329 Acenaphthene		7 08E+03	4 21E-02	7 69E-06	4 24E+00	6.36F-03	3 44E-04 1 55E-04	ű K	419 60 550 54	661 15 803 15	966 8	5 8E-05
			1		!!!!	:		;	5	2 200	ec1,21	00+400

Reference conc , RfC (mg/m³)

CONTRACTOR CONTRACTOR	4	1			VLOOKUP TABLES							
84502 Diethyphthalate	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07		567 15	757 00	13,733	00=+00	2 BE+00
85887 But Jennary promagate	3 39E+04	4 385-02	/ 86E-06	1 12E+01	3 85E-08	9 39E-10		613 15	798 67	14,751	00+300	3 5E-01
86305 N-Mitosodiobandomoo	3 /3E+U4	1 74E-UZ	4 83 11 10 6	2 695+00	5 1/E-05	1 26E-06		660 60	839 68	13,000	0.05	7 0E-01
86737 Fluorene	1 385+04	3 635-02	7 885-06	3 31E+01	2.05E-04	5 CCE-O6	9	632 28	890 45	13,000	1 4E-06	0 0E+00
86748 Carbazole	3 39 03	3 906-02	7 035-08	7 48 - +00	6 26F-07	1 53E-08		5/U 44 697 87	870 00	12,666	0 0 0 0 0	1.4E-01
87683 Hexachloro-1,3-butadiene	537E+04	5 61E-02	6 16E-06	3 23E+00	3.34E-01	8 15E-03		486 15	738.00	13,977	3 / H / G	000
87865 Pentachlorophenol	5 92E+02	5 60E-02	6 10E-06	1 95E+03	1,00E-06	2 44E-08	25	582 15	813.20	14,000	3.46-05	00+100
88062 2,4,6-Trichtorophenal	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06		519 15	749 03	12,000	3 1E-06	8 + H 0 0
91203 Naphthalene 91941 3 3 Dichlarakenaidan	2 00E+03	5 90E-02	7 50E-06	3 10 - 101	1 98E-02	4 83E-04	25	49114	748 40	10,373	0 0E+00	1 4E-01
9.5441	3 635+02	3 30E-02	4 00 E OS	3 11E+00	1 64E-07	4 00E-09		560 26	754 03	13,000	1 3E-04	0 0E+00
95487 2-Methylphenol (o-cresot)	9 12E+01	7 40F-02	8.30F-06	2 ROF +04	4 97E-05	3 20E-03		417 60	63030	8,661	00000	7 0E+00
95501 1,2-Dichtorobenzene	6 17E+02	6 905-02	7 90E-06	1 56E+02	7 79E-02	1 90E-03	3 6	453.57	705 OO	008,01	00+300	1850
95578 2-Chlorophenol	3 88E+02	5 01E-02	9 46E-06	2 20E+04	1 60E-02	3 90E-04	3 5 5 4	47 53	675 00	9,700	00+100	2 OE-07
95954 2,4,5-Trichlorophenol	1 60E+03	2 9TE-02	7 03E-06	1 20 <u>Ē</u> +03	1 78E-04	4 34E-06	25 5	526 15	759 13	13.000	0.000	3.5E-01
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 84E-04	2 40E-05	25 4	483 95	719 00	10,566	0 00+00	2 0E-03
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	25 4	409 34	617 20	8,501	0 0E+00	1 0E+00
105425 Styrene 105679 2 4-Dimethylopenal	7 765+02	7 10E-02	8 00E-06	3 105 402	1 13E-01	2 76E-03	25	41831	636 00	8,737	0 0E+00	1 0E+00
106423 p-Xvlene	2 USE+U2 3 R9F+02	2 64E-02	8 69E-U6 8 44E-06	7 87E+03	8 20E-05	2 00E-06	25 6 4 4	484 13	707 60	11,329	0.000	7 0E-02
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7.90E-06	7.38F+01	9 96 1-02	7 43E-03	2 4	411,54	616.20	8,525	00=+00	7 0E+00
106478 p-Chloroaniline	8 61E+01	4 83E-02	1 01E-05	5 30E+03	1 36E-05	3 32E-07	25 5	503 65	754 00	11,689		4 U U
107062 1,2-Dichloroethane	174E+01	1 04E-01	9 90€-06	8 52E+03	4 01E-02	9 78E-04	25	356 65	561 00	7.643	2 6E-05	0.000
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 12E-04		345 65	519 13	7,800	0 0E+00	2 0E-01
	4 07E+02	7 00E-02	7 80E-06	1,81E+02	3 01E-01	7 34E-03	25 4	412 27	617 05	8,523	0 0E+00	7 0E+00
108907 Chlomberzene	1 62E+02	8 70E-02	8 505-05	5 26E+02	2 72E-01	6 63E-03		383 78	591 79	7,930	0 0 0 0	4 0E-01
	2 88E+01	8 20E-02	9 10 506	8 28F±04	1 52E-01	3 / TE-03	5 K	404 87	632 40	8,410	00+100	2 0E-02
111444 Bis(2-chloroethyl)ether	1 55E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05	2 52	451 15	659 79	000	2 2E-00	200
115297 Endosulfan	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	25	674 43	942.94	14,000	0 0E+00	2 1E-02
117817 Bis(2-ethylhexyl)phthalate	151E+07	3 51E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	25 6	657 15	806 00	15,999	4 0E-06	0 0E+00
117840 Di-n-octyl phthalate	8 32E+07	151E-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05	25 7(	704.09	862 22	15,000	0 0E+00	7 0E-02
110/41 MEXACTIONODERIZERS	5 50E+04	5,42E-02	5.91E-06	6 20E+00	5 41E-02	1 325-03	52	582.55	825 00	14,447	4 6E-04	0 0E+00
	1 78F+03	3 00F-02	7.74E-06	4 34E-02	2 6/E-03 5 825.02	65111-05	522	615 18	873 00	13,121	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,16+00
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 175-06	3 2	480 15	20 67/	10,471	00+400	2 UE-01
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01	7 06E-08	2 70E+02	3 80€-06	9 27E-08	25 55	590 00	814 00	13 467	4 9F-04	0.05+0.0
	631E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04	25 4	416 14	678 20	8,000	2 4E-05	00.00
127184 Tetrachloroethylene	1 55E+02	7 20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02	25 36	394 40	620 20	8,288	5 8E-07	0 0E+00
156592 crs-1 2-Dichlomothylone	1 USE+US	2 /ZE-02	7.24E-U6	1 35E-01	4 51E-04	1 10E-05	52	667.95	936 00	14,370	0 0E+00	1100
156605 trans-1.2-Dichlorethylene	\$ 25E+01	7 07E-02	1 195-05	3 30E+03	3 855.01	4 U/E-U3	9 6	333 65	544 00	7,192	00=+00	3 5E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 605-06	52 72 72 72 73 73 73	09 15	1078.24	17,000	2 JE-04	0 0F+00
205992 Benzo(b)fluoranthene	1,23E+06	2 26E-02	5 56E-06	1 50E-03	4,55E-03	1115-04		715 90	969.27	15,000	2 1E-04	0000
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	161E-05		655 95	905 00	13,815	0 0E+00	1 4E-01
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 COE-04	3 40E-05	8 29E-07	25 7	53 15	1019.70	16,000	2 1E-05	0 0E+00
309002 Aldrin	3 98E+US	1 32E-02	6 21E-U6	1 60E-03	3 88E-03	9 46E-05	525	714 15	979 00	16,455	2 1E-06	000
319846 alpha-HCH (alpha-BHC)	123E+03	1 42E-02	7 345-06	2 00E+00	4.35F-04	1.065-04	8 % 8 %	503 01 596 55	830 36	000,51	20-118 t	00+00
319857 beta-HCH (beta-BHC)	1 26E+03	1 42E-02	7 34E-06	2 40E-01	3 05E-05	7 44E-07		596.55	839.36	13,000	535-04	00+400
542756 1,3-Dichloropropene	4 57E+01	6 26E-02	1 00E-05	2 80E+03	7 26E-01	1 77E-02		381 15	587.38	7,000	3 7E-05	2 0E-02
606202 2,6-Dinitratoluene	6 92E+01		7 26E-06	1 82E+02	3 O6E-05	7 46⊑-07		558 00	770 00	12,938	1 9E-04	0 0E+00
52 1047 N-Mitrosodi-n-propylamine 1024573 Hentachlor econide	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06	52 20	509 60	746 87	11,000	2 0E-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3 07F-02	4 25E-00	5.625-02	3 90E-04 4 67E-01	9.515-06		613 96	848 76 1760 00	13,000	2 6E-03	0 0E+00
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6.005-06			873.31	14,127	3 2F-04	0 0E+04
11096825 Aroclar 1260 (PCB-1260)	2 90E+05	1 38E-02	4 32E-06	8 00E-02	1 89E-01	4 60E-03	3 55	402 50	539.37	19,000	1 0E-04	000+00
11097691 Aroclor 1254 (PCB-1254)	2 00E+05	1 56E-02	5 00E-06	5 70E-02	8 20E-02	2 00E-03		377 50	512 27	19,000	1 0E-04	0 0E+00
12674112 Aroclor 1016 (PCB-1016)	3 30E+04	2 22E-02	5.42E-06	4 20E-01	1 19E-02	2 90E-04	<b>52</b>	340 50	475 22	18,000	1 0E-04	00=300
23409219 Arocior 1242 (PUB-1242)	3 30E+04	2 14E-02	5 31E-06	3 40E-01	2 13E-02	5 20E-04	25 3	45 50	482 20	18,000	1 0E-04	0.06+00

VERSION 1.2 September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

×

YES

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below) S R

			· · · · · · · · · · · · · · · · · · ·
		ENTER	User-defined stratum A soil vapor permeability, k, (cm²)
			۳. °
		ENTER	A timate or lity)
		ENTER	SCS soil type directly above water table
		ENTER	Soil stratum directly above water table, (Enter A, B, or C)
į	ethane	ENTER L <sub>wt</sub> (cell D28)	Thickness of soil stratum C, (Entervalue or 0) hc (cm)
Chemical	1,1,2,2-Tetrachloroethane	NTER ENTER ENTER Totals must add up to value of L <sub>wT</sub> (cell D28)	Thickness Thickness of soil soil statum B, stratum C, (Enter value or 0) (Enter value or 0) h <sub>B</sub> h <sub>C</sub> (cm) (cm) (cm)
		ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub> (cm)
_		ENTER	Depth below grade to water table, Lwr (cm)
ENTER Initial groundwater conc. C <sub>w</sub> (µg/L)	12 19064103	ENTER Depth	below grade to bottom of enclosed space floor. Le (cm)
ENTER Chemical CAS No (numbers only, no dashes)	79345	ENTER	Average soll groundwater temperature, T <sub>s</sub> (°C)

,	2	70		0.42	0.2/	17	64	ျ
ENTER Enclosed	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
space	Sort-bldg	space	space	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
hickness,	differential,	length,	width,	height,	width,	rate		
Loren	ΔÞ	ţ,	W	ī,	*	ä		
(cm)	(g/cm-s <sup>2</sup> )	(E)	(GIII)	(ca)	(cm)	(1/h)		

ENTER
Stratum C
soil water-filled
porosity,  $\theta_{w}^{c}$ (cm<sup>3</sup>/cm<sup>3</sup>)

ENTER Stratum C soil total porosity, n<sup>c</sup>

ENTER
Stratum C
soil dry
bulk density,
P<sub>b</sub><sup>c</sup>
(g/cm³)

ENTER
Stratum B
soil water-filled
porosity,  $\theta_w^B$   $(cm^3/cm^3)$ 

ENTER Stratum B soil total porosity, n<sup>8</sup>

ENTER Stratum B soul dry bulk density, Poll (g/cm³)

ENTER
Stratum A
soil water-filled
porosity,
6,^A
(cm<sup>3</sup>/cm<sup>3</sup>)

ENTER Stratum A soil total porosity, n<sup>A</sup>

ENTER Stratum A soil dry bulk density, Po<sup>A</sup> (g/cm³)

15	40	961	961	488	0.1	0 45
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	
eraging	Averaging			Target	Target hazard	
time for	time for	Exposure	Exposure	risk for	quotient for	
archogens,	noncardinogens,	duration,	frequency,	carcinogens,	noncardinogens.	
ATc	ATre	ED	Ш	, Œ	된	
(yrs)	(yrs)	(yrs)	(days/yr)	(nutless)	(unitless)	
70	30	30	350	1 0E-06	-	
				Used to calc.	Used to calculate risk-based	
				groundwater	concentration	
				Usea to card groundwater		Used to calculate hisk-based groundwater concentration

CHEMICAL PROPERTIES SHEET

	FO	00.7500	10000	0.000 140.00 100.000 0.000.00	140.60	300 d	36	7 40E-02 7 00E-08 3 44E-04	7 005-08	7 405.00
(mg/m³)	(mg/m <sub>3</sub> )-1	(mg/L)	(cm <sub>3</sub> /g)		(%)	(cat/mol)	(ి,)	(atm-m³/mol)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)
RfC	URF	ဟ	ጜ	ř		ΔH <sub>v,b</sub>	F.	I,	ď '	<b>់</b>
couc'	factor,	solubility,	coefficient,	temperature,	point,	boiling point,	temperature,	temperature,	in water,	in air,
Reference	rlsk A	water	partition	Critical	polling	the normal	гебегелсе	at reference	Diffusivity	Diffusivity
	ž	component	carbon		Normal	vaporization at	law constant	law constant		
			Organic			Enthalpy of	Henrys	Henry's		

Floor-wall seam perimeter, X <sub>vact</sub> (cm)	3,844	Diffusion path length, L <sub>4</sub>	1509	
Water-filled porosity in capillary zone, $\theta_{w,ca}$	0 294	Total overall effective diffusion coefficient, Dof (cm <sup>2</sup> /s)	8 32E-04	
Air-filled porosity in capillary zone, $\theta_{a} = (cm^{3}/cm^{3})$	0 136	Capillary Zone Sone effective diffusion coefficient, D" a (cm²(s)	5 83E-04	
Total porosity in capillary zone, ne	0.43	Stratum C C effective diffusion coefficient, D <sup>m</sup> C (cm <sup>2</sup> /s)	5 23E-04	Reference conc., RfC (mg/m³)
Thickness of capillary zone, La	17 05	Stratum B B effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	7 95E-04	Unit nsk factor, URF (µg/m³)**
Stratum A soil effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, Deff (cm²/s)	2 90E-03	infinite source bidg conc. Chuthing (Hg/m³)
Stratum A soul relative air permeability, k <sub>re</sub> (cm²)	0 746	Vapor viscosity at ave soil temperature, µтs (g/cm-s)	1 77E-04	Infinite source source indoor attenuation coefficient, a (untiless)
Stratum A soil intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'1s (unitiess)	8 36E-03	Exponent of equivalent foundation Peciet number, exp(Pe <sup>4</sup> ) (unitiess) 7 88E+03
Stratum A effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> ).	0 419	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol)	1 98E-04	Area of crack, Area (cm²)
Stratum C soil air-filled porosity, $\theta_{\bullet}^{c}$ $(cm^3/cm^3)$	0 130	Enthalpy of vaporization at ave groundwater temperature, d.h., rs (cal/mol).	10,480	Crack effective diffusion coefficient, Done (cm²/s)
Stratum B soil air-filed porosity, $\theta_{\bullet}^{B}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 150	Crack depth below grade, Zenet (cm)	15	Average vapor flow rate into bldg , Qua (cm³/s)
Stratum A soil alr-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitless)	4 16E-04	Crack radius, frank (cm)
Source- building separation, L <sub>7</sub>	1509	Area of enclosed space below grade, A <sub>B</sub>	9.24E+05	Source vapor conc, C <sub>source</sub> (µg/m³)
Exposure duration, t	9 46E+08	Bidg ventilation rate, Quedre (cm <sup>3</sup> /s)	5 63E+04	Convecton path length, L, (cm)

#### RESULTS SHEET

INCREMENTAL RISK CALCULATIONS	
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	

Hazard quofient from vapor intrusion to indoor air, noncarcinogen (unifiess)	NA
incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	NA
Final Indoor exposure groundwater conc , (µg/L)	9 79E+02
Pure component water solubility, S	2 97E+06
Risk-based indoor exposure groundwater conc, (µg/L)	9 79E+02
Indoor exposure groundwater conc , noncarcinogen (µg/L)	AN
Indoor exposure groundwater conc , carcinogen (µg/L)	9 79E+02

ERROR SUMMARY BELOW. (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

			1			VLOOKUP TABLES	LES						
SCS Soil Type	K, (cm/h)	α (1/cm)	Sod Properties Lookup Table N (unitless) M (unitless)	ookup Table M (unitless)	θ, (cm³/cm³)	8, (cm³/cm³)	Mean Grain Drameter (cm)						
<u>υ</u> <u>τ</u>	0 20	0 008	1 09	0 083	0.38	9900	0 0092						
<u>.</u>	0.26	0 0 19	131	0 237	0 41	0 095	0 0 16						
S	2 5	0.036	156	0.359	0 43	0 078	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
Ø	29 70	0 145	2 68	0.557	0 41 1 42	0.057	0 040						
၁နှ	0 12	0 027	1 23	0 187	0.38	0 0	2000						
JOS.	131	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 48	0 324	0 39	0 100	0 029						
ī, ā	0 25	0 0 16	1 37	0.270	0 46	0 034	0 0046						
200	0 02	0 005	£ 00	0 083	0.26	0 0 0 0	0 0039						
	200	0 0 10	123	0 187	0 43	0 089	9500 0						
SI	4 42	0.020	- 1	0.231	0.45	0 065	0011						
											:		
		ola con C			Chemic	Chemical Properties Lookup Table	kup Table						
		Carbon			Pure		Henry's	Henry's			Enthalpy of		
		partition	Diffusivity	Diffusivity	water	e, do	iaw constant	law constant	Noma		vaponzation at	ië C	
		coefficient,	mair	in water.	solubility.	law constant	at reference termoeraturo	reterence	Bolling Filed	Cutical	the normal	ž į	Reference
		Y	៤	ď	S	Ì	T I	temperature,	Ĕ +	temperature, T	boiling point,	factor,	conc.
CAS No Chemical		(cm³/g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(ma/L)	(nuitless)	(atm-m³/mol)	<u>.</u> (5	<u>ء</u> ج	ပ္	4,74¢ (1,14,14,14)	- K-	בן בולי
											(cashio)	( month	(mgm)
50293 DDT		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720,75	11.000	9.7E-05	0.05+00
50328 Senzo(a)pyrene		1 02E+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 135-06	25	71590	969 27	15,000	2 1E-03	0 0 0 0 0 0
53703 Dihenzia hisothracea		1 WE-UZ	2 /35-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	52	605 28	827 85	15,000	0 0E+00	7 0E-03
56235 Carbon tetrachlonde		3 60E+00	2 02E-02 7 80E-03	9 185-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03	0 0E+00
56553 Benz(a)anthracene		3 98E+05	5 105-02	9095	9.405-03	1 25E+00	3 05E-02	25	349 90	556 60	7,127	1 SE-05	0 0E+00
		1 20E+05	1 18E-02	4 37E-06	5 50F-02	1 000-04	3345-06	52	708 15	1004 79	15,000	2 1E-04	0 0E+00
		1 07E+03	1 42E-02	7.34E-06	6 80E+00	5 746-04	1 40E-05	2, 2,	506 55	885 73	13,000	3 7E-04	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
60571 Dieldrin		2 14E+04	1 25E-02		1 95E-01	6 19E-04	151E-05	52	613.32	842.25	13,000	40.17.4	00+400
63850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	52	720 00	751 00	10,000	0 OE+00	146+01
67663 Chlonform		3 (SEC)	1 24E-01		1 00E+06	1 59E-03	3 88E-05	22	329 20	508 10	6,955	00+300	3 5 6 01
67721 Hexachloroethane		1 78E+03	2 50 11 53	1 00E-05	/ 92E+03	1505-01	3 66E-03	72	334 32	536 40	6,988	2 35-05	0 0E+00
71363 Butanol		6 92E+00	8 00E-02		7 40F+04	3.53E-01	3885-03	52.5	458 00	695 00	9,510	4 OE-06	00+300
71432 Benzene		5 89E+01	8 80E-02		1 75E+03	2 28E-01	5,56,03	3 5	353 24	563 US	10,346	00E+00	3 5E-01
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02		1335+03	7 05E-01	1 72E-02	52	347.24	545 PO	7 136	97490	00+100
72/26 Methodichler		1 23E+04	1 256-02		2 50E-01	3 08E-04	7.51E-06	25	71815	986 20	12,000	000+00	1 15-03
72548 DDD		3 //#+U4	1 565-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0 0E+00	1 8E-02
72559 DDE		4 47E+06	1 44E-02		3 005-02 1 20E-01	8 6.1E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05	0 0E+00
74839 Methyl bromide		1 05E+01	7 285-02		1 52E+04	2.568-01	2 10E-03 6 34E-03	9 8	636 44	86038	13,000	9 7E-05	0 0E+00
75014 Vinyl chloride (chloroethene)	sue)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2.715-02	, K	259.75	00 / 64	5,714	000-100	5 0E-03
75092 Methylene chlonde		1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	32 2	313 00	510 00	0,430	4 4 CO	001100
75750 Carbon disuffide		4 57E+01	1 04E-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	22	319 00	552 00	6.391	0.05+00	7 05-01
75274 Bermodichloremethers		8 /15+01	1 49E-02	1 03E-05	3 10E+03	2 195-02	5 345-04	25	422 35	00 969	9,479	1 16-06	0 OE+00
75343 11-Dichlomethans		3 156 101	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 8E-05	00-900
75354 1.1-Dichloroethylene		3 10E+01	7 4ZE-0Z	1 05E-05	5 06E+03	2 30E-01	561E-03	52	330 55	523 00	6,895	0 0E+00	5 0E-01
76448 Heptachlor		1 41E+06	1 12F-02	5.695.06	2 20E+03	1 U/E+00	2 61E-02	52	304,75	576 05	6.247	5 OE-05	0 0E+00
77474 Hexachlorocyclopentadiene	ē	2 OOE+05	1 61E-02	7 21E-06	1 80E+00	1 115+00	1 08E-03	8 8	603 69	84631	13,000	13E-03	0 0E+00
78591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6.635-06	5 5	21 7 10 488 35	715 00	10,931	00F+00	7 0E-05
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7 590	7040	0 0E+00
70046 Trablemethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 746-02	9 12E-04	25	386 15	602 00	8,322	1 6F-05	00-110
79345 1,1,2,2-Tetrachloroethane		9 33E+01	7 10F-02	9 10E-06 7 90E-06	1 10E+03	4 22E-01	1 03E-02	25	360 36	544 20	7,505	1 7E-06	
83329 Acenaphthene		7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	3 44 E-U4	50 K	419 60 550 54	661 15	966'8	5 8E-05	
					ı I	)		3	200	60 500	12,155	0 0E+00	2 16-01
						!							•

	2 8E+00	3.5E-01	7 OE-01	0 0 0 0	1 4臣-01	0 0E+00	0 0 0 0	000	4 4 F-04	001+00	7 OE+00	1 8E-01	2.0E-01	1.8E-02	3 5 5 0 1	2 OE-03	00+100	7 OF-02	7 OE+00	8 0E-01	1 4E-02	0 0E+00	Z 0E-01	00+00	4 UE-01	2 15 +00	001100	2 15-02	0 0E+00	7 0E-02	0 0E+00	1,1E+00	2 0E-01	1 1E-02	00+00	00+400	116-01	3 5E-02	7 0E-02	000	001100	000+00	00+100	000+00	0 0E+00	0 0E+00	2 0E-02	0.05+00	00+00	20000	0 0 = +00	0 0E+00	0 0E+00	00E+00	
	0 0E+00	00=+00	0 00+00	1 4E-06	0 0E+00	5 7E-06	2 2E-05	3 4E-05	20-11-0	13F-04	0000	0 0E+00	0 0E+00	<u>0</u> 0 <u>E</u> +00	0 OE+00	000+00	00+110	00E+00	0.0E+00	0 0E+00	0 0E+00	2 6E-05	00400	004		00+00	3.3E-04	0 0E+00	4 OE-06	0 0E+00	4 6E-04	0 0E+00	900	0.000	1 90-04	7 P P C C C C C C C C C C C C C C C C C	00100	0.0E+00	0 OE+00	2 1E-04	2.15-04	2 15.05	2 15-06	4 9E-03	1 8E-03	5 3E-04	3 7E-05	1 9E-04	2 00.03	2 00400	3 2E-04	1 OE-04	1 0E-04	1 0E-04	
	13,733	14,751	13,000	13,000	12,666	13,977	10,206	14,000	10.373	13,000	8,661	10,800	9,700	9,572	13,000	10,566	9 737	11,329	8 525	9,271	11,689	7,643	008,	6,523	0.87	10.920	000.6	14,000	15,999	15,000	14,447	13,121	10,471	11,000	13,467	9,000	14.370	7,192	6,717	17,000	15,000	16,010	16.455	13,000	13,000	13,000	2,000	12,938	11,000	13,000	14,000	19,000	19,000	18,000 18,000	
	757 00	798 67	839 68	890 45	870 00	899 00	738 00	279.02	748 40	754 03	630 30	09 269	705 00	675 00	759 13	719 00	636.00	707 60	616 20	684 75	754 00	561 00	019 13	60 7 03	537.40	694.20	62 629	942.94	806 00	862 22	825 00	873 00	725 00	708.17	678 30	620.20	936 00	544 00	516 50	1078 24	969.27	1019 70	01.818	839.37	839 36	839 36	587 38	270 00	746 87	1750.00	873.31	539 37	512 27	475 22 482 20	
	567 15	613 15	09 099	632 28	570 44	627 87	486 15	510 15	491 14	560 26	417 60	464,19	453 57	447 53	526 15	483.95	418.31	484 13	411 52	447 21	503 65	356 65	4100	25 79	404 R7	455.02	451 15	674 43	657 15	704 09	582 55	615 18	486 15	482 15	290,00	394 40	667 95	333 65	320 85	809 15	D6 GL/	753 15	714 15	603 01	596 55	596 55	381 15	558 00	509 60	98 900	657 15	402 50	377 50	340 50 345 50	
	25	25	52	25	52	83	52 1	8 %	2 22	52	25	25	25	52	52	2 4	3 2	22	56	52	52	52	9 %	3 6	3 %	3 5	22	22	22	52	52	52	52	52	9 4	3 5	22	52	52	52	2 2	3 %	2 12	122	25	52	52	25	52	8 8	25.55	22	25	55 55 54	
	4 51E-07	9 39E-10	1 26E-06	\$ 00E-06	6 37E-05	1 53E-08	8 15E-03	2 44E-06 7 78E-06	4 83E-04	4 00E-09	5 20E-03	1 20E-06	1 90臣-03	3 90E-04	4 345-06	2 40E-U5 2 88E-03	2.76E-03	2 00E-06	7 66E-03	2 43E-03	3,32E-07	9 78E-04	7 345-03	24 E E E E E E	3 71 11-03	3.98F-07	1 80E-05	1 12E-05	1 02E-07	6 68E-05	1 32E-03	6 51 E-05	1 42E-03	3 17E-06	9 Z/E-08	1 84F-02	1 10E-05	4 07E-03	9 39E-03	1 605-06	1115-04	8 29F-07	9.46F-05	1 70E-04	1 06長-05	7.44E-07	1 77E-02	7 46E-07	2 25 5-06	9 510-06 4 440-05	90-300 9	4 60E-03	2 00E-03	2 90E-04 5 20E-04	
VLOOKUP TABLES	1 85E-05	3 85E-08	5 17E-05	2 05E-04	2.61E-03	6 26E-07	3345-01	3 195-06	1 98E-02	1 64E-07	2 13E-01	4 92E-05	7 79E-02	1 60E-02	1 /8E-04	3 23E-04	1 13E-01	8 20E-05	3 14E-01	9 96E-02	1 36E-05	4 U1E-U2	2 01E-02	2 72 E-01	152F-01	1 63E-05	7 38E-04	4 59E-04	4 18E-06	2 74E-03	5 41E-02	2 67E-03	5 82E-02	1,305-04	3 3 4 11 0 0	7.54E-01	451E-04	1 67E-01	3 85E-01	6 56E-05	4 55E-03	3.40E-05	3 885-03	6 97E-03	4 35E-04	3 05E-05	7 26E-01	3 06E-05	9 23 5-05	3 90E-04	2 46E-04	1895-01	8 20E-02	1 19E-02 2 13E-02	
>	1 08E+03	1 12E+01	2 69E+00	3 51E+01	1 98E+00	7 48E+00	3 23E+00	8 00F+02	3 10 -01	3 11E+00	1 78E+02	2 60E+04	1 56E+02	2 20E+04	1 20E+03	2 USE+U3	3.10E+02	7 87E+03	1 85E+02	7 38E+01	5 30E+03	8 52E+03	1616+02	5 26E±02	4 72E+02	8 28E+04	1 72E+04	5 10E-01	3 40E-01	2 00E-02	6 20E+00	4 34E-02	3 00E+02	4 50E+03	2 705+02	2 00F+02	135E-01	3.50E+03	6 30E+03	2 20E-05	200-03	8 00F-04	1 60F-03	1 80E-01	2 00E+00	2 40E-01	2 80E+03	1 82E+02	9 89E+03	7.00E-01	7 40E-01	8 00E-02	5 70E-02	4 20E-01 3 40E-01	
	6 35E-06	7 86E-06	4 83E-06	6 355-06	7 88E-06	7 03E-06	6 16E-06	6.255-06	7 50E-06	6 74E-06	1 00E-05	8 30E-06	7 90E-06	9 46E-06	/ 03E-06	8 50E-05	8 00E-06	8 69E-06	8 44E-06	7 90E-06	1 01E-05	9.000.00	3,205-00 7,80E-06	200 K	8 70E-06	9.10E-06	7 53E-06	4 55E-06	3 66E-06	3 58E-06	5 91E-06	7 74E-06	8 23E-06	8 //E-U6	1055.05	8 20E-06	7 24E-06	1.13E-05	1 19E-05	5 66E-06	2 22E 0	5.56F-06	8 21F-06	4 86E-06	7 34E-06	7 34E-06	1,00E-05	7 26E-06	8 17E-06	4.23E-06	4 34E-06	4 32E-06	5 00E-08	5 42E-06 5 31E-06	
	2 56E-02	4 38E-02	1 74E-02	3 12E-02	3 63E-02	3 90E-02	5 61E-02	3 18F-02	5 90E-02	1 94E-02	8 70E-02	7 40E-02	6 90E-02	5 01E-02	2916-02	7.505-02	7 10E-02	5 84€-02	7 695-02	6 905-02	4 83E-02	104H-01	7 00E-02	8 70E-02	7.30E-02	8 20E-02	6 92E-02	1 15E-02	3 51E-02	151E-02	5 42E-02	3 24E-02	3 00E-02	3 465-02	1 965.07	7 205-02	2 72E-02	7 36E-02	7 07E-02	1 90E-02	70-E-07	2 26F-02	2 48F-02	1 32E-02	1 42E-02	1 42E-02	6 26E-02	3 27E-02	5 45E-02	3.07E-02	1 16E-02	1 38E-02	1 56E-02	2 22E-02 2 14E-02	
	2 88E+02	3 39E+04	5,75E+04	1 29E+03	1 38E+04	3 396+03	5 37 E+04	3.81F+02	2 00E+03	7 24E+02	3 63E+02	9.12E+01	6 17E+02	3 88E+02	1 605+03	3 63E+01	7 76E+02	2 09E+02	3 89E+02	6 17E+02	6 61E+01	1 /4E+01	4 07E+03	1 87E+02	2 19E+02	2 88E+01	1 55E+01	2 14E+03	1 51E+07	8 32E+07	5 50E+04	2 95E+04	1 78E+03	14/6+02	8 346+01	1.55E+02	1 05E+05	3 55E+01	5,25E+01	3,47E+06	1 235+06	1235+06	3 98F+05	2 45E+06	1 23E+03	1 26E+03	4 57E+01	6 92E+01		5 32E+04	2 57E+05	2.90E+05	2 00E+05	3 30E+04 3 30E+04	
	84662 Diethylphthalate		85687 Butyl benzyl phthalate	86306 N-Nitrosodiphenylamine	86737 Fluorene	86748 Carbazole	87683 Hexachloro-1,3-butadiene	88062 2.4.6-Trichloroxhanol	91203 Naphthalene	91941 3,3-Dichlorobenzidine	95476 o-Xylene		95501 1,2-Dichiorobenzene	95578 2-Chlorophenol	93834 Z.4.3-Trichlorophenol	100414 Ethylbenzene	100425 Styrene	105679 2,4-Dimethylphenol		106467 1,4-Dichlorobenzene	106478 p-Chloroaniine	10705Z 1,Z-Dicnioremane	108383 m-Xvlene	10883 Toliene	108907 Chlorobenzene		111444 Bis(2-chloroethyl)ether	115297 Endosulfan	117817 Bis(2-ethylhexyl)phthalate	117840 Di-n-octyl phthalate			120821 1,2,4-Trichlorobenzene	120532 Z,4-Dichlorophenol	124481 Chiendhromethae		129000 Pyrene	156592 cis-1,2-Dichloroethylene	156605 trans-1,2-Dichtoroethylene	193395 Indeno(1,2,3-cd)pyrene	205392 Senzo(b)ildoranmene	207089 Benzo(k)fluoranthene	218019 Chrysene	309002 Aldrin	319846 alpha-HCH (alpha-BHC)	319857 beta-HCH (beta-BHC)	542756 1,3-Dichloropropene	505202 Z,5-Dinitrototuene	621647 N-Nitrosodi-n-propylamine	102457.5 Replacifier epoxice 7439976 Merchy (elemental)	8001352 Toxaphene	11096825 Aroctor 1260 (PCB-1260)	11097691 Aroctor 1254 (PCB-1254)	12674112 Aractor 1016 (PCB-1016) 53469219 Aractor 1242 (PCB-1242)	

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

VERSION 12 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

		ENTER	User-defined stratum A soil vapor permeability, k, (cm²)
		ENTER	stratum A SCS soil type (used to estimate OR soil vapor permeability)
		ENTER	SCS soil type directly above water table
		ENTER	Soil stratum directly above water table, (Enter A. B. or C)
	ride	ENTER Lwr (cell D28)	Thickness of soil stratum C, (Enter value or 0) h <sub>c</sub> (cm)
Chemical	Methylene chloride	NTER ENTER ENTER TOTAL (Cell D28)	Thickness   Thickness   Thickness   of soil   of soil   of soil   of soil
		ENTER Totals mus	Thickness of soil stratum A, h <sub>A</sub> (cm)
		ENTER	Depth below grade to water table, Lwn (cm)
ENTER Inttal groundwater conc, C <sub>W</sub> (µgf.)	9 843137255	ENTER Depth	below grade to bottom of enclosed space floor, L (cm)
ENTER Chemical CAS No (numbers only, no dashes)	75092	ENTER	Average soil/ groundwater temperature, Ts (°C)

15	0 43	0.2	17	0 42	0.27	11	L	0 43	L	03
ENTER	ENTER	ENTER	ENTER	FRTER	ant Na	0 11 20				
Enclosed		Enclosed	Enclosed							
space	Soil-bidg	space	space	Enclosed	Floor-wall	Indoor				
floor	pressure	floor	floor	SDace	seam crack	air exchange				
thickness,	differental,	length,	width,	height,	width.	rate				
	Φ	٦	W	· £°	*	E E				
(B)	(g/cm-s <sup>2</sup> )	(EE)	(cm)	(E)	(m)	(10)				

ENTER
Stratum C
soil water-filled
porosity,  $\theta_w^c$   $(cm^3/cm^3)$ 

ENTER Stratum C soil total porosity,

ENTER Stratum C soil dry bulk density, P<sub>C</sub> (g/cm<sup>3</sup>)

ENTER
Stratum B
soil water-filled
porosity,

ENTER Stratum B soil total porosity,

ENTER Stratum B soil dry bulk density, PB (g/cm³)

ENTER
Stratum A
soil water-filled
porosity,  $\theta_w^A$ (cm³/cm³)

ENTER Stratum A sof total porosity.

ENTER Stratum A soil dry bulk density, ps.<sup>4</sup> (g/cm³)

e e (cm³/cm³)

ATT NI		
risk for		Exposure
		EF EF
1	(days/yr)	(yrs) (days/yr)
-	350	30 350
	320	
~ ~ I I	Exposure frequency, EF (days/yr)	

### CHEMICAL PROPERTIES SHEET

Reference conc , RfC	(mg/m³)	3.0E+00
Unit risk factor, URF	(mg/m <sub>3</sub> ) 1	4 7E-07
Pure component water solubility, S	(mg/L)	1 30E+04
0 - 48	(cm³/g)	1 17E+01
Critical temperature, T <sub>c</sub>	(°K)	510 00
Normal boiling point,	(%K)	313 00
Enthalpy of vaponization at the normal boiling point, $\Delta H_{v,b}$	(cal/mol)	6,706
Henry's law constant reference temperature, T <sub>R</sub>	(၁့)	25
Henry's law constant at reference temperature,	(atm-m³/mol)	2 19E-03
Diffusivity in water, D <sub>w</sub>	(cm <sup>2</sup> /s)	1 17E-05
Diffusivity In air, D.	(cm <sub>2</sub> /s)	1.01E-01

Floor-wall seam penmeter, Xunck (cm)	3,844	Duffusion path length, L <sub>d</sub> (cm)
Water-filled porosity un capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 294	Total overall effective diffusion coefficient, Defr (cm²/s)
Aur-filed porosity in capillary zone, $\theta_{a,cd}$ $(cm^3/cm^3)$	0 136	Capillary  zone effective diffusion coefficient, Deff (cm²/s)
Total porosity in capillary zone, $r_{ca}$	0 43	Stratum C effective diffusion coefficient, D="c (cm²/s)  630E-04  Reference conc, RfC (mg/m³)
Thickness of capitlary zone, La	17.05	Stratum B effective diffusion coefficient, D== 8 (cm²/s) 1 05E-03 Unit nsk factor, URF (µg/m³) 1
Stratum A solt effective vapor permeability, k,	6 98E-10	Stratum  A effective diffusion coefficient, Deff (cm²/s) 4 10E-03  Infinite source bidg. conc. Cwaters (µg/m³)
Stratum A soil relative air permeability, k <sub>re</sub>	0 746	Vapor viscosity at ave soil temperatura, Hrs (g/cm-s) 177E-04 Infinite source indoor attenuation coefficient, $\alpha$ (unitless)
Stratum A soft infunsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (untless)  6.40E-02  Exponent of equivalent foundation Pecter number, exp(Pe) (untless)
Stratum A effective total fuid saturation,  S <sub>ie</sub> (cm³/cm³)	0 419	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol) 152E-03 Area of crack, Area (cm²) 384E+02
Stratum C soul aur-filled porosity, $\theta_a^c$ (cm³/cm³)	0 130	Enthalpy of vaporization at ave groundwater temperature, d.H., 15 (cal/mol) 6,970 Grack effective diffusion coefficient, Darek (cm²/s) 4,10E-03
Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	0.150	Crack depth below grade, Zosek (cm)  15  Average vapor flow rate into bldg, Qua (cm³/s)
Stratum A soll atr-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, 1 (unitless) 4 16E-04 Crack radius, fores (cm)
Source- building separation, L <sub>T</sub>	1509	Area of enclosed space below grade, A <sub>e</sub> (cm²) Source vapor conc. C <sub>cores</sub> (µg/m³)
Exposure duration, r (sec)	9 46E+08	Bldg ventillation rate, Quadra (cm³/s)  Convection path length, Lp (cm)

#### RESULTS SHEET

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INCREMENTAL RISK CALCULATIONS,

Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
Incremental risk from vapor Intrusion to indoor air, carcinogen (unitiess)
Final indoor exposure groundwater conc, (µg/L)
Pure component water solubility, S (µg/L)
Risk-based indoor exposure groundwater conc, (µg/L)
Indoor exposure groundwater conc, noncarcinogen (µg/L)
Indoor exposure groundwater conc , carcinogen (µg/L)

ERROR SUMMARY BELOW (BO NOT USE RESULTS IF ERRORS ARE PRESENT)

K, (cm/h) 0 20 0 26 1 04 1 4 59 2 9 70 0 13 1 1 3 1	(cm/h) \(\alpha\) (1/4m) (020 0.008 0.019 0.019 0.019 0.019 0.019 0.019 0.014 0.025 0.025 0.025 0.016 0.025 0.016 0.025	Soil Properties Lookip Table N (unitless) M (unitless) N (unitless) M (unitless) N (1131 0.23') N 1.56 0.35' N 2.28 0.56' N 2.68 0.62' N 1.48 0.32' N 1.48 0.32'	M (unuless) 0 083 0 237 0 237 0 248 0 627 0 187	θ. (cm³/cm³) 038 041 041 043 043 043 043 046	6, (cm³/cm³) 0 068 0 095 0 078 0 057 0 045 0 100 0 100 0 030	Mean Grain Diameter (cm) 0 0092 0 016 0 020 0 040 0 040 0 044 0 044 0 045
0		-	_			0 0038
00		0 123				0 0056
4		og r	0.474	0.44		000

				Chemic	Chemical Properties Lookup Table	p Table						
	Organic			Pure		Henry's	Henry's			Enthaloy of		
	carbon			component		law constant	law constant	Normat		vanonzation at	Lind	
	partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	Political	Critical	the nomet	<u> </u>	Ooforonco
	coefficient,	in air,	in water,	>	law constant	temperature.	temperature.	Boint &	temperature	boding point	factor	COUL
	پر	<b>"</b>	្នំ	တ	Ì	·	F,	Fª	Tc	ΔH,	URF	. S
CAS No Chemical	(cm <sub>3</sub> /g)	(cm <sup>2</sup> /s)	(cm²/s)	(mg/L)	(unitless)	(atm-m³/mol)	(၁)	( <del>K</del>	( <del>K</del> )	(cat/mol)	(mg/m³).1	(mg/m³)
50293 DDT	2 635+06	137E-02	4 95F-06	2505.02	9 32E_04	80 110+ 8	ä	4004	35.005	4000	40	000
50328 Benzo(a)ovrene	1025+06	4 30 11.00	90 100 0	1 62 1 02	4 625 05	20 10: 0	3 6	250	2077	000'11	CD-11/ F	0.0=+00
51285 24 Diellropherod	00.100	10000	00-100-0	50-101-0	4 05 FO	1135-06	S :	15.90	969 27	15,000	2 1E-03	0000
62203 Diton-(a b)-cat-	20-200 I	20-35-02		Z /9E+U3	1 825-05	4 44E-07	25	605 28	827.85	15,000	0 0E+00	7 0E-03
ostos Cubenz(a,n)anunacene	3 80E+06	2 02E-02		2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16,000	2 1E-03	0 0E+00
55235 Carbon tetrachlonde	1 74E+02	7 80E-02		7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7,127	1 55-05	00000
50553 Benz(a)anthracene	3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	15,000	2 1E-04	0 0E+00
57749 Chlordane	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4.85E-05	25	624 24	885 73	13,000	3.7E-04	000+00
58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04	0.000
60571 Dieldrin	2 148+04	1 25E-02	4.74E-06	195E-01	6 19E-04	1 51E-05	25	613 32	842 25	13,000	4 6E-03	00000
65850 Benzoic Add	6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10.000	0 0E+00	1 4E+01
67641 Acetone	5.75E-01	1 24E-01	1 14E-05	1 00E+06	1 595-03	3 88E-05	25	329 20	508 10	6,955	000+00	3.5E-01
67663 Chloroform	3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	52	334 32	536 40	6.988	2 35-05	0 0E+00
67721 Hexachloroethane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 88E-03	25	458 00	695 00	9.510	4 OF OB	001100
71363 Butanol	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	25	390.88	563.05	10.346	0.05+00	2 5E-04
71432 Benzene	5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7.342	8 3F-06	000+000
71556 1,1,1-Trichloroethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545.00	7 136	004-00	00400
72208 Endrin	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	718 15	986 20	12,000	00+00	1 16.03
72435 Methoxychlor	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14.000	0.05+00	18F-02
72548 DDD	1 00E+06	1 69E-02		9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	6 95-05	00F+00
72559 DDE	4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44	86038	13,000	9 7E-05	0.000
74839 Methyl bromide	1 05E+01	7 285-02	1.21E-05	1 52E+04	2 56E-01	6 24E-03	25	276 71	467 00	5,714	005+00	5 DE-03
75014 Vinyl chlonde (chloroethene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 11 1 + 00	2 71E-02	25	259 25	432 00	5,250	8 4E-05	0 0E+00
/5092 Methytene chlonde	1175+01	1015-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	313 00	510 00	6,706	4 7E-07	3 0 € +00
75150 Carbon disuride	4 57E+01	1046-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	25	319 00	552 00	6,391	0 0E+00	7 0E-01
/ Significant	8 71E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	25	422 35	00 969	9,479	1 15-06	00+300
75274 Bromodichionethane	5 50E+01	2 98E-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363 15	585 85	2,000	1.8E-05	0 0 0
/5343 1,1-Oidnorbethane	3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	25	330 22	523 00	6,895	0 0E+00	5 0E-01
75354 1,1-Utchloroethylene	5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	304,75	576 05	6,247	5 0E-05	0 0E+00
76448 Heptachior	141E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	84631	13,000	1 3E-03	0 0E+00
77474 Hexachlorocyclopentadiene	2 00E+05	1 61E-02	7 21E-06	1 80E+00	1 11E+00	2 71E-02	52	512 15	74600	10.931	0.05+00	7 OF-05
78591 Isophorone	4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10 27 1	2 7F-07	001100
78875 1,2-Dichloropropane	4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	52	369 52	572 00	7.590	0.05+0.0	A OF 03
79005 1,1,2-Trichloroethane	5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602.00	8 222	1.65	20100
79016 Trichloroethylene	1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 035-02	25.	36036	544.20	7,505	4 4 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	00+110
79345 1,1,2,2-Tetrachloroethane	9 335+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44 6-04	52	41960	661 15	960	2001	00100
83329 Acenaphthene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803.15	13.50	00000	00000
									<u>}</u>	<u> </u>	200	4 1 2

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

OR.

YES

ENTER YES

ENTER

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater cond below)

VERSION 12 September, 1998

		ENTER	User-defined stratum A soil vapor permeability, $k_v$ (cm²)	
			<b>6</b> OR	П
		ENTER Sail	stratum A SCS Soil type (used to estimate soil vapor permeability)	S
		ENTER	SCS soil type directly above water table	S
		ENTER	Soil stratum directly above water table, (Enter A. B. or C)	0
	ethylene	ENTER (Lwt (cell D28)	Thickness Thickness of soil stratum B, stratum C, (Enter value or 0) (Enter value or 0) h <sub>b</sub> h <sub>C</sub> (cm)	792 48
Chemical	trans-1,2-Dichloroethylene	INTER ENTER ENTER Totals must add up to value of L <sub>wT</sub> (cell D28)	Thickness of soil stratum B, (Enter value or 0)	96 09
	T tr	ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub>	670 56
		ENTER	Depth below grade to water table, Lwr (cm)	1524
Initial groundwater conc , Cw (µg/L)	10 70764706	ENTER Depth	below grade to bottom of enclosed space floor, Le (cm)	15
Chemical CAS No (numbers only, no dashes)	156605	ENTER	Average soul groundwater temperature, T <sub>S</sub>	16

15	043	0.2	17	0.42	0.27	1.7	0 43	03
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		
space	Soil-bidg pressura	space floor	space	Enclosed	Floor-wall	indoor		
thickness,	differential,	length,	width,	height,	width,	rate.		
, com	ΔP	Ţ,	×	£	*	<b>E</b>		
(cm)	(g/cm-s²)	(cm)	(cm)	(cm)	(cm)	(1/h)		
5	40	961	961	488	01	0.45		
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER			
time for archogens,	time for noncarcinogens,	Exposure duration,	Exposure frequency,	nsk for cardinogens,	quotient for noncarcinogens,			

ENTER
Stratum C
soal water-filled
porosity,
θ<sub>w</sub><sup>c</sup>
(cm<sup>3</sup>/cm<sup>3</sup>)

ENTER Stratum C soil total porosity, n<sup>c</sup>

ENTER Stratum C soll dry bulk density, p<sub>o</sub><sup>c</sup> (g/cm³)

ENTER Stratum B soil water-filled porosity,

ENTER Stratum B soil total porosity,

ENTER Stratum B soil dry bulk density, Pa (g/cm³)

ENTER
Stratum A
soll water-filled
porosity, bu

ENTER Stratum A soil total porosity,

ENTER
Stratum A
soil dry
bulk density,

(a/cm<sup>3</sup>)

θ<sub>.</sub><sup>B</sup> (cm³/cm³)

quotient for noncarcinogens, THO	(Claudes)	-	Used to calculate risk-based	groundwater concentration	1 of 7
nsk for cardinogens, TR	(See an an an an an an an an an an an an an	1 0E-06	Used to calcu	groundwater	
Exposure frequency, EF	10000	350			
Exposure duration, ED (vrs)		30			
time for noncarcinogens, AT <sub>NC</sub> (vrs.)		30			
time for carcinogens, AT <sub>C</sub> (vrs)		20			

	Reference	conc.	S <sub>C</sub>	(mg/m³)		7 05 00
Ę	risk	factor,	AR.	(µg/m³)-1		001000
component	water	solubility,	S			R SOFTOS
carbon	partition	coefficient,	ૠુ	(cm <sub>3</sub> /g)		5 25E401
	Critical	temperature,	Ļ	(R)		518 ED
Normal	polilng	point,	۳	(k)		320 AE
vaporization at	the normas	boiling point,	ΔН,	(cal/mol)		6 717   320 RF   516 F0   5 25E+01   8 30E+03   0 0E+00   7 0E-00
law constant	reference	temperature,	۳			25
law constant	at reference	temperature,	I	(atm-m³/mol)		7.075-02 1.195-05 9.395-03
	Diffusivity	ın water,	_**	(cm <sup>2</sup> /s)		1 19E.05
	Diffusivity	in air,	ជំ	(cm <sup>2</sup> /s)		7 07E-02
	law constant law constant vaporization at Normal carbon componen	law constant law constant vaporization at Normal carbon component Unit Diffusivity at reference reference the normal boiling Critical partition water risk	law constant law constant vaporization at Normal carbon component Unit Diffusivity at reference reference the normal boiling Critical partition water risk in water temperature, temperatur	law constant law constant vaporization at Normal carbon component Unit Diffusivity at reference reference the normal boiling Critical partition water risk in water, temperature, temperature, boiling point, temperature, coefficient, solubility, factor, $D_{\rm w}$ H $T_{\rm R}$ $\Delta H_{\rm Vb}$ $T_{\rm B}$	law constant law constant vaporization at Normal carbon component Unit Diffusivity at reference reference the normal boiling Critical partition water risk in water text temperature, temperature, boiling point, temperature, coefficient, solubility, factor, $D_w$ H $T_R$ $\Delta H_{v,b}$ $T_B$ $T_C$ $K_{cc}$ $S$ URF $(cm^2/s)$ $(atm\cdot m^3/mol)$ $(^{\circ}C)$ $(cal/mol)$ $(^{\circ}K)$ $(^{\circ}K)$ $(cm^3/g)$ $(mg/L)$ $(\mu g/m^3)^{-1}$	law constant vaporization at Normal carbon reference the normal boiling Critical partition temperature, boiling point, temperature, coefficient, $T_R$ $\Delta H_{\rm vb}$ $T_8$ $T_{\rm c}$ $K_{\rm cc}$ (°C) (cal/mol) (°K) (°K) (cm³/g)

Floor- wall seam permeter, Xees	3,844 Diffusion path length, La	1509
Water-filled porosity in capillary zone, 8, ∞ α (cm³/cm³)	Total overall effective diffusion coefficient, Deff.	7 06E-04
Aur-filled porosity in capillary zone, $\theta_{\bullet, ca}$ $(cm^3/cm^3)$	Capillary Zone effective diffusion coefficient, Deff cm²/s)	98 6 6 6 7 7
Total porosity in capillary zone, net (cm³/cm³)	Stratum C effective diffusion coefficient, Deff (cm²/s)	Reference conc , RfC (mg/m³)
Thickness of capitary zone, La	Stratum B B effective diffusion coefficient, D eff (cm²/s)	7 26E-04 Unit nsk factor, URF (µg/m³)"
Stratum A soul effective vapor permeability, k, (cm²)	Stratum A effective diffusion coefficient, Deff (cm²/s)	1.97E-03 Infinite source bldg conc. Chading (μg/m³)
Stratum A soil relative air permeability, k <sub>re</sub> k <sub>re</sub>	Vapor viscosliy at ave soil temperature, Hrs (g/cm-s)	Infinite source indoor attenuation coefficient, a (unitless)
Stratum A soil intunsic permeability, k	9 36E-10 Henry's law constant at ave groundwater temperature, Hrs (unitless)	Exponent of equivalent foundation Peciet number, exp(Pe <sup>1</sup> ) (unitless)
Stratum A effective total fluid saturation, S <sub>a</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Henry's law constant at ave, groundwater temperature, Hrs (atm-m³/mol)	Area of crack, Area (cm²)
Stratum C soil air-filled porosity, $\theta_a^c$ $(cm^3/cm^3)$	0 130 Enthalpy of vaportzation at ave groundwater temperature, ΔH <sub>v.15</sub> (cal/mol)	7,073  Crack effective diffusion coefficient, Drack (cm²/s)
Stratum B soil aur-filled porosity, $\theta_{a}^{B}$ (cm³/cm³)	Crack depth below grade, Zonek (cm)	Average vapor flow rate into bldg , Qual (cm <sup>3</sup> /s)
Stratum A soil air-filled porosity, $\theta_a^A$ (cm³/cm³)	Crack-to-total area ratio, n	4 16E-04 Crack radius, radius, (cm)
Source- building separation, L <sub>T</sub>		9 24E+05. Source vapor conc., Casarce (µg/m²)
Exposure duration, t	. Ti	5 63E+04 Convection path length, L <sub>p</sub> (cm)

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SK CALCULATIONS	Hazard quotient from vapor infrusion to indoor air, ioncarcinogen (unitless)	YA.
INCREMENTAL RISK CALCULATIONS	Incremental nak from vapor intrusion to indoor air, carcinogen (unitless)	¥2.
LATIONS	Final indoor exposure groundwater conc (ug/L)	3 / 35 704
ATION CALCU	1 H	-1
R CONCENTR	Risk-based Pure Indoor component exposure water groundwater solubility, S conc. (ug/L) (ug/L)	1 J. J.
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS	Indoor exposure groundwater conc, noncarcinogen (µg/L)	1
RISK-BASE	Indoor exposure groundwater conc , carcingen (µg/L)	

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

4 of 7

		ľ	Soil Omeration   and a Table	Toble		VLOOKUP TABLES	LES					
SCS Soil Type	K, (am/h)	a (1/cm)	N (unitiess)	M (unitiess)	θ, (cm³/cm³)	0. (cm³/cm³)	Mean Grain Diameter (cm)					
0 0	0.20	9000	1 09	0 083	0 38	0 068	0 0092					
<u>.</u>	0 26	0 019	131	0 237	041	0 095	0 0 1 6					
- <u>-</u>	를 등 등	0.036	1 56	0 359	0 43	0 078	0 020					
ີ່ທ	14 56 65 65	0.124	2 28	0 561	041	0 057	0 040					
SC	53.0	0 143	202	0.627	0 43	0.045	0 044					
SCL	13.5	0,059	48	0.324	880	5 5	0 025					
ī	0 25	0 016	1 37	0.270	0.46	25.0	0.0046					
SIC	0 02	0 005	1 09	0.083	0 26	0200	0003					
ואוכר ואוכר	0 07	0 010	1 23	0 187	0.43	0 089	0 0056					
SL	0 45 4 42	0 020	141	0 291	0 45	790 0	0 0 11					
			3			200.0	0.030					
					Chemica	Chemical Properties Lookup Table	okup Table					
		Crganic			Pula		Henry's	Henry's			Enthalpy of	
		Cartificati	Duff leboth.	9.6	component	4	law constant	law constant	Normal		vaponzation at	ij
		coefficient	Cilidalvity	United Styles	Water	Henrys	at reference	reference	poiling	Cntrcal	the normal	пsk
		Ā	۵	, D	_	iaw Constant H	temperature, H	temperature, T.	Doini,	temperature,	botling point,	factor,
CAS No Chemical		(g/ <sub>s</sub> mo)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(nutless)	(atm-m³/mol)	د ق	<u>.</u> €	ر م چ	ΔH <sub>v,b</sub>	14. 1. (1.)
100 0000											(cannot)	(mg/m)
50328 Benzo(a)ovrede		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9.7E-05
51285 2,4-Dirutrophenol		1 00E-02	2 73F-02	90-300 6	1 62E-03	4 63E-05	1 13E-06	52 51 51 51	715 90	969 27	15,000	2 1E-03
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 / 3E-03	6.035-03	4 44E-U/	25	605 28	827 85	15,000	0.06+00
56235 Carbon tetrachlonde		174E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3.05F-02	2, 2,	349 90	990 41	16,000	2 1E-03
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	137E-04	3.34E-06	25	708 15	1004 79	15,000	2 1F-04
50000 comment of the contract		1 20E+05	1 185-02	4 37E-06	S 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	375.04
Seesa gamma-HCH (Lindane)		1 07E+03	1 42E-02	7 34E-06	6 80E+00	574E-04	1 40E-05	25	596 55	839 36	13,000	3 7E-04
		2 14E+04	1 25E-02 6 36E 03	4 74E-06	1 95E-01	6 19E-04	151E-05	25	613 32	842 25	13,000	4 6E-03
67641 Acetone		5 75 F-01		11/11/05	3 50E+03	631E-05	154E-06	25	720 00	751 00	10,000	0 0E+00
67663 Chloroform		3 98E+01	104E-01	1 00E-05	7 92F±03	1 50E-03	3 88E-U5	529	329 20	508 10	6,955	0 0E+00
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	159E-01	2000 C	0 K	354 35	536 40	6,988	2 3E-05
71363 Butanol		8 92E+00		9 30E-06	7 40E+04	3616-04	8 80E-06	25	39088	563.05	9,510	4 05-06
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7.342	8.37-06
73208 Endin		1 10E+02	7 805-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0 0E+00
72435 Methoxychlor		9 775+04	1 25E-02	4 /4E-06	2 50E-01	3 08 5-04	7 51E-06	25	718 15	986 20	12,000	0.00
72548 DDD		1 00E+06	1 695-02	4 76F-06	4 30E-02	0 48E-04	1 58E-05	25	651 02	848 49	14,000	0 0E+00
72559 DDE		4 47E+06	1 44E-02	5875-06	1 205-01	26.71.08 10.71.08	2 10E-06	C 4	06.66.9	863 77	14,000	6 96 95
74839 Methyl bromide		1 05E+01	7 28E-02	1.21E-05	1 52E+04	2 56E-01	£ 10E-03	57 K	27.87.0	360 38	000,61	9.7E-05
75014 Vinyl chloride (chloroethene)	ene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2 716-02	25	259.25	432.00	5,714 780	00+400
75092 Methylene chloride		1 17E+01	1 01E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	313 00	510 00	6 706	4 7E-57
75150 Carbon disuffide		4 57E+01	1046-01	1 00E-05	1.19E+03	1 24E+00	3 02E-02	22	319 00	552 00	6.391	0 0E+00
75274 Remodehicomethers		8 71E+01	1 49E-02	1 03 E-05	3 10E+03	2 19E-02	5 34E-04	25	422 35	00 969	9,479	1 15-06
75343 1.1-Dichlomethane		3 15 101	7.435.02	1 00 1 00	6 74E+03	6 56E-02	1 605-03	25	363 15	585 85	7,000	1 8E-05
75354 1,1-Dichloroethylene		5 89E+01	9 00F-02	1 04 15-05	2 25E±03	2 30E-01	561E-03	55	330 55	523 00	6,895	0 0E+00
76448 Heptachlor		1 41E+06	1125-02	5 695-06	1 BNF-01	4 475-02	2 615-02	52	304 75	576 05	6,247	5 OE -05
77474 Hexachlorocyclopentadiene	ene	2 00E+05	161E-02	7 21E-06	1 80E+00	1 11 6 + 00	7.15-03	0 K	542 45	346 31	13,000	1 35-03
78591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 635-06	35	488 35	715 00	10,931	0 0E+00
78875 1,2-Dichloropropane		4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	52 22	369 52	572.00	7.591	Z /E-0/
79005 1,1,2-Inchloroethane		5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8.322	166-05
79345 1.1.2.2-Tetrachloroethane	g	1 56E+02	7 90E-02 7 10E-02	9 105-06	1 10E+03	4 22E-01	1 03E-02	52	360 36	544 20	7,505	1.7E-06
83329 Acenaphthene	ę	7 08E+03	4 21E-02	7 69E-06	4 24E+00	1 41E-02 6 36E-03	3 445-04	72 72	419 60	661 15	8,996	5 8E-05
		!	 	1	**	3	100 m	3	550 54	803 15	12,155	0 0E+00

Reference conc. RfC (mg/m³)

					VLOOKUP TABLES							
84662 Diethylphthalate	2 88E+02	2 56E-02	6 35E-06	1 08E+03	1 85E-05	4 51E-07		567 15	757 00	13,733	0 0E+00	2 8E+00
84742 Di-n-butyl phthalate	3 39E+04	4 38E-02	7 B6E-06	1 12E+01	3 85E-08	9 39E-10		13 15	798 67	14,751	0 OE+00	3 55-01
85687 Butyl benzyl phthalate	5 75E+04	1 74E-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06		90 60	839 68	13,000	0 0E+00	7 0E-01
86306 N-Nitrosodiphenylamine	1 29E+03	3 12E-02	6 35E-06	3 51E+01	2 05E-04	\$ 00E-06		32 28	890 45	13,000	1 4E-06	00E+00
86737 Fluorene	1 38E+04	3 63E-02	7 885-06	1 98E+00	2 61E-03	6 37E-05		570 44	870 00	12,666	0 05+00	1 4E-01
86/48 Carbazole	3 39E+03	3 90E-02	7 035-06	7 48E+00	6 26E-07	1 53E-08		627 87	899 00	13,977	5 7E-06	0 OE+00
87683 Hexachloro-1,3-butadiene	5 37 E+04	5 61E-02	6 16E-06	3 23E+00	3.34E-01	8 15E-03	52 t	486 15	738 00	10,206	2 2E-05	0 0E+00
88062 2.4.6-Trichlorophenol	3.815+02	3 18F-02	6 25F-06	8 00F+03	3 19E-06	2 44E-08 7 78E-06		552 15	813.20	14,000	346-05	00400
	2 00E+03	5 90E-02	7 50E-06	3 10E+01		4 83E-04	3.5	491 14	748 40	10,373	0 H+00	4 4E-01
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	6 74E-06	3 11E+00	1 64E-07	4 00E-09		560 26	754 03	13,000	- 3급·수	00+00
95476 o-Xylene	3 63 = +02	8,70E-02	1 00E-05	1 78E+02	2 13E-01	5 20E-03		417 60	630 30		0 05+00	7 0E+00
95487 Z-Methylphenol (o-cresol)	9 12E+01	7 40E-02	8 30E-06	2 60E+04	4 92E-05	1 20E-06	25	464 19	697 60		0 0E+00	186-01
95501 1,2-Dichlorobenzene	6 17E+02	6 90 = -02	7 90E-06	1.56E+02	7 79E-02	1 90E-03		453 57	705 00		0.000	2 0E-01
900/6 Z-Chiotophenol	3 88E+02	5 01E-02	9 46E-06	2 205+04	1 60E-02	3 90 5-04	22 F	447,53	675 00	9,572	0 OE +00	1 8E-02
98953 Nitrobenzene	6.46F+01	7 60F-02	7 03E-06	2.095+03	- 70E-04	4 34E-06 2 40E-05	0 K	לר 12 אם 22	759 13	13,000	00000	3.5E-01
	3 63 E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03	32	409.34	617.20	501		2 UE-03
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03	25	41831	636 00	8,737	00+00	9
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	25	484 13	707 60	11,329	0.000	7 0E-02
	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3.14E-01	7 66E-03	26	11 52	616 20	8,525	0 0E+00	7 0E+00
106467 1,4-Dichlorobenzene	6 17 E+02	6 905-02	7 90E-06	7 38E+01	9 96E-02	2 435-03	52 5	447 21	684 75	9,271	0.0E+00	8 0E-01
107062 1.2-Dichlomethane	1 74 F +01	4 83E-02	905-08	5 50E+U3	1 36E-US 4 01E-02	3 32E-U/ 9 78E-04	5 6 5 12 5 12 5 13 5 13 5 13 5 13 5 13 5 13 5 13 5 13	503 65 356 65	754 00	11,689	0 OE+00	1.4E-02
108054 Vinyl acetate	5 25E+00	8 50E-02	9 20E-06	2 00E+04	2 10E-02	5 125-04	3 45	15.65	519 13	2 6	20110	200-400
108383 m-Xytene	4 07E+02	7 00E-02	7 80E-06	1 61E+02	3 01 15-01	7 34E-03		412 27	617 05	8,523	00+400	7.05+00
	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2,72E-01	6 63E-03		383 78	591 79	7,930	00+900	4 OE-01
108907 Chlorobenzene	2 19E+02	7 30E-02	8 705-06	4 72E+02	1 52E-01	3 71E-03	25 4	404 87	632 40	8 410	00+00	2 0E-02
108952 Phenol	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07	25	455 02	694 20	10,920	00=100	2 1E+00
111444 Bis(2-chloroethyt)ether	155E+01	6 92E-02	7 53E-06	1 72E+04	7 38E-04	1 80E-05		51 15	659 79	9,000	3 3E-04	00+#00
117817 Bis(2-ethylbexyllohthalate	1.51F+07	3.515-02	3 66F-06	3 40E-01	4 59E-04 4 18E-06	1 12E-05	52 22	674 43 657 15	942 94	14,000	0 0E+00	2 1E-02
	8 32E+07	1515-02	3 58E-06	2 00E-02	2 74E-03	6 68E-05		704 09	862 22	15,000	4 UE-08	2 OF -00
118741 Hexachlorobenzene	5 50E+04	5 42E-02	5 91E-06	6 20E+00	5 41E-02	1 32E-03	32 32	582 55	825 00	14,447	4 6E-04	00+400
	2 95E+04	3 24E-02	7 74E-06	4 34E-02	2 67E-03	6 51E-05		615 18	873 00	13,121	0 0E+00	1111100
120821 1,2,4-Trichlorobenzene	1 78E+03	3 00E-02	8 23E-06	3 00E+02	5 82E-02	1 42E-03		486 15	725 00	10,471	0.0E+00	2 0E-01
120832 2,4-Dichlorophenol	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30E-04	3 17E-06	25	482 15	708 17	11,000	0 0E+00	1 1E-02
121142 Z,4-Unitrototuene 124491 Chlosodihramosmothoso	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80E-06	9 27E-08		590 00	814 00	13,467	2 SE-04	00±00
	1.5555+02	1 90E-02 7 20E-02	1 05E-05	2 50E+03	3 21E-02 7 54E-01	7 83E-04	52 F	416 14	678 20	000'8	2.4E-05	000
	1.05E+05	2 72E-02	7 24E-06	1 35E-01	4 51E-04	1 10E-05		584 40	936.00	14.370	0.05+00	115.00
156592 cis-1,2-Dichloroethylene	3 55E+01	7 36E-02	1 13E-05	3 50E+03	1 67E-01	4 07E-03		33 65	544 00	7,192	0 0E+00	3 5E-02
156605 trans-1,2-Dichloroethylene		7 07E-02	1 19E-05	6 30€+03	3 85E-01	9 39E-03		320 85	516 50	6,717	0 0E+00	7 0E-02
193395 Indeno(1,2,3-cd)pyrene	3 47E+06	1 90E-02	5 66E-06	2 20E-05	6 56E-05	1 605-06		809,15	1078 24	17,000	2 1E-04	00E+00
206440 Fluoranthene	1 07E+05	3 025-02	35F-06	2 06F-03	4 55E-03 6 60E-04	1 115-04		15 9U	969.27	15,000	2 15-04	00±400 4 7 8 0 0 1
207089 Benzo(k)fluoranthene	1 23E+06	2 26E-02	5 56E-06	8 00E-04	3 40E-05	8 29E-07	25 25 25	753 15	1019 70	16.000	2 1E-05	000-00
218019 Chrysene	3 98E+05	2 48E-02	6 21E-06	1 60E-03	3 88E-03	9 46E-05		714 15	00 626	16,455	2 1E-06	0 0E+00
309002 Aldrin	2 45E+06	132E-02	4 86E-06	1 80E-01	6 97E-03	1 70E-04		603 01	839 37	13,000	4 9E-03	0 0E+00
319846 alpha-HCH (alpha-BHC)	1,23E+03	1 42E-02	7 34E-06	2 00E+00	4 35E-04	1 06E-05		596 55	839 36	13,000	1 85-03	0 0E+00
51965/ Deta-HCH (Deta-BHC)	1 265+03	1 42E-02	7.345-06	2 40E-01	3 05E-05	7 44E-07		596 55	839 36	13,000	5 38-04	0 0E+00
606202 2,6-Dinitrotoluene	6 92E+01	3 27E-02	7 26E-06	1 82E+02	3.06E-05	7 465-07	S 50	381 15 558 00	287.38	7,000	3 /m 05	2 UE-02
621647 N-Nitrosodi-n-propytamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06		20 60 20 20 20 20 20 20 20 20 20 20 20 20 20	746 87	11.000	2.0E-03	00100
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9 51E-06		613.96	848 76	13,000	2 6E-03	00±±00
7439976 Mercury (elemental)	5 20E+01	3 07E-02	6 30E-06	5 62E-02	4 67E-01	1 14E-02		629 88	1750 00	14,127	0 0E+00	3 0E-04
8001352 Toxaphene	2 57E+05	1 16E-02	4 34E-06	7 40E-01	2 46E-04	6 00E-06	25 6	657 15	873 31	14,000	3 2E-04	00E+00
11096825 Arodor 1260 (PCB-1260) 11097691 Arodor 1254 (BCB-1254)	2 90E+05	1 385-02	4 32E-06	8 00E-02	189E-01	4 60E-03	-	402 50	539.37	19,000	- 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0	00+00
12674112 Arodor 1016 (PCB-1034)	3 30E+04	2 22F-02	5 42F-06	3 70E-02 4 20E-01	8 20E-02 1 19E-02	2 00E-03		3//50	512.2/ 475.22	000,81	2 5 5	204
53469219 Arodor 1242 (PCB-1242)	3 30E+04	2 14E-02	5 31E-06	3 40E-01	2 13E-02	5 20E-04	25 29	345 50	482 20	18,000	1 OE-04	0 0E+00

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

VERSION 12 September, 1998

		ENTER	User-defined stratum A soil vapor permeability, k, (cm²)		
		Ü			
			g.	ᅵ	
		ENTER	stratum A SCS Soil type (used to estimate soil vapor permeability)	IS	ENTER Stratum C sout water-filled porosity, $\theta_{\mathbf{w}}^{\mathbf{c}}$ $(\mathbf{cm}^3/\mathbf{cm}^3)$
		ENTER	SCS soil type directly above	S	ENTER Stratum C soil total porosity, n <sup>c</sup> (untitless)
		ENTER	Soil stratum directly above water table, (Enter A, B, or C)	o	ENTER Stratum C soil dry bulk density, P <sub>c</sub> P <sub>c</sub> (g/cm³)
	hylene	ENTER (Lwr (cell D28)	Thickness Thickness of soil stratum B, stratum C, (Enter value or 0) (Enter value or 0) h <sub>0</sub> (cm)	792 48	ENTER Stratum B sool water-filled porosity, $\theta_w^B$ $(cm^3/cm^3)$
Chemical	cis-1,2-Dichloroethylene	INTER ENTER ENTER Totals must add up to value of Lw1 (cell D28)	Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub>	96 09	ENTER Stratum B soll total porosity, n (untless)
	ō	ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub>	670 56	ENTER Stratum B soil dry bulk density, Pe (g/cm³)
_		ENTER	Depth below grade to water table, Lwr (cm)	1524	ENTER Stratum A soil water-filled porosity, 8,^^ (cm³/cm³)
ENTER Intral groundwater conc. Cw (ug/L)	6 171851852	ENTER Depth	below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	15	ENTER Stratum A soli total porosity, n <sup>A</sup> (unidess)
ENTER Chemical CAS No (numbers only, no dashes)	156592	ENTER	Average soil/ groundwater temperature, T <sub>s</sub> (°C)	16	ENTER Stratum A soil dry bulk density, Po.^ (g/cm³)

15	0.43	0.2	17	0.42	0.27	17	0.43	L	0.3
ENTER	ENTER	ENTER	AT T	CH LN	GHL	CMTCO			
			1	-	23.62	מאַ			
Finclosed		Enclosed	Enclosed						
space	Soil-bidg	space	space	Enclosed	Floor-wall	Indoor			
good	Chessina	foor	4	6000	10000	1			
			3	and a	SERIE CIRCL	air exchange			
thickness,	differential,	length,	width,	height,	width,	rate,			
Loreck	ΔP	۳.	×	Ę	*	<b>6</b>			
(eg)	(o/cm-s <sup>2</sup> )	(42)	( <del>m</del> )	(10)	(200)	1400			

40	961	961	488	0.1	0.45
ENTER	ENTER	ENTER	ENTER	ENTER	
Averaging			Target	Target hazard	
time for	Exposure	Exposure	risk for	quotient for	
noncarcinogens,	duration,	frequency,	cardinogens,	noncardnogens	
AT <sub>xc</sub>	<b>a</b>	Ħ	Æ	돧	
(yrs)	(yrs)	(days/yr)	(nuitless)	(unitless)	
		ļ			
30	30	350	1 05-06	-	
			Used to calc	Jsed to calculate nsk-based	
			oroundwate	proundwater concentration	

		Reference	conc,	RfC	(mg/m³)	2 50 03
	ž	risk	factor,	묾	(hg/m³)	004300
Pure	component	water	solubility,	Ø	(mg/L)	2 505+03
Crganic	carbon	partition	coefficient,	ş	(cm <sub>3</sub> /g)	2 555+01
		Critical	temperature,	Ļ	(°K)	544 00   3 55E+01   2 50E+03   0 0E+00   2 5E 02
	Normal	boiling	point,	<b>1</b>	(%)	333 65
Enthalpy of	vaponzation at	the normal	boiling point,	ΔH <sub>v,b</sub>	(cal/mot)	7 102   333.65
				T.		25
Henry's	law constant	at reference	temperature,	I	(atm-m³/mol)	1 135-05 4 075-03
		Diffusivity	in water,	å	(cm <sub>2</sub> /s)	1 135-05
		Diffusivity			(cm <sup>2</sup> /s)	7.36F-02

Floor-wall seam penmeter, X <sub>cract</sub> (cm)	3,844	Diffusion path length, L <sub>d</sub>	1509	
Water-filled porosity in capillary zone, $\theta_w^{\alpha} \alpha$ $(cm^3/cm^3)$	0 294	Total overall effective diffusion coefficient, Defr (cm²/s)	7 42E-04	
Air-filled porosity in capillary zone, B. c. (cm <sup>3</sup> /cm <sup>3</sup> )	0 136	Capillary Zone effective diffusion coefficient, $\mathbb{D}^{et}_{ct}$ (cm <sup>2</sup> /s)	5 24E-04	
Total porosity in capillary zone,	0 43	Stratum C C effective diffusion coefficient, D c (cm²/s)	4 56E-04	Reference conc , RfC (mg/m³)
Thickness of capillary zone, La	17 05	Stratum B B effective diffusion coefficient, D <sup>eff</sup> (cm²/s)	7.60E-04	Unit risk factor. URF (µg/m³)-¹
Stratum A soil effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, Def (cm²/s)	2 98E-03	Infinite source bldg. conc , Chattern (μg/m³)
Stratum A soil relative air permeability, kg (cm²)	0.746	Vapor viscosity at ave soll temperature, krs (g/cm-s)	1 77E-04	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)
Stratum A soil intrinsic permeability, k <sub>i</sub>	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (untiless)	1 15E-01	Exponent of equivalent foundation Peclet number, exp(Pe <sup>4</sup> ) (unitless) 6 13E+03
Stratum A effective total fluid saturation,  Stature (cm <sup>3</sup> /cm <sup>3</sup> )	0 419	Henry's law constant at ave groundwater temperature, Hrs (attr-m³/mol)	2 72E-03	Area of crack, Acrea (cm²)
Stratum C soil au-fi)ed porosity, e <sub>0</sub> <sup>c</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	0 130	Enthalpy of vaporization at ave groundwater temperature, AH, 75 (cal/mol)	7,674	Crack effective diffusion coefficient, Donat (cm <sup>2</sup> /s)
Stratum B soil aur-filled porosity, $\theta_a^B$ (cm³/cm³)	0 150	Crack depth below grade, Zonet (cm)	15	Average vapor flow rate into bidg , Qua (cm³/s)
Stratum A soil au-filled porosity, $\theta_{\bullet}^{\bullet}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 230	Crack- to-total area ratio, n (unitiess)	4 16E-04	Crack radius, fract (cm)
Source- building separation, L <sub>T</sub>	1509	Area of enclosed space below grade, A <sub>6</sub>	9 24E+05	Source vapor conc , Ceurs (Lig/m³)
Exposure duration,	9 46E+08	Bidg ventitation rate, G <sub>battero</sub> (cm <sup>3</sup> /s)	5 63E+04	Convection path length, L <sub>p</sub> (cm)

SA-BASE	AISK-BASEU GRUUNDWALER CONCENTRATION CALCULATIONS	TY CONCENTY	ALION CALC	or A Lions	INCREMENTAL	INCREMENTAL RISK CALCULATIONS
Indoor	Indoor	Risk-based	Pure	Final	incremental rlsk from	Hazard quotient
exposure	exposure	Indoor	component	indoor	vapor	from vapor
oundwater	groundwater	exposure	water		intrusion to	intrusion to
conc.,	conc,	_	solubility,	groundwater	indoor air,	indoor air,
arcinogen	noncarcinogen		တ		carcinogen	noncarcinogen
(mg/L)	(µg/L)	(μg/L)	(μg/L)	(μg/L)	(nuitless)	(nnitless)
ΑN	6 64E+04	6 64E+04	6 64E+04 3 50E+06	6 64E+04	¥	Y.

					-	VLOOKUP TABLES	LES							
SCS Soil Type	K, (cm/h)	S a (1/cm)	Soil Properties Lookup Table N (unitless) M (unitless)	_ !	θ, (cm³/cm³)	8, (cm³/cm³)	Mean Grain Diameter (ตก)							
<u> </u>	0.20		1 09	١,,	0 38	990 0	0 0092							
<u>.</u>	0.26		131	0 237	0 41	0 095	0 0 0 1 6							
<u>ب</u> ر	<b>3</b> 5			0 359	0 43	0 078	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0							
<u>}</u>	29 70	0 145		0 561	0 41	0 057	0 040							
၁၄	0 12			0 187	0.38	0.00	0 0025							
SCL	131		-	0 324	0 39	0 100	0 023							
, S	0 25		• •	0.270	0.46	0 034	0 0046							
	005			0 083	0.26	0 0 0 0	60000							
SIL	700	0010	23	0 187	0 43	680 0	99000							
SL	4 42	0.020	- 1	0 471	0.45	0.067	0.031							
					Срепіс	Chemical Properties Lookup Table	okuo Table							
		Organic			Pure		Heppys	Hannye			Cothoday			
		carbon			component		law constant	law constant	Nome		cinnapy of	1		
		partition	Diffusivity	Diffusivity	water	Henry's	atreference	reference		Cuffical	the normal	<u> </u>	Doforanco	
		coefficient,	in air,	ın water,	<u>-</u>	law constant		temperature.		temperature.	bolino point	factor	an la la la co	
		፯	ď	<u>.</u>		Ì		L R		T.	AH.s	J. J.	2 2 3 3	
CAS No Chemical		(cm <sup>3</sup> /g)	(cm <sup>2</sup> /s)	(cm²/s)	(mg/L.)	(unitless)	(lom/m-ma)	်ပ	ج	, £	(cal/mol)	(ma/m³) f	(ma/m³)	
100 0000								ı						
50338 Benzo(a)tweepe		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 105-06	25	533 15	720 75	11,000	9 7E-05	00+300	
51285 2.4-Dinitrophenol		1 00E-02	4 30E-02 2 73E-02	90-190-6	1 62E-03	4 63E-05	1 13E-06	52	715 90	969 27	15,000	2 1E-03	0 0E+00	
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2.49F-03	6.03E-07	4 445-07	9 5	97 cna	827.85	15,000	00110	7 05-03	
56235 Carbon tetrachlonde		1 74E+02	7 806-02	8 80E-06	7 93E+02	1 25E+00	3.055-02	2, 53	349 90	556 60	16,000	2 15-03	00000	
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34E-06	52	708 15	1004 79	15,000	2 - 2 - 2 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4	00+100	
57749 Chlordane		1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	52	624 24	885 73	13,000	3 7 1-04	00+100	
58899 gamma-HCH (Lindans)	_	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13,000	376-04	0 OE+00	
605/1 Disidrin 65960 Descripto And		2 14E+04	1 25E-02	4.74E-06	1 95E-01	6 19E-04	1515-05	25	613 32	842 25	13,000	4 6E-03	0 0E+00	
62630 Benzole Add		6 00E-01	5 36E-02	7.97E-06	3 50E+03	631E-05	1546-06	25	720 00	751 00	10,000	0 0E+00	1 4E+01	
67663 Chloroform		3 985+01	104501	1 100 100	1 00E+05	1 595-03	3 88E-05	52	329 20	508 10	6,955	0 0E+00	3 5E-01	
67721 Hexachloroethane		1 78E+03	2.50F-03	6 80 5-08	5 OOF +03	1 505.01	3 000 00	2, 6	334.32	536.40	886'9	2 35-05	00+900	
71363 Butanol		6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	3 80E-06	22 23	390.88	563 05	9,510	4 0E-06	0 0 0 0 0	
71432 Benzene		5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	S2 52	353 24	562.16	7.342	8 3F-06	00+40	
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0 0E+00	1 0E+00	
72208 Endin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 515-06	25	718 15	986 20	12,000	0 0E+00	1 15-03	
72548 DDD		1 005406	1 695-02	4 46E-U6	9 00 00	6 48E-04	1 58E-05	25	651 02	848 49	14,000	0 0E+00	1 8E-02	
72559 DDE		4 47E+06	1 44E-02	5 87E-06	1 205-01	20 m	2 10E-05	522	639 90	863 77	14,000	6 9E-05	· 0 0E+00	
74839 Methyl bromide		1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6.24E-03	3 %	276 74	467.00	13,000	9 / E-05	0.05+00	
75014 Vinyl chlonde (chloroethene)	hene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	2 71E-02	52 52	259 25	432.00	5,714	0 0E+00	5 OE-03	
75092 Methylene chlonde		1 17E+01	101E-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	25	313 00	510 00	6.706	4 7E-07	3 05+00	
75150 Carbon disuffide		4 57E+01	1046-01	1 00E-05	1 19E+03	1 24E+00	3 02E-02	52	319 00	552 00	6,391	0 0E+00	7 0E-01	
75274 Bromodichloromethene		8 /1E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 345-04	25	422 35	00 969	9,479	1 1E-06	0 0E+00	
75343 1.1-Dichloroethane		3 15F+01	7 425-02	1058-05	5 060+03	2 305.02	1 60E-03	52	363 15	585 85	7,000	1 85-05	0 0E+00	
75354 1,1-Dichloroethylene		5 89E+01	9 00E-02	1 04E-05	2.25F+03	1 07F+00	2616-03	S #	35.00	523 00	6,895	00=+00	5 0E-01	
76448 Heptachlor		1 41E+06	1 12E-02	5 69E-06		4 47E-02	1 09E-03	25.	603 69	3/6 (3	12,000	2 CT C	0000	
77474 Hexachlorocyclopentadlens	lene	2 00E+05	1 61E-02		1 80E+00	1,11E+00	2 71E-02	25	512 15	746 00	10.931	00-10	7.05-05	
78591 Isophorone		4 68E+01	6 23E-02	ш	1 20E+04	2 72E-04	6 635-06	25	488 35	715 00	10,271	2 7E-07	000+00	1
70005 1.Z-Ukanloropropane		43/6+01	7 82E-02	8 73E-06	2 80E+03	1,15E-01	2 805-03	25	369 52	572 00	7,590	0 0E+00	4 0E-03	Ų.
79016 Trichloroethylene		1 66E+02	7 90E-02	8 80E-06 9 10E-06	4 42E+03	3 74E-02 4 22E-01	9 12E-04 1 03E-02	25	386 15	602 00	8,322	1 6E-05	0 0E+00	4
79345 1,1,2,2-Tetrachloroethane	92	9 33E+01	7 10E-02	1 121	2 97E+03	1 41E-02	3 445-04	3 55	419.50	544 20	7,505	1 7E-06	00000	L
83329 Acenaphthene		7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	0 00+00	0.0E+00	4.
						!						;	- > !	1

					VLOOKUP TABLES							
84662 Diethylphthalate	2 88E+02	2 56E-02	6 35E-06	1 08E+03	185E-05	4 51E-07	25 5	567 15	757 00	13,733	0 0E+00	2 8E+00
	3 39E +04	4 38E-02	7 86E-06	1 12E+01	3 85E-08	9 39E-10		613 15	798 67	14,751	0 0E+00	3 55-01
6556 / Butyl benzyl phthalate	5 75E+04	174E-02	4 83E-06	2 69E+00	5 17E-05	1 26E-06		960 60	839 68	13,000	0 0E+00	7 0E-01
posuo n-inigosogiphenyiamine	1 295+03	3 12E-02	635E-06	351E+01	2 05E-04	5 00E-06		632 28	890 45	13,000	1 4E-06	000+00
86748 Cathazole	3.30E+04	3 035-02	7.035-05	1 98E+UU	2615-03	63/5-05		570 44	870 00	12,666	0 0E+00	1 4E-01
87683 Hexachloro-1.3-butadiene	5.37E+04	5 61F-02	6 165-06	3 23 E+00	3 34F.01	9 155.03		02/8/ 408 45	338 00	13,977	57E-06	00=+00
	5 92E+02	5 60E-02	6 105-06	1 95E+03	1 00E-06	2 445-08	3 12	582 15	736 UU 813 20	10,206	2.2t-05	000+00
88062 2,4,6-Trichtorophenol	3 81E+02	3 18E-02	6 25E-06	8 00E+02	3 19E-04	7 78E-06			749 03	12,000	3 15-06	00=+00
91203 Naphthalene	2 00E+03	5 90E-02	7 50E-06	3 10E+01	1 98E-02	4 83E-04		491 14	748 40	10,373	0.0E+00	1 4E-01
91941 3,3-Dichlorobenzidine	7 24E+02	1 94E-02	674E-06	3 116-00	1 64E-07	4 00E-09		56u 2 <sub>6</sub>	754 03	13,000	13E-04	00=+00
95476 O-Xylene	3 63 E + 02	8 70E-02	1 00E-05	1 78E+02	2,13E-01	5 20E-03	25 4	417 60	630 30	8,661	0 0E+00	7 0E+00
95467 7-2-Neuriyininini (6-cresor)	8 12E+01	7 40E-02	8 30E-06	2 50E+04	4 92E-05	1 20E-06		464 19	697 60	10,800	00+300	1 8E-01
95578 2-Chlomothanol	3 88 - 102	5 01E-02	9 45 5-06	205-402	1 805-02	3 00 00	5 6	453.57	705 00	9,700	00+400	2 OE-01
95954 2.4.5-Trichlorophenol	1 60E+03	2 915-02	7 03E-06	1 20E+03	1 785-04	3 30E-04		447 33 526 15	00 619	9.572	0.01+00	1.8E-02
98953 Nitrobenzene	6 46E+01	7 60E-02	8 60E-06	2 09E+03	9 845-04	2 40E-05	25.25	483.95	719.00	10.568		ם נו נו נו
100414 Ethylbenzene	3 63E+02	7 50E-02	7 80E-06	1 69E+02	3 23E-01	7 88E-03		409 34	617 20	8.501	0 00+00	1 05+00
100425 Styrene	7 76E+02	7 10E-02	8 00E-06	3 10E+02	1 13E-01	2 76E-03		41831	636 00	8.737	00+400	1 0 = +00
105679 2,4-Dimethylphenol	2 09E+02	5 84E-02	8 69E-06	7 87E+03	8 20E-05	2 00E-06	25 4	484 13	707 60	11,329	00+400	7 0E-02
	3 89E+02	7 69E-02	8 44E-06	1 85E+02	3 14E-01	7 66E-03		411 52	616.20	8,525	0 0E+00	7 0E+00
106467 1,4-Dichlorobenzene	6 17E+02	6 90E-02	7 90E-06	7 38E+01	9 96E-02	2 43E-03		447 21	684 75	9,271	0 0E+00	8 0E-01
106478 p-Chioroaniine 107062 1 2-Dishlomathana	4 746 +01	4 83E-02	1 01E-05	5 30E+03	136E-05	3 32E-07	52 5	503 65	754 00	11,689	0 0E+00	1 4E-02
108054 Vind acetate	5.255+00	A 50E-0	90-306 6	9 00E+03	2 100.02	40,000		55 55 46 66	561 00	7,643	2 6E-05	000+000
108383 m-Xvlene	4 07E+02	7 00E-02	7.80F-06	1.61E+02	3.015-03	7 34F-03		412 27	51.0	00'0	001100	200.00
108883 Toluene	1 82E+02	8 70E-02	8 60E-06	5 26E+02	2 72E-01	6.635-03		383.78	50170	7 020	00+100	2010
108907 Chlorobenzene	2 196+02	7 30E-02	8,70E-06	4 72E+02	1 52E-01	3 715-03	25. 4	404.87	637.40	0.55,	200	200
108952 Phenol	2 88E+01	8 20E-02	9 10E-06	8 28E+04	1 63E-05	3 98E-07		455 02	694 20	10.920	00000	2 1E+00
	1 55E+01	6 92E-02	7 53E-06	172€+04	7 38E-04	1 80E-05		451 15	629 79	000'6	3 35-04	0 OE+00
	2 14E+03	1 15E-02	4 55E-06	5 10E-01	4 59E-04	1 12E-05	25 6	674 43	942 94	14,000	0 0E+00	2 1E-02
137647 bis(z-etnythexyl)phthalate	151E+07	351E-02	3 66E-06	3 40E-01	4 18E-06	1 02E-07	52	657 15	806 00	15,999	4 0E-06	0 0E+00
118741 Hexachlorobenzene	0 32E+0/	1 3 IE-02	5 25 F C C	2 00E-02	Z /4E-U3	4 88 F-05		704 09	862 22	15,000	001100	7 0E-02
	2 95E+04	3 24E-02	7.745.06	0 20E+00	3 41E-02	1 325-03		582 55	825 00	14,447	4 65-04	00+00
	1 78F+03	3 005-02	8 23E-06	3 00 0 + 02	5 87E-03	1.425.03	2 5	515 18 406 45	373 00	13,121	001100	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	1 47E+02	3 46E-02	8 77E-06	4 50E+03	1 30F-04	3 175-06		400 (3	708 17	4,0	00+00	2 t
121142 2,4-Dinitrotoluene	9 55E+01	2 03E-01	7 06E-06	2 70E+02	3 80€-06	9 27E-08		590 00	814 00	13 467	4 9F-04	0.05+00
124481 Chlorodibromomethane	6 31E+01	1 96E-02	1 05E-05	2 60E+03	3 21E-02	7 83E-04		416 14	678 20	8,000	2 4E-05	000+00
127184 Tetrachloroethylene	1 55E+02	7,20E-02	8 20E-06	2 00E+02	7 54E-01	1 84E-02		394 40	620 20	8,288	5 8E-07	0 0E+00
129000 Pyrana	1 05E+05	2 72E-02	7 24E-06	135E-01	4 51E-04	1 105-05		667.95	936 00	14,370	0 0E+00	1 16-01
156605 trans.1 2-Dichlomethylene	5 55E+01	7 075.02	1 100.00	3 30E+03	16/E-01	4 0/E-03		333 65	544 00	7,192	0.000	3 25-02
193395 Indeno(1,2,3-cd)byrene	3.47E+06	1 905-02	5.665-06	2.20E-05	5.56F-05	8 39E-03		320 83 809 15	016 50 1078 24	7,7,0	0 UE+00	70507
205992 Benzo(b)fluoranthene	1,23E+06	2 26E-02	5 56E-06	1 50E-03	4 55E-03	1 11E-04	25	715 90	969 27	15,000	2 1E-04	000+00
206440 Fluoranthene	1 07E+05	3 02E-02	6 35E-06	2 06E-01	6 60E-04	1615-05	_	655 95	905 00	13,815	000+00	1 4E-01
207089 Benzo(k)fluoranthene	1,23E+06	2 26E-02	5,56E-06	8 00E-04	3 40E-05	8 295-07		753 15	1019 70	16,000	2 1E-05	0.05+00
218019 Chrysene	3 985+05	2 48E-02	6.21E-06	1 60E-03	3 88E-03	9 46E-05	•	714 15	979 00	16,455	2 1E-06	0.05+00
319846 alpha.HCH (alpha.RHC)	7 45E+05	1 32E-02	4 86E-06	1 80E-01	6.97E-03	1.705-04	52 5	603 01	839 37	13,000	4 9E-03	00+00
319857 beta-HCH (beta-BHC)	1.285+03	1 425-02	7.345-05	2.40E-01	4 30E-04	1 USE-US		596 55	639 36	13,000	18F-03	0000
542756 1.3-Dichloropropene	4 57F+01	6.26F-02	1 00 1 00	2 805-01	2 26E-03	1 775.02		595 55 381 18	559 30	3,000	0 4 4 4 4 4 4 4 4 4 4 4 7 7 7 8 7 8 7 7 8 7 7 7 7	3 00 00
606202 2,6-Dinitrotoluene	6 92E+01	3.27E-02	7 26E-06	1 82E+02	3 06E-05	7.46E-07		558 00	770 00	12.938	1.9F-04	0.05+00
621647 N-Nitrosodi-n-propylamine	2 40E+01	5 45E-02	8 17E-06	9 89E+03	9 23E-05	2 25E-06		509 60	746 87	11,000	2 0E-03	0.06+00
1024573 Heptachlor epoxide	8 32E+04	1 32E-02	4 23E-06	2 00E-01	3 90E-04	9.51E-06		613 96	848 76	13,000	2 6E-03	0 0E+00
7439976 Mercury (elemental)	5 20E+01	3.07E-02	6 305-06	5 62E-02	4 67E-01	1 14E-02		629 88	1750 00	14,127	0 0E+00	3 0E-04
6001352 Toxaphene 11096825 Aroclor 1260 (PCB-1260)	2 57E+05	1 16E-02	4 345-06	7 40E-01	2 46E-04 1 89E-01	6 00E-06	_	657 15 402 50	87331	14,000	3 2E-04	0000
11097691 Araclar 1254 (PCB-1254)	2 00E+05	1.565-02	5 00E-06	5 70E-02	1 09E-U 1	4 50E-03	52 E	402 50	539 3/	000'8	10E04	00+100
12674112 Arodor 1016 (PCB-1016)	3 30E+04	2 22E-02	5 42E-06	4 20E-01	1 19E-02	2 905-03		40.50	516.27	18,000	10 F	00+00
53469219 Aroclor 1242 (PCB-1242)	3 30E+04	2,14E-02	531E-06	3 40E-01	2 13E-02	5 20E-04	25	345 50	482 20	18,000	1 OE-04	9 H 1 H 2 H 2 H 2 H 2 H 3 H 3 H 3 H 3 H 3 H 3 H 3 H 3 H 3 H 3

DATA ENTRE SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

ves ×

YES

VERSION 1.2 September, 1998 CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and mital groundwater cond below)

		ENTER	User-defined stratum A soil vapor permeability, k, (cm²)	
		ENTER	stratum A SCS sort type (used to estimate OR soil vapor permeability)	91
		ENTER	SCS soil type directly above water table	n
		ENTER	Soil stratum directly above water table, (Enter A, B, or C)	)
	lene	ENTER Lwr (cell D28)	Thickness of soil stratum C. (Enter value or 0) hc (cm)	2. 72.
Chemical	1,1-Dichloroethylene	NTER ENTER ENTER Totals must add up to value of LwT (cell D28)	Thickness         Thickness           of soil         of soil           of soil         stratum C,           stratum A,         (Enter value or 0)           h <sub>k</sub> h <sub>c</sub> (cm)         (cm)           670 56         60 96           789 48	
		ENTER Totals mu	Thickness of soil stratum A, h <sub>A</sub> (cm)	
		ENTER	Depth below grade to water table, Lwr (cm) .	
ENTER Initial groundwater conc , Cw (µg/L)	19 67987179	ENTER Depth	below grade to bottom to bottom space floor, Lr (cm)	
ENTER Chemical CAS No (numbers only,	75354	ENTER	Average soli/ groundwater temperature, T <sub>s</sub> (°C).	

6	043	0.2	17	0.42	0.27	17	0.43	03
ENTER Enclosed	ENTER	ENTER	ENTER Enclosed	ENTER	ENTER	ENTER		
space	Soil-bldg	space	space	Enclosed	Floor-wall	Indoor		
floor	pressure	floor	floor	space	seam crack	air exchange		
uckness,	dtfferential,	length,	width.	height,	width,	rate,		
, orec	ΔP	ב	Α×	ī,	*	ER		
(cm)	(g/cm-s <sup>2</sup> )	(cm)	(cm)	(cm)	(63)	(1/4)		

ENTER
Stratum C
soil water-filled
porosity,
θ<sub>w</sub><sup>c</sup>
(cm³/cm³)

ENTER Stratum C soil total porosity,

ENTER Stratum C soil dry bulk density, Po<sup>c</sup> (g/cm³)

ENTER
Stratum B
soil water-filled
porosity,  $\theta_w^a$   $(c\pi^3/cm^3)$ 

ENTER Stratum B soil total porosity, n<sup>8</sup>

ENTER Stratum B soll dry bulk density, Pa (g/cm³)

ENTER
Stratum A
soil water-filled
porosity,
6,^^
(cm³/cm³)

ENTER Stratum A soil total porosity, n<sup>A</sup>

ENTER Stratum A soil dry bulk density, Pa (g/cm³)

15	40	$\dashv$	961	961	488	0.1	0.45
ENTER	ENTER		ENTER	ENTER	ENTER	ENTER	
Averaging time for	Averaging		Evrapority .		Target	Target hazard	
carcinogens,	noncarcinogens	٠.	duration,	frequency,	nsk for carcinocens.	quotient for noncardinodens	
ATc	AT <sub>NC</sub>		G	H	, <del>K</del>	T DH	
(yrs)	(yrts)	1	(yrs)	(days/yr)	(unitless)	(nuitless)	
70	30	$\dashv$	30	350	1 0E-06	-	
					Used to calcu	Jsed to calculate risk-based	
				•	aroundwater	groundwater concentration	

### CHEMICAL PROPERTIES SHEET

		Reference	conc.,	RfC	(mg/m³)	
	รัฐ	ЯŞL	factor,	URF	(ma/m <sub>3</sub> )-1	
Pure	component	water	solubility,	Ø	(mg/L)	
Organic	carbon		o	స్త		
				۲	<b>(</b>	
	Normal	polling	point,	₽	ક્	
Enthalpy of	vaponzation at	the normal	boiling point,	ΔH <sub>ν,b</sub>	(cal/mol)	
Henry's	law constant	reference	temperature,	F.	(၃)	
Henry's	law constant	at reference	temperature,	I	(atm-m³/mol)	
				₫	(cm <sup>2</sup> /s)	
		Diffusivity	in alr,	o <b>"</b>	(cm <sup>2</sup> /s)	

_ 1		<b>!</b> □
Floor-wall seam perimeter,	3,844	Diffusion path length, L4 (cm)
Water-filled porosity in capillary zone, $\theta_{w,cz}$ $(cm^3/cm^3)$	0 294	Total overall effective diffusion coefficient, Deff (cm²/s)
Arr-filled porosity in capillary zone, $\theta_b = (cm^3/cm^3)$	0 136	Capillary  Zone effective diffusion coefficient, Deff (cm²/s)
Total porosity in capillary zone, na can (cm ³/cm³)	0.43	Stratum C effective diffusion coefficient, D'''c (cm²/s)  Reference conc, RfC (mg/m³)
Thickness of capillary zone, L <sub>ca</sub> (cm)	17 05	Stratum B effective diffusion coefficient, D*ff e (cm²/s) 9 22E-04 9 22E-04 Unit nsk factor, URF (Hg/m³)**
Stratum A soul effective vapor permeability, k, (cm²)	6 98E-10	Stratum A effective adiffusion coefficient, Deff (cm²/s) 3 65E-03 Infinite source bidg, conc. Guadane (µg/m³)
Stratum A soil relative air permeability, $k_{\rm sp}$ (cm²)	0.746	Vapor viscosity at ave soil temperature, Hrs (g/cn-s) 1.77E-04 Infinite source indoor attenuation coefficient, a (unitless)
Stratum A soll intrinsic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)  7 88E-01  Exponent of equivalent foundation Peclet number, exp(Pe) (unitless)
Stratum A effective total fluid saturation, S <sub>is</sub>	0419	Henry's law constant at ave groundwater temperature,  Hrs  Hrs  (atm-m³/mol)  1.87E-02  Area of crack,  Area of crack,  Area of crack,  Area of crack,  Area of crack,  Area of crack,
Stratum C sod sod air-filled porosity, $\theta_{\phi}^{c}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 130	Enthalpy of vaporization at ave groundwater temperature, AH, 1s (cal/mol) 6,353 Crack effective diffusion coefficient, Dorse (cm²/s) 3.65E-03
Stratum B soil aur-filled porosity, $\theta_a^B$ (cm³/cm³)	0 150	Crack depth below grade, Z-rack (cm)  15  Average vapor flow rate into bldg., Quant (cm <sup>3</sup> /s)
Stratum A solt arr-filled porosity, $\theta_a^A$ (cm³/cm³)	0 230	Crack- to-total area ratio, n (unritess) 4 16E-04 Crack radius, forea (cm)
Source- building separation, L <sub>T</sub> (cm)	1509	Area of enclosed space space below grade.  A <sub>B</sub> (cm <sup>2</sup> ) 924E+05 Source vapor conc. Conc. Cecure (µg/m³)
Exposure duration, r	9 46E+08	Bldg ventriation rate, Questing (cm³/s)  5.63E+04  Convection path length, Le (cm)

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RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS

INCREMENTAL RISK CALCULATIONS

Hazard quotient from vapor Intrusion to indoor air, noncarcinogen (unitess)
Incremental nsk from vapor Intrusion to indoor air, carcinogen (unitless)
Final indoor exposure groundwater conc, (µg/L)
Pure component water sofubility, S S
Risk-based indoor exposure groundwater conc, (µg/t)
Indoor exposure groundwater conc , noncarcinogen (µg/L)
Indoor exposure groundwater conc, carcinogen (µg/L)

ERROR SUMMARY BELOW. (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

0 0E+00 0 0E+00 0 0E+00 0 0E+00 0 0E+00 0 0E+00 1 0E+00 0 0E+00 0 0E+00 1 0E+00 1 0E+00 0 0E+00

						VLOOKUP TABLES	ES						
SCS Soll Type	K, (cm/h)	ς α(1/cm)	Soil Properties Lookup Table N (unitless) M (unitless)	ookup Table M (untiless)	B. (cm³/cm³)	6. (cm³/cm³)	Mean Gram Damater (rm)						
0	0.20	g	8	0 083	0 38	0 068	0 0092						
<u>ವ</u> .	0.26	0 019	131	0 237	0 41	960 0	0 016						
<u> </u>	<b>5</b> 5	0 036	1 56	0 359	0.43	0 078	0 020						
<u>s</u>	20 70	0 124	2 28	0 561	041	0.057	0 040						
SC	0 12	0.027	4 t	0 187	24.0	£ 5	0.044						
SCL	131	0 0 0 59	1 48	0 324	65 O	900	0.00						
<u></u>	0 25	0 016	137	0 270	0.46	0 0 34	0 0046						
200	0 02	0 005	1 09	0 083	0.26	0.000	0 0039						
	007	0 0 0 0	123	0 187	0.43	0 089	0 0026						
יטר פרי	4 4 2 5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	141	0 291	0 45	0 065	0.030						
					Chemic	Chemical Properties Lookup Table	aro Table						1
		Organic			Pure		Henry's	Henv's			Enthainy of		
		carbon			component		law constant	law constant	Normal		vaponzation at	į	
		partition	Diffusivity	Diffusivity		Henry's	at reference	reference	polling	Critical	the normal	TSK TA	۳,
		coefficient, K	E	in water,	solubility,	law constant	temperature,	temperature,	ی	lemperature,	boiling point,		
CAS No Chemical		(G/ <sub>C</sub> up)	(cm²/s)	(cm²/s)	(Total)	(sinifless)	H (atm-m³(mol)	۳. فر	<u>.</u>	ج ج		URF L	-
					/= 2	(conunction)	(muntillana)	(2)		2	(cal/mol)	(ш/бп)	_
50293 DDT 50398 Bonzo(a)wrzene		2 63E+06	1 37E-02	4 95E-06	2 50E-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05	
51285 2 4-Dinitrochenol		1 UZE+06	4 30E-02	9 00E-06	1 62E-03	4 63E-05	1 13E-06	25	715 90	969 27	15,000	2 1E-03	
53703 Dibenzía hlanthracene		3 805+06	2025-02	9 UOE - UO	Z /9E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0E+00	
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 80E-06	7 935+02	1 25E±07	14/E-08	22	743 24	990 41	16,000	2 1E-03	
56553 Benz(a)anthracene		3 98E+05	5 10E-02	90 300 6	9 40E-03	1 37E-04	3.34F-06	5 K	708 45	1004 20	7,127	1 5E-05	
57749 Chlordane		1,20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25 25	624 24	885 73	13,000	2 H 4	
5889 gamma-HCH (Lindane)	_	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13.000	2 E	
60571 Dieldrin		2 145+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05	25	613 32	842 25	13,000	4 6E-03	
62850 Benzolc Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10,000	0 0E+00	
67641 Acetone		5 755-01	1 24E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	52	329 20	508 10	6,955	0 0E+00	
A7721 Hexachlocoethana		3.98E+01	104E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	52	334 32	536 40	6,988	2 35-05	
71363 Butanol		6 925+00	2 30E-03	97906-6	3 00E+01	1 59E-01	3 88E-03	52 5	458 00	695 00	9,510	4 OE-06	
71432 Benzene		5 89E+01	8 80E-02	90E-06	1 75E+03	2 28E-01	5.56F-03	6 % 6 %	353.24	563 U5	10,346	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
71556 1,1,1-Trichloroethane		1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	22 52	347.24	545.00	7,342	2 3E-06	
72208 Endrin		1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	25	71815	986 20	12.000	000+00	
72548 DDD		9 / /E+04	1 565-02	4 46E-06	4 50E-02	6 48E-04	1 585-05	52	651 02	848 49	14,000	0.000	
72559 DDE		4 47E+06	1 44E-02	5 87F-06	9 00 <b>6</b> -02	1 04 H	4 00E-06	52 52	639 90	863 77	14,000	6 9E-05	
74839 Methyl bromide		1 05E+01	7 28E-02	1216-05	1 52E+04	2 56E-01	6 245-03	2 10	276 71	467.00	3,000	9 /E-05	
75014 Vinyl chlonde (chloroethene)	rene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 115+00	2 716-02	\$2 52 53 54	259 25	432 00	5.250	8 4 11 15	
75092 Methylene chlonde		1 17E+01	1015-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	22	313 00	510 00	902'9	4 7E-07	
75150 Carbon disuffide		4 57E+01	1045-01	1 00E-05	1,19E+03	1 24E+00	3 02E-02	25	319 00	552 00	6,391	0 0E+00	
75274 Bromoduhlormethans		8 /1E+01	1 49E-02	1 03E-05	3 10E+03	2 19E-02	5 34E-04	52	422 35	00 969	9,479	1 1E-06	
75343 1.1-Dichlomethane		3 166+01	2 42E-02	1 055 05	6 /4E+U3	2 201 02	1 60E-03	52	363 15	585 85	7,000	1 8E-05	
75354 1,1-Dichloroethylene		5 89E+01	9 005-02	104E-05	2 25E+03	1 07E+00	2615-03	0 K	300 25	523 00	6,895	0 0E+00	
76448 Heptachlor		1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25.	603 69	846.31	13,000	한다 당당	
77474 Hexachlorocyclopentadiene	ene	2 00E+05	1 61E-02	7.21E-06	1 80E+00	1 11E+00	2 71 6-02	25	512 15	746 00	10.931	0.05-03	
78591 Isophorone		4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 635-06	25	488 35	715 00	10,271	2 7E-07	
79005 1.2-Trichlometrans		4 3/E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7,590	0 0E+00	
79016 Trichloroethylene		1 665+02	7 90E-02	9 10E-06	1 10F+03	3 74E-02 4 22E-01	9 125-04	25	386 15	602 00	8,322	1 6E-05	_
79345 1,1,2,2-Tetrachloroethane	ē	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44 E-04	25.25	419.60	544 20 661 15	7,505	1 7E-06	
83329 Acenaphthene		7 08E+03	4 21E-02	7 695-06	4 24€+00	6 36E-03	1 555-04	52	550 54	803 15	12,155	0 0E+00	-
						:						; ;	

Reference conc. RfC (mg/m³)

	2 8E+00	3.5E-01	7 OF 01	0 OE+00	1 4E-01	00=+00	0 0 0 0	00 to 0	00E+00	0 DE+00	7 0E+00	186-01	2 0E-01	1 8E-02	3.56-01	2 0E-03	100	7 0E-02	7 0E+00	8 0E-01	1 4E-02	000+000	7 00100	4 0F-01	2 OE-02	2 1 1 + 00	0 0E+00	2 1E-02	0 0E+00	7 0E-02	001400	2.00-00	1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0E+00	0 0E+00	0 0E+00	1 1 1 5 0 1	3 20 02	0 0E+00	00E+00	1 4E-01	0 0E+00	00#00	00 000	00+11000	200.00	000+00	0 0E+00	0 0 = +00	3 0E-04	0000	0 0 1 1 0 0	00+1100	00 0 0
	0 0E+00	000+000	00000	1 4E-06	0 0E+00	5 7E-06	2 2E-05	346-05	00-410	3E-04	0 0E+00	0 OE+00	0 05+00	0 0E+00	0 0 0 0	001400	00+100	00+900	00+300	0.00	0 0 10 0	2 05-03	001100	001100	0 OE+00	0 00 +00	3 3E-04	0 0E+00	4 0E-06	0.000	4 6H-04	001100	0 OE+00	1 9E-04	2 4E-05	5 8E-07	0.000	001100	2 1E-04	2,16-04	0 0E+00	2 1E-05	2 15-06	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	195-04	2 0E-03	2 6E-03	0.05+00	3 2E-04	1 OE-04	10 H	1 0E-04
	13,733	14,751	13,000	13,000	12,666	13,977	10,206	14,000	10 373	13,000	8,661	10,800	9,700	9,572	13,000	10,356	8 737	11,329	8,525	9,271	11,689	, v 540, v	, con	7,930	8.410	10,920	000'6	14,000	15,999	15,000	14,447	10,121	11 000	13,467	8,000	8,288	14,370	ZRL'/	17,000	15,000	13,815	16,000	16,455	13,000	2,000	200	12.938	11,000	13,000	14,127	14,000	19,000	18,000	18,000
	757 00	798 67	839 68	890.45	870 00	899 00	738 00	37.00.03	748 40	754 03	630 30	697 60	205 00	675 00	759 13	617.20	636.00	707 60	616 20	684 75	754 00	510 13	617.05	59179	632 40	694 20	629 79	942 94	806 00	862.22	825 00	725.00	708 17	814 00	678 20	620 20	936 00	544 GU	1078 24	969 27	905 00	1019 70	00 626	839 37	930.36	587 38	770.00	746 87	848.76	1750 00	87331	539 37	512.27	482 20
	567 15	613,15	990 99	632 28	570 44	627 87	486 15	510 15	491 14	500 26	417.60	464 19	453 57	447 53	526 15	403 93	41831	484 13	411 52	447 21	503 65	345.65	412 27	383 78	404 87	455 02	451 15	674 43	657 15	20405	562 55	486 15	482 15	290 00	416 14	394 40	20, 20	335 B5	809 15	715 90	655 95	753 15	714 15	603 01	290 22	381 15	558 00	509 60	613 96	629 88	657 15	402 50 377 50	340.50	345 50
	52	25	25	52	52	52	52 5	3 %	25	25	25	22	52	52	3 2	3 5	22 22	25	26	52	ខ្ល	3 5	25.55	22 22	32	52	22	25	52	9 5	Q %	2 52	25	25	25	52	9 8	6 ¥	3 2	<b>52</b>	25	52	52	25	2 %	3 %	25	52	25	22	52	55 X	6 <del>7</del> 5	192
•	4 51E-07	9 39E-10	1 26E-06	5 00E-06	6 37E-05	1 53E-08	8 15 5 63	7.78E-06	4 83E-04	4 00E-09	5 205-03	1 20E-06	1 90E-03	3 900.04	4 345-05	7 885-03	2 76E-03	2 00E-06	7 66E-03	2 435-03	3 325-07	5 125-04	7 34E-03	6 63E-03	3 71E-03	3 98E-07	1 80E-05	1 12E-05	1 02E-07	0 000-00	- 34E-03	1 42E-03	3 17E-06	9 27E-08	7 83E-04	1846-02	105.03	4 07 E-03 9 39E-03	1 60 E-06	1 115-04	1 61E-05	8 29E-07	9 46E-05	1 /05-04	7 44E-07	1775-02	7 46E-07	2 255-06	9 51E-06	1 14E-02	6 005-06	4 60E-03	2 90F-04	5 20E-04
VLOOKUP TABLES	1 85E-05	3 85E-08	5 17E-05	2 05E-04	2 61E-03	6 26E-07	2 300 2	3 19F-04	1 98E-02	1 64E-07	2 13E-01	4 92E-05	7 79E-02	1 60E-02	9 84E-04	3 23E-01	1 13E-01	8 20E-05	3 14E-01	9 96E-02	1 30E-U3	2 10E-02	3 015-01	2 72E-01	1 52E-01	1 63E-05	7 38E-04	4 59E-04	4 18E-06	Z./4E-U3	2.675-03	5 82E-02	1 30E-04	3 80€-06	3 21E-02	7 54E-01	4 5 1 5 - 04	3.855-01	6 56E-05	4 55E-03	6 60E-04	3 40E-05	3 88E-03	0.97m-0.5		7.26E-01	3 06E-05	9 23E-05	3 90E-04	4 67E-01	2 46E-04	1 89E-01 8 20E-02	1 19E-02	2 13E-02
>	1 08E+03	1 12E+01	2 69E+00	3 51E+01	1 98E+00	7 48E+00	3 23E+00	8 00E+02	3 10E+01	3 11E+00	1 78E+02	2 60E+04	1 56E+02	2 20E+04	2 09E+03	1 69E+02	3 10E+02	7 87E+03	1 85E+02	7 38E+01	3 30E+03	2 00E+04	1 61E+02	5 26E+02	4 72E+02	8 28E+04	1 72E+04	5 10E-01	3 40E-01	\$ 20E-02	4 34F-02	3 00E+02	4 50E+03	2 70E+02	2 60E+03	2 00E+02	3 505-03	6 305+03	2 20E-05	1 50E-03	2 06E-01	8 00E-04	1 60E-03	10-E00	2.40F-01	2 80E+03	1 82E+02	9 89E+03	2 00E-01	5 62E-02	7 40E-01	5 70E-02	4.20E-01	3 40E-01
	6 35E-06	7 86E-06	4 83E-06	6.35E-06	7 88E-06	7 03E-06	6 10E-00	6.255-06	7 50E-06	8 74E-06	1 00E-05	8 30E-06	7 90E-06	9 46E-06	7 03E-06	7 80E-06	8 00E-06	8 69E-06	8 44E-06	7 905-06	9 90 10 0	9 20E-06	7 80E-06	8 60E-06	8 70E-06	9 10E-06	7 53E-06	4 55E-06	3 665-06	2 30E-00	7 74E-06	8 23E-06	8 77E-06	7 06E-06	1 05E-05	8 20E-06	1 135.05	1 195-05	5 66E-06	5 56E-06	6 35E-06	5 56E-06	6.21E-06	7 345-06	7.34 F-06	1 00E-05	7 26E-06	8 17E-06	4 23E-06	6 30E-06	4 34E-06	5 00E-06	5 42E-06	5 31E-06
	2 56E-02	4 38E-02	1 74E-02	3 12E-02	3 63E-02	3 300 50 5	5605-02	3 18E-02	5 90E-02	1 94E-02	8.70E-02	7 40E-02	6 905-02	5016-02	7 60F-02	7 50E-02	7 10E-02	5 84E-02	7 69E-02	6 90E-02	1 045-02	8 50E-02	7 00E-02	8 70E-02	7 30E-02	8 20E-02	6 92E-02	1 15E-02	3 57E-02	5 42E-02	3 24E-02	3 00E-02	3 46E-02	2 03E-01	1 96E-02	7 20E-02	7.365-02	7 07E-02	1 90E-02	2 26E-02	3 02E-02	2 26E-02	2 48E-02	1 42E-02	1 42E-02	6 26E-02	3 27E-02	5 45E-02	1 32E-02	3 07E-02	1 16E-02	1 56E-02	2 22E-02	2 146-02
	2 88E+02	3 39E+04	5 75E+04	1 29E+03	1,38E+04	3,39E+U3	5 92 04	381E+02	2 00E+03	7 24E+02	3 63E+02	9 12E+01	6 1/E+02	3 88 2 + 02	6.46F+01	3 63E+02	7 76E+02	2 09E+02	3 89E+02	6 17E+02	174F+01	5 25E+00	4 07E+02	1 82E+02	2.19E+02	2 88E+01	1 55E+01	2,14E+03	101E+U/	5 50 11 + 04	2 95E+04	178E+03	147E+02	9 55E+01	631E+01	155E+02	3550+01	525E+01	347E+06	123E+06	1 07 E+05	1 23E+06	3.988+05	1.23 F + 03	1.26E+03	4 57E+01	6 92E+01	2 40E+01	8 32E+04	5 20E+01	2 57 E+05	2 00E+05	3 30E+04	3 30E+04
	84662 Diethylphthalate	84742 Di-n-butyl phthalate	85687 Butyl benzyl phthalate	86306 N-Nitrosodiphenytamine	86/3/ Fluorene	97692 Hevenhory, 2-hundler	87865 Pentachlomohenol	88062 2,4,6-Trichtorophenol	91203 Naphthalene	91941 3,3-Dichlorobenzidine		95487 Z-Methylphenoi (o-cresol)	93301 1,Z-Dichloropenzene	95070 Z-Chiolophenol 95954 2 4 5-Trichlomphonol	98953 Nitrobenzena	100414 Ethylbenzens	100425 Styrene	105679 2,4-Dimethylphenol		105407 1,4-Dichioropenzene 106478 p.Chlomapiline	107062 1.2-Dichloroethane	108054 Vinyl acetate	108383 m-Xylene		108907 Chlorobenzene	108952 Phenol		115297 Endosulfan	117840 Discostal phthelete	118741 Hexachlorobenzene	120127 Anthracene	120821 1,2,4-Trichlorobenzene	120832 2,4-Dichlorophenol	121142 2,4-Dinitrotoluene		127184 1etrachloroethylene	156592 cis-1 2-Dichloroathylana	156605 trans-1,2-Dichloroethylene	193395 Indeno(1,2,3-cd)pyrene	205992 Benzo(b)fluoranthene	206440 Fluoranthene	207089 Benzo(k)fluoranthene	200002 Alder	319846 aloha-HCH (aloha-RHC)	319857 beta-HCH (beta-BHC)	542756 1,3-Dichloropropene	606202 2,6-Dinitrotoluene		1024573 Heptachlor epoxide	7439976 Mercury (elemental)	8001352 Foxaphene 11096825 Amdor 1260 (BCB-1260)	11097691 Arodor 1254 (PCB-1254)	12674112 Arador 1016 (PCB-1016)	53469219 Arodor 1242 (PCB-1242)

DATA ENTR

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

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YES

YES

VERSION 1 2 September, 1998

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below) 띪

							FNTER		er-defined	tratum A	soil vapor	rmeability,	<u>.</u>	(cm²)							
									Š	**	· w	8 8			L						
							ENTER	Soil	stratum A	SCS	soil type	(used to estimate	soil vapor	permeability)	ıs	ENTER	Stratum C	soil water-filled	Domestr	9 6	**************************************
							ENTER				SCS	soil type	directly above	water table	s	ENTER	Stratum C	soil total	porosity	٥	(andland)
							ENTER			Soil	stratum	directly above	water table,	(Enter A, B, or C)	, <sub>0</sub>	ENTER	Stratum C	soll dry	bulk density,	: °&	(cuto)
					900		ENTER	Lwr (cell D28)	Thickness	of soil	stratum B, stratum C,	(Enter value or 0)	ę	(cm)	792 48	ENTER	Stratum B	soil water-filled	porosity,		(cm <sub>3</sub> /cm <sub>3</sub> )
				Chemical	1 2-Dichloroethane	11001001000	ENTER	Totals must add up to value of Lwn (cell D28)	Thickness	of soil	stratum B,	(Enter value or 0)	ē	(cm)	96 09	ENTER	Stratum B	soil total	porosity,	<b>6</b> L	(andilloca)
•							ENTER	Totals mu				∢		(c <sub>L</sub> )	670 56	ENTER	Stratum B	soil dry	bulk density,	<b>8</b> 9	(a/cm³)
						_	ENTER			Depth	below grade	to water table,	Ţ	(cm)	1524	ENTER			porosity,		(cm³/cm³)
	ENTER	groundwater conc.	, J*	(µg/L)	3 822307692		ENTER	Depth	below grade	to bottom	of enclosed	space noor,	ָ ל	(cm)	15	ENTER	Stratum A	soul total	porosity,	<b>₹</b> _	(unitess)
	ENTER	Chemical CAS No	(numbers only,	no dashes)	107062		ENTER		Average	lios	groundwater	remperature,	vı (	ĵ)	16	ENTER	Stratum A	soll dry	bulk density.	<b>₹</b> &	(g/cm³)

ENTER Stratum C oil water-filled porosity, e,c cm³/cm³/	0.3	
ENTER Stratum C sol total sol porosity, n <sup>C</sup> (untless)	0 43	
ENTER Stratum C soil dry bulk density, P <sub>o</sub> <sup>C</sup> (g/cm³)	17	ENTER Indoor air exchange rate, ER (1/h)
ENTER Stratum B soul water-filled porosity.	0.27	ENTER Floor-wall seam crack widh, w (cm)
ENTER Stratum B soil total porosity, n <sup>8</sup>	0.42	Enter Enclosed Space height, He (cm)
ENTER Stratum B soil dry bulk density, P.B (g/cm³)	17	Entersed space floor width, Wa (cm)
ENTER Stratum A soil water-filled porosity, $\theta_{w}^{A}$ (cm³/cm³)	0.2	ENTER Enclosed space floor length, Ls (cm)
ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	0.43	Sol-bidg pressure driftential, AP AP (g/cm-s²)
ENTER Stratum A soll dry bulk density, Pe <sup>A</sup> (g/cm³)	1.5	ENTER Endosed space floor thickness. Lored (cm)

ENTER Target hazard quotent for noncarcinogens, THQ (untless)	1 0E-06 1 Jsed to calculate risk-based groundwater concentration 1 of 7
ENTER Target risk for carcinogens, TR (unitless)	1 0E-06 Used to calca groundwater
ENTER Exposure frequency, EF EF (days/r)	350
EXPOSURE duration, ED (yrs)	30
ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	30
ENTER Averaging tune for carcinogens, ATc (yrs)	70

	•					
	Reference	conc.	RC	(mg/m <sup>3</sup> )		0 0E+00
į	risk	factor,	URF	(ma/m <sub>3</sub> )-1		2 6E-05
component	water	solubility,	S	(mg/L)		8 52E+03   2 6E-05   0 0E+00
carbon	partition	coefficient,	ጜ	(cm <sup>3</sup> /g)		174E+01
	Critical	temperature,	T <sub>c</sub>	(°K)		561 00
Normal	bolling	point,	Ľ	( <b>,</b> K)		356 65
vaponzation at	the normal	boiling point,	ΔHν,	(cal/mol)		7,643
aw constant	reference	temperature,	,e <sup>e</sup>	(၁၀)		25
law constant	at reference	temperature,	I	(atm-m <sup>3</sup> /mol)		9 78E-04
	Diffusivity	ın water,	ភ្នំ	(cm <sup>2</sup> /s)		9 90E-06
	Diffusivity	in air,	ຜ້	(cm <sup>2</sup> /s)		1 04E-01
	law constant law constant vaponzation at Normal carbon component	law constant law constant vaponzaton at Normal carbon component Unit Diffusivity at reference reference the normal boiling Critical partition water risk F	law constant law constant vaponzation at Normal carbon component Unit at reference reference the normal bolling Critical partition water risk femperature, temperature, bolling point, point, temperature, coefficient, solubility, factor,	law constant law constant vaponzaton at Normal carbon component Unit Diffusivity at reference reference the normal boiling Critical partition water risk for water, temperature, temperature, boiling point, temperature, coefficient, solubility, factor, $D_{\rm w}$ H $T_{\rm R}$ $\Delta M_{\rm v,e}$ $T_{\rm B}$ $T_{\rm C}$ $K_{\rm cc}$ S URF	law constant law constant vaponzaton at Normal carbon component Unit Diffusivity at reference reference the normal boiling Critical partition water risk $F$ in water, temperature, temperature, boiling point, temperature, coefficient, solubility, factor, $D_{\rm w}$ H $T_{\rm R}$ $\Delta M_{\rm v,e}$ $T_{\rm B}$ $T_{\rm C}$ $K_{\rm cc}$ $S$ URF $C_{\rm cc}$	law constant law constant vaponzation at Normal carbon component Diffusivity at reference reference the normal bolling Critical partition water in water, temperature, temperature, boiling point, point, temperature, coefficient, solubility, find $D_w$ H $T_R$ $\Delta H_{v,o}$ $T_B$ $T_C$ $K_{oc}$ $S$ $(cm^2/s)$ $(atm-m^3/mol)$ $(°C)$ $(cal/mol)$ $(°K)$ $(ng/L)$ $(\mu g/L)$

# INTERMEDIATE CALCULATIONS SHEET

	4	و <u></u> ا		
Floor-wall seam permeter,	3,844	Diffusion path length, L <sub>d</sub>	1509	
Water-filled porosity in capil'ary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 294	Total overall effective diffusion coefficient, $D^{eff}$ $(cm^2/s)$	1 08E-03	
Air-filled porosity in capillary zone, $\theta_{\bullet,\alpha}$ (cm <sup>3</sup> /cm <sup>3</sup> )	0 136	Capillary zone effective diffusion coefficient, Def α (cm²/s)	7 62E-04	
Total porosity in capitlary zone,  Details (cm <sup>3</sup> /cm <sup>3</sup> )	0 43	Stratum C C effective diffusion coefficient, D <sup>eff</sup> c (cm²/s)	6 67E-04	Reference conc , RfC (mg/m³)
Thickness of capillary zone, Let (cm)	17.05	Stratum B B effective diffusion coefficient, D'''' G''''s)	1 09E-03	Unit risk factor, URF (µg/m³) <sup>-1</sup>
Stratum A soil effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	4 22E-03	Infinite source bldg conc , Chadre (µg/m³)
Stratum A sod relative air permeability, k <sub>q</sub>	0 746	Vapor viscosity at ave. soil temperature, prs (g/cm-s)	177E-04	Infinite source indoor attenuation coefficient, a a (unitless)
Stratum A soil intrinsic permeability. k	9 36E-10	Henry's law constant at ave. groundwater temperature, H'rs (untiless)	2 64E-02	Exponent of equivalent foundation Peclet number, exp(Pe <sup>t</sup> ) (unitless)
Stratum A effective total fluid saturation, S <sub>b</sub>	0 419	Henry's law constant at ave groundwater temperature, Hrs (atm-m³/mol)	6 27E-04	Area of crack, Areack (cm²)
Stratum C solt air-filled porosity, 9, c (cm³/cm³)	0 130	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{\nu,13}$ (cal/mol)	8,457	Crack effective diffusion coefficient, Dowd (cm²/s)
Stratum B soil air-filled porosity, e.g. (cm³/cm³)	0 150	Crack depth below grade, Zasa (cm)	15	Average vapor flow rate into bldg , Quat (cm <sup>3</sup> /s)
Stratum A soul air-filled porosity, $\theta_{\bullet}^{A}$ (cm $^{3}$ /cm $^{3}$ )	0.230	Crack- to-total area ratio,  n (unittess)	4 16E-04	Crack radius.  fored (cm)
Source- building separation, L <sub>T</sub> (cm)	1509		9 24E+05	Source vapor conc. Course (µg/m³)
Exposure duration, t	9 46  +08	Bidg ventilation rate,  Quadana (cm³/s)	5 63E+04	Convection path length, L <sub>p</sub> (cm)

### RESULTS SHEET

SNC
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INCREMENTAL RISK CALCULATIONS

Hazard quotlent	from vapor	intrusion to	indoor air,	noncarcinogen	(unitless)
Incremental risk from	vapor	intrusion to	indoor air,	carcinogen	(nuitless)
Final	ındoor	exposure	groundwater	conc,	(µg/L)
Pure	component	water	solubility,	ഗ	(µ9/L)
Risk-based	Indoor	exposure	groundwater	conc ,	(\\B\)
Indoor	exposure	groundwater	conc,	попсагсіподел	(µg/L)
Indoor	exposure	groundwater	conc '	carcinogen	(µg/L)

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

						VLOOKUP TABLES	ES				
		Ø	Soul Properties Lookup Table	ookup Table				_			
SCS Soil Type	K, (cm/h)	a (1/cm)	N (unitless)	M (untless)	8, (cm³/cm³)	θ, (cm³/cm³)	Mean Grain Diameter (cm)				
<u>o i</u>	0 20	0 008	1 09	0 083	0 38	890 0	0 0092	In			
<u>. 5</u>	0.26		131	0 237	0 41	0 095	0 0 16	10			
<u> </u>	<u>-</u>	0 036	1 56	0 359	0 43	0 078	0.020				
S	14 59	0 124	2 28	0 561	0 41	0 057	0 040				
so i	29 70	0 145	2 68	0 627	0.43	0 045	0 044				
ပ္သ	0 12	0 027	1 23	0 187	0 38	0 100	0 025				
ಶ್ವ	131	0 028	1 48	0 324	0 39	0 100	0 029				
<u> </u>	0.25	0 016	137	0 270	0 46	0 034	0 0046				
Sic	0 02	0 00	1 39	0 083	0.26	0 0 0 0 0	60000				
10 <u>10</u> 10	200	0 0 0 10	1 23	0 187	0 43	0 089	0 0056				
SIL	0 45	0 020	141	0 291	0 45	290 0	0 011				
SL	442	0.075	1 89	0 471	0 41	0 065	0 030	_			
					Chemic	Chemical Properties Lookup Table	kup Table				
		Organic			Pure		Henvs	Henrys			Fothath
		carbon			component		law constant	law constant	la mon		te choney
•		partition	Diffusivity	Diffusivity	water	Henry's	atreference	reference	to dispos	Coffical	the pos
		coefficient,	ın aır,	in water,	solubility.	law constant	temperature	ternneratura		temperature	Politica I
		ጜ	<b>.</b>	å	Ś	Î	r	_	عر	T.	Ţ
CAS No Chemical		(cm <sub>3</sub> /g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(ma/L)	(unitless)	(atm-m³/mol)	ີ ບູ	a Se	, §	(valley)
50293 DOT		30+3c3 c	20 77 00	200	L	1000		1	ı		
1000000		001100	20-275	000	70-206 7	3 321-04	8 10E-06			720 75	
SUSZO BENZO(a)pyrene		1 025+06	4 30E-02	90E-06	1 62E-03	4 63E-05	113E-06			969 27	
51285 2,4-Dintrophenol		1 00E-02	2 73E-02	90E-06	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	
53703 Dibenz(a,h)anthracene		3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	
56235 Carbon tetrachloride		1 74E+02	7 80E-02	8 805-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	
56553 Benz(a)anthracene		3 98E+05	5 10E-02	9 00E-06	9 40E-03	1 37E-04	3 34E-06	25	708 15	1004 79	
57749 Chlordane		1 20E+05	1 185-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	
58899 gamma-HCH (Lindane)	_	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05		596 55	839 36	
60571 Dieldrin		2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05			842 25	
65850 Benzoic Acid		6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25		751 00	
67641 Acetone		5.75E-01	124E-01	114E-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	
67663 Chloroform		3 98E+01	1.04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	
67721 Hexachloroethane		1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 595-01	3 88E-03	25	458 00	695.00	

Chemical author)		•			Chemic	Chemical Properties Lookup Table	p Table						
Change   C		Organic			Pure		Henry's	Henry's			Enthalpy of		
Confident   Conf		carpon			component		law constant	law constant	Normal		vaponzation at	TE O	
Common   C		partition	Officsivity	Diffusivity	water	Henry's	at reference	reference	bolina	Cotical	the normal	Sk Sk	Reference
Countree    Coun		coefficient,	ın air.	ın water,	solubility,	law constant	temperature,	temperature.	point	temperature.	boiling rount	factor	COUC
Cyantical         (m <sup>2</sup> / <sub>2</sub> )         (m <sup>2</sup> / <sub></sub>		7 <sub>8</sub>	<b>°</b>	<u>*</u>	Ø	Î	I	, L <sup>ex</sup>	, <b>4</b> 9	_2	ΔH,	S.	S.C.
Continue	CAS No Chemical	(cm <sub>3</sub> /g)	(cm²/s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m³/mol)	(၃)	(°K)	æ	(cat/mol)	(mg/m <sub>3</sub> )	(mg/m³)
1000000000000000000000000000000000000	50293 DDT	2 63E+06	1.37F-02	4 955-08	2 505-02	3 325-04	90 301 8		17 663	1000	11 000	i d	
100E-20   100E	5/13/28 Benzo(a)mmnn	90.1100	1 5	100	1 6	100	00-2010		5	000	000,11	8 /E-02	00+100
100E-02   278E-03   278E-03   278E-03   182E-04   147E-05   25.055.2   24.92   25.055.2   27.057   2	SOSTO DENZO(B)pyrene	1 025+06	4 301-02	9 00E-06	1 62E-03	4 63E-05	113E-06	25	715 90	969 27	15,000	2 1E-03	0 0E+00
100   100	51285 2,4-Diretrophenol	1 00E-02	2 73E-02	90E-06	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0.05+00	7 0E-03
1746-20   1762	53703 Dibenz(a,h)anthracene	3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 475-08	•	743 24	990 41	16,000	2 1E.03	00180
1000-100   1100-100	56235 Carbon tetrachloride	1 74E+02	7 80E-02	8 805-06	7 93F+02	1 255+00	2 055 02		000	0000	2,000	201	00-10-0
1,000-10   1,000-10	56553 Benzielanthracene	204380 S	5 40H 01	90 0	10 TO TO TO	241.00	30-100	67	06.640	0000	771')	200	0.01
107E-03   142E-04   142E	57740 Chlodano	201100 t	20-02	00-100	50 HOLD	40-11/2	3.34E-06		708 15	1004 79	15,000	2 1E-04	0 0E+00
100   100	of 499 Chloradae	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05		624 24	885 73	13,000	3 7E-04	00=+00
21   22   22   23   24   24   25   25   25   25   25   25	58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05		596 55	839 36	13.000	3 7E-04	0.01
6 00E-01         5 58E-02         7 97E-06         3 58E-02         7 97E-06         3 58E-03         7 570 00	60571 Dieldrin	2 14E+04	1 25E-02	4 74E-06	1 95E-01	6 19E-04	1 51E-05		613.32	842 25	13,000	4 6E-03	00100
575E-01         134E-01         114E-02         115E-03         114E-03         114E-03 <t< td=""><th>65850 Benzoic Acid</th><td>6 00E-01</td><td>5 36E-02</td><td>7 97E-06</td><td>3 50E+03</td><td>6 315-05</td><td>1.548-06</td><td></td><td>230 52</td><td>751.00</td><td>2,000</td><td>200</td><td>20,10</td></t<>	65850 Benzoic Acid	6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 315-05	1.548-06		230 52	751.00	2,000	200	20,10
## 106E-01 10AE-01 10AE-02 20E-02 0 00E-03 2	67641 Acetone	5.75F-01	1 24F-01	1 14E-05	1 00E+06	1 50E-03	2 885 05	3 4	200	00 00	0000	000	411
## 176E-12 100E-04 120	67663 Chlomform	2 085 404	10,000	1000	1001	00-100-	CD-100 C	C7 1	228 20	01 800	6,955	0 0E+00	3 5 5 - 01
### 1785-00 8 006-20 9 006-40 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		10-106.	10-11-0'-	60-100	/ 92E+U3	1 300-01	3 665-03	25	334 32	536 40	6,988	2 3E-05	0 0E+00
89E+01 80E-22 90E-06 740E-44 50E-04 80E-06 25 389 65 530 8 530 6 530 6 530 6 0E-00 3 E-01  110E+02 70E-02 80E-06 132E+03 70E-01 177E-03 2 2 2 2 3 47 24 9 E-00 7736 00E-00 175E-03 10E-00 10E-00 175E-03 2 2 2 2 3 47 24 9 E-00 7736 00E-00 175E-03 10E-00 175E-03 10E-00 175E-03 10E-00 175E-03 10E-00 175E-03 10E-00 175E-03 10E-00 175E-03 10E-00 175E-03 10E-00 175E-03 10E-00 175E-03 10E-00 175E-03 10E-00 175E-03 10E-00 175E-03 10E-00 175E-03 10E-00 175E-03 10E-00 175E-03 10E-00 175E-03 17	57721 Hexachioroethane	1 /8E+03	2 50E-03	6 80E-06	5 00E+01	1 595-01	3 88E-03	25	458 00	695 00	9,510	4 0E-06	0 0E+00
State-off   Stat	71363 Butanol	6 92E+00	8 00E-02	9 30E-06	7 40E+04	3 61E-04	8 80E-06	52	390 88	563 05	10.346	00+300	3.5E-01
110E+02   180E-02   180E-02   133E+03   705E-01   177E-02   25 71815   98E 70   7,138   0E+00   10E+00   16E-02   77E+04   156E-02   44E-04   56E-02   46E-04   75E-03   77E+04   156E-02   44E-04   75E-03   77E+04   156E-02   44E-04   76E-04   76E-04   77E+04   7	71432 Benzene	5 89E+01	8 80E-02	9 80E-06	1 75E+03	2 28E-01	5 56E-03	25	353 24	562 16	7.342	8.3F-06	00+00
172E+04   156E+02   444E+06   250E+01   308E+04   751E+06   25 718 15   986 20   12,000   00E+10   15E-03   17E-04   156E+02   446E+06   565E+02   446E+06   565E+02   446E+06   565E+02   446E+06   565E+02   446E+06   565E+02   446E+06   565E+02   446E+06   456E+03	71556 1,1,1-Trichtoroethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1,72E-02	25	347 24	545 00	7 136	005+00	00+00
10   10   10   10   10   10   10   10	72208 Endrin	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 085-04	7 51E-06		718 15	986 20	12 000	001100	1 1 1 0 3
100E+06   169E-02   476E-06   9 00E-02   164E-04   4 00E-06   25 639 90   86377   14,000   9 E-05   0 0E+00     146E-01   121E-05   121E-05   121E-04   2 10E-01   8 10E-04   2 10E-05   25 636 44   860 38   13,000   9 T-05   0 0E+00     156E+01   106E-01   121E-05   122E-04   2 50E-01   2 71E-02   2 5 135 71   1 00E-01   2 71E-05   0 0E+00     156E+01   106E-01   121E-05	72435 Methoxychlor	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14 000	00+400	186.02
447E+06 144E+02 587E+02 121E+03 120E+04 2 58E-01 621E+03 2 10E+03 2 5 636 44 88638 13,000 97E-05 00E+00 144E+02 121E+05 152E+04 2 58E-01 10E+04 2 58E-01 10E+04 2 10E+03 2 15E+03 2 11E+04 2 11E	72548 DDD	1 00E+06	1 69E-02	4 76E-06	9 OCE-02	1 64E-04	4 00E-06	25	639 90	863 77	14 000	8 95.05	00.00
105E+01   728E-02   121E-05   152E+04   258E-01   624E-03   25   276 71   467 00   5,714   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	72559 DDE	4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44	86038	000,51	9 75 0	
defection of the control of the cont	74839 Methyl bromide	1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	3,5	276 71	467.00	200'S	001100	20,10
Heat   117E+01   101E-01   117E-05   130E+04	75014 Vinyl chloride (chloroethene)	1 86E+01	1 06E-01	1 23E-06	2 76E+03	1 116+00	2.2.E-03	3, 3	250 25	432.00	* CHC	00490	20.00
Barrier   104E-01   106E-05   106E	75092 Methylene chloride	1 17E+01	1015-01	1 17F-05	1.30F±04	8 98E-02	2 19E-02	24	200	432.00	007'6	5 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0.05
## Size of the control of the contro	75150 Carbon distriffide	4 57E±01	10/11/01	100105	4 400.00	10000	SOCIOL S	2 6	2000	20010	90/0	4 /E-U/	3 0E+00
of TeCh         1 185-02         1 18-02         5 34E-04         25 422 35         686 00         9,479         1 1E-06         0 0E+00           methane         5 0E+01         1 38E-02         1 0E+02         5 34E-04         25 343.6         686 00         9,479         1 1E-06         0 0E+00           ylene         5 0E+01         7 42E-02         1 0EE-03         2 316E-01         2 61E-03         2 5 330 5         5 23 00         6,885         0 0E+03         0 0E+00           ylene         5 0EE+01         2 0EE-02         1 0EE-03         2 0EE-03         2 0EE-03         2 5 330 5         5 23 00         6,885         0 0E+03         0 0E+03           ylene         1 41E+06         1 12E-02         5 69E-06         1 80E-01         4 47E-02         2 61E-02         2 5 30 5         6 0B-03         0 0E+00         0 0E+00 <th>JEST Beneficial</th> <td>10,110</td> <td>P 10 10 10 10 10 10 10 10 10 10 10 10 10</td> <td>0000</td> <td>190100</td> <td>745+00</td> <td>3 UZE-UZ</td> <td>ર :</td> <td>319 00</td> <td>552 00</td> <td>6,391</td> <td>0 0E+00</td> <td>7 05-01</td>	JEST Beneficial	10,110	P 10 10 10 10 10 10 10 10 10 10 10 10 10	0000	190100	745+00	3 UZE-UZ	ર :	319 00	552 00	6,391	0 0E+00	7 05-01
10   10   10   10   10   10   10   10	TOOL OF THE PROPERTY OF THE PR	0 / 15+01	1 495-02	1 035-05	3 10=+03	2 195-02	5 34E-04	25	422 35	00 969	9,479	1 1E-06	· 0 0E+00
side-ful         742E-02         105E-05         5 0EE+03         2 38E-01         5 6E-03         25         330 55         5 23 00         6,895         0 0E+09         5 0E-01           ylene         5 98E+01         742E-02         1 05E-05         5 0EE+03         2 38E-01         5 67 05         6,895         0 0E+03         5 0E-05           specification         5 0E+06         1 0E-03         2 0E+03         2 0E+03         2 0E+03         3 0E+03         0 0E+03         1 0E+03         0 0E+03         0 0E+03         1 0E+03         0 0E+03 </td <th>/52/4 Bromodichioromethane</th> <td>5 50E+01</td> <td>2 985-02</td> <td>1 06E-05</td> <td>6 74E+03</td> <td>6 56E-02</td> <td>1 60E-03</td> <td>25</td> <td>363,15</td> <td>585 85</td> <td>7,000</td> <td>1 8E-05</td> <td>0.000</td>	/52/4 Bromodichioromethane	5 50E+01	2 985-02	1 06E-05	6 74E+03	6 56E-02	1 60E-03	25	363,15	585 85	7,000	1 8E-05	0.000
yidene         5 89E+01         9 00E-02         1 0AE-05         2 25E+03         1 07E+00         2 61E-02         2 6 3 69         846 31         5 0E-05         0 0E+00         1 0E+00         2 61E-02         2 6 03 69         846 31         1 3,000         1 3E-03         0 0E+00	75343 1,1-Dichloroethane	3 16E+01	7 42E-02	1 05E-05	5 06E+03	2 30E-01	5 61E-03	52	330 55	523 00	6.895	0 0E+00	5 0E-01
141E+06         112E-02         5 99E-06         180E-01         4 7E-02         109E-03         25         603 69         846 31         13,000         13E-03         0 GE+00           lopentadiene         2 00E+05         1 12E-02         2 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	75354 1,1-Dichloroethylene	5 89E+01	9 00E-02	1 04E-05	2 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6.247	5 05-05	00+00
lopentadiene         2 00E+05         1 61E-02         7 21E-06         1 80E+04         1 11E+00         2 7 1E-02         2 7 1E-02         2 5 12 15         7 46 00         1 0,931         0 0E+06         7 0E-05           death         6 68E-06         2 7 20E-04         6 68E-06         2 8 88 35         7 15 00         1 0,271         2 7 E-07         0 0E+00         7 0E-05           spane         4 68E+01         6 32E-02         8 7 7 60         1 2 0E+07         1 2 0E+07         0 0E+00         4 0E-03           spane         4 5 7 60         1 2 0E+03         1 1 5 E-01         2 8 0E-03         2 8 0E 60         2 7 8 0         7 500         7 500         0 0E+00         4 0E-03           spane         5 0 0E+02         9 10E+03         1 1 0E+03         3 7 4 E-01         1 0 0E+02         2 8 0E 60         3 8 0E 60         3 8 0E 60         3 8 0E 60         3 8 0E 60         4 0 E 60         4 0 E 60         4 0 E 60         4 0 E 60         4 0 E 60         4 0 E 60         4 0 E 60         4 0 E 60         4 0 E 60         4 0 E 60         4 0 E 60         4 0 E 60         4 0 E 60         4 0 E 60         4 0 E 60	76448 Heptachlor	1 41E+06	1 12E-02	5 69E-06	1 80E-01	4 47E-02	1 09E-03	25	603 69	84631	13,000	1.35-03	00+400
4 68E+01 6 23E-02 6 76E-06 1 20E+04 2 72E-04 6 65E-06 25 488 35 715 00 10,271 2 7E-07 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	77474 Hexachlorocyclopentadiene	2 00E+05	1 61E-02	7 21E-06	1 80E+00	1 11E+00	2 715-02	25	512 15	746 00	10,931	0.0F+00	
pane         437E+01         782E-02         873E-06         280E+03         115E-01         280E-03         25 369 52         572 00         7,590<	78591 Isophorone	4 68E+01	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	25	488 35	715 00	10 271	2 7E.07	_
sthane 5 01E+01 7 80E-02 8 80E-06 4 42E+03 3 74E-02 9 12E-04 25 386 15 60200 8.752 0 UE+05 4 UE+05 0 UE+06 1 10E+03 4 2E-01 1 03E-02 25 386 15 60200 8.50 0 UE+05 0 UE+06 1 10E+03 4 2E-01 1 03E-02 25 386 15 60200 8.50 1 TE-05 0 UE+06 1 10E+03 1 4 IE-02 3 4 4 E-04 25 4 19 60 661 15 8,996 5 8E-05 0 UE+06 1 USE+03 1 4 IE-02 7 59E-06 4 2 4 IE-02 7 59E-06 4 2 4 IE-02 7 59E-06 6 3 IE-03 1 5 IE-03 1 IE-03 IE-03 IE-03 IIII	78875 1,2-Dichloropropane	4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	55	369.52	572 00	7 500	0	
ne 1 66E+02 7 90E-02 9 10E-06 1 10E+03 4 22E-01 103E-02 25 303 6 542 0 7,522 1 0E+00 0 0E+00 0 34E-04 25 419 60 661 15 8,996 5 8E-05 0 0E+00 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	79005 1,1,2-Trichloroethane	5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 125-04	25	386 15	802.00	200	201700	
Moroethane 9 33E+01 7 10E-02 7 90E-06 2 97E+03 1 41E-02 3 44E-04 25 550 54 803 15 12,155 0 0E+00 0 1E+00 1 0E+	79016 Trichloroethylene	1 66E+02	7 90E-02	9 10E-06	1 10E+03	4 22E-01	1 03E-02	, K	36036	644.20	2,000		
7 08E+03 4 21E-02 7 69E-06 4 24E+00 6 36E-03 155E-04 25 550 54 803 15 12,155 0 0E+00 2 1E-01	79345 1,1,2,2-Tetrachloroethane	9 33E+01	7 10E-02	7 90E-06	2 97E+03	1 41E-02	3 44F-04	3 5	419.60	66115	COC' -	000	
5.47	83329 Acenaphthene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6.36F-03	1 45E-04	3 1	550 54	200	0,830	2 95-03	
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						5,01							.1

	2 8 5 + 00	,	7 05-01		_				00E+00	Ī					3 5E-01						8 UE-U1	Ī								7 0F±00					000+00					00=+00	_					200.02								0.05400
	00±00	0			_				3.75-06		_						0 05+00			00+200			_				_		005+00	_		0 0E+00			19E-04			0 0 0 0							20-03			2 0E-03		_	3 2E-04	1 0E-04	1 OE-04	4 00.04
	13,733	14,751	13,000	13 000	12,666	13,977	10,206	14,000	12,000	13,000	8,661	10,800	002'6	9,572	13,000	10,566	8,501	8.737	11,329	8,525	11.580	7.643	7,800	8,523	7,930	8,410	10,920	000'6	14,000	15,999	14,447	13,121	10,471	11,000	13,467	8,288	14,370	7,192	6,717	15,000	13,815	16,000	16,455	13,000	13,000	3,000	72 938	11.000	13,000	14,127	14,000	19,000	19,000	18 000
	757 00	798 67	839 68	890 45	870 00	899 00		813.20	748 40	754 03	630 30	697 60	705 00	675.00	759 13	719 00	617 20	636 00	707 60	07 010	754 00	561 00	519 13	617 05	591 79	632 40	694 20	659 79	942 94	862 22	825 00	873 00	725 00	708 17	814 00	620 20	936 00	544 00	516 50	969 27	905 00	1019 70	979 00	839 37	839 36	559 35 587 38	770 00	746 87	848 76	1750 00	873 31	539 37	512 27	476.22
								510 15											464 13										6/4 43	704 09	582.55				590 00				320 85						290 20	200			61396	629 88	657 15		377 50	340.50
	55	53	25	53	52	55	2 6	3 2	25	122	83	52	25	25	52	25	52	9 8	9 8	2 6	3 12	8	25	25	25	52	25	23 12	5 K	22 22	23	52	25	22	25 25	25	25	52	52	2, 2,	32	52	52	52 5	<b>3</b>	3 %	3 5	25	25	25	25	52	22	25
	4.51E-07	9 39E-10	1 26E-06	5 00E-06	6 37E-05	1 53E-08	8 15E-03	7 78F-06	4 83E-04	4 00E-09	5 20E-03	1 20E-06	1 90E-03	3 90E-04	4 34E-06	2 40E-05	7 88E-03	2 705-03	2 00E-00 2 66E-03	2.435-03	3.32E-07	9 78E-04	5 12E-04	7 34E-03	6 63E-03	3 71E-03	3 98E-07	1 80 5-05	1 12E-05	6 68E-05	1 32E-03	6 51 <b>E-</b> 05	1 42E-03	3 17E-06	9.27E-08 7.83E-04	1 84E-02	1 10E-05	4 07E-03	9 39E-03	1 115-04	1 61E-05	8 29E-07	9 46E-05	1 70E-04	7 445-07	177E-02	7 465-07	2 25E-06	9 51E-06	1 14E-02	90-300 9	4 60E-03	2 005-03	2 90F-04
VLOOKUP TABLES	1 85E-05	3 85E-08	5 17E-05	2 055-04	2 61E-03	6 26E-07	10-11-0-4	3 19E-04	1 98E-02	1 64E-07	2 13E-01	4 92E-05	7 79E-02	1 60E-02	1 78E-04	9 84E-04	3 23E-01	20E-05	3 14F-01	9.96F-02	1 36E-05	4 01E-02	2.10E-02	3 01E-01	2 72E-01	1 52E-01	1635-05	4 50E-04	4 18F-06	2 74E-03	5 41E-02	2 67E-03	5 82E-02	1 30E-04	3 21 E-02	7 54E-01	4 51E-04	1675-01	3 85E-01 6 56E-05	4,55E-03	6 60E-04	3 40E-05	3 88E-03	6 97E-03	3.05E-04	7 26E-01	3 06E-05	9 23E-05	3 90€-04	4 67E-01	2 46E-04	1895-01	8 20E-02	1 10E-02
	1 08長+03	1 12E+01	2 69E+00	3 51E+01	1 98E+00	7 48E+00	1 055 100	8 00E+02	3,10E+01	3 11E+00	1 78E+02	2 60E+04	1 56E+02	2 20E+04	1 20E+03	2 095-403	3 105102	7 875+02	1.85E+02	7.38E+01	5 30 = +03	8 52E+03	2 00E+04	1 61E+02	5 26E+02	4 72E+02	8 28E +04	5 10F-01	3.40E-01	2 00E-02	6 20E+00	4 34E-02	3 00E+02	4 50E+03	2 /UE+02 2 60E+03	2 00E+02	135E-01	3 50E+03	2 20E+03	1 50E-03	2 06E-01	8 00E-04	1 60E-03	1 80E-01	2 40F-01	2 80E+03	1 82E+02	9 89E+03	2 005-01	5 62E-02	7 40E-01	8 00E-02	5 70E-02	4 20E-01
	6 35E-06	7 86E-06	4 83E-06	6 35E-06	7 88E-06	7 031-06	6 10E-06	6 25E-06	7 50E-06	6 74E-06	1 00E-05	8 30E-06	7 90E-06	9 46E-06	7 03E-06	8 60E-06	A 00E-06	A 69F-06	8 44E-06	7 90E-06	1 01E-05	9 90E-06	9 20E-06	7 80E-06	8 60E-06	8 70E-06	9 10E-08	4 55E-06	3 66E-06	3 58E-06	5 91E-06	7 74E-06	8 23E-06	8 //E-06	1 05E-05	8.20E-06	7 24E-06	1135-05	5 66F-06	5 56E-06	6 35E-06	5 56E-06	6 21E-06	7 34 E-06	7.34F-06	1 00E-05	7 26E-06	8 17E-06	4 23E-06	6 30E-06	4 34E-06	4 32E-06	5 00E-06	5 42E-06
	2 56E-02	4 38E-02	1 74E-02	3 12E-02	3 635-02	3 90E-02	5605.02	3 18E-02	5 90E-02	1 94E-02	8 70E-02	7 40E-02	6 90E-02		2916-02	7 50E-02	7 10E-02	5 84F-02	7 69E-02	6 90E-02	4 83E-02	1 04E-01	8 50E-02	7 00E-02	8 70E-02	7 30E-02	8 20E-02	15F-02	3 51E-02	151E-02	5 42E-02	3 24E-02	3 00E-02	3 46E-02	1 96E-02	7 20E-02	2 72E-02	7 36E-02	1 90E-02	2.26E-02	3 02E-02	2 26E-02	2,48E-02	1.42F±02	142E-02	6 26 5-02	3 27E-02	5 45E-02	132E-02	3 07 E-02	1 16E-02	138E-02	1 56E-02	2 22E-02
	2 88E+02	3,39E+04	5 75E+04	1 29E+03	1385+04	3 39E+03	5 92F±02	3 81€+02	2 00E+03	7 24E+02	3 63E+02	9 12E+01	6 17E+02	3 88E+02	1 505+03	9 45E+U1	7 76F+02	2 09E+02	3 89 E+02	6 17E+02	6 61 5 + 01	1.74E+01	5 25E+00	4 07E+02	1 82E+02	2 195+02	1 555+01	2 14E+03	151E+07	8 32E+07	5 50E+04	2 95E+04	1 78E+03	14/E+UZ	6 31E+01	1 55E+02	1 05E+05	3 55E+01	3.475+06	1 23E+06	1 07E+05	1 23E+06	3.985-05	1235+03	1 26E+03	4.57E+01	6 92E+01	2 40E+01	8 32E+04	5 20E+01	2 57E+05	2.90E+05	2 005+05	3 30E+04
	84562 Diethylphthalate		8508/ Butyl benzyl phthalate	66305 N-Nitrosodiphenylamine	96/3/ Fluorene	87683 Hevsethorn 3-hitedless			91203 Naphthalene	91941 3,3-Dichlorobenzidine		95487 2-Methylphenol (o-cresol)		95078 Z-Chlorophenol	GBOS3 Nitrobostopo	500414 Ethylhenzene			106423 p-Xylene		106478 p-Chloroaniline		108054 Vinyl acetate		10883 Ioluene 108007 Chlombonson	108957 Phenol				117840 Di-n-octyl phthalate			120821 1,2,4-filchlorobenzene 120822 2 4-Dickloropenzene	120552 Z.4*Dichoropherio	124481 Chlorodibromomethane	127184 Tetrachloroethylene	129000 Pyrene	156505 trans. 1.2-Dichlorostnylens	193395 Indeno(1,2,3-cd)pyrene	205992 Benzo(b)fluoranthene		207089 Benzo(k)fluoranthene	210013 Cillysoffe	319846 alpha-HCH (alpha-BHC)	319857 beta-HCH (beta-BHC)		606202 2,6-Dinitrotaluene	621647 N-Nitrosodi-n-propylamine	1024573 Heptachior epoxide		8001352 Toxaphene 1400es75 Ameler 4260 (1900 4200)	11090823 Aradiot 1260 (PCB-1260) 11097691 Aradiot 1264 (BCB-1264)	1097091 Arodior 1204 (PCB-1204)	126/4112 Arocior 1016 (PCB-1016)

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

OR
CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc below)

YES

YES

VERSION 12 September, 1998

	ENTER User-defined stratum A soil vapor permeability, k,	
	£	
	ENTER Soll stratum A SCS soil type (used to estimate soil vapor permeability)	SI ENTER Stratum C soil water-filled porosity, e <sub>w</sub> <sup>C</sup> (cm³/cm³)
	ENTER SCS soil type directly above	ENTER Stratum C soil total porosity, n <sup>c</sup> (untiless)
	ENTER Soil Stratum directly above water table, (Enter A, B, or C)	ENTER Stratum C soll dry bulk density, P. P. (g/cm³)
	ENTER If Lwr (cell D28) Thickness of sout stratum C, (Enter value or 0) hc (cm)	ENTER Stratum B soil water-filled porosity, a, t, t
Chemical	Totals must add up to value of Lyrr (cell D28) Thickness Thickness Thickness of soil of soil of soil stratum B, stratum C, atum A, (Enter value or 0) (Enter value or f, h, he hc (cm)	ENTER Stratum B soll total porosity, n 8
	ENTER Totals m Thickness of soil stratum A, h,	FNTER Stratum B soil dry bulk density, P <sub>b</sub> (g/cm <sup>3</sup> )
	ENTER Depth below grade to water table, Lwr (cm)	ENTER Stratum A soll water-filled porosity, 6,* (cm³/cm³)
ENTER Indiat groundwater conc, Cw (ug/L) 318 8892	ENTER Depth below grade to bottom of enclosed space floor, Le (cm)	ENTER Stratum A soi lotal porosity, n <sup>A</sup> (unitless)
Chemical CAS No (numbers only, no dashes)	ENTER Average soul groundwater temperature, T <sub>s</sub> (°C)	ENTER Stratum A soil dry bulk density, Pa (g/cm³)

043	70		0.42	0.27		$\frac{1}{2}$	043
	ENTER	ENTER	ENTER	ENTER	ENTER		
	Enclosed	Enclosed					
	space	space	Enclosed	Floor-wall	loopul		
	floor	floor	space	seam crack	arr exchange		
	length,	width,	height,	width,	rate		
	ٿ	e	f	*	ER		
	(cm)	(cm)	(cm)	(cm)	(1/h)		
	961	961	488	0.1	0.45		
	ENTER	ENTER	ENTER	ENTER		}	
			Target	Target hazard			
	Exposure	Exposure	risk for				
	duration,	frequency,	cardhogens,				
	<u> </u>	Ш	, <b>Æ</b>	완			
ľ	(yrs)	(days/yr)	(unitless)				
ŀ							
	96	350	1 0E-06	1			

Used to calculate risk-based groundwater concentration 1 of 7

## CHEMICAL PROPERTIES SHEET

	Reference	COUC	S.	(mg/m <sub>3</sub> )		20.00
	5 2	factor.	URF	(ma/m <sub>3</sub> ) 1		30 50 0
Pure	water	solubility	Ś	(mg/L)	1	1 00 1
Organic						0 000
	Critical	temperature,	Ľ	(ع ع		535 40
14	boiling	point,	T	ફુ ૪		00 400
Enthalpy of	the normal	boiling point,	ΔH,	(cal/mol)		6 089 334 30 605 AO 1 2 00 E + 0 1 1 0 0 E + 0 2 E + 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Henry's	reference	temperature,	+	(၁၀)		25
Henry's				(atm-m³/mol)		3 885-03
	Diffusivity	ın water,	₫	(cm <sup>2</sup> /s)		1.005,05
	Drffusivity	in air,	ດໍ	(cm <sup>2</sup> /s)		1 04E-01 1 00E-05 1 3 88E-03

# INTERMEDIATE CALCULATIONS SHEET

Floor-wall seam penmeter,	3,844	Diffusion path length, La	2057 64	
Water-filled porosity in capulary zone, $\theta_{w,ca}$ $(cm^3/cm^3)$	0 294	Total overal effective diffusion coefficient, Deff (cm²/s)	9 74E-04	
Aur-filled porosity in capillary zone, $\theta_{\mathbf{h} \in \mathbf{c}}$	0 136	Capillary  zone effective diffusion coefficient, D** (cm²/s)	7 36E-04	
Total porosity in capillary zone, n <sub>cz</sub>	0 43	Stratum C C effective diffusion coefficient, D°fc (cm²/s)	6 40E-04	Reference conc , RtC (mg/m³)
Thickness of capillary zone, Le	17 05	Stratum B effective diffusion coefficient, D <sup>eff</sup> (cm <sup>2</sup> /s)	1 07E-03	Unit risk factor, URF (µg/m³).1
Stratum A soul effective vapor permeability, k, (cm²)	6 98E-10	Stratum A A effective diffusion coefficient, Deff (cm²/s)	4 22E-03	Infinite source bldg conc , Chesters (µg/m³)
Stratum A soil relative air permeability, k <sub>ra</sub>	0 746	Vapor viscosity at ave soil temperature, Hrs (g/cm-s)	1775-04	Infinite source indoor attenuation coefficient, $\alpha$ (unitless) 4 69E-06
Stratum A soil intrursic permeability, k	9 36E-10	Henry's law constant at ave groundwater temperature, H'rs (unitless)	1 04E-01	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)
Stratum A effective total fluid saturation, Se (cm³/cm³)	0419	Henry's law constant at ave groundwater temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mo))	2 47E-03	Area of crack, Aread (cm²)
Stratum C soil air-filled porosity, $\theta_a^c$ $(cm^3/cm^3)$	0 130	Enthalpy of vaporization at ave. groundwater temperature, AH <sub>v</sub> rs (cal/mol))	7,492	Crack effective diffusion coefficient, Drack (cm <sup>2</sup> /s)
Stratum B soil air-filled porosity, e_B (cm³/cm³)	0 150	Crack depth below grade, Zonak (cm)	15	Average vapor flow rate into bidg ,  Quat (cm³/s)
Stratum A soil air-fit ed porosity, $\theta_a^A$ (cm³/cm³)	0 230	Crack- to-total area ratio,  n	4 16E-04	Crack radius, frank (cm)
Source- building separation, L <sub>7</sub>	2057.64	Area of enclosed space below grade, A <sub>e</sub>	9 24E+05	Source vapor conc , Cearce (Hg/m²)
Exposure duration, t	9 46E+08	Bidg ventilation rate, Q <sub>buston</sub> (cm³/s)	5 63E+04	Convection path length, L, L, (cm)

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RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS.

INCREMENTAL RISK CALCULATIONS

Hazard quotient	from vapor	intrusion to	indoor air,	noncarcinogen	(anitless)
incremental risk from	vapor	intrusion to	indoor air,	carcinogen	(unitless)
Finai	Indoor	exposure	groundwater	conc,	(µg/L)
Pure	component	water	solubility,	S	(HB/L)
Risk-based	ındoor	exposite	groundwater	couc,	(µg/L)
Indoor	exposure	groundwater	conc,	noncarcinogen	(ng/L)
Indoor	exposine	groundwater	COUC,	carcinogen	(µg/L)

ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

						VLOOKUP TABLES	ILES
		•	Sou Properties Lockup Table	Lockup Table			
SCS Soil Type	K, (cm/h)	a (1/cm)	N (untiless)	M (unitless)	9, (cm <sup>3</sup> /cm <sup>3</sup> )	θ, (cm³/cm³)	Mean Grain Diameter (cm)
	0.20	0 008	1 09	£80 0	0 38	890 0	0 0032
	0.26	0 019	131	0 237	041	0 095	0 0 1 6
	<u>-</u>	0 036	156	0 359	0.43	0 078	0 0 0
	14 59	0 124	2 28	Ĭ	041	0 057	0.040
	29 70	0 145	2 68		0.43	0 045	9000
	0 12	0 027	1 23	0 187	0 38	0 100	0 025
	131	0 059	1 48	0 324	0 39	0 100	0000
	0.25	0 016	1 37	0 270	0.46	0 034	0 0046
	0 02	0 005	1 09	0 083	0 26	0 0 0 0	0.003
	0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 23	0 187	0.43	0 088	9500 0
	0 45	0 020	141	0 291	0 45	290 0	0 011
	4 42	0 075	1 89	0.471	0.41	0.065	060 0

				Chemics	Chemical Properties I pokup Table	Table						
	Organic			Pure		Henvs	Henrys			Enthaloy of		
	carpon			component		law constant	law constant	Noma		to contamonat	-	
	partition	Diffusivity	Diffusivity		Henry's	at reference	reference	polling	Critical	the normal	į	Reference
	coefficient	⊒ arr,	ın water,	Ę.	law constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,	conc ,
	<u>8</u>	ລ້ຳ	ว้ '	ທ	ī	Ŧ.	ᄩ	<b>-</b>	Ի	ΔHν,	R.	ñ
CAS No Chemical	(cm²/g)	(cm²/s)	(cm,/s)	(mg/L)	(unitless)	(atm-m³/mol)	ဥ်	£	(%)	(cal/mol)	(µg/m³) <sup>-1</sup>	(mg/m³)
50293 O.T.	2047540	275	90 130 1	L	i d							
50308 Barrata	4 005 100	375-02	4 305-00	2005-02	3 32E-04	8 10E-06	25	533 15	720 75	11,000	9 7E-05	0 0E+00
Store of the particular of the	1 0ZE +06	4 30E-02	90E-06	1 62E-03	4 63E-05	1 13E-06	25	715 90	969 27	15,000	2 1E-03	0.05+00
51285 2,4-Dinitrophenol	1 00E-02	2 73 5-02	9 06E-06	2 79E+03	1 82E-05	4 44E-07	25	605 28	827 85	15,000	0 0F+00	7 OF 03
53703 Dibenz(a,h)anthracene	3 80E+06	2 02E-02	5 18E-06	2 49E-03	6 03E-07	1 47E-08	25	743 24	990 41	16 000	2.1F-03	00-400
56235 Carbon tetrachloride	1 74E+02	7 80E-02	8 80E-06	7 93E+02	1 25E+00	3 05E-02	25	349 90	556 60	7 127	1 1. 2 1. 3 4.	00+400
56553 Benz(a)anthracene	3 98E+05	5 10E-02	9 00E-06	9 40E-03	137E-04	3 34E-06	25	708 15	1004 79	15,000	2 1F-04	00+100
57749 Chlordane	1 20E+05	1 18E-02	4 37E-06	5 60E-02	1 99E-03	4 85E-05	25	624 24	885 73	13,000	3.75.04	00+00
58899 gamma-HCH (Lindane)	1 07E+03	1 42E-02	7 34E-06	6 80E+00	5 74E-04	1 40E-05	25	596 55	839 36	13.000	3 7F-04	001100
60571 Diekan	2 14E+04	1 25E-02	4 74E-06	1956-01	6 19E-04	1 51E-05	25	61332	842 25	13,000	4 6E-03	001100
62830 Benzoic Acid	6 00E-01	5 36E-02	7 97E-06	3 50E+03	6 31E-05	1 54E-06	25	720 00	751 00	10,000	0 0E+00	14E+01
5/641 Acetone	5 75E-01	124E-01	1 14E-05	1 00E+06	1 59E-03	3 88E-05	25	329 20	508 10	6,955	00+300	3.5F-01
6/663 Chlorotom	3 98E+01	1 04E-01	1 00E-05	7 92E+03	1 50E-01	3 66E-03	25	334 32	536 40	6,988	2.3E-05	0.05+00
67721 Hexachloroethane	1 78E+03	2 50E-03	6 80E-06	5 00E+01	1 59E-01	3 BBE-03	25	458 00	695 00	9,510	4 OF OF	00100
/ 1363 Butanol	6 92E+00	8 00E-02	9 30 6-06	7 40E+04	3 61E-04	8 80E-06	25	390 88	563 05	10.346	0.0F+00	3.55.01
71432 Benzene	5 89E+01	8 80E-02	9 80E-06	175E+03	2 28E-01	5 56E-03	25	353 24	562 16	7.342	8 35-06	0.0E+00
71556 1,1,1-Trichloroethane	1 10E+02	7 80E-02	8 80E-06	1 33E+03	7 05E-01	1 72E-02	25	347 24	545 00	7,136	0.0F+00	10F+00
72208 Endrin	1 23E+04	1 25E-02	4 74E-06	2 50E-01	3 08E-04	7 51E-06	52	718 15	986 20	12,000	0.0E+00	1.1F-03
72435 Methoxychlor	9 77E+04	1 56E-02	4 46E-06	4 50E-02	6 48E-04	1 58E-05	25	651 02	848 49	14.000	0 OE+00	1.8F-02
72548 UDU	1 00E+06	1 69E-02	4 76E-06	9 00E-02	1 64E-04	4 00E-06	25	639 90	863 77	14,000	6 9E-05	0.05+00
7.559 UUE	4 47E+06	1 44E-02	5 87E-06	1 20E-01	8 61E-04	2 10E-05	25	636 44	860 38	13,000	9 7E-05	0 0E+00
75044 Vines elected Action of	1 05E+01	7 28E-02	1 21E-05	1 52E+04	2 56E-01	6 24E-03	52	276 71	467 00	5,714	0 0E+00	5 0E-03
75002 Mathidae (chicrostnene)	1865-01	1 06E-01	1 23E-06	2 76E+03	1 11E+00	271E-02	25	259 25	432 00	5,250	8 4E-05	0 0E+00
75052 Metalylene Chonde	175	1015-01	1 17E-05	1 30E+04	8 98E-02	2 19E-03	52	313 00	510 00	90'.9	4 7E-07	3 0E+00
75050 Bromoform	104116	200	1 000 1	1 19E+03	1 24E+00	3 02E-02	52	319 00	552 00	6,391	0 0E+00	7 0E-01
75274 Bromodichloromethans	10+110	1 49E-02	1 03 1 - 03	3 10=+03	2 19E-02	5 34 E-04	52	422 35	969	9,479	1 1E-06	0 0E+00
75343 1 1-Dichlomethans	3 46 11-04	70-102	1 UOE-US	6 /4E+03	6 56E-02	1 60E-03	25	363 15	585 85	7,000	1 8E-05	00±400
75354 1 1-Dichlomethylene	201100	20-100-0	1 000	2012000	2 305-01	5 61E-03	8	330 22	523 00	6,895	0 0E+00	5 0E-01
76448 Hentachior	304174	9 00 00 00	1 04 H-U	Z 25E+03	1 07E+00	2 61E-02	25	304 75	576 05	6,247	5 0E-05	00±±00
77474 December and a second se	90+30+0	1125-02	5 6911-06	1 805-01	4 47E-02	1 09E-03	25	603 69	84631	13,000	1 3E-03	0 0E+00
77474 nexaciiorocydopeniadiene	2 00E+05	1615-02	7 21E-06	1 80E+00	1116+00	2 71E-02	25	512 15	746 00	10,931	0.05+00	7 OF 05
euproduces ( Co. 1200)	4 58E+0	6 23E-02	6 76E-06	1 20E+04	2 72E-04	6 63E-06	52	488 35	715 00	10.271	2.7F-07	0 0F+00
78875 1,2-Dichloropropane	4 37E+01	7 82E-02	8 73E-06	2 80E+03	1 15E-01	2 80E-03	25	369 52	572 00	7.590	005+00	4 00.03
79005 1,1,2-inchloroethane	5 01E+01	7 80E-02	8 80E-06	4 42E+03	3 74E-02	9 12E-04	25	386 15	602 00	8 322	1 6E-05	00710
79016 Inchloroethylene	1 66E+02	7 90E-02	9 10년-06	1 10E+03	4 22E-01	1 03E-02	25	360 36	544 20	7.505	175.06	00+100
79345 1,1,2,2-Tetrachioroethane	9 33E+01	7 10E-02	7 90E-06	2 97E+03	141E-02	3 44E-04	25	419 60	661 15	965 8	2 4	00+10
83329 Acenaphthene	7 08E+03	4 21E-02	7 69E-06	4 24E+00	6 36E-03	1 55E-04	25	550 54	803 15	12,155	005-00	2010
										:	,	1

37E+04 5 61E-02 92E+02 5 60E-02 81E+02 3.18E-02 00E+03 5 90E-02 24E+02 1 94E-02 633E+02 7 40E-02
5 01E-02 5 01E-02 2 91E-02 7 50E-02 7 50E-02 7 50E-02 7 50E-02
5 84E-02 8 7 89E-02 8 8 90E-02 1 4 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
6 92F-02 7 116F-02 3 351F-02 3 351F-02 3 324E-02 7 3 306F-02 8 3 46E-02 2 2 3 46E-02 1 198E-02 1 7 20E-02 8
2 72E-02 7 7 36E-02 1 7 70FE-02 1 90E-02 5 2 26E-02 5 2 26E-02 5 2 26E-02 6 1.32E-02 6 1.32E-02 4
236+03 142E-02 734E-06 57E-03 142E-02 734E-06 57E-01 37E-02 100E-05 92E+01 37E-02 73E-06 92E+01 37E-02 73E-06 90E+05 13E-02 73E-06 90E+05 13E-02 73E-06 90E+05 13E-02 73E-06 90E+05 13EE-02 73E-06 90E+05 13EE-02 73E-06 90E+05 13EE-02 73E-06 90E+05 13EE-02 73E-06 90E+05 13EE-02 73E-06 90E+05 13EE-02 73E-06 90E+05 90E+05 90E+0

## TAB

Appendix H

APPENDIX H

### **Supporting Information for Exposure Factors Development**

TABLE H-1 Exposure Factors for Soil Memphis Depot Dunn Flaid RI

		1											1	Г
			ŀ		ţ	FUTURE	ŀ							_
Symbols	Paramoter	Maintenance Worker		Utility Worker		Industrial Worker	~	Onsite Residential or Recreational Adult	<u> </u>	Onsite Residential or Recreational Child		Onsite Recreational		<u> </u>
BW	Body Weight (kg)	70	æ	0,2	æ	70	œ	5	8	1	۵	45	ļ	Т
다		20	8	20	65	20	œ	20	8		a	20	4	7-
IR Inh ad	Inhalation Rate_age-adjusted	ΝΆ	-	N/A		A/A	t	12.86	8.0			N/A	1	Т
AT C	Averaging Time - Carcinogenic	70x365	<b>@</b>	70x365	8	70x365	8	70x365	es		a	70x365	٩	Τ.
AT NC	Averaging Time - Noncarcinogenic	25x365	- a	25x385	a	25x365	æ	30x365	6		ø	10x365	1 00	1
			+				H		Ц		П		L	T-7
9	Sign	1	+				+		$\dashv$				Ц	7
ה היים היים	7	1	Ω	100	4	20	ᅴ	92	٩		4	100		7
ng ii	Fraction (mg/day)	A/A	+	A/A	1	ΨŅ,	+	114 29	å	N/A	1	ΝΆ	4	-7
	Prescuentigasian	60	0	60	0	-	o l		U		0	+	٩	_
á	ONIT CUTISCE Area (CIT)	2,6/9	0	2,679	-	2,679	ō	5,049	•		-	4,478	ţ	_
SA ad	Age-adjusted Skin Surface Area (cm²)	N/A	$\dashv$	N/A		ΝΆ		2,671	9,0	N/A		A/N	_	
¥	Adherence Factor for dry soil (mg/cm²)	003	E	0.1	_	0 03	£	003	ے	0.15	1	0 15	L	r-
PEF	Particulate Emission Factor (m³/kg)	1 32E+09	*	1 32E+09	k	1 32E+09	×	1 32E+09	×	1 32E+09	¥	1 32E+09	Ĭ	_
۳	Exposure Time (hours/day)	8	43	8	В	8	87	4		4	-	4	F	Т
<u>u</u>	Exposure Frequency (days/year)	50	E	24	u	250		350, 45	a,	350, 45	ар	45	_	Т
ED	Exposure Duration (years)		e	25	В	25	6	90	٣	9	6	10	ľ	т
a o o o ∞ o c − ~× ~ E c	I Guidance activity sure Factor sure Factor apted from n EPA Expc sure to mix encleum, or idance Te idance Te idemal cc	S. Region 4 Bulleline, book August 1997 & is posure Factor Hands rposure Factor Hands Actor Handsook, August ordiculture center, carr exposure to grass, barr Reckground Documen and Inhalation exposure is vacation little	Human s protec book, Au sst 1997 npus gr npus gr ces, dus e earth, nt	to RAGS. Region 4 Bulletine, Human Heath Risk Assessment, Interfin, November 1995 I Handbook August 1997 & is protective of 1/2 head (face), hands & forearms (see App EPA Exposure Factor Handbook, August 1997 & is protective of 1/2 head (face), hands, sure Factor Handbook, August 1997 & is protective of 1/2 head (face), hands, sure Factor Handbook, August 1997 & is protective of 1/2 head (face), hands, whan hortcullure center, campus grounds, aborehum) AFe chosen from Soil Loading cal dabere earth, concerts surfaces, dust & debths, AFe chosen from Soil Loading calculatio choical Beckground Document index and inhalation exposure time ar, minus vacation time	t, interf ands 6 of 1/2 of 1/2 of (fac om So om So	in, November 1995 foreims (see Appendi i read (face), hands, fore head (face), hands, sore hand (ace), hands, fore hand (ace), hands, foreims, forei hand (ace), faceims, forei hands, foreims, forei hands i Loading calculations (i ii Loading calculations)	ix G) sarms sarms, ser leg: see A; see A;	& lower legs (see Apper lever legs from the lever legs & frest (see Appendix G) ppendix G) ppendix G)	andix C Appe					
0	Age-edjusted inhalation rate for residential adult	Ranh adj		R-Inhox EDo	+	R-Inha x (EDa - EDc)		87 87 87 87 87 87 87 87 87 87 87 87 87 8	+	20 x 130-50	•	12 86 (m3-year)/(kg-day)	~	
٩	Age-adjusted ingestion rate for residential adult	IRadj		IRe x EDe BWe	•	Rax (EDs. EDc) BWa		200 x 6	•	70 100 x (30-0) 70	•	114.29 (mg-yeat)/(kg-day)	~	
ъ	Age-adjusted dermal contact for residential adult	SAnd		SAS X EDC	•	SAs x (EDs.EDc)		2351 x B	+	5049 x (30-8)	•	2671 (cm2-year)/(kg)		
È	centimeters squared			<u>!</u>				2		2				
daya/year	days per year													-
hours/day	hours per day													
ysb/m	Cubic meters per day													
D,W	cubic meters per kilogram													
mo/om/	milligrams per centimeters equared													
mQ/day	THE DESTRICTION OF LAW													
	Not applicable for this receptor		1										1	7

TABLE H-2
Exposure Factors for Sediment and Surface Water
Menahis Depot Dunn Flexi R!

			1		1				┢			
		Majatanana Markar	Ė	1   1   1   1   1   1   1	-	TO LOKE	Į		+			-
Symbols		ditches		icustrial worker ditches		Onsite Recreational Adult		Onsite Recreational Child		Onsite Recreational Youth		_
BW	Body Weight (kg)	7.0	В	70	в	02	6	15	g	45	e.	_
드	inhalation Rate (m³/day)	20	a	20	8	20	В	15	6	20	œ	
ΑŢ	Averaging Time - Carcinogenic	70x365	a	70x365	æ	70x365	æ	ΑN	╁	70x365	6	_
AT NC	Averaging Time - Noncarcinogenic	25x365	В	25x365	В	30x365	63	6x365	6	10x365	ro.	_
									H			
	Surface Water		$\dashv$						-			_
IR Ing ×	R Ing w Incidental Ingestion - Wading (Lhour)	0.01	q	0 01	q	0 01	۵	0 01	٥	0.01	۵	_
SA w	Skin Surface Area - Wading (cm²)	2,679	υ	2,679	o	5,671	٥		-	4.785	E	_
ΕŢ	Exposure Time (hours/day)	2	5	2	o	2	-		-	,	-[-	_
EF	Exposure Frequency (days/year)	12	ے	50	Ē	45	<b>†</b> -	45	<del> </del> -	45	Ι	
ED	Exposure Duration (years)	25	8	25	6	30	1		-	\$ 5	T	
			H				t		╫		Ŧ	
	Sediments		╁				T		+		I	
IR Ing	Incidental Ingestion - Wading (mg/day)	50	×	50	×	100	-	200	╁	100	]-	
F	Fraction Ingested	1	-	1	ŀ		F		+		T	
SA	Skin Surface Area - Wading (cm²)	2.679	Ü	2 679	٠	5.R71	₹	4 D.K.4	╀,	4 79E	Ţ	
ΑF	Adherence Factor for wet soil (mo/cm²)		E		Ī		†	T	╫	20,1	-	
F	Exposure Time (hours/day)		=  -	5	=		=		티	0	Ε	
ü	Exposure Exposures (despisate)	7	5	7	9	2	하			2	G,	
֓֞֞֜֜֜֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	Exposure Frequency (daysyear)	17	=	20	-	45	╡	45	╣	45	٦	
3	Exposure Duration (years)	25	<u>-</u>	25	ø	30	в	9	В	10	-	
Notes:	All current scenario exposure factors are subject to	plect to re-evaluation based on site-specific information	Specifi	c information							Ţ	
æ	Default exposure factors adapted from EPA, Human	Health Evaluation Manual.	ladns	emental Gudance	Stand	ard Default Exposure Factor	00	Human Health Evaluation Manual. Supplemental Guidance "Standard Default Exmertre Earthre", OSWED Dreadus 0065 6 to Manual of 4004	, de	1001		
Δ	Surface water ingestion while wading adapted from Supplemental Guidance to RAGS. Report Sulfators. Human Health Risk Assessment Intern November 1995.	Supplemental Guidance to	RAGS	Region 4 Bulletins.	Huma	n Health Risk Assessment		VIEW Directive 5205 6-05, MI November 1995	3			
v	Worker surface water/sediment exposure is adapted from EPA Exposure Factor Handbook, Aurust 1997 & is increative of 12 hand (face) hands a fernance fees a houseful surface water/sediment exposure fees and an exposure fees an exposure fees an exposure fees and an exposure fees and exposure fees an exposure fees an exposure fees an exposure fees an exposure fees an exposure fees an exposure fees and exposure fees an exposure fees and exposure fees an exposure fees an exposure fees an exposure fees and exposure fees an exposure fees and exposure fees and exposure fees and exposure fees and exposure fees and exposure fees an exposure fees an exposure fees an exposure fees an exposure fees an exposure fees an exposure fees and exposure fees an exposure fees an exposure fees an expos	I from EPA Exposure Factor	FEE	book, August 1997 8	8	ofective of 10 head (face)	and a	R forestine fees according			_	
ס	Recreational adult sediment/surface water exposur	e is adapted from EPA Expo	Sure	ector Handbook, Au	Gust 1	997 & is protective of hands		exposure is adapted from EPA Exposure Factor Handbook. Audust 1997 & is pridective of hands forwards leng & feet (see Annewdow Co.)	Ą	0.00		
•		e is adapted from EPA Expo	Sure	actor Handbook, Au	Gust 1	997 &is protective of hands	fores	exposure is adapted from EPA Exposure Factor Handbook. Aureust 1997 & survivance of hands foresame leves the Annalysis of the		( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )		
•	Recreational child sediment/surface water exposure is adapted from EPA Exposure Factor Handbook. Autoust 1997 is professional child sediment/surface water exposure is adapted from EPA Exposure Factor Handbook. Autoust 1997 is professive changes from large 8 least fees Assembly CA	is adapted from EPA Expos	Sure F.	actor Handbook, Aug	ust 15	397 & is protective of hands.	forear	ms, lower lags & fact (see A		(S)		
<b>C</b> 3	2 hours exposure to drainage ditch sediment/surface water is assumed for workers/recreational visitors based on the nature of the activities	e water is assumed for work	ers/rec	reational visitors bas	500	the nature of the activities			1	ĵ		
£	Maintenance Worker surface water/sediment exposure is assumed to be once a month	ure is assumed to be once a	#HOUT	£							_	
-	Industrial Worker surface water & sediment exposur	exposure (sump, ditch or impoundment) is assumed to be once a week.	ent) is	assumed to be once	9 ₩ B	Đ,						
-	Recreational factors adapted from Supplemental Guidance to RAGS Region 4 Bulletins, Human Health Risk Assessment, Interm. November 1995	idance to RAGS Region 4	Bulletr	ns, Human Health Ri	sk Ass	sessment. Interm. Novembe	1995					
×	Sediment ingestion rates adapted from Supplemental Guidance to RAGS. Region 4 Bulletins, Human Health Risk Assessment, Interm. November 1995	al Guidance to RAGS Regix	on 4 By	ulletins, Human Heal	윤	k Assessment, Interim, Nove	ğ	1995				
-	Fraction ingested assumed by the nature of the activity	ııty.										
E,	01 = Construction Worker (heavy digging, exposure to mixed bare earth, concrete surfaces, dust & debns) AFs chosen from Soil Loading calculations (see Appendix G)	to mixed bare earth, concre	ste sur	faces, dust & debns)	AFS	chosen from Soil Loading cal	cutatic	ons (see Appendix G)			_	
Ē	centimeters squared							:				
days/year												
hours/day												
<b>3</b>	kilograms											
- Crock	itters per hour											
έρ, E	cubic meters per day										_	
BY,	cubic meters per kilogram											
mb/cm	miligrams per centimeters squared										_	
mg/day	miligrams per day											
Ϋ́	Not applicable for this receptor		Ì								_	

TABLE H-3 Exposure Factors for Groundwater Memphs Depot Dunn Field RI

					l		ŀ	
				FUTURE	411			
			Г	Onsite Resident	Έ	Onsite Resident	Ţ	
Symbols	Parameter	Industrial Worke	ş	(Adult)		(Child)		
BW	Body Weight (kg)	70	В	70	В	15	æ	
IR Inh	Inhalation Rate (m³/day)	*						
AT C	Averaging Time - Carcinogenic	70x365	8	70x365	۵	A/N	Γ	
AT NC	Averaging Time - Noncarcinogenic	25x365	В	30x365	B	6x365	æ	
	Groundwater							
IR Ing	Ingestion Rate of Water (L/day)	1	æ	2	æ	1	æ	
IR adj Ing	ing Age-adjusted Incidental Ingestion Rate (L/day,	N/A		1-1	a,	A/A	Г	
SA	Skin Surface Area (cm²)	2679	۵	20,000	٥	6,557	v	
SA_ad	Age-adjusted Skin Surface Area (cm²)	A/A	L	9480	ü	A/N	Γ	
ET	Exposure Time (hours/day)	0 007	ø	0 007	•	0 007	0	
H	Exposure Frequency (days/year)	250	6	350	6	350	ď	
9	Exposure Duration (years)	25	45	30	æ	9	co	
Notes.								
	Inhaiation exposures to volatites in the groundwater	are equal to the	500	thou exposures	60	the organidwater are equal to the indestion exposures as per FPA Region IV policy	2	
·		Health Evaluat	Ň	emelonis lenne	1 4 5	andance "Standan	֓֞֝֞֜֜֝֞֝֜֝֓֞֝֓֞֝֓֞֝֓֞֝֓֓֞֝֡֡֝֓֡֝֞֝֓֡֝֝֡֡֝֡֝֡֡֝֝֡֡֝	114 Exposure Despee "OSSAS Diseases
·	9285 6-03, March 25, 1991.		<u>.</u>	allte, ceppion	, 5	adioance consum		all cyposure raciols Covyon Directive
م	Worker groundwater exposure is adapted from EPA Exposure Factor Handbook. Aurust 1997 & is protective of 1/2 head (face) hands & forearms (see Annendry G)	Exposure Fact	or Han	dbook, August 1	266	k is protective of 1	7 Fear	(face) hands & forestine (see Appendix (2)
o	Residential adult total body surface area is adapted from EPA Exposure Factor Handbook August 1997 & is protective of all body parts (see Annewly Co.)	from EPA Expo	Sure	actor Handbook	And	ust 1997 & is prote	i ve	fall body parts (see Appendix G)
0	Residential child total body surface area is adapted from EPA Exposure Factor Handbook, August 1997 & is protective of all body parts (see Appendix A)	rom EPA Expo	sure F	actor Handbook	Aug	ust 1997 & is protect	tive o	all body parts (see Appendix 3)
•	Calculation for Shower dermal exposure time 10 minute event x 1 hour/60 minutes x 1 day/ 24 hours = 0 007 event/day	nute event x 1 h	)9/Jnou	0 minutes x 1 da	y/ 24	hours = 0 007 ever	Vdav	
٠	Age-adjusted ingestion rate for residential adult.	Ra	Radj =	IRC X EDC	+	IRa x (EDa - EDc)	n	$\frac{1 \times 6}{15} + \frac{2 \times (30-6)}{70} = 11 \text{ (L-year)/(kg-day)}$
σ,	Age-adjusted dermal contact for residential adult	SAadj ≉	ti To	SAC X EDC	+	SAa x (EDa - EDc)	11	6 + 2000
				BWC		BWa		15 70
5					(			
days/year	days per year							
hours/day								
ъ								
L/day	liters per day							
m³/day	cubic meters per day							
V/N	Not applicable for this receptor							

TABLE H-4 Surface Areas per Receptor Memphis Depot Dunin Field RI

Surface Area Calculation	or for Adult	Dagantera					·
Surface Area for Reside							
1/2 Head	Hands	Arms					
602 5	903 5		Forearms	_		Feet	<del></del>
002.5	a03 2	1805	1172 5	2370	5930	N/A	5049 1/2 head, hands, forearms,
Surface Assartant duty							& lower legs
Surface Area for Adults 1/2 Head							
	Hands	Arms	Forearms	-	Legs	Feet	
602 5	903 5	1805	1172 5	N/A	N/A	N/A	2679 1/2 head hands & forearms
Surface Area for Recrea							
1/2 Head	Hands	Arms	Forearms	Lower legs	Logs	Foot	
N/A	903 5	1805	1172 5	2370	5930	1225	5671 hands, forearms,
_							lower legs & feet
Forearms = 45% whole Ar							
Lower legs = 40% entire L	eg if not ava	ulable					
All values are averages of	50th percen	ttle Male-Fema	ale Adults fr	om EPA, Exp	osure Factors	Handbook	. 1997 (Tables 6.2 & 6.3)
							(144)
Mean Total Body Surface	e Area (TBS	A) for male/fe	male adult	<b>s</b> =		20,000	7
TBSA is central tendency:	value for Ma	le-Female Adu	ilts from EP	A. Exposure F	actors Handb	nk 1007	(Table 6 14)
•				, it makes and i	000013110100	ook, 1331	(1200014)
		_					
Surface Area Calculation							
Total Body Surface Area			n				
50th percentile		Malo (	Female				
0>1		6030	5790	1			*
1>2		6030	5790	)			
2>3		6030	5790	P.			
3>4		6640	6490	)			
4>5		7310	7060	۲			
5>6		7930	7790	Mean TBS	SA for Child	6557	7
All values are averages of	50th percen	tile Male-Ferna	ila Children	from EPA Ev	rongure Eartor	e Handba	
			0		Choagia Larioi	з панили	JK, 1897 (Tables 6 6 & 6 7)
Percent of Total Body Su	rfaco Area	for Male-Fema	ala Childre	n hy Bady Ba	-4		
Age 1			Feet	Forearms	Lower leas		
0>1	18 2	53	6 54				
1>2	16.5	5 68	6 27				
2>3	14 2	53	7 07				
3>4	13 6	6 07	7 21	14 4			
4>5	138	57	7 29				
5>6		٠,	7 23	14	210		
Mean %	15	6	7	_	. ,_F		<b>7.</b> ,
**************************************	500			6		43	<b>1</b> %
	500	368	451	395	637	2351	Percentage of TBSA for Child
0-11-1-1							
Calculated Surface Area	for Child to	r sediment (w:	adıng) exp	Osure		2	в %
		368	451	395	637	185	Percentage of TBSA for Child (sed exposure)
					_		(von oxposers)
For companson				Arms (ontire)	Leas (entire)		
		N.	lean %	13	- ' '		
				877	1593		
All values are mean values	of Percenta	ge of TBSA by	body part i	or Male-Fema	ale Children fro	m FP∆ ⊏	xposure Factors Handbook, 1997 (Table 6 8)
Forearms = 45% whole Arr	ns if not ava	ilable			SINIQUE II U	r. u' r	Access 1 acres 1 adiabook, 1991 (1906 6 8)
Lower legs = 40% entire Le							
g	- a						

(Surface areas for Youth receptors on next page)

TABLE H-4 Surface Areas per Receptor Memphis Depot Dunn Field RI

	culations for Yo	•					
i otal body Sunace A 50th percentile			emale				
6>7		8660	8430				
)~/ !>8		9360	9170				
>9		10000	10000				
>10		10700	10600				
D>11		11800	11700				
1>12		12300	13000				
12×13		12300	14000				
3>14		14700	14800				
3>14 4>15		16100	15500				
5>16		17000	15700				
5>16 6>17	1	17600	16000				
10>17 17>18		18000	16300				
17210		18000	19300		المستقدية	40440	<b>-</b>
					A for Youth		<del>_</del>
ill values are averages	of 50th percentile M	ale-remale Child	ren from EPA	Exposure Factor	ns Handbook	, 1997 (1ac	Dies 6 6 & 6 7)
	A			04			
ercent of Total Body			ins by policy lands				
ge >7	Head . 13 1	Anna F	12inos 471	Legs 1 27 1	Feet 69		
>10 2>13	12 8.74	12 3 34 7	53	28 7 30 5	7 58 7 03		
			5 39				
3>14 0>47	9 97	32.7	5 11	32	8 02		
6>17	796	32 7	5 68	33 6	6 93		
7>18	7 58	31 7	5 13	30 8	7 28		
	10	26	5	30	7		
Kean %							
	1298	3437	685	3994	956		
6 TBSA						posure Fact	ors Handbook, 1997 (Table 6 8)
6 TBSA Ut values are mean val	ues of Percentage of	TBSA by body p				posure Fact	ors Handbook, 1997 (Table 6 8)
6 TBSA Ut values are mean val	ues of Percentage of	TBSA by body p	art for Ma <del>le f</del>	emale Children (	rom EPA, Ex		pra Handbook, 1997 (Table 6 8)
6 TBSA Ut values are mean va	tues of Percentage of rea for Youth for soil 1/2 Head	TBSA by body p  I exposure  Forearms	art for Male f	emale Children i	rom EPA, Ex	72	<b>⊤</b> *
6 TBSA Ut values are mean val	ues of Percentage of	TBSA by body p	art for Ma <del>le f</del>	emale Children (	rom EPA, Ex		% Percentage of TBSA for Youth (soil)
i TBSA If values are mean val	tues of Percentage of rea for Youth for soil 1/2 Head	TBSA by body p  I exposure  Forearms	art for Male f	emale Children i	rom EPA, Ex	72	<b>⊤</b> *
6 TBSA Lit values are mean vai Calculated Surface Ar	tues of Percentage of rea for Youth for soi 1/2 Head 649	TBSA by body p  I exposure  Forearms  1547	art for Male-F Hands 685	emale Children i	rom EPA, Ex	72	% Percentage of TBSA for Youth (soil)
Aean %  1 Transa are mean val  2 Transa are mean val  2 Transa are mean val  2 Transa are mean val	tues of Percentage of rea for Youth for soi 1/Z Head 649	TBSA by body p I exposure Forearms 1547	art for Male-F Hands 685 exposure	emale Children f Lower legs 1598	Feet N/A	72 4478	% Percentage of TBSA for Youth (soil) 1/2 head, hands, forearms & lower legs
6 TBSA Lit values are mean vai Calculated Surface Ar	tues of Percentage of rea for Youth for soi 1/2 Head 649 rea for Youth for sed 1/2 Head	TBSA by body p I exposure Forearms 1547  liment (wading) Forearms	exposure  Hands	Lower legs 1598 Lower legs	Feet N/A	72 4478	Y. Percentage of TBSA for Youth (soil) 1/2 head, hands, forearms & lower legs
. TBSA If values are mean val alculated Surface Ar	tues of Percentage of rea for Youth for soi 1/Z Head 649	TBSA by body p I exposure Forearms 1547	art for Male-F Hands 685 exposure	emale Children f Lower legs 1598	Feet N/A	72 4478	% Percentage of TBSA for Youth (soil) 1/2 head, hands, forearms & lower legs  % Percentage of TBSA for Youth (sed)
TBSA If values are mean val ziculated Surface An	ues of Percentage of 12 Head 649 sea for Youth for sed 1/2 Head N/A	TBSA by body p I exposure Forearms 1547  siment (wading) Forearms 1547	exposure  Hands	Lower legs 1598 Lower legs	Feet N/A	72 4478	Y. Percentage of TBSA for Youth (soil) 1/2 head, hands, forearms & lower legs

TABLE H-5 Chemical-specific Dermal Permeability Factors Memphis Depot Dunn Field RI

		Dermal Absorption	Pen	neability Constant
Chemical Name		ABS		PC
,1,2,2-Tetrachloroethane	1%	EPA Reg 4 1995	9 0E-03	EPA 1992
1,1,2-Trichloroethane	1%	EPA Reg 4 1995	N/A	
,1-Dichloroethene	1%	EPA Reg 4 1995	N/A	
,2-Dichloroethane	1%	EPA Reg 4 1995	5 3E-03	EPA 1992
4,6-Trichlorophenol	10%	EPA Reg 3 1995	5 0E-02	EPA 1992
!-Nitrophenol	N/A	_	1 0E-01	EPA 1992
Vurninum	0 1%	EPA Reg 4 1995	1 6E-04	EPA 1992
Intimony	0 1%	EPA Reg 4 1995	1 6E-04	EPA 1992
vsenic	3%	Wester 1993	1 6E-04	EPA 1992
larium	0 1%	EPA Reg 4 1995	1 6E-04	EPA 1992
lenzo(a)anthracene	10%	EPA Reg 3 1995	8 1E-01	EPA 1992
lenzo(a)pyrene	13%	EPA Reg 3 1995	1 2E+00	
lenzo(b)fluoranthene	10%	EPA Reg 3 1995		EPA 1992
lenzo(k)fluoranthene	10%	-	1 2E+00	EPA 1992
leryllium	0.1%	EPA Reg 3 1995	1 6E-04	EPA 1992
admium	1%	EPA Reg 4 1995	1 6E-04	EPA 1992
arbazole		EPA Reg 4 1995	1 0E-03	EPA 1992
arbon tetrachloride	10%	EPA Reg 3 1995	1 6E-04	EPA 1992
Aloroethane	1%	EPA Reg 4 1995	2 2E-02	EPA 1992
	1%	EPA Reg 4 1995	8 OE-03	EPA 1992
hloroform hloromethane	1%	EPA Reg 4 1995	1 3E-01	EPA 1992
	1%	EPA Reg 4 1995	4 2E-03	EPA 1992
hromium, total	0 1%	EPA Reg 4 1995	1 0E-03	EPA 1992
hrysene	10%	EPA Reg 3 1995	8 1E-01	EPA 1992
obalt	0 1%	EPA Reg 4 1995	4 0E-04	EPA 1992
opper	0 1%	EPA Reg 4 1995	1 6E-04	EPA 1992
tbenz(a,h)anthracene	10%	EPA Reg 3 1995	2 7E+00	EPA 1992
ieldrin	10%	Ryan 1987	1 6E-02	EPA 1992
eptachlor epoxide	10%	EPA Reg 3 1995	1 6E-04	EPA 1992
ideno(1,2,3-cd)pyrene	10%	EPA Reg 3 1995	1 9E+00	EPA 1992
ead	0 1%	EPA Reg 4 1995	4 0E-06	EPA 1992
langanese	0 1%	EPA Reg 4 1995	1 6E-04	EPA 1992
lercury	0 1%	EPA Reg 4 1995	1 0E-03	EPA 1992
lethylene chloride	1%	EPA Reg 4 1995	4 5E-03	EPA 1992
ickel	0 1%	EPA Reg 4 1995	1 0E-04	EPA 1992
entachlorophenol	24%	Wester 1993	6 5E-01	EPA 1992
henanthrene	1%	EPA Reg 4 1995	2 3E-01	EPA 1992
ilicon	N/A		1 6E-04	EPA 1992
etrachloroethene	1%	EPA Reg 4 1995	4 8E-02	EPA 1992
hallium	0 1%	EPA Reg 4 1995	1 6E-04	EPA 1992
otal 1,2-Dichloroethene	1%	EPA Reg 4 1995	1 0E-02	EPA 1992
ylenes (total)	1%	EPA Reg 4 1995	8 0E-02	EPA 1992 *
richloroethene	1%	EPA Reg 4 1995	1 6E-02	EPA 1992
anadium	0 1%	EPA Reg 4 1995	1 6E-04	EPA 1992
nyl chloride	1%	EPA Reg 4 1995	7 3E-03	EPA 1992
oferences				
PA Reg 3 1995	EPA Region III	Fechnical Guidance Manual Risk As	sessment. Assessing Den	mat Exposure from Soil August 199
PA Reg 4 1995		Supplemental Guidance to RAGS N		Exposite from Con Tragget 100
PA 1992		osure Assessment Principles and A		ary 1992
		water (1 6e-4) applied if missing from		ary 1352
/an 1987		Hawkins, et al 1987 Assessing Ris		at Hazardoue Wasta Sitosia
		J Bennett, eds Superfund 87 Proc		
		The Hazardous Materials Control		
ester 1992				
	f14Cl chlords	Marbach, L. Sedik, J. Melendres, (	- Luao, S D⊯10 1992 F	reroutaneous absorption of
ester 1993		from soil Journal of Toxicological ar		
upw( 1353		Maibach, et al 1993 în vivo and i		
octor 1006		vater and soil Fundamental and App		
ester 1996	Wester, R.C., J	Melendres, F Logan, X Hui, H I Ma	aibach, M. Wade, K-C. Hu	ang 1996 Percutaneous absorptior
	2,4-dichloropher	oxyacetic acid from soil with respec	t to soil load and skin cont	act time. In vivo absorption in Rhesi
<b>A</b>	Monkey and in v Not Available	itro absorption in human skin. Journ	al of Toxicological and Em	Aronmental Health, Vol. 47, pp. 335

TABLE H-6 Soil Loading Information Memphis Depot Dunn Field RI

Activity	N	Hands		Arms		Legs		Face	S		Feet		
•		Geo Mean	std dev	Geo Mean	std dev	Geo. Mean	std dev	Geo	Mean	std dev	Geo	Mean	std dev
Indoor:													
Tae Kwon Do	7	0 0063	19	0 0019	4.1	0 002	2					0 0022	2 1
Greenhouse Workers	2	0 043	-	0 0064	-	0 0015	-		0.005	-			
Indoor Kids No 1	4	0 0073	19	0 0042	19	0 0041	23					0 012	1.4
Indoor Kids No 2	6	0 014	15	0 0041	2	0 0031	15					0 0091	17
Daycare Kids No 1a	6	0.11	1.9	0 026	19	0.03	17					0 079	2 4
Daycare Kids No 1b	6	0.15	2 1	0 031	18	0 023	1.2					0 13	1.4
Daycare Kids No.2	5	0 073	16	0 023	1 4	0 011	14					0 044	13
Daycare Kids No 3	4	0 036	13	0 012	1 2	0 014	3					0 0053	5 1
Outdoor:													
Soccer No 1	8	0 11			2				0 012				
Soccer No 2	8	0 035	39	0 0043	22	0.014	53		0 016				
Soccer No 3	7	0 019	1.5	0 0029	22	0.0081	16		0 012	16			
Groundskeepers No.1	2	0 15	-	0 005					0.0021			0 018	
Groundskeepers No 2	5	0 098	2 1	0 0021	26	0 001	15		0 01	2			
Groundskeepers No 3	7	0 03	23	0 0022	19	0 0009	18	(	0044	2.6		0 004	2 (
Groundskeepers No 4	7	0 045	19	0 014	18	0 0008	1.9	(	0026	16		0 018	1 5
Groundskeepers No 5	8	0.032	17	0 022	28	0 001	14	(	0039	2 1			
Landscape/Rockery	4	0 072	21	0 03	2 1			(	0057	19			
Imgation Installers	6	0 19	16	0.018	3 2	0 0054	18	(	0063	13			
Gardeners No 1	8	02	19	0 05	2 1	0 072	14		0 058	16		0 17	1 6
Gardeners No 2	7	0 18	34	0.054	2.9	0 022	2		0 047	16		0 26	16
Rugby No 1	8	04	17	0 27	16	0 36	17		0 059	27			
Rugby No.2	8	0 14	14		16		16		0 046	14			
Rugby No.3	7	0 049	17	0 031	13				0.02	15			
Archeologists	7	0 14	13		19		4 1		0 05			0 24	1.4
Construction Workers	8	0 24	15		15				0 029				_
Utility Workers No 1	5	0 32	17	02					0 1	15			
Utility Workers No 2	6	0 27	2 1	03	18				0.1				
Equipment Operators No 1	4	0 26	2.5		16				01				
Equipment Operators No 2	4	0 32	16	0 27	1.4				0.223				
Farmers No 1	4	0 41	16	0 059	3.2	0 0058	2.7		0.018				
Farmers No 2	6	0 47	1.4	0 13	2.2	0 037			0 041	3			
Reed Gatherers	4	0 66	18	0 036	2.1	0.16			_ •	·		0 63	7 -
Kids-in-mud No 1	6	35	23	11	6.1	36						24	
Kids-in-mud No 2	6	58	23	11	3.8	95						6.7	12 4

<sup>=</sup> substituted information

Kissel et al., 1996b, Holmes et al., 1996 (submitted for publication) adapted from EPA, Exposure Factors Handbook, 1997 (Table 6.12)

N = Number of subjects

Sources.

1ABLE H-† Sol Loading Information Memphis Depot Duna Fest Fi

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B Calculation of UCL90 for Soil Loading of Body Parts	or Soil L	oading of	Body Parts																		
Activity	Z	Hands	Hands		Hands SL Arms		Arms	Ĭ	Arms St. Legs	Г	Legs	f	Leas SL	Faces	Faces	ľ	Faces St	1961	Foot	ľ	Foot SI
			Іп(Gвот теал)	(ps)u	06730	1	In(Geom	)ji	96		E -				Ę	1			In(Geom		
Indoor:	L	Γ	Г	Т	L	T	T	-	П	T	7			8 0	7	(1)	200	D	mean	n(sa)	UCLSO
Tae Kwon Do	7	1 9020	-5 0672	0.64	0 0127	3 1435	-6 2659	17	0 0314	1 9700	6 2146	0.69	0.0044			†		20446	6 1102	1,2	0000
Greenhouse Workers	2		-3 1466				-5 0515	+			6 5023				5 2983	$\dagger$		2	9	5	2000
Indoor Kids No 1	4	3 0 1 1 5	4 9199	0.64	0 0274	3 0115	-5 4727	0.64	0 0158	3 6225	-5 4968	0.83	0.0334			1		201475	47220	76.0	00100
Indoor Kids No 2	9	1 6810	4 2687	0 41	0 0206	2 1270	-5 4968	690	0.0101	1 68	-5 7764	0.41	0.0048	Ī		†	Ì	2000	1 6006	5 6	00100
Daycare Kids No 1a	۵	2 0430		0.64	0 2430	2 0430	3 6497	0.64	0.0574	1 8095	-3.5066	0 23	0.0531	Ī		†	1	0000	4 0835	3 8	19100
Daycare Kids No 1b	g	22190		074	0 4125	1 9590	3 4738	0.59	0.0617	1 48320	3 7723	3 2	0 0 0		1	T		none z	2, 2383	900	0 3034
Daycare Kds No 2	2	1 9070	-26173	047	0 1276	1 6910	3 7723	N.	0 0323	1 691	5089	2 2	0.0155	Ī		†		27.23	70007	\$ 6 0	76/10
Daycare Kids No 3	4	1 7975	-3 3242	0.26	0 0489	1 7035	4 4228	0 18	0 0146	50045	4 2687	100	06120			†	Ī	7 1683	2,00	2 5	0.000
								_				T				$\dagger$		3	200	3	
Outdoor.								l	+		<del> </del>	$\dagger$			1	T				t	
Soccer No 1	8	2 096	-2 2073	0.59	0 2083	2 2514	4 5099	690	0 0252	3 5926	-3 473B	132	0.4634	1 8366	9000	1	0.0472		1		
Soccer No 2	8	3 5926	l i	136	0 5609	2 4217	5 4491	670	0 0 1 2 1	4 1486	4 2687	167	0.7687	888	4 1352		0000			†	
Socoer No 3	1	1 6070	-3 9633	041	0 0269	2 1190	-5 8430	0 79	0.0078	-	A 8150	0.47	0.0426	77	7000	1	00700		1	1	
Groundskeepers No.1	2	100 m	F-4-1 8974		A STANCE		-5 2983						200		7		2		1	1	ľ
Groundskeepers No 2	9	2 3935	-2 3228	074	0 3136	2 9800	6 1658	8	0.0138	17550	8 90778		0000	07000	1 5057	2 C C C	10000		4	1	1
Groundskeepers No 3	7	2 1190	ı	0 83	0.08721	1 9020	£ 1193	0.64	0000	100	707	3	1000		ZCDO T	8 8	מממו				
Groundskeepers No 4	-	1 9020	-3 1011	0.64	0.0910	1 B340	4 2687	5.0	0.0258	Ş	7 1300	3 2	7000	7	1000		5000	24500	5 5215	8	0 0164
Groundskeepers No 5	<u></u>	1 9566	-3 4420	0.53	0.0545	28	-3 8167	3 5	0 4444	1 7852	a 0078	3 6	0.0010	100000	77060	1	2000	2 20/0	4 01/4	2 14 14	0 0255
Landscape/Rockery	4	3 4163	-2 6311	0 74	0 4096	3.4163	3 5056	77	0 1707	300	2	5	2000	2 2300	200	7 2	8000	ļ		1	
Imgation Installers	9	1 8095	-1 6607	0.47	0.3104	2 9878	4 0174	1 4	0 4875	1 0500	£ 224.4	- 62.0	0.0403	50100	2000	\$ 6	0.0214				
Gardeners No 1	æ	2 1777	1.6004	200	0.4164	2366	2 0067	2 2	2000	2020	2000	200	2000	1 32/10	2/900	0.26	9/30	Ì			
Gardeners No 2		2 9045	7148	5 5	1 6240	2 4500	2000	1 9	0071	700	-25317	q (	9500	8	284/3	047	0 0917	1 9566		0 47	0 2688
Rugby No 1	6	1 9566	0 9163	0.53	0 6817	1 9566	3703	3 6	03070	9050	4 0047	800	2000		200	4	00/28	1712	7	0 47	0 4033
Rugby No 2	8	1 7852	.1 9661	0.34	0 1859	958	-2 2073	74	0 1730	3 3	1 8071		00130	2 2 2	7 200		02/0	1	1	1	
Rugby No 3	_	1 7120	-3 0159	0 53	0 0817	1 4795	3 4738	0.26	0 0376	1 4420	-2 BS47	0,18	0.0645	1 61	20130	3 5	2000		1	1	
Archeologists	7	1 4795	-1 9661	0.26	0 1698	1 9020	3 1942	0.64	0 0829	3 1435	-3 5756	4 41	0.4633	1 837	7300 C	100	2000	4 6000		-	
Construction Workers	8	1 8366	-1 4271	041	0 3453	- 8366	-2 3228	041	0 1410	7852	-2 7181	4	0.0876	1 05.57	-2 540E	800	2000	387	-1 47/1	3	0.3148
Utility Workers No 1	5	1 9070	-1 1394	0 53	0 6110	2 9800	-1 6094	660	1 4388			+		1,55	30.06	7 5	25.5	İ	1	Ť	
Utility Workers No 2	9	2 2 1 90	-1 3083	0 74	0 7424	1 9590	-1 2040	0.59	0 5967	f	-	$\dagger$		2	3005	180	247		1	t	
Equipment Operators No 1	4	4 0425	-1 3471	0 92	3 3578	2 4485	-2 4191	0 47	0 1932		-	-		2 01475	2 3026	72	15.65		†	+	
Equipment Operators No 2	4	2 4485	-1 1394	0 47	0 6945	2 0148	-1 3093	034	0.4226	-		$\vdash$		2 4485	5005	0.53	0.5435		T	$\dagger$	
Farmers No 1	4	2 4485	-0 8916	0 47	0 8898	5 0045	-2 8302	1 16	3 3434	4 4675	-5 1499	660	0 1231	2 01475	4 0174	25.0	0 0282			$\mid$	T
Farmers No 2	9	1 6265	-0 7550	0.34	0 6353	2 3110	-2 0402	620	0 4007	3 5450	-3 2968	136	0 8081	2 98775	-3 1942	1 10	0 3254	Ī	†	t	
Reed Gatherers	4	2 8130	-0 4155	0 29	2	3 4163	-3 3242	0.74	0 2048	9 8920	-1 8326	222	599620					A 7005	AR20	98	63000
Kids-in-mud No 1	٥	23110	3 5553	0 83	117	4 4105	2 3979	181	1997	2 1270	3 5835	690	89		l		Ī	2 98775	3 1781	1 28	2000
Kids-in-mud No 2	9	2 3110	4 0604	0 83	194	3 5450	2 3979	132	223	2 3110	2 2513	083	32	Ī			T	4 1000	1 000	2 50	302
=missirig information														1	1		1	3	300	70.7	/00601

=missing information Sources Kassel et al. 1996b, Holmes et al. 1996 (submitted for publication) adapted from EPA, Exposure Factors Handbook, 1997 (Table 6 12) H™ values adapted from R.O. Gilbert, 1987 Statistical Methods for Environmental Pollution Monitoring (Table A10)

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Soil Loading Information	Memorita Dapat Dune Field Rr

C Calculation of Adherence Factors for Child Receptors	nce Facto	* for Child	Receptors	_																					
Activity	2	Hands	Hands   Hands St.   Hands	Hands	-	Arms ,	4rms SL)	Arms Arms St. Arms vs For	orearms.		T aBen	1 7S abe	Legs SL   Legs vs   Lower legs	ower legs	F	Faces	Faces St.	Faces		Feet	Feet SL	Fact	- =Fina:	Elina; 22 -22 (all)	47 1911
																							Hande Far	}_;	Č
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### TAB

Appendix I

APPENDIX I

### **Supplementary Toxicity Material**

### Appendix I TOXICOLOGICAL PROFILES FOR COPCs AT DUNN FIELD

### ANTIMONY

Antimony is a silvery white metal of medium hardness that breaks easily. Antimony is used as a component of lead and zinc alloys which are used in lead storage batteries, solder, sheet and pipe metal, bearings, castings, type metal, ammunition and pewter. Exposure to antimony may occur through the ingestion of food or water, via breathing of air or through contact with soil, water or other substances that contain antimony. Skin contact and inhalation are common occupational exposures. A small amount of ingested antimony is absorbed into the bloodstream after a few hours. An unknown amount of inhaled antimony is absorbed through the lungs within a few days. Most of the absorbed antimony is transported to the liver, lungs, intestines and spleen. Within several weeks, antimony is excreted in the feces and urine (ATSDR, 1990).

Acute symptoms of antimony exposure include, diarrhea, vomiting, gastric discomfort and ulcers following oral ingestion of large quantities (< 19 ppm). Animal studies indicate that acute exposures may result in lung, heart, liver and kidney damage, eye irritation following inhalation of antimony, and skin irritation following dermal contact. Subchronic exposure to antimony via inhalation leads to heart problems, stomach ulcers, pneumoconiosis and eye and skin irritation. Animal studies indicate that subchronic ingestion of antimony may cause diarrhea, weight loss, liver damage and decreased red blood cell count (ATSDR, 1990).

Antimony in the atmosphere is in the form of particulate matter or adsorbed to particulate matter. Transport to land and surface water occurs through gravitational settling and other forms of dry and wet deposition. The fate of antimony in the environment is complicated because it can exist in two oxidation states, 3+ and 5+. In the aquatic environment, antimony is mainly associated with particulate matter and tends to settle out in areas of active sedimentation. Some forms of antimony are strongly sorbed to soil, making it relatively immobile. Antimony may also adsorb strongly to colloidal materials in soil which may become mobilized and transported to groundwater. In general, adsorption is greatest at near neutral pHs. Antimony does not appear to bioconcentrate in fish and aquatic organisms (ATSDR, 1990).

### ARSENIC

Arsenic is a naturally occurring element and enters the environment as a result of natural forces (volcanoes, weathering) and human activities such as metal smelting, glass manufacturing, pesticide production and application, and fossil-fuel burning (ATSDR, 1991). In general, inorganic arsenic is more toxic than organic arsenic. The most common exposure route is ingestion of arsenic in food or water. Inhalation and skin contact are secondary routes of exposure. Arsenic is quickly absorbed through the lungs or digestive tract into the bloodstream. Within a few hours most of the absorbed arsenic is cleared from the blood and is excreted in the urine (ATSDR, 1991).

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Large doses of ingested inorganic arsenic (20 mg/kg or greater) induce death while smaller doses produce systemic effects such as irritation of the digestive tract, nausea, vomiting, and diarrhea. In addition, there are effects on cells that produce blood, abnormal heart function, blood vessel damage, liver or kidney injury, and impaired nerve functioning. The ingestion of arsenic in drinking water has been associated with an elevated incidence of skin cancer. Epidemiological data demonstrate an association between occupational exposure to inhaled arsenic and lung cancer (ATSDR, 1991). The USEPA classifies arsenic as a group A carcinogen (sufficient evidence of carcinogenicity in humans) (IRIS, 1995).

Arsenic is a non-volatile solid. The mobility of arsenic in the environment depends on the solubility of the particular chemical form present. Most arsenic in the air is adsorbed to particulate matter and settles out according to particle size. Arsenic found in the soil is predominantly an insoluble, adsorbed form. Arsenic in soil and water may be reduced and methylated by soil organisms. Bioconcentration of arsenic occurs primarily in aquatic algae and lower invertebrates. Biomagnification varies by species with some fish and invertebrates containing elevated levels of arsenic compounds. Terrestrial plants uptake arsenic from the soil and air (ATSDR, 1991).

### 1,2-DICHLOROETHANE

1,2-Dichloroethane is used primarily as a starting material in the manufacture of vinyl chloride, tetrachloroethylene, trichloroethylene, and other chlorinated organic compounds. It is also used as a degreasing agent, solvent, furnigant for grain and upholstery, varnish and paint remover, and lead-scavenging agent in gasoline. Primary routes of exposure include breathing air, drinking water, and skin absorption (IRP, 1989).

Short-term exposures to vapor concentrations greater than 125 ppm produce irritation of the eyes, nose and throat. Ingestion or inhalation of the compound causes dizziness, nausea, vomiting, increasing stupor, cyanosis, rapid pulse, loss of consciousness, and injury to the liver, kidneys and lungs. The dermal LD<sub>50</sub> in rabbits is 2800 mg/kg of body weight (IRP, 1989). In addition, reproductive effects have been noted in rats at an oral dose of 120 mg/kg-day (ATSDR, 1992).

Chronic exposures are associated with loss of appetite, nausea, vomiting, gastric pain, neurological disturbances, and liver and kidney impairment. In animal studies, death was outcome for inhalation exposures greater than 400 ppm The USEPA has classified 1,2-dichloromethane as a Group B2 carcinogen (probable human carcinogen) (IRP, 1989).

1,2-Dichloroethane is expected to be highly mobile in the soil/ground-water system. Adsorption to soil is low; volatilization from soils is the primary transport process. Microbial degradation in soil is not expected to be significant (IRP, 1989)

### 1,1-DICHLOROETHENE

1,1-Dichloroethene (1,1-DCE), also known as 1,1-dichloroethylene and vinylidene chloride, is a clear, colorless liquid that has a mild, sweet chloroform-like odor. It is a man-made chemical used to make copolymers, modacrylic fibers and other chemicals. It evaporates quickly at room temperature and is flammable. 1,1-DCE may enter the body by inhalation of contaminated air or ingestion of contaminated food or water (ATSDR, 1992).

There have been no studies that reported death of humans following inhalation exposure to 1,1,-DCE. Lethality in laboratory animals after inhalation exposure varies considerably depending on species, strain, sex and nutritional status. When experimental animals were exposed to high concentrations of 1,1-DCE, damage to the liver, kidney and central nervous system has been reported. The liquid is moderately irritating to the eyes and skin (ATSDR, 1992).

Long-term effects of 1,1-DCE include liver and kidney damage. There is also evidence of mutagenicity in several test systems. A statistically significant increase in kidney tumors was observed in mice exposed to 1,1-DCE via inhalation. Other tumor types were also reported in this study. The USEPA has classified 1,1-DCE as a Group C carcinogen (possible human carcinogen) (IRP, 1989).

The environmental fate of 1,1-DCE is influenced largely by its high volatility; the majority evaporates to the atmosphere. Because it is water soluble and weakly adsorbed to soil/sediment, the potential for surface water or ground-water contamination and transport is great. Transformation processes are not expected to be great in natural soil (IRP, 1989).

### DIELDRIN

Dieldrin is a chlorinated hydrocarbon compound that has been widely used as a domestic pesticide. Its primary use in the past was as an insecticide for corn and for termite control. Human exposure can result from inhalation and ingestion. Dermal exposure is limited to the past for those involved in manufacturing or application of pesticides containing dieldrin. Dermal exposure could occur when contact at hazardous waste sites or contaminated soils/sediments.

Dieldrin is absorbed into the bloodstream from the gastrointestinal tract after ingestion or from the lungs after inhalation. It is quickly distributed throughout the body after intake, but is rapidly concentrated in fatty tissues due to its lipophilic nature where it can remain for years. Other organs which tend to have high concentrations are the liver, kidneys, brain, and blood. Dieldrin is excreted, mainly in the feces, in the form of several metabolites that are more polar than the parent compounds (ATSDR, 1991).

Signs of toxicity include effects on the central nervous system with symptoms of headache, dizziness, nausea, general malaise, and vomiting, followed by muscle twitching, myoclonic jerks,

and even convulsions. These symptoms are reversible with time after removal from the source of exposure. Death may result from anoxemia (ATSDR, 1991)

No chronic effects have been observed in humans exposed to low levels of dieldrin in the workplace. Animal studies, however, have indicated a decrease in immune function and liver damage resulting from dieldrin exposure. In addition, liver cancer has been observed in mice chronically exposed to dieldrin (ATSDR, 1991). Dieldrin has been classified by the USEPA as a probable human carcinogen, class B2. There is sufficient evidence that exposure to dieldrin has resulted in liver cancer in animal studies (IRIS, 1995).

### HEPTACHLOR\HEPTACHLOR EPOXIDE

Heptachlor is a man-made pesticide used in homes, buildings, and on food crops, but it is no longer manufactured in the United States. It is a white powder in its pure form, while technical grade heptachlor is a tan powder. It is a component of the pesticide, chlordane. Heptachlor epoxide is a breakdown product of heptachlor, and is a result of bacterial activity (ATSDR, 1992).

Heptachlor is readily absorbed into the gastrointestinal tract and the skin. It is slowly eliminated via the bile duct to the feces. Heptachlor epoxide is an oxidation product which is formed by plants and animals after exposure to heptachlor. Heptachlor epoxide is often detected in human milk, blood and other body tissues and is more harmful than heptachlor itself. Other breakdown products are less harmful (ATSDR, 1992).

Heptachlor is acutely toxic via the oral and dermal routes. No studies are available to show that inhalation of heptachlor is harmful to humans. Hepatotoxicity is the most sensitive noncancer endpoint with animal acute and chronic studies describing evidence of severe liver damage, increased liver weight, and increased levels of serum liver enzymes. Central nervous system disorders are also evident. Long-term oral exposures in animals are also associated with kidney, adrenal, and blood defects. It is also fetotoxic and caused reduced fertility in laboratory rodents. Chronic oral exposure to heptachlor or heptachlor epoxide increased the incidence of liver carcinomas in several species of mice. Studies of pesticide applicators indicate a slight increased incidence in cancers of the lung, skin and bladder (ATSDR, 1992). The USEPA classifies heptachlor and heptachlor epoxide as group B2 carcinogens (probable human carcinogens) (IRIS, 1995).

Heptachlor and its epoxide are persistent in soil with half-lives of two and fourteen years, respectively. Heptachlor and its epoxide can evaporate into the air and ultimately travel long distances. Heptachlor epoxide dissolves more easily in water than does heptachlor and evaporates slowly. Heptachlor does not dissolve easily in water and will bind to sediments. In soil and water heptachlor is broken down by bacteria to its epoxide and other substances. Bioaccumulation of both heptachlor and heptachlor epoxide occur in aquatic and terrestrial organisms, where they are stored in fatty tissues for long periods of time (ATSDR, 1992).

### **LEAD**

Lead is a commonly used, naturally occurring metal which is ubiquitous throughout the environment. Lead is found in construction materials, leaded gasoline, radiation protection gear, paint, ceramics, plastics, antimonial lead storage batteries, and ammunition. Lead is well absorbed from all portions of the respiratory tract including the nasal passages. Absorption from the gastrointestinal tract is less rapid and complete than from the respiratory tract. Dermal absorption is a much less significant route of lead absorption than inhalation or ingestion. Absorbed lead is distributed to the soft tissues of the body with the greatest distribution to the kidneys and the liver. Lead is eventually transferred to the skeleton where 90% of the body's long-term burden is stored. Approximately 70% of the absorbed lead dose is excreted. The portion of lead that is not absorbed is excreted in the feces. Most of the absorbed lead is excreted by the kidneys or through biliary clearance into the gastrointestinal tract (ATSDR, 1988).

Lead intoxication in humans can occur by ingestion and inhalation of dust or fumes. Lead interferes with the blood making process, production of energy, and transmission of nerve impulses. Symptoms of lead intoxication include anorexia, malaise, headaches, and intestinal spasms. The neuromuscular disease, lead palsy, is a result of advanced subacute poisoning (lead blood levels of 70 Tg/dL and less), and is characterized by muscle weakness leading to paralysis. Lead encephalopathy is the term used for the central nervous system manifestation which is commonly seen in children when lead blood levels reach 90 Tg/Dl. Symptoms include clumsiness, dizziness, delirium, convulsions, and coma. The mortality rate is 25% when the brain is involved, with survivors suffering long-term neurological problems (ATSDR, 1988).

Chronic low level lead exposure (lead blood levels of 30-50 Tg/Dl) is associated with learning disabilities. Lead toxicity is defined by the Centers for Disease Control as a blood level of 10 Tg/Dl or greater (child). Kidney damage occurs after prolonged exposures, and is apparently reversible. In epidemiological studies, lead intoxication is also associated with increased blood pressure which is symptomatic of kidney damage. Lead exposure is associated with reproductive effects such as miscarriages and temporary sterility. Lead readily crosses the placenta. In all systems, the concentrations of essential nutrients and elements have a significant impact on the degree of toxicity seen with lead exposures. Occupational exposure to airborne lead is associated with an increased incidence of total malignant neoplasms, cancers of the digestive tract and cancers of the respiratory tract. An increased incidence in kidney cancer was seen in lead smelter workers exposed by inhalation and in various animal species exposed by ingestion at levels of 500 ppm and above. The USEPA has classified lead as a group B2 carcinogen based on animal studies (probable human carcinogen with inadequate or no evidence in humans) (ATSDR, 1988; IRIS, 1995; USEPA, 1994c).

The mobility of lead in soil is dependent on the chemical properties of the soil. Lead can react with sulfates, carbonates, and phosphates or combine with clays and organic matter which limits the further migration of lead through the soil matrix. Lead in surface waters is usually present as suspended solids. Atmospheric lead is removed by dry deposition and rainout. Lead does not

significantly bioaccumulate in fish. Lead localizes in fish skin which serves to reduce human exposures by fish consumption. Lead is toxic to wildlife, particularly water fowl, through their consumption of lead shot. Tetraethyl lead is biodegradable, but inorganic lead concentrations above 5 Tg/L can be toxic to microorganisms. As water hardness increases, the acute toxicity of lead to freshwater aquatic species decreases (ATSDR, 1988).

### POLYCYCLIC AROMATIC HYDROCARBONS

Polycyclic aromatic hydrocarbons (PAHs) are a diverse class of compounds formed as a result of incomplete combustion of organic compounds with insufficient oxygen. As pure chemicals, PAHs generally exit as colorless, white, pale yellow, or green solids. This leads to the formation of C-H free radicals which can polymerize to form various PAHs. Although the health effects of the individual PAHs are not exactly alike, the following PAHs are considered as three groups in this profile (ATSDR, 1993):

### Low Molecular Weight Compounds (152-178g/mol)

acenaphthene acenaphthylene anthracene fluorene phenanthrene

### Medium Molecular Weight Compounds (202 g/mol)

fluoranthene pyrene

### High Molecular Weight Compounds (228-278 g/mol)

benzo(a)anthracene (B[a]A)
benzo(b)fluoranthene (B[b]F)
benzo(j)fluoranthene (B[j]F)
benzo(k)fluoranthene (B[k]F)
benzo(g,h,i)perylene (B[ghi]P)
benzo(a)pyrene (B[a]P)
benzo(e)pyrene (b[e]P)
chrysene
dibenz(a,h)anthracene (D[ah]A)
indeno(1,2,3-c,d)pyrene (I[123cd]P)

PAHs are present in the environment from both natural and anthropogenic sources. As a group, they are widely distributed in the environment. Humans may be exposed to PAHs in the environment, in tobacco smoke, in cooked food, and in the workplace. Typically, individuals are not exposed to a single PAH, but to a mixture of related chemicals (ATSDR, 1993). PAHs are readily absorbed into the bloodstream from the gastrointestinal tract after ingestion or the lungs after inhalation. PAHs are metabolized primarily in the liver and excreted in the feces.

Most of the information available for PAHs are from studies on experimental animals. Adverse effects in humans are generally not observed, but have been documented. Hematologic effects (myelosuppression) were produced in people after intravenous administration of anthracene-containing chemotherapeutic agents. Dermal effects have been documented. Regressive verrucae followed repeated topical application of B[a]P over a four-month period. In animals, oral administration of PAHs affect proliferating organs and tissue such as bone marrow, lymphoid organs, and intestinal epithelium (ATSDR, 1993).

PAHs are well established as experimental carcinogens for all routes through which humans would normally be expected to be exposed. In human occupational studies, lung and skin cancer have been demonstrated after inhalation exposure to PAHs. These workers were employed in coke production plants as roofers and as oil refinery workers. In experimental animals, the site of tumor induction is generally the point of first contact with the PAHs (i.e., stomach tumors after ingestion, lung tumors after inhalation, etc.) (ATSDR, 1993). The following PAHs are classified as B2 carcinogens by the USEPA: B[a]A, D[ah]A, B[a]P, B[b]F, B[k]F, chrysene and I[123cd]P; these PAHs are probable human carcinogens. Anthracene, B[ghi]P, pyrene, fluorene, naphthalene, fluoranthene, acenaphthylene and phenanthrene are class D carcinogens (not classifiable as to human carcinogenicity). No data exist on the carcinogenicity of acenaphthalene (IRIS, 1995).

Some of the transport and partitioning characteristics (Henry's law constant,  $K_{\infty}$  values,  $K_{\text{ow}}$  values) of the 17 PAHs are roughly correlated to their molecular weights. PAH compounds in water tend to be removed by volatilization, binding to particulates or sediments or being bioaccummulated. The low molecular weight PAHs have Henry's Law constants in the range of  $10^{-3}$  to  $10^{-5}$  atm-m³/mol and are therefore associated with significant volatilization. The other PAHs volatilize to a lesser extent. In the atmosphere they are associated with particulate matter, especially soot, and can travel long distances. PAHs suspended in the air are thought to undergo direct photolysis very quickly (ATSDR, 1993)

PAHs have low water solubilities and high propensity for binding to particulate or organic matter. In general PAHs do not easily dissolve in water although they have been detected in groundwater in some distances. Medium and high molecular weight PAHs are primarily removed from the water column by deposition and some volatilization (they have  $K_{\infty}$  values of  $10^4$  to  $10^6$  indicating strong tendencies to adsorb). Low molecular weight PAHs are removed by volatilization and biodegradation (they have  $K_{\infty}$  values  $10^3$  to  $10^4$  indicating moderate potential to bind). In general sorption of PAHs to soil and sediment increases with increasing organic carbon content and is also directly dependent on particle size. The ultimate fate of PAHs in the sediment is believed to be biodegradation and biotransformation by microbes. In soils and water PAH breakdown generally takes weeks to months and is due primarily to the actions of microorganisms. Photodegradation also plays a role in PAH breakdown in water (ATSDR, 1993).

PAHs can be accumulated in organisms: the higher molecular weight compounds accumulating more easily than the lower molecular weight ones. Most organisms, however, metabolize and excrete PAHs rapidly, resulting in short lived bioaccumulation (ATSDR, 1993).

### 1,1,2,2,-TETRACHLOROETHANE

1,1,2,2-Tetrachloroethane was commonly used to produce other chemicals such as paints and pesticides or as an industrial solvent and degreasing agent. Now, it is introduced into the environment as a minor impurity or chemical intermediate of other chlorinated solvents. Exposure may occur through inhalation of contaminated air, dermal contact or incidental ingestion in water or food (ATSDR, 1994).

Inhalation of airborne fumes at greater than 360 ppm can cause fatigue, vomiting, dizziness, and possibly unconsciousness. Breathing, drinking, or skin contact with lower concentrations may cause liver damage, stomach upsets, or dizziness. An oral acute LOAEL value of 75 mg/kg/day was established for liver damage in rats (ATSDR, 1994).

Long-term effects of human exposures are not established. Reproductive, systemic, or carcinogenic effects have not been noted in human populations. Chronic oral studies with rats noted reduced body weights (108 mg/kg/day) and renal effects (284 mg/kg/day). Based on a NCI mouse study, it is suspected to be a promoter of hepatic tumors. This compound has been classified as a group C carcinogen (limited evidence of carcinogenicity in animals and inadequate data for humans) (ATSDR, 1994).

1,1,2,2-Tetrachloroethane when released to the atmosphere is fairly stable with an estimated half-life in the troposphere of two years. When released to water, the compound will be lost by volatilization in a period of days. The compound is not expected to adsorb to soil, suspended solids, and sediment unless in high clay, dry soils. The bioconcentration factor in fathead minnows has been reported as 49 which indicates little tendency for the compound to bioaccumulate in fish and aquatic organisms (ATSDR, 1994)

### TETRACHLOROETHENE (PCE)

Tetrachloroethene or tetrachloroethylene is a clear, colorless, nonflammable liquid that has a characteristic odor. It is a widely used solvent, particularly as a dry cleaning agent, a degreaser, a chemical intermediate, and a fumigant, and was given orally as a medical treatment for hookworms. The most significant exposure probably occurs in the industrial environment by inhalation. It is readily absorbed after ingestion or inhalation, but dermal absorption is poor. However, skin irritation may result from direct contact with the undiluted liquid. The main excretion pathway is through exhalation of the unmetabolized compound (ATSDR, 1992).

In confined, poorly ventilated areas, single exposures to high concentrations of tetrachloroethene can result in dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, and possibly unconsciousness and death. The consequences of chronic exposure to

tetrachloroethene by breathing or ingesting low levels of the chemical are not known. In laboratory animals, studies were conducted using higher concentrations than normally found in an environmental setting. These studies suggested the potential for tetrachloroethene to result in liver and kidney damage, birth defects, toxicity to pregnant animals, liver cancer and leukemia. Based on evidence from animal studies, tetrachloroethene is considered to be carcinogenic. The USEPA classifies tetrachloroethene as a B2 carcinogen (probable human carcinogen based on animal studies, but inadequate or no evidence in humans)

Tetrachloroethene found in surface waters or on soil surfaces will predominantly evaporate into the atmosphere. However, tetrachloroethene is moderately to highly mobile in soil and susceptible to leaching. In subsurface soils where volatilization cannot occur, tetrachloroethene is only slowly degraded and may be relatively persistent. Studies have shown that tetrachloroethene has a low bioaccumulation potential (ATSDR, 1992).

### TETRACHLOROMETHANE (Carbon Tetrachloride)

Tetrachloromethane, more commonly referred to as carbon tetrachloride, is a clear, heavy liquid with a sweet aromatic odor. It is a synthetic chemical with no natural sources. Because it evaporates very easily, it is not usually encountered in its liquid state in the environment. Carbon tetrachloride is readily absorbed from the gastrointestinal tract and more slowly absorbed through the lungs and skin. Most carbon tetrachloride leaves the body by being exhaled through the lungs within a few hours after exposure.

Acute exposures of carbon tetrachloride to humans have shown a wide range of effects. Prior exposure to alcohol, phenobarbital, and some pesticides have been shown to increase the effects of carbon tetrachloride. Single exposures to low concentrations may cause symptoms such as irritation of the eyes, moderate dizziness and headache which disappear once exposure is discontinued. Exposure to higher concentrations will cause the same symptoms as above, but additional symptoms of nausea, loss of appetite, mental confusion, agitation and the feeling of suffocation may be seen. Chronic exposure to carbon tetrachloride produces symptoms of fatigue, lassitude, giddiness, anxiety, headache and muscle twitching. Organ damage is usually restricted to the liver, although there are some reported cases of kidney damage. After chronic exposure there is usually regeneration in these organs. Carbon tetrachloride is carcinogenic in animals producing mainly liver tumors. The USEPA has classified carbon tetrachloride as a group B2 carcinogen indicating that, based on animal studies, it is probably a human carcinogen, although there are no adequate studies of cancer in humans.

Most carbon tetrachloride is released to the environment in the atmosphere. Although it is moderately soluble in water, its high rate of volatilization results in only about 1% of the total carbon tetrachloride in the environment being in surface waters and oceans. Likewise, carbon tetrachloride tends to volatilize from tap water used for showering, bathing and cooking inside a home (ATSDR, 1989).

### 1,1,1-TRICHLOROETHANE

1,1,1-Trichloroethane (1,1,1-TCA) is a colorless liquid with a sweet characteristic odor. It is used as a solvent for adhesives, in metal degreasing, in textile processing, as an aerosol propellant and in spot cleaners. 1,1,1-TCA can enter the body through the lungs by breathing contaminated air or through the digestive system by eating or drinking contaminated food or water. Most 1,1,1-TCA is exhaled regardless of how it entered the body, but small metabolized amounts leave in the urine (ATSDR, 1990).

Acute inhalation exposure to concentrations greater than 500 ppm of 1,1,1-TCA in humans may result in dizziness, lightheadedness and loss of balance and coordination. These effects are reversible when the exposure is discontinued. Continued breathing of higher concentrations of 1,1,1-TCA could lead to unconsciousness, a decrease in blood pressure and cardiac arrest. Although the health effects of long-term low dose exposure in humans is unknown, studies in experimental animals have shown that damage occurs to the breathing passages, lungs and liver following inhalation of high levels. Studies in experimental animals have shown that exposure to high concentrations of 1,1,1-TCA during pregnancy could result in birth defects. If 1,1,1-TCA comes into direct contact with skin for more than five minutes, a mild irritation may occur, but would disappear in a few hours after removal of the 1,1,1-TCA. The USEPA classifies 1,1,1-TCA in group D (not classifiable as to human carcinogenicity).

1,1,1-TCA evaporates easily and is moderately water soluble. It volatilizes from soil, surface water, and from unconfined ground water to the soil. If released to soil as a liquid, 1,1,1-TCA does not sorb to soil and may leach to groundwater. 1,1,1-TCA is not believed to bioconcentrate in fish and aquatic organisms (ATSDR, 1990).

### TRICHLOROETHENE (TCE)

Trichloroethene (TCE) or trichloroethylene is a colorless liquid at room temperature with an odor similar to ether. The major use of this chemical is as a solvent for degreasing metal parts. Exposure to TCE can occur via inhalation and by ingestion of contaminated food and water. Absorption of TCE following inhalation exposure is high with approximately 50% of the inhaled dose absorbed and 50% exhaled. Dermal absorption is poor in humans. Once absorbed the majority of the TCE is metabolized and then excreted in the urine, only a relatively small amount of absorbed TCE is exhaled via the lungs (ATSDR, 1991).

Trichloroethene is not acutely toxic by the inhalation or oral routes. Oral and inhalation exposures affect the central nervous system, liver and kidney. Trichloroethane was once used as an anesthetic; inhalation of high doses (5000 ppm) produces anesthetic effects. Human epidemiology studies have not shown a clear connection between exposure to trichloroethene and increased cancer risk (ATSDR, 1991). Laboratory animals exposed by inhalation developed cancers in the lung and liver, while animals exposed orally had increased incidence of liver and kidney carcinomas. The USEPA classifies TCE as a group B2 carcinogen (probable human carcinogen but inadequate or no

evidence in humans)(HEAST, 1994). The USEPA is currently re-evaluating the toxicity and carcinogenicity of trichloroethene (IRIS, 1994).

Environmentally, trichloroethene volatilizes rapidly from water. It is highly mobile in soil and quickly leaches to the ground water. It exists predominantly in the vapor phase with some removal from the atmosphere via wet deposition. TCE is believed to have a low bioaccumulation potential in fish and other aquatic creatures (ATSDR. 1991).

### TRICHLOROMETHANE (Chloroform)

Chloroform is a colorless or water-white liquid with a pleasant non-irritating odor. It can enter the body by breathing air, drinking water or eating food that contains chloroform. Because chloroform can penetrate the skin, it may enter the body by bathing or showering in water containing chloroform. Water that has been chlorinated for disinfectant purposes may contain chloroform as a by-product. In general chloroform is rapidly eliminated from the body (ATSDR, 1991).

Short-term inhalation exposure to high concentrations (900 ppm) results in CNS effects such as tiredness, dizziness and headache while higher concentrations (8,000 to 10,000 ppm) may result in unconsciousness and death. Longer-term exposure to chloroform can affect liver and kidney function. Dermal exposures may cause sores on the skin. Chloroform was used as a surgical anesthetic for many years before its harmful effects on the liver and kidneys were recognized. Chronic oral doses of chloroform at concentrations greater than 60 mg/kg/day have been found to result in liver and kidney cancer in laboratory animals. Epidemiological studies found a correlation between chlorinated drinking water and cancer of the bladder, large intestine and rectum in humans. However, chloroform is only one of many chlorinated compounds found in chlorinated drinking water that are potentially carcinogenic. The USEPA classifies chloroform as a group B2 carcinogen (probable human carcinogen based on animal studies, but madequate or no evidence in humans) (IRIS, 1994).

Chloroform is released to the environment as a result of its manufacture and use in the chlorination of water and from other water treatment processes. Most of the chloroform released to the environment will eventually volatilize from water and soil to the atmosphere. Chloroform in the atmosphere may be degraded by photochemical reactions. Because of its limited ability to sorb to soil and its high water solubility, chloroform will leach from soil to groundwater where it may persist for a long time (ATSDR, 1991).

### VINYL CHLORIDE

Vinyl chloride is a colorless gas with a mild, sweet odor. It is used to make polyvinyl chloride (PVC), as a refrigerant gas, and in the manufacture chlorinated compounds.

Acute exposure in humans to approximately 10,000 ppm vinyl chloride for five minutes results in central nervous system effects including dizziness, disorientation, nausea, and headaches. Death

has resulted when humans were acutely exposed to high levels of vinyl chloride. Acute inhalation of 100,000 to 400,000 ppm vinyl chloride has resulted in death in laboratory animals. Inhalation of vinyl chloride has been reported to result in impaired liver function, liver damage, and central nervous system effects at doses as low as 10 ppm in laboratory animals. Chronic inhalation exposure has also resulted in a syndrome known as vinyl chloride disease. Symptoms include circulatory disturbances in the extremities, and blood, lung, and liver effects. In animals, chronic exposure to oral and inhaled vinyl chloride resulted in decreased longevity, vinyl chloride syndrome, toxic hepatitis, kidney effects, and cancer (ATSDR, 1991). Vinyl chloride has been classified as a group A carcinogen in humans (HEAST, 1994). Increases in the occurrence of tumors in the liver (angiosarcomas), brain, lung, and blood making tissues have been associated with occupational exposure to vinyl chloride in humans (ATSDR, 1991).

Vinyl chloride is a highly mobile compound and may leach into ground water. It does not adsorb to soil. Vinyl chloride in surface water will volatilize to the atmosphere. In the atmosphere, vinyl chloride exists as a vapor and is rapidly degraded. It does not bioconcentrate significantly in aquatic organisms (ATSDR, 1991; Howard, 1990).

# Appendix A Toxicology Profiles for Contaminants

## A.1 Inorganic Arsenic

**Toxicity Classification:** 

EPA: Group A (known human carcinogen)

**Toxicity Criteria:** 

Reference Dose (RfD)—Oral: 0.0003 milligrams per kilogram (mg/kg)/day

Uncertainty/Modifying Factor:

Principal Studies: Tseng et al., 1968; Tseng, 1977

Cancer Slope Factor—Oral: 1.5 (mg/kg/day)<sup>-1</sup>

Principal Studies: Tseng et al., 1968; Tseng, 1977

Cancer Slope Factor–Inhalation: 4.3 E<sup>-3</sup> (mg/m<sup>3</sup>)<sup>-1</sup>

Principal Studies: Brown and Chu, 1983a-c; Lee-Feldstein, 1983; Higgins,

1982; Enterline and Marsh, 1982

#### **Target Organs (Primary):**

- skin (hyperpigmentation and hyperkeratosis)
- nervous system (peripheral neuropathy)
- · vascular system
- hematopoietic system
- gastrointestinal
- lungs
- liver
- kidney

#### A.1.1 General Information

The toxicity of inorganic arsenic (As) depends on its valence state (-3, +3, or +5), and also on the physical and chemical properties of the compound in which it occurs. Trivalent (As<sup>+3</sup>) compounds are generally more toxic than pentavalent (As<sup>+5</sup>) compounds, and the more water soluble compounds are usually more toxic and more likely to have systemic effects than the less soluble compounds, which are more likely to cause chronic pulmonary effects if inhaled.

One of the most toxic inorganic arsenic compounds is arsine gas (AsH<sub>3</sub>). It should be noted that laboratory animals are generally less sensitive than humans to the toxic effects of inorganic arsenic. In addition, in rodents, the critical effects appear to be immunosuppression and hepato-

renal dysfunction, whereas in humans the skin, vascular system, and peripheral nervous system are the primary target organs.

Water soluble inorganic arsenic compounds are absorbed through the G.I. tract (>90 percent) and lungs; distributed primarily to the liver, kidney, lung, spleen, aorta, and skin; and excreted mainly in the urine at rates as high as 80 percent in 61 hrs following oral dosing (EPA, 1984). Pentavalent arsenic is reduced to the trivalent form and then methylated in the liver to less toxic methylarsinic acids (ATSDR, 1989).

# A.1.2 Basis for Toxicity Criteria

The Reference Dose (RfD) for chronic oral exposures, 0.0003 mg/kg/day, is based on a No Observed Adverse Effects Level (NOAEL) of 0.0008 mg/kg/day and a Lowest Observed Adverse Effects Level (LOAEL) of 0.014 mg/kg/day for hyperpigmentation, keratosis, and possible vascular complications in a human population consuming arsenic-contaminated drinking water (EPA, 1991a). Because of uncertainties in the data, the U.S. Environmental Protection Agency (EPA) (1991a) states that "strong scientific arguments can be made for various values within a factor of 2 or 3 of the currently recommended RfD value." The subchronic Reference Dose is the same as the chronic RfD, 0.0003 mg/kg/day (EPA, 1992).

Acute inhalation exposures to inorganic arsenic can damage mucous membranes, cause rhinitis, pharyngitis and laryngitis, and result in nasal septum perforation (EPA, 1984). Epidemiological studies have revealed an association between arsenic concentrations in drinking water and increased incidences of skin cancers (including squamous cell carcinomas and multiple basal cell carcinomas), as well as cancers of the liver, bladder, respiratory, and gastrointestinal tracts (EPA, 1987; IARC, 1987; Chen et al., 1985, 1986). Occupational exposure studies have shown a clear correlation between exposure to arsenic and lung cancer mortality (IARC, 1987; EPA, 1991a). EPA (1991a) has placed inorganic arsenic in weight-of-evidence group A, human carcinogen. A drinking water unit risk of 5E-5(mg/L)<sup>-1</sup> has been proposed (EPA, 1991a); derived from drinking water unit risks for females and males that are equivalent to slope factors of 1.0E-3 (mg/kg/day)<sup>-1</sup> (females) and 2.0E-3 (mg/kg/day)<sup>-1</sup> (males) (EPA, 1987). For inhalation exposures, a unit risk of 4.3E-3 (mg/m³)<sup>-1</sup> (EPA, 1991a) and a slope factor of 5.0E+1 (mg/kg/day)<sup>-1</sup> have been derived (EPA, 1992).

Symptoms of acute inorganic arsenic poisoning in humans are nausea, anorexia, vomiting, epigastric and abdominal pain, and diarrhea. Dermatitis (exfoliative erythroderma), muscle cramps, cardiac abnormalities, hepatotoxicity, bone marrow suppression and hematologic abnormalities (anemia), vascular lesions, and peripheral neuropathy (motor dysfunction, paresthesia) have also been reported (U.S. Air Force, 1990; ATSDR, 1989; EPA, 1984). Primary target organs are the skin (hyperpigmentation and hyperkeratosis) [Terada et al. 1960; Tseng et al., 1968;], nervous system (peripheral neuropathy), and vascular system [Tseng et al., 1968]. Anemia, leukopenia, hepatomegaly, and portal hypertension have been reported. In addition, possible reproductive effects include a high male-to-female birth ratio.

In animals, acute oral exposures can cause gastrointestinal and neurological effects. Chronic exposures have also resulted in mild hyperkeratosis and bile duct enlargement with hyperplasia, focal necrosis, and fibrosis. Reduction in litter size, high male-to-female birth ratios, and fetotoxicity without significant fetal abnormalities occur after oral dosing; however, parenteral

dosing has resulted in exencephaly, encephaloceles, skeletal defects, and urogenital system abnormalities.

It is reported that a 12 percent incidence of skin abnormalities occurred in children whose drinking water contained 0.6 to 0.8 mg As/L. The earliest cases occurred about 4 to 5 years after the initial exposure. Cardiovascular effects, including Raynaud's syndrome, acrocyanosis, angina pectoris, hypertension, myocardial infarction, mesenteric thrombosis, systemic occlusive arterial disease, bronchiectasis, and recurrent broncho-pneumonia were also observed in this group of subjects). The bronchiectasis and recurrent broncho-pneumonia were attributed to an immunosuppressive action of arsenic in the lungs. A significant decrease in the incidence of skin abnormalities was observed after a reduction in drinking water concentration to about 0.04 mg/L. After 4 years at the lower exposure, effects were rarely seen in children younger than 12 years old). Central nervous system deficits (hearing loss, eye damage, abnormal EEGs, mental retardation, and epilepsy), electrocardiographic changes (elevated ST wave and extended QT interval), and skin abnormalities (melanosis, desquamation, rashes, and hyperkeratosis) occurred in infants who had been fed arsenic-contaminated milk for 1 to 2 months. It was estimated that the daily arsenic intake was about 3 mg/day (EPA, 1984).

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# A.2 Polycyclic Aromatic Hydrocarbons (PAHs)

#### **Toxicity Classification:**

EPA: B2 (probable human carcinogen, includes carcinogenic PAHs; B(a)P, B(a)A,

B(b)F, B(k)F, carbazole, chrysene, D(ah)A, indeno(1,2,3-cd)pyrene, EPA,

1995)

Comment: Classification is based on multiple studies indicating carcinogenicity of

individual components of PAHs mixture through inhalation, and dermal

contact exposures

#### **Toxicity Criteria:**

Reference Dose (RfD)—Oral: Acenaphthene = 6.0E-2, anthracene = 3.0E-1, fluoranthene, and

fluorene = 4.0E-2, and pyrene = 3.0E-2

Cancer Slope Factor-Oral: B(a)P - 7 3 (mg/kg/day)<sup>-1</sup>

Comment: Mouse skin carcinogenesis. Other carcinogenic PAHs are

evaluated based on their relative potency compared with B(a)P.

The relative potency factors areas follows: B(a)P = 1.0, B(a)A

= 0.1, B(b)F = 0.1, B(k)F = 0.01, chrysene = 0.001, D(ah)A =

1.0, indeno(123-cd)pyrene = 0.1.

#### Target Organs (Primary):

- skin (cancer)
- immune system
- nervous system

#### A.2.1 General Information

PAHs are products of incomplete combustion of organic materials from sources such as cigarette smoke, municipal incinerators, wood stove emissions, coal conversion, and fossil

fuel burning (diesel and gasoline automobile exhausts). PAHs are a diverse class of compounds formed as a result of incomplete combustion of organic compounds with insufficient oxygen This leads to the formation of C-H free radicals, which can polymerize to form various PAHs. Among these PAHs are compounds such as benzo(a)pyrene (B[a]P), benz(a)anthraene (B[a]A) and Dibenz(a,h)anthracene (ATSDR, 1988).

PAHs are present in the environment from both natural and anthropogenic sources. As a group, they are widely distributed in the environment, having been detected in animal and plant tissue, sediments, soils, air, and surface water. Humans may be exposed to PAHs in the environment, in tobacco smoke and cooked food, and in the work place. Typically, individuals are not exposed to a single type of PAHs, but to a mixture of related chemicals (ATSDR, 1988).

The environmental fate of PAHs is determined largely by their low water solubilities and high propensity for binding to particulate or organic matter. In the atmosphere they are associated with particulate matter, especially soot. In aquatic environments, PAHs are usually bound to suspended particles or bed sediments. PAHs suspended in the air are thought to undergo direct photolysis very quickly. The ultimate fate of PAHs in the sediment is believed to be biodegradation and biotransformation by benthic organisms (EPA, 1986).

Unsubstituted lower molecular weight PAH compounds that contain 2 or 3 rings exhibit significant acute toxicity and other adverse effects to some organisms, but are noncarcinogenic. The higher molecular weight PAHs that contain 4 to 7 rings are significantly less toxic, but many of these are demonstrably carcinogenic, mutagenic, or teratogenic to a wide variety of organisms including fish, birds, and mammals. These animals have been exposed to PAHs (particularly B[a]P) by several routes of exposure including dermal absorption, ingestion, injection, and inhalation. The metabolism is important in determining their carcinogenicity and effects and many of the metabolites are more toxic than the parent compound. PAHs in the water column also accumulate in organisms, but many organisms metabolize and excrete PAHs rapidly, resulting in short-lived bioaccumulation (EPA, 1986).

# A.2.2 Basis for Toxicity Criteria

There is no direct information available for the effects of PAHs on humans. All of the information available for PAHs is from studies on experimental animals. PAHs are well-established as experimental carcinogens for all routes to which humans would normally be exposed. Non-carcinogenic effects reported for PAHs include skin lesions and non-cancer lung diseases such as bronchitus. Benzo(a)pyrene has been associated with developmental toxicity and adverse reproductive effects in experimental animals (ATSDR, 1988).

Risk is assessed separately for carcinogens and noncarcinogens. Benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, B(a)P, chrysene, dibenz[a,h]anthracene, and indeno[1,2,3-cd]pyrene are classified as B2 carcinogens (probable human carcinogen; sufficient evidence of carcinogenicity in animals; inadequate evidence of carcinogenicity in humans). The other PAHs have a D classification (not classified; inadequate evidence of carcinogenicity in animals). Because of recent changes in the interpretation of toxicological data, the following discussion regarding the source of information used to develop the action

levels is presented. The animal data consist of dietary, gavage, inhalation, intratracheal instillation, and dermal and subcutaneous studies in numerous strains of at least four species of rodents and several primates. Repeated B(a)P administration has been associated with increased incidences of total tumors and of tumors at the site of exposure. Distant site tumors have also been observed after B(a)P administration by various routes. B(a)P is frequently used as a positive control in carcinogenicity bioassays.

B(a)P administered in the diet or by gavage to mice, rats, and hamsters has produced increased incidences of stomach tumors. Neal and Rigdon (1967) fed B(a)P (purity not reported) at concentrations of zero, 1, 10, 20, 30, 40, 45, 50, 100 and 250 parts per million (ppm) in the diets of male and female CFW-Swiss mice. The age of the mice ranged from 17 to 180 days old, the treatment time from 1 to 197 days, and the size of the treated groups from 9 to 73. There were 289 mice (number of mice/sex not stated) in the control group. No forestomach tumors were reported in the zero-, 1- and 10-ppm dose groups. The incidence of forestomach tumors in the 20-, 30-, 40-, 45-, 50-, 100- and 250-ppm dose groups were 1/23, 0/37, 1/40, 4/40, 23/34, 19/23 and 66/73, respectively. The authors felt that the increasing tumor incidences were related to both the concentration and the number of doses administered. Historical control forestomach tumor data are not available for CFW-Swiss strain mice. In historical control data from a related mouse strain, SWR/J Swill, the forestomach tumor incidence rate was 2/268 and 1/402 for males and females, respectively (Rabstein et al., 1973)

Brune et al. (1981) fed 0.15 mg/kg B(a)P (reported to be highly pure) in the diet of 32 Sprague-Dawley rats/sex/group either every 9th day or 5 times per week. These treatments resulted in annual average doses of 6 or 39 mg/kg, respectively. An untreated group of 32 rats/sex served as the control. Rats were treated until moribund or dead; survival was similar in all groups. Histologic examinations were performed on each rat. The combined incidence of tumors of the forestomach, esophagus, and larynx was 3/64, 3/64 and 10/64 in the control group, the group fed B(a)P every 9th day and the group fed B(a)P 5 times/week, respectively. A trend analysis showed a statistically significant tendency for the proportion of animals with tumors of the forestomach, esophagus, or larynx to increase steadily with dose (Knauf and Rice, 1992).

As part of the same study, Brune et al. (1981) administered B(a)P (highly pure) orally to Sprague-Dawley rats by caffeine gavage. The rats were treated until moribund or dead; all rats were subjected to terminal histopathologic examination. Gavaged rats were divided into three dose groups of 32 rats/sex/group; the groups received 0.15 mg/kg per gavage either every 9th day (Group A), every 3rd day (Group B), or 5 times per week (Group C). These treatments resulted in annual average doses of 6, 18 or 39 mg/kg, respectively. Untreated and gavage (5 times/week) controls (32 rats/sex/group) were included. The median survival times for the untreated control group; the gavage control group; and groups A, B, and C were 129, 102, 112, 113, and 87 weeks, respectively. The survival time of Group C was short compared with controls, and may have precluded tumor formation (Knauf and Rice, 1992). The combined tumor incidence in the forestomach, esophagus, and larynx was 3/64, 6/64, 13/64, 26/64, and 14/64 for the untreated control group, gavage control group, group A, group B, and group C, respectively. There was a statistically significant association between the dose and the proportions of rats with tumors of the forestomach, esophagus, or larynx.

This association is not characterized by a linear trend. The linearity was affected by the apparently reduced tumor incidence that is seen in the high-dose group (Knauf and Rice, 1992).

Intratracheal instillation and inhalation studies in guinea pigs, hamsters, and rats have resulted in elevated incidences of respiratory tract and upper digestive tract tumors (EPA, 1991a). Intraperitoneal B(a)P injections have caused increases in the number of injection site tumors in mice and rats (reviewed in EPA, 1991a). B(a)P has also been reported to be carcinogenic in animals when administered by the following routes—i.v.; transplacentally; implantation in the stomach wall, lung, renal parenchyma, and brain; injection into the renal pelvis; and vaginal painting (EPA, 1991a).

At the June 1992 CRAVE Work Group meeting, it was noted that an error had been made in the 1991 document Dose-Response Analysis of Ingested Benzo[a]pyrene which is quoted in the Drinking Water Criteria Document for PAH. In the calculation of the doses in the Brune et al. (1981) study, it was erroneously concluded that doses were given in units of mg/year, whereas it was in fact mg/kg/year. When the doses are corrected, the slope factor is correctly calculated as 11.7 per (mg/kg)/day, as opposed to 4.7 per (mg/kg)/day as reported in the Drinking Water Criteria Document. The correct range of slope factors is 4.5 to 11.7 per (mg/kg)/day, with a geometric mean of 7.3 per (mg/kg)/day. A drinking water unit risk based on the revised slope factor is 2.1E-4 per ( $\mu$ g/L). Therefore, these values have been changed on IRIS, and an Erratum to the Drinking Water Criteria Document is being prepared.

Risk estimates were calculated from two different studies in two species of outbred rodents (Neal and Rigdon, 1967; Brune et al., 1981). These studies have several commonalities, including mode of administration, tumor sites, tumor types, and the presumed mechanisms of action. The data sets were not combined before modeling (the preferred approach) because they used significantly dissimilar protocols.

The geometric mean from several slope factors, each considered to be of equal merit, was used to calculate a single unit risk. These four slope factor estimates span less than a factor of three, and each is based on an acceptable, but less-than-optimal, data set. Each estimate is based on a low-dose extrapolation procedure that entails the use of multiple assumptions and default procedures.

Clement Associates (1990) fit the Neal and Rigdon (1967) data to a two-stage dose response model. In this model, the transition rates and the growth rate of preneoplastic cells were both considered to be exposure-dependent. A term to permit the modeling of B(a)P as its own promoter was also included. Historical control stomach tumor data from a related, but not identical, mouse strain, SWR/J Swill (Rabstein et al., 1973) and the CFW Texas colony (Neal and Rigdon, 1967) were used in the modeling. In calculating the lifetime unit risk for humans, several standard assumptions were made—mouse food consumption was 13 percent of its body weight/day; human body weight was assumed to be 70 kg; and the assumed body weight of the mouse was 0.034 kg. The standard assumption of surface area equivalence between mice an humans was the cube root of 70/0.034. A conditional upper bound estimate was calculated to be 5.9 per (mg/kg)/day (EPA, 1991a).

An EPA report (1991b) argued that the upper-bound estimate calculated in Clement Associates (1990) involved the use of unrealistic conditions placed on certain parameters of the equation. Other objections to this slope factor were also raised. The authors of this report used the Neal and Rigdon (1967) data to generate an upper-bound estimate extrapolated linearly from the 10 percent response point to the background of an empirically fitted dose-response curve (Clement Associates, 1990). Other results, from similar concepts and approaches used for other compounds, suggest that the potency slopes calculated in this manner are comparable to those obtained from a linearized multistage procedure for the majority of the other compounds. The upper bound estimate calculated in EPA (1991b) is 9.0 per (mg/kg)/day. The authors of EPA (1991b) selected a model to reflect the partial lifetime exposure pattern over different parts of the animals' lifetimes. The authors thought that this approach more closely reflected the Neal and Rigdon (1967) regimen. A Weibull-type dose-response model was selected to accommodate the partial lifetime exposure; the upper-bound slope factor calculated from this method was 4.5 per (mg/kg)/day.

EPA selected a slope factor for B(a)P of 7.3, which is a geometric mean of 4.5 to 11.7. EPA currently proposes to regulate carcinogenic PAHs based on their relative potency in producing skin tumors in mouse skin painting studies. The toxicity values (RfDs), critical effects, and uncertainties for five of the noncarcinogenic PAH compounds are verified and currently available on IRIS as listed above.

#### A.2.3 Standards and Criteria

Occupational Exposures: OSHA PEL (B[a]P) 0.2 mg/m<sup>3</sup>

The proposed maximum contaminant level (MCL) value for B(a)P is 0.0002 mg/L (proposed, 1990). The World Health Organization European standards for drinking water recommend a concentration of PAHs not to exceed 0.2 µg/L (EPA, 1988).

For ambient water quality criteria (AWQC) for protection of humans to water and fish, the consumption is 2.8E-3  $\mu$ g/L; fish consumption alone is 3.11E-2  $\mu$ g/L. The AWQC for protection of aquatic organisms is not available for fresh water organisms or for marine organisms: the acute LEC is 3.0E+2  $\mu$ g/L and no chronic LEC is available. The values that are indicated as LEC are not criteria, but are the lowest effect levels found in the literature. LECs are given when the minimum data required to derive water quality criteria are not available. The values given represent PAHs as a class (45 FR 79318 (11/28/80).

#### A.2.4 References

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# A.3 Tetrachloroethylene

**Toxicity Classification:** 

Classification:

B2, probable human carcinogen (EPA, 1991).

**Toxicity Criteria:** 

Reference dose (RfD)-Oral:

0.01 mg/kg/day (EPA, 1991)

**Uncertainty Factor:** 

100

NOAEL:

20 mg/kg/day (converted to 14 mg/kg/day)

Principal Study:

Buben and O'Flaherty, 1985

Cancer Slope Factor-Oral:

5.1 x 10<sup>-2</sup> (mg/kg/day)<sup>-1</sup>

Unit Risk:

 $1.5 \times 10^{-6} (\mu g/L)^{-1}$ 

(CRAVE-EPA group verified, pending input into IRIS; quantitative estimates were not calculated by the CRAVE Workgroup [EPA, 1991].)

Cancer Slope Factor—Inhalation:

2.03E-3 (mg/kg/day)<sup>-1</sup> (provisional value)

Unit Risk:

 $5.8 \text{ E-7 } (\mu \text{g/m}^3)^{-1}$ 

(CRAVE-EPA group verified, pending input into IRIS; quantitative estimates were not calculated by the CRAVE Workgroup [EPA, 1991].)

#### **Target Organs:**

- liver and kidney (oral and inhalation exposure)
- central nervous system (inhalation exposure)

#### A.3.1 General Information

Tetrachloroethylene (CAS No. 127-18-4) is a halogenated aliphatic hydrocarbon with a vapor pressure of 17.8 mm Hg at 25°C (EPA, 1982). The chemical is used primarily as a solvent in industry and, less frequently, in commercial dry-cleaning operations (ATSDR, 1990). Occupational exposure to tetrachloroethylene occurs via inhalation, resulting in systemic effects, and via dermal contact, resulting in local effects. Exposure to the general population can occur through contaminated air, food, and water (ATSDR, 1990).

The respiratory tract is the primary route of entry for tetrachloroethylene (NTP, 1986; EPA, 1988). The chemical is rapidly absorbed by this route and reaches an equilibrium in the blood within 3 hours after the initiation of exposure. Tetrachloroethylene is also significantly absorbed by the gastrointestinal (g.i.) tract, but not through the skin (ATSDR, 1990). The chemical accumulates in tissues with high lipid content, where the half-life is estimated to be 55 hours (ATSDR, 1990), and has been identified in perirenal fat, brain, liver, placentofetal tissue, and amniotic fluid. The proposed first step for the biotransformation of tetrachloroethylene is the formation of an epoxide thought to be responsible for the carcinogenic potential of the chemical. Tetrachloroethylene is excreted mainly unchanged through the lungs, regardless of route of administration (NTP, 1986). The urine and feces comprise secondary routes of excretion. The major urinary metabolite of tetrachloroethylene, trichloroacetic acid, is formed via the cytochrome P-450 system (ATSDR, 1990).

# A.3.2 Basis for Toxicity Criteria

## A.3.2.1 Non-carcinogenicity

Acute exposure to high concentrations of the chemical (estimated to be greater than 1,500 ppm for a 30-minute exposure) may be fatal to humans. Chronic exposure causes respiratory tract irritation, headache, nausea, sleeplessness, abdominal pains, constipation, cirrhosis of the liver, hepatitis, and nephritis in humans; and microscopic changes in renal tubular cells, squamous metaplasia of the nasal epithelium, necrosis of the liver, and congestion of the lungs in animals (NTP, 1986). Some epidemiology studies have found an association between inhalation exposure to tetrachloroethylene and an increased risk for spontaneous abortion, idiopathic infertility, and sperm abnormalities among dry-cleaning workers. The adverse effects in humans are supported in part by the results of animal studies in which tetrachloroethylene induced fetotoxicity (but did not cause malformations) in the offspring of treated dams.

A carcinogenicity bioassay in mice and rats (NCI, 1977) provided the only available chronic oral toxicity data for tetrachloroethylene. For both mice and rats, dosage adjustments were made during the study. The time-weighted average doses of the chemical, administered for 78 weeks in corn oil, were as follows: male B6C3F<sub>1</sub> mice, 536 or 1,072 mg/kg; female mice, 386 or 772 mg/kg; Osborne-Mendel male rats, 471 or 941 mg/kg; and female rats, 474 or 949 mg/kg. Toxic nephropathy was observed at all doses in both sexes of mice and rats. The nephropathy was characterized by degenerative changes in the proximal convoluted tubule at the junction of the cortex and medulla, with fatty degeneration, cloudy swelling, and necrosis of the tubular epithelium.

RfDs for chronic and subchronic oral exposure to tetrachloroethylene are 0.1 mg/kg/day and 0.01 mg/kg/day, respectively (Buben and Flaherty, 1985; EPA, 1990; 1991). These values are based on hepatotoxicity observed in mice given ≥ 100 mg tetrachloroethylene/kg body weight for 6 weeks and a NOAEL of 20 mg/kg.

# A.3.2.2 Carcinogenicity

Epidemiology studies of dry cleaning and laundry workers have demonstrated excesses in mortality due to various types of cancer, including liver cancer, but the data are regarded as inconclusive because of various confounding factors (Lynge and Thygesen, 1990; EPA, 1988). The tenuous finding of an excess of liver tumors in humans is strengthened by the results of carcinogenicity bioassays in which tetrachloroethylene, administered either orally or by inhalation, induced hepatocellular tumors in mice (NCI, 1977; NTP, 1986). The chemical also induced mononuclear cell leukemia and renal tubular cell tumors in rats. Tetrachloroethylene was negative for tumor initiation in a dermal study and for tumor induction in a pulmonary tumor assay (Van Duuren et al., 1979; Theiss et al., 1977).

On the basis of the sufficient evidence from oral and inhalation studies for carcinogenicity in animals and none or inadequate evidence for carcinogenicity to humans, tetrachloroethylene is placed in EPA's weight-of-evidence Group B2, probable human carcinogen (NCI, 1977; NTP, 1986; EPA, 1991). For oral exposure, the slope factor is  $5.1 \times 10^{-2}$  (mg/kg/day)<sup>-1</sup>; the unit risk is  $1.5 \times 10^{-6}$  (mg/L)<sup>-1</sup>. For inhalation exposure, the slope factor was not calculated; the unit risk is  $5.2 \times 10^{-7}$  (mg/m<sup>3</sup>)<sup>-1</sup>.

Human health effects resulting from chronic exposure to various concentrations of tetrachloroethylene include respiratory tract irritation, headache, nausea, sleeplessness, abdominal pains, constipation, cirrhosis of the liver, hepatitis, and nephritis (Coler and Rossmiller, 1953; Stewart et al., 1970; von Ottingen, 1964, Stewart, 1969). In one study, 16 of 25 workers, exposed to 59 to 442 ppm for 2 months to 27 years had significantly elevated SGOT and SGPT activity compared with controls (Chmielewski et al., 1976).

An NTP bioassay provided chronic toxicity data for animals exposed to tetrachloroethylene. Groups of 50 male and 50 female F344/N rats and B6C3F<sub>1</sub> mice inhaled the chemical 6 hours/day, 5 days/week for 103 weeks (NTP, 1986). The exposure concentrations consisted of zero, 200, or 400 ppm for rats and zero, 100, or 200 ppm for mice. In rats, nonneoplastic effects consisted of dose-related renal tubular cell karyomegaly (males and females), renal tubular cell hyperplasia (males only), and dose-related increases in the incidences of nasal thromboses and squamous metaplasia (the thromboses were believed to have been secondary to tetrachloroethylene-induced leukemia). The incidence of renal tubular cell karyomegaly was higher in males than in females. In mice, nonneoplastic effects consisted of dose-related hepatic degeneration, hepatic necrosis, and hepatic nuclear inclusion; dose-related renal tubular cell karyomegaly; and pulmonary congestion.

Pegg et al. (1978), reported in a fate and disposition study that rats inhaling a tetrachloroethylene concentration of 600 ppm (4 g/m<sup>3</sup>) 6 hours/day, 5 days/week for 12 months developed unspecified reversible liver damage.

In a Danish study, a cohort of laundry and dry-cleaning workers was studied for cancer incidence among persons exposed to tetrachloroethylene (the most commonly used solvent in Danish dry-cleaning shops) (Lynge and Thygesen, 1990). The 10-year follow-up study evaluated 8,567 women and 2,033 men employed in laundry and dry-cleaning in 1970. The study revealed a significant excess risk for primary liver cancer among the women (7 observed, 2.1 expected); but not one case of primary liver cancer was found among the men, for whom the expected value was 1.1. Although the majority of primary liver cancer cases in Denmark has been associated with excess alcohol consumption, the investigators did not believe this to be the exclusive explanation for the excess tumors among the dry-cleaning workers.

A retrospective mortality epidemiologic study of dry cleaning workers with exposure to tetrachloroethylene reported an excess of mortality from kidney and bladder cancer (8 cases versus 2.7 expected; SMR=296) and cancer of the cervix (10 observed versus 5.1 expected; SMR=296) (Brown and Kaplan, 1985). The cohort consisted of 1,690 workers with ≥ 23 years of employment. The results of this study were inconclusive because the workers had potential occupational exposure to petroleum solvents, in addition to tetrachloroethylene. However, a subcohort of the study, consisting of 615 workers with no known exposure to petroleum solvents, demonstrated no excess risk for cancer at any site (Brown and Kaplan, 1985). Other studies of dry cleaning and laundry workers have demonstrated increases in mortality due to various types of cancer (lung, cervix, kidney, skin and/or colon), but the data are also regarded as inconclusive because of various confounding factors (EPA, 1988).

In a carcinogenicity bioassay, groups of 50 male and 50 female F344/N rats and B6C3F<sub>1</sub> mice inhaled tetrachloroethylene 6 hours/day, 5 days/week for 103 weeks (NTP, 1986) The exposure concentrations were zero, 200, or 400 ppm for rats and zero, 100, or 200 ppm for mice. Exposure to tetrachloroethylene under the conditions of the study resulted in: (a) clear evidence of carcinogenicity for male F344/N rats as shown by an increased incidence of mononuclear cell leukemia (controls, 28/50; low dose, 37/50; high dose, 37/50) and renal tubular cell adenomas or carcinomas combined (1/49, 3/49, 4/50) (the incidence of the renal tumors was not statistically significant, but these uncommon tumors had been found consistently at low incidences in male rats in other studies of chlorinated ethanes and ethylenes); (b) some evidence of carcinogenicity for female rats as shown by increased incidences of mononuclear cell leukemia (18/50, 30/50, 29/50); and (c) clear evidence of carcinogenicity for mice as shown by increased incidences of hepatocellular adenomas (11/49, 8/49, 18/50) and carcinomas (7/49, 25/49, 26/50) in males and of hepatocellular carcinomas (1/48, 13/50, 36/50) in females. There were no neoplastic changes in the respiratory tract of either species, but there was an increased incidence (non-dose-related) of squamous metaplasia in the nasal cavities of treated male rats.

Tumors were not observed in groups of 96 male and 96 female Sprague-Dawley rats exposed to tetrachloroethylene concentrations of 300 or 600 ppm, 6 hours/day, 5 days per week for 52 weeks and observed for the rest of their lives (Rampy et al., 1978).

#### A.3.3 References

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# A.4 Polychlorinated Biphenyls (PCBs)

**Toxicity Classification:** 

B2 carcinogens (EPA, 1995)

(Comment: Classification is based on hepatocellular carcinomas in rats and mice, suggestive evidence of excess risk of liver cancer in humans by ingestion, inhalation, and dermal contact.)

#### **Toxicity Criteria:**

# 7041478

Reference Dose (RfD)—Oral: 7.0E-5 mg/kg/day (Arochlor-1016)

2.0E-5 mg/kg/day (Arochlor-1254)

Cancer Slope Factor–Oral: 7.7 (mg/kg/day)<sup>-1</sup>

Cancer Slope Factor–Inhalation: To be determined

#### Target Organs (primary):

skin (hyperpigmentation and hyperkeratosis)

#### A.4.1 General Information

There are four commercial PCB mixtures marketed in the U.S. under the name Aroclor® (Aroclor®1016, 1242, 1254, and 1260) (USAF, 1989). Aroclor® formulations are complex mixtures of PCBs produced by progressive chlorination of biphenyl with anhydrous chlorine, and because they are mixtures, their physical properties and chemical behavior cannot be precisely defined (USAF, 1989). PCBs have been used as heat transfer liquids, hydraulic fluids, lubricants, plasticizers, surface coatings, inks, adhesives, pesticide and extenders, and for microencapsulation of dyes for carbonless duplicating paper (USAF, 1989).

The environmental behavior of the Aroclor® mixtures is a direct function of their relative composition with respect to the individual PCB species (USAF, 1989). Individual PCBs vary widely in their physical and chemical properties according to the degree of chlorination and position of the chlorines on the biphenyl structure. In general, as chlorine content increases, adsorption increases while transport and transformation processes decrease (USAF, 1989).

Because of their very low solubility in water ( $\sim 2.70 \times 10^{-3}$  mg/L at  $20^{\circ}$ C), high log octanol-water partitioning coefficients ( $K_{ow}$ ) of 6.1 to 9.3, and extremely high organic carbon partition coefficients ( $K_{ow}$ ) of 100,000 to 1,000,000,000, adsorption to soils and sediments is the major fate process affecting PCBs in the environment, particularly in soils with high organic carbon content (USAF, 1989). As a result, PCBs are expected to be highly immobile in the soil, and leaching to the groundwater system is unlikely. However, in the presence of organic solvents, PCBs are found to be highly mobile in the soil despite the high percent retained by the organic carbon present (USAF, 1989).

Transport of PCB vapors through the air-filled pores of unsaturated soils is not expected to be a rapid transport pathway. Volatilization (mostly from aqueous systems) followed by atmospheric transport is expected to be slow, but may be a significant long-term transport process and is thought to account for the widespread, almost ubiquitous, distribution of PCBs in the environment. PCBs have been reported to be strongly resistant to chemical degradation by oxidation or hydrolysis; however, PCBs have been shown to be susceptible to slow-rate photolytic and biological degradation. Highly chlorinated PCBs can be photolytically degraded, resulting in the formation of lower chlorinated species and substituted products, as well as potential formation of biphenylenes and chlorinated dibenzofurans. The presence of oxygen retards the photolytic degradation of PCBs (USAF, 1989).

Microbial degradation has been reported to be an important transformation process for PCBs to include both aerobic oxidative and anaerobic dechlorination biodegradation. In general, the less chlorinated PCBs were more easily degraded than the more chlorinated species. However, the presence of the lower chlorinated biphenyls has been shown to increase the rate of biodegradation of the more chlorinated PCBs through co-metabolism (USAF, 1989).

The high bioconcentration factor combined with the persistence of PCBs suggests that these compounds bioaccumulate and can be biomagnified (EPA, 1979b).

## A.4.2 Basis for Toxicity Criteria

## A.4.2.1 Non-carcinogenic Effects

EPA currently has not established an RfD/RfC for the noncarcinogenic effects of oral or inhalation exposures to PCBs (IRIS, 1995; HEAST, 1994). Because PCBs are slowly metabolized compounds, toxic symptoms of noncarcinogenic effects usually occur after long-term exposure and bioaccumulation. Initial symptoms of PCB poisoning are non-specific, such as loss or reduced weight gain, while more severe poisoning in rats have resulted in ataxia, diarrhea, lack of response to pain stimuli; and histopathological changes primarily in the liver and kidney (USAF, 1989). In humans exposed to PCBs in the workplace, reported adverse effects include chloracne (a long-lasting, disfiguring skin disease), impairment of liver function, neurobehavioral disorders, menstrual disorders, and minor birth abnormalities (ATSDR, 1988b; EPA, 1985b). Animals experimentally exposed to PCBs have shown most of the same symptoms as well as impaired reproduction and fetotoxicity; pathological changes in the liver, stomach, skin, spleen, lymph nodes, and thymus; and suppression of the immunological system (ATSDR, 1988b; EPA, 1985b; and USAF, 1989).

PCBs are almost completely absorbed from the digestive tract (>90 percent) with subsequent distribution to the liver and muscle tissue, followed by redistribution to body fat, skin, and other fat-containing organs (ATSDR, 1988b). Absorption via the skin is also fairly efficient, as indicated by occupational exposures where effects of PCB exposure can be detected even at doses too low to produce pathologic effects (ATSDR, 1988b).

# A.4.2.2 Carcionogenicity

On the basis of the increased incidence of liver tumors following dietary exposure of rats to Aroclor® (Norback and Weltman, 1985), PCBs have been classified by EPA as B2 carcinogens (IRIS, 1995) for both the oral and inhalation routes of exposure. A classification of B2 indicates that sufficient evidence exist to show carcinogenicity in animals, but inadequate evidence of carcinogenicity in humans. Based on a statistically significant increase in the occurrence of liver tumors following oral exposure, EPA (IRIS, 1995) has developed an oral cancer potency slope factor of 7.7 (mg/kg/day)<sup>-1</sup> for PCBs; a CPF has not yet been determined for the inhalation route of exposure (IRIS, 1992; HEAST, 1992).

#### A.4.3 Standards And Criteria

EPA has promulgated the enforceable (for public water supplies) maximum contaminant level (MCL) of 0.0005 mg/L for PCBs, based on a practical quantitation limit (PQL) of 0.0005 mg/L, which is associated with a maximum lifetime individual risk of 1 x 10<sup>-4</sup>. EPA has also proposed an MCL Goal (MCLG) of zero mg/L PCBs based on the evidence of carcinogenic potential (classification group B2) (IRIS, 1995).

EPA has also established ambient water quality criterion (AWQC) for human consumption of water and aquatic organisms contaminated with PCBs at 7.9 x  $10^{-5}$  ug/L (IRIS, 1995). An AWQC of 7.9 x  $10^{-6}$  µg/L has also been set for the consumption of aquatic organisms alone

(IRIS, 1995). The proposed federal AWQC for the protection of aquatic life are 2.0 mg/L (acute) and 0.014 mg/L (chronic) (IRIS, 1992).

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Table PCB-2

Acute Toxicities of Aroclor® PCBs to Freshwater Aquatic Organisms

Page 1 of 3

	Exposure		
Organism,	Period	LC50	
Compound Tested	(days)	(μg/L)	Reference*
nvertebrates			
Orconectes nais (Crayfish)			
1242	7	30	NAS, 1979
1254	7	80 to 100	NAS, 1979
Gammarus pseudolimnaeus (Scud)			
1242	4	10	NAS, 1979
1242	10	5	NAS, 1979
1248	4	52	NAS, 1979
1254	4	2,400	NAS, 1979
alaemonetes kadiakensis (Glass shrimp)			
1254	7	3	NAS, 1979
chnura verticalis (Damselfly)			
1242	4	400	Johnson and Finley, 1986
1254	4	200	Johnson and Finley, 1980
<u> facromia</u> sp (Dragonfly)			
1242	4	800	Johnson and Finley, 1980
1254	5	800	Johnson and Finley, 1980
daphnia magna (Cladoceran)			
1254	14	1 8 to 24 0	EPA, 1980c
1254	21	1.3	EPA, 1980c
teronarcella badia (Stonefly)			
1016	4	424 to 878	Johnson and Finley, 1980
Iydra <u>oligactis</u> (Hydra)			
1016	3	5,000	Adams and Haileselassie
			1984

Table PCB-2
Acute Toxicities of Aroclor® PCBs to Freshwater Aquatic Organisms

Page 2 of 3

	Exposure		
Organism,	Period	LC50	
Compound Tested	(days)	(μg/L)	Reference*
1254	3	10,000	Adams and Haileselassie
ısh			1984
ncorhyncus mykiss (Rainbow trout)			
1016	4	114 to 159	Johnson and Finley, 1980
1242	5	67	Johnson and Finley, 1980
1248	5	54	Johnson and Finley, 1980
1254	5	142	Johnson and Finley, 1980
1254	10	8	NAS, 1979
1260	20	21	NAS, 1979
pomis macrochirus (Bluegill)			
1016	4	390 to 540	Johnson and Finley, 1980
1242	5	125	Johnson and Finley, 19801
1242	15	54	NAS, 1979
1248	20	10	NAS, 1979
1254	25	54	NAS, 1979
1260	30	150	NAS, 1979
alurus punctatus (Channel catfish)			
1016	4	340 to 560	Johnson and Finley, 1980
1242	15	110	NAS, 1979
1248	15	130	NAS, 1979
1254	15	740	NAS, 1979
1260	30	140	NAS, 1979
lmonids, 4 spp.			
1016	4	134 to 1,154	Johnson and Finley, 1980
atostomids, 2 spp			
1016	4	222 to 582	Johnson and Finley, 1980

Table PCB-2

Acute Toxicities of Aroclor® PCBs to Freshwater Aquatic Organisms

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	Exposure		
Organism,	Period	LC50	
Compound Tested	(days)	(μg/L)	Reference*
rsh, cont'd			
Salmo <u>clarkı</u> (Cutthroat trout)			
1221	4	1,170	Johnson and Finley, 1986
1232	4	2,500	Johnson and Finley, 1986
1242	4	5,420	Johnson and Finley, 1980
1248	4	5,750	Johnson and Finley, 1980
1254	4	42,500	Johnson and Finley, 1980
1260	4	60,900	Johnson and Finley, 1986
1262	4	>50,000	Johnson and Finley, 1986
1268	4	>50,000	Johnson and Finley, 1980
erca flavescens (Yellow perch)			
1016	4	240	Johnson and Finley, 1980
1242	4	>150	Johnson and Finley, 1980
1248	4	>100	Johnson and Finley, 1980
1254	4	>150	Johnson and Finley, 1986
1260	4	>200	Johnson and Finley, 1986

<sup>\*</sup>References cited are from USFWS, 1986b.

Table PCB-1 Effects of PCBs on Aquatic Plants

Species	Chemical	Duration	Effect	Result (mg/L)	Reference*
<u>Euglena gracıilıs</u> (Alga)	Aroclor® 1221	48 hrs	LD50	4,400	Ewald <u>et al</u> , 1976
<u>Euglene gracilis</u> (Alga)	Aroclor® 1242	8 days	Reduced growth	10,000	Bryan and Olafsson, 1978
Scenedesmus obtusiusculus (Alga)	Aroclor® 1242	24 hrs	Growth inhibition	300	Larsson and Tillberg, 1975
Scenedesmus quadricauda (Alga)	Aroclor® 1254	24 hrs	Reduction in rate of carbon fixation	0 1	Laird, 1973
<u>Chlorella pyrenordosa</u> (Alga)	Aroclor® 1268	191 hrs	Depressed cell productivity	1,000	Hawes <u>et बा</u> , 1976
<u>Chlorella pyrenoidosa</u> (Alga)	Aroclor® 1254	73 hrs	Reduced population growth	1,000	Hawes <u>et ब</u> ो , 1976
<u>Chlamydomonas reinhardtii</u> (Alga)	Aroclor® 1242	22 days	Reduced growth	2,000	Morgan, 1972
Phormidium sp (Alga)	Dichlorobiphenyl	3 hrs	Reduced motility	20	Zullet and Benecke, 1978

\*References cited are from EPA, 1980c

Table PCB-4
BCFs for Aroclor® PCBs

Species	Tissue	BCF	Duration (days)	Reference*
<u>Daphna magna</u> (Cladoceran) 1254	Whole body	3,800	4	Mayer <u>st al</u> , 1977
Gamnarus pseudolimnaeus (Scud) 1248	Whole body	108,000	09	Nebeker and Pugliss, 1974
Chaoborus punctipennis (Phantom midge) 1254	Whole body	2,700	4	Mayer <u>et al</u> , 1 <i>977</i>
<u>Pimephales promelas</u> (Fathead minnow) (female) 1248 1260	Whole body Whole body Whole body	120,000 270,000 274,000	240 240 255	DeFoe <u>et al</u> , 1978 DeFoe <u>et al</u> , 1978 Nebeker <u>et al</u> , 1974
Lepomis macrochirus (Bluegill) 1248	Whole body	52,000	77	Stalling, 1971
Ictalurus punctatus (Channel catfish) 1248	Whole body	56,400	77	Mayer <u>et al</u> , 1977

\*References cited are from EPA (1980c)

#### A.5 Trichloroethene

**Toxicity Classification:** 

Classification B2: Prob

Probable human carcinogen (EPA, 1990)

**Toxicity Criteria:** 

Reference dose (RfD)-Oral:

6E-3 mg/kg/day (provisional value)

Uncertainty/modifying factor:

N/A

Cancer Slope Factor-Oral:

1.1E-2 (mg/kg/day)<sup>-1</sup> (provisional value) (Withdrawn from IRIS, pending review)

Cancer Slope Factor-Inhalation:

6E-3 (mg/kg/day)<sup>-1</sup> (provisional value)

#### **Target Organs:**

 Nervous system: CNS symptoms in workers exposed to TCE by inhalation included headache, sleepiness, vision distortion, nausea, abnormal reflexes, tremors, ataxia, nystagmus, and increased respiration.

- Liver: After inhalation exposure to TCE, rodents developed enlarged livers and biochemical changes indicative of liver damage. Liver damage in humans is primarily associated with acute exposure to TCE. The hepatotoxic effects of TCE are enhanced by concomitant exposure to alcohol.
- Kidney: Rats developed renal cytokaryomegaly after chronic inhalation exposure to TCE.
- Cardiovascular system: Occupational exposure to TCE has been associated with vasomotor changes, tachycardia, bradycardia, extrasystoles, conduction disturbances, and precordial pain. TCE sensitizes the heart to cardiac arrhythmias.
- Hematopoietic system: Inhalation of TCE induced myelotoxic anemia in rabbits and produced dose-related changes in several hematological indices in rats.
- Reproduction: Inhalation studies with rodents indicate that TCE may cause increased resorptions, reduced fetal body weight, and ossification anomalies. Exposure to high concentrations produced sperm abnormalities in mice.
- Skin: Reddening of the skin after mechanical or heat insults and dermographism was seen in workers exposed to TCE by inhalation.

# A.5.1 General Information

Trichloroethene is widely used as an industrial solvent, particularly in metal degreasing (USAF, 1989). It is also used in a variety of miscellaneous applications such as a low-temperature heat exchange fluid, as a fumigant, as a diluent in paints and adhesives, in aerospace operations to flush liquid oxygen, and in textile processing. It was previously used as an extractant in food processing and as an anesthetic, but it is no longer used for these purposes because of possible carcinogenic activity (USAF, 1989).

Trichloroethene is expected to be relatively mobile in the soil/groundwater system as, at 1,000 mg/L at  $20^{\circ}\text{C}$ , it is soluble in water. Trichloroethene has a low soil sorption coefficient ( $K_{\infty}$ ) that, with an estimated value of 127 and a log octanol-water partition coefficient (log  $K_{\infty}$ ) of 2.42, indicates that it will not be strongly bound to soils (USAF, 1989). On the basis of the vapor pressure of 60 torr at  $20^{\circ}\text{C}$ , transport of trichloroethene vapors through the airfilled pores of unsaturated soils, followed by photooxidation, is an important loss mechanism for near-surface contaminated soils (USAF, 1989). Upon reaching the atmosphere from surface waters and soil surfaces, trichloroethene reacts with hydroxyl radicals to produce hydrochloric acid, carbon monoxide, carbon dioxide, and carboxylic acid. In saturated subsurface soils (where soil organic carbon and soil air are negligible), a much higher fraction of the trichloroethene is expected to be present in the soil-water phase and transported with flowing groundwater. Because trichloroethene is a low molecular weight chloroaliphatic, it is not rapidly metabolized in the environment, although it can be degraded by acclimated microbial populations. Under normal environmental conditions, trichloroethene is not expected to undergo rapid hydrolysis (USAF, 1989).

# A.5.2 Basis for Toxicity Criteria

EPA (IRIS, 1995; HEAST, 1994) does not provide any RfDs or slope factors (SFs) for trichloroethene. Because a chronic health hazard assessment for noncarcinogenic effects is currently under review by an EPA Work Group, an oral RfD is listed as pending. EPA's Environmental Criteria and Assessment office does provide an interim oral health-based value of 0.006 mg/kg/day. No data are available for developing an inhalation RfD for trichloroethene (IRIS, 1994).

Effects of short-term human exposure include mild eye irritation, nausea, vertigo, headache, and confusion. Unconsciousness and death may occur after exposure to excessive concentrations (ATSDR, 1988). Chronic oral exposure of humans to trichloroethene is characterized by dizziness, nausea, headache, ataxia, decreased appetite, and sleep disturbances (ATSDR, 1988). The acute oral toxicity of trichloroethene is low in animals, as indicated by acute oral LD<sub>50</sub> values that range from 2,400 mg/kg for a mouse to 7,330 mg/kg for a rabbit (ATSDR, 1988). EPA (1984) reported 18 mg/kg/day as the NOAEL for trichloroethene.

# A.5.3 Carcinogenicity

### A.5.3.1 Oral Studies

EPA has classified trichloroethene as a group B2 (probable human) carcinogen. This classification indicates that sufficient evidence exists, based on an increased incidence of lung and liver tumors after exposure, to support carcinogenicity in animals, but inadequate evidence exists of carcinogenicity in humans (IRIS, 1992). The results of several mouse bioassays indicated an increased incidence of liver tumors following oral gavage exposure and an increased incidence of lung tumors following inhalation exposure (EPA, 1984). EPA has developed an interim oral slope factor of 0.011 (mg/kg/day)<sup>-1</sup> and an interim inhalation slope factor of 0.017 (mg/kg/day)<sup>-1</sup>. EPA (IRIS, 1991) had listed final slope factor values, but has withdrawn them (IRIS, 1995) pending further review by an EPA Work Group.

Maltoni et al. (1986) treated male and female Sprague-Dawley rats by gavage with TCE (99.9 percent pure) in olive oil at doses of 50 or 250 mg/kg/day, 4 to 5 days/week for 52 weeks. There was a dose-related increase in the incidence of leukemia in males, but no increased tumor incidence in females.

Significantly increased incidences of hepatocellular carcinomas occurred in B6C3F<sub>1</sub> mice that were administered time-weighted-average doses of 1,170 or 1,340 mg/kg/day (males) or 870 or 1,740 mg/kg/day (females) by gavage, 5 days/week for 78 weeks. No compound-related carcinogenic effects were found in Osborne-Mendel rats similarly treated with 550 or 1,100 mg/kg/day, but this finding was inconclusive because of poor survival. The TCE used in the study was  $\geq$  99 percent pure but contained stabilizers, including epichlorohydrin, a known carcinogen (NCI, 1976).

Studies by NTP (1982, 1986a) showed significantly increased incidences of hepatocellular carcinomas in male and female B6C3F<sub>1</sub> mice treated by gavage with epichlorohydrin-free TCE at a dose of 1,000 mg/kg/day, 5 days/week for 103 weeks. F344 rats treated with 1,000 mg/kg/day by the same regimen exhibited renal adenomas and adenocarcinomas; this effect was not seen at 500 mg/kg/day or in females at either dose level. Due to poor survival, the results in rats were considered inadequate. A third NTP study (NTP, 1988) exposed groups of male and female ACI, August, Marshall, and Osborne-Mendel rats by gavage to epichlorohydrin-free TCE in corn oil at doses of zero, 500, or 1,000 mg/kg, 5 days/week for 103 weeks. There were significantly increased incidences of renal tubular cell neoplasms in low dose male Osborne-Mendel rats and interstitial cell neoplasms of the testis in high-dose Marshall rats. This study also was considered inadequate for the assessment of carcinogenic activity because of toxic nephrosis and low survival.

Henschler et al. (1984) compared the carcinogenicity of TCE stabilized with epichlorohydrin (0.8 percent) or 1,2-epoxybutane (0.8 percent) to that of industrial-grade TCE in male and female ICR/Ha Swiss mice. TCE was administered daily by gavage (2.4 g/kg, females; 1.8

g/kg, males) for 18 months, with and without the addition of the epoxides. Animals exposed to epichlorohydrin- or 1,2-epoxybutane-stabilized TCE exhibited an increased incidence of papillomas and carcinomas of the forestomach. This effect was not observed without stabilizers.

## A.5.3.2 Inhalation Exposures

Epidemiologic studies conducted by Axelson et al. (1978), Malek et al. (1979), and Tola et al. (1980) reported no significant excess cancer risks associated with occupational exposure to TCE, but the studies do not permit definite conclusions because of various study limitations such as inadequate latency periods, small sample size, lack of analysis by tumor site, and multiple chemical exposure (ATSDR, 1989; EPA, 1985) An update of one of the studies (Axelson, 1986) found a slight increase of bladder cancer and lymphomas in an expanded cohort study; however, details of TCE exposure were not given. A retrospective cohort mortality study of dry-cleaning and/or laundry workers (Blair et al., 1979) found significant increases in the incidence of cancer at several sites (lung/bronchi/trachea, cervix, and skin) among a group of 330 deceased workers. This cancer increase was possibly due to dry-cleaning chemicals (carbon tetrachloride, tetrachloroethylene, and TCE) but could not be related to TCE alone. Paddle (1983) examined tumor registry records in Great Britain and found no association between liver cancer and TCE exposure in workers employed in one TCE production facility.

Bell et al. (1978) reported no carcinogenic effects in Charles River rats exposed to technical grade TCE at concentrations of zero, 100, 300, or 600 ppm, 6 hours/day, 5 days/week for 24 months. Hepatocellular carcinomas were seen in B6C3F<sub>1</sub> mice similarly exposed to TCE, with a greater incidence of tumors occurring in males than in females. The TCE employed contained 0.148 percent epichlorohydrin and several other additives.

Wistar rats, NMR mice, and Syrian hamsters were exposed to purified TCE at zero, 100, or 500 ppm, 6 hours/day, 5 days/week for 18 months (Henschler et al., 1980). The only statistically significant effect was an increased incidence of malignant lymphomas in female mice. EPA (1987) suggested that lymphoma susceptibility may have been enhanced by virus and immunosuppression.

Fukuda et al. (1983) exposed female ICR mice and Sprague-Dawley rats to reagent-grade TCE (containing 0.019 percent epichlorohydrin) at concentrations of zero, 50, 150, or 450 ppm, 7 hours/day, 5 days/week for 104 weeks. Although there were a number of tumors at several sites in rats and mice, only lung adenocarcinomas were significantly increased in mice at the two highest concentrations, as compared with controls.

Maltoni et al. (1986, 1988) exposed male and female Sprague-Dawley rats, Swiss mice, and B6C3F<sub>1</sub> mice to 100, 300, or 600 ppm epoxide-free TCE, 7 hours/day, 5 days/week for 104 weeks (rats) or 78 weeks (mice). Statistically significant increased incidences of tumors included testicular Leydig cell tumors in rats at 100 ppm, lung adenomas in male Swiss mice at 300 ppm, hepatomas in male Swiss mice at 600 ppm, and lung adenomas in female B6C3F<sub>1</sub> mice at 600 ppm.

# A.5.3.3 Teratogenicity/Reproductive Effects

No epidemiological studies of congenital anomalies in children born to women exposed to trichloroethene during pregnancy have been reported (TERIS, 1995).

Developmental toxicity studies with trichloroethene indicate that it is fetotoxic, but is neither mutagenic nor teratogenic to rodents after inhalation exposure; however, one of the potential intermediate metabolites, chloral hydrate, is mutagenic. No fetotoxicity or teratogenicity were reported in pregnant mice and rats exposed to air levels of 300 ppm for 7 hours/day on gestational days 6 through 15. However, anomalies of skeletal and soft tissues indicative of developmental delay were reported in offspring of pregnant rats exposed to high doses.

## A.5.4 Standards and Criteria

EPA has promulgated an enforceable (for public water supplies) MCL of 5 mg/L for trichloroethene based on 10X the MDL; it is associated with a maximum lifetime individual risk of 1E-6 (IRIS, 1992). EPA has also promulgated a nonenforceable MCL Goal (MCLG) of zero mg/L based on the potential carcinogenic effects associated with exposure to this Group B2 carcinogen. EPA is currently re-evaluating the carcinogenic ranking for trichloroethene.

EPA has also established ambient water quality criteria (AWQC) for human consumption of water and aquatic organisms (W + F) of 2.7 mg/L and for human consumption of aquatic organisms alone (F) of 80.7 mg/L (IRIS, 1992). These AWQC would yield a value for human consumption of water alone (W) of 2.8 mg/L based on the following formula:

$$\frac{1}{W+F} = \frac{1}{W} + \frac{1}{F}$$

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# A.6 cis- and trans-1,2-Dichloroethene

#### **Toxicity Classification:**

EPA:

Group D (not classifiable as a carcinogen)

**Toxicity Criteria:** 

Reference Dose (RfD)-Oral:

1E-2 mg/kg/day (EPA, 1990b) (cis 1,2-DCE)

Uncertainty/modifying factor:

3,000

trans-1,2-Dichloroethene

Oral RfD:

2E-2 mg/kg/day (EPA, 1990a,b)

**Uncertainty Factor:** 

1,000

Modifying Factor:

1

NOAEL:

0.1 mg/L (17 mg/kg/day)

LOAEL:

1 mg/L (175 mg/kg/day)

#### **Target Organs:**

- liver
- nervous system
- eyes
- heart
- liver
- lungs

#### A.6.1 General Information

1,2-dichloroethene exists in two isomeric forms: *cis*-1,2-dichloroethene and *trans*-1,2-dichloroethene, that are colorless, volatile liquids with a slightly acrid odor. Although not used extensively in industry, 1,2-dichloroethene is used in the production of other chlorinated solvents and as a solvent for dyes, perfumes and lacquers. Humans are exposed to 1,2-dichloroethene primarily by inhalation, but exposure can also occur by oral and dermal routes.

Limited information exists about the absorption, distribution, and excretion of 1,2-dichloroethene in either humans or animals. *In vitro* studies have shown that the mixed function oxidases will metabolize 1,2-dichloroethene; the final metabolic products being dependent on the initial isomer of 1,2-dichloroethene.

Information about the toxicity of 1,2-dichloroethene in humans and animals is limited. Workers acutely exposed to 1,2-dichloroethene have been reported to suffer from drowsiness, dizziness, nausea, fatigue, and eye irritation (ATSDR, 1990). Acute and subchronic oral and inhalation studies of *trans*-1,2-dichloroethene and acute inhalation studies of *cis*-1,2-dichloroethene indicate that the liver is the primary target organ in animals; toxicity being expressed by increased activities of liver associated enzymes, fatty degeneration, and necrosis (McCauley et al., n.d.; Barnes et al., 1985). Secondary target organs include the central nervous system and lungs.

## A.6.2 Basis for Toxicity Criteria

On the basis of an unpublished study describing decreased hemoglobin and hematocrits in rats treated by gavage for 90 days, EPA (1990a,b) assigned a subchronic and chronic oral RfD for cis-1,2-dichloroethene of 1E-1 mg/kg/day and 1E-2 mg/kg/day, respectively. The RfDs were derived from NOAEL/LOAEL of 32 mg/kg/day. No inhalation reference concentration (RfC) for cis-1,2-dichloroethene has been derived.

Subchronic and chronic RfDs of 2E-1 mg/kg/day and 2E-2 mg/kg/day, respectively, for *trans*-1,2-dichloroethene have been calculated. The RfDs were derived from a LOAEL of 175 mg/kg/day based on the increase of serum alkaline phosphatase activity in mice that received *trans*-1,2-dichloroethene in their drinking water (EPA, 1990a,b). No RfC for *trans*-1,2-dichloroethene has been derived.

No information was available concerning the chronic, developmental or reproductive toxicity of *cis*-1,2-dichloroethene or *trans*-1,2-dichloroethene. No cancer bioassays or epidemiological studies were available to assess the carcinogenicity of 1,2-dichloroethene. EPA (1990a,b) has placed *cis*-1,2-dichloroethene in weight-of-evidence group D; not classifiable as to human carcinogenicity, based on the lack of human or animal carcinogenicity data and on essentially negative mutagenicity data. *trans*-1,2-dichloroethene has not been classified.

Freundt et al. (1977) reported that groups of six adult female Wistar rats exposed to *trans*-1,2-dichloroethene at concentrations of 200, 1,000, or 3,000 ppm for 8 hours or to 200 ppm 5 days/week for 1 or 2 weeks developed fat accumulation in the hepatocytes and Kupffer cells of the liver and capillary hyperemia of the lung. Rats exposed to 1,000 ppm *trans*-1,2-dichloroethene for 8 hours had significantly decreased (p<0.05) serum concentrations of albumin and urea nitrogen and decreased alkaline phosphatase activity. These results are of questionable biological significance because none were outside the established normal range for the species. In addition, rats exposed to 3,000 ppm *trans*-1,2-dichloroethene developed fibrous swelling and hyperemia of the cardiac muscle.

Freundt and Macholz (1978) reported the results of studies in which adult female SPF Wistar rats were exposed for 8 hours to concentrations of zero, 200, 600, 1,000, or 3,000 ppm cis-1,2-dichloro-ethene and trans-1,2-dichloroethene. Although the inhalation treatment of rats with either isomer of 1,2-dichloroethene produced a significant (p<0.05) and dose-dependent increase in the hexobarbital sleeping time and zoxazolamine paralysis time, the effects

produced by cis-1,2-dichloroethene were greater than those of trans-1,2-dichloroethene. In addition, both isomers of 1,2-dichloroethene produced a significant (p<0.05) and dose-dependent reversible inhibition in the formation of free aminoantipyrene. Freundt and Macholz (1978) also reported that the addition of 1,000 ppm trans-1,2-dichloroethene to rat microsomes competitively inhibited the N-demethylation of aminopyrine and the O-demethylation of p-nitroanisole.

#### A.6.3 References

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# A.7 1,1,1-Trichloroethane

# Toxicity Classification:

EPA's weight-of-evidence group D, "not classifiable as to human carcinogenicity" (EPA, 1990).

# Toxicity Criteria:

Reference dose (RfD)-Oral:

0.035 mg/kg/day

**Uncertainty Factor:** 

1,000

NOAEL:

500 ppm

# 7041498

(Comment: Value based on the hepatotoxicity observed in a 6-month inhalation study in the guinea pig by Torkelson et al. (1958). The Torkelson et al. (1958) study provided a NOAEL of 500 ppm that was converted to 90 mg/kg/day (EPA, 1991). Uncertainty factors of 10 each were employed for use of a subchronic assay, for extrapolation from animal data, and for protection of sensitive human subpopulations. The oral RfD is withdrawn from IRIS (EPA, 1995).)

Reference Dose (RfD)-Inhalation:

2.86E-1 mg/kg/day

Inhalation RfC<sub>C</sub>:

 $1 \mu g/m^3 (0.3 g/kg/day)$ 

**Uncertainty Factor:** 

1,000

NOAEL:

500 ppm

(Comment: Value cited in EPA (1991). Uncertainty factors of 10 each were employed for use of a subchronic assay, for extrapolation from animal data, and for protection of sensitive human subpopulations. This value has been withdrawn from IRIS (EPA, 1995).)

#### **Target Organs:**

- Liver: Increased bilirubin levels, observed in one individual following accidental ingestion of 1,1,1-trichloroethane, is the main available evidence for hepatotoxicity of the chemical following oral exposure.
- Central nervous system: Anesthesia is one of the main effects of 1,1,1-trichloroethane administered orally to animals, resulting in death at high doses.

#### A.7.1 General Information

1,1,1-trichloroethane (methyl chloroform) (CAS No. 71-55-6) has a typical sweetish odor that may be noticeable at concentrations near 100 ppm, significantly less than those that cause toxic response. At 1,000 ppm, the odor is not unpleasant enough to discourage exposure, but at 1,500 and 2,000 ppm, the odor has been described as strong and unpleasant (Torkelson and Rowe, 1981). 1,1,1-trichloroethane has a molecular weight of 133.42, a specific gravity of 1.3249 (26/4°C), and a vapor pressure of 127 torr at 25°C (Torkelson and Rowe, 1981). It is soluble in acetone, benzene, carbon tetrachloride, methanol, and ether, but is insoluble in water (Budavari et al., 1989).

The 1989 use pattern for 1,1,1-trichloroethane is as follows: vapor degreasing (34 percent), cold cleaning (12 percent), aerosols (10 percent), adhesives (8 percent), intermediate (7percent), coatings (5 percent), electronics (4 percent), other (5 percent), and exports (15 percent) (Chem. Mark. Rep., 1989).

Both OSHA (1989) and ACGIH (1990) have established time-weighted averages (TWAs) of 350 ppm for 1,1,1-trichloroethane. The ACGIH short-term exposure limit (STEL) is 450 ppm. In 1989, the Chemical Marketing Reporter (1989) noted that the chemical was under study by EPA as a possible threat to the ozone layer.

1,1,1-trichloroethane is absorbed via inhalation, oral, and dermal exposure routes (ATSDR, 1990). After cessation of exposure, clearance of the chemical from the blood is rapid-60 to 80 percent is eliminated within 2 hours, and more than 95 percent is eliminated within 50 hours. A large fraction of the absorbed dose is excreted unchanged in exhaled air, regardless of route of exposure (Torkelson and Rowe, 1981). Humans metabolize less than 10 percent of the inhaled dose of 1,1,1-trichloroethane; the major urinary metabolites are trichloroethanol and its glucuronide conjugate, trichloroacetic acid, and volatile carbon dioxide (ATSDR, 1990; Nolan et al., 1984).

# A.7.2 Basis for Toxicity Criteria

In both humans and animals, the first and primary response to acute, high concentrations of inhaled 1,1,1-trichloroethane is central nervous system (CNS) depression. The chemical also can sensitize the heart to epinephrine at high levels, but has little effect on other organs. Accidental exposures to concentrations ranging from 6,000 to 70,000 ppm have been fatal to humans (ATSDR, 1990; Torkelson and Rowe, 1981).

The effects of subchronic and chronic inhalation exposure to 1,1,1-trichloroethane are generally mild, characterized by growth reduction in guinea pigs (650 ppm), and minimal hepatic effects in mice (247 ppm, continuous exposure) and rats (1,500 ppm, intermittent exposure). Fatty liver in humans has been associated with exposure to 1,1,1-trichloroethane.

Subchronic and chronic oral RfD values for 1,1,1-trichloroethane are 0.9 mg/kg/day and 0.09 mg/kg/day, respectively (Torkelson et al., 1958; EPA, 1991), subchronic and chronic inhalation RfC values for the chemical are 10 mg/m³ (3 mg/kg/day) and 1 mg/m³ (0.3 mg/kg/day), respectively (Torkelson et al., 1958, EPA, 1991)

Oral bioassays were inconclusive regarding the carcinogenicity of 1,1,1-trichloroethane, and inhalation studies were negative (NCI, 1977; Maltoni et al., 1986). No epidemiological data for 1,1,1-trichloroethane and inadequate carcinogenicity data for animals place the chemical in EPA's weight-of-evidence group D, "not classifiable as to human carcinogenicity" (EPA, 1990).

# A.7.2.1 Oral Exposures

Information about the chronic oral toxicity of 1,1,1-trichloroethane in humans was not available. In an NCI bioassay (NCI, 1977), Osborne-Mendel rats were treated by gavage with 750 or 1,500 mg of 1,1,1-trichloroethane/kg body weight in corn oil 5 days a week for 78 weeks. The only adverse effects observed in the rats were decreased body weights at both doses and more severe signs of aging in treated versus control animals. In the same bioassay, B6C3F<sub>1</sub> male and female mice given TWA doses of 2,500 or 4,011 mg/kg/day 5 days/week

for 78 weeks exhibited a reduced body weight gain, and female mice had a dose-related decrease in survival. In an analysis of this study, ATSDR (1990) identified the higher doses for both rats and mice as NOAELs for respiratory, cardiovascular, gastrointestinal, hematological, musculo-skeletal, hepatic, dermatological, immunological, and reproductive effects.

# A.7.2.2 Inhalation Exposures

Intentional and accidental inhalation of 1,1,1-trichloroethane has resulted in human fatalities, as reported in several case studies (Hall and Hine, 1966; MacDougall et al., 1987; Stahl et al., 1969). Estimations for fatal exposure concentrations range from 6,000 to 70,000 ppm (ATSDR, 1990). Death has been attributed to either depression of the central nervous system (CNS), resulting in respiratory arrest, or sensitization of the heart to epinephrine, resulting in cardiac arrythmia. A 15-year-old boy who sniffed typing eraser fluid containing 1,1,1-trichloroethane had complained of double vision and hallucinations before he collapsed and died. Autopsy revealed a grossly edematous brain, edema of the lungs, liver and gut, and tonsillar herniation. Levels of 1,1,1-trichloroethane in the blood were 1.7 ng/mL (1.7 ppb). Levels of 1,1,1-trichloroethane in the blood of three other victims of fatal intoxication (ingested or inhaled) were estimated at 60, 62, and 120 ppm.

In one study, a NOAEL of 370 ppm was defined for Long-Evans and Sprague-Dawley rats, Hartley guinea pigs, squirrel monkeys, New Zealand rabbits, and beagle dogs exposed continuously to 1,1,1-trichloroethane concentrations of 135 or 370 ppm for 90 days (EPA, 1982). In another study, the following species were exposed to 1,1,1-trichloroethane 7 hours/day, 5 days/week for approximately 1 to 3 months: guinea pigs (650, 1,500, 3,000, or 5,000 ppm), rats (5,000 or 3,000 ppm); rabbits (5,000 ppm); and monkeys (3,000 ppm). Body weights, relative organ weights, and BUN levels were measured and histopathological examinations were performed on selected major organs. Rats were unaffected by exposure; rabbits showed slight retardation of growth at 5,000 ppm; and guinea pigs had "slight" liver degeneration at 3,000 ppm, "slight to moderate" degeneration at 5,000 ppm, testicular degeneration at 5,000 ppm, and slight, but significantly reduced growth rates at all exposure levels. The LOAEL for guinea pigs in this study was 650 ppm.

Torkelson et al. (1958) exposed rats, rabbits, guinea pigs, and monkeys to 1,1,1-trichloroethane concentrations of 500, 1,000, 2,000, or 10,000 ppm 7 hours/day, 5 days/week for 6 months. Growth rate, general appearance, mortality, hematology, organ weights and gross and microscopic pathology were evaluated. The female guinea pig was the most sensitive species. At 1,000 ppm, the female guinea pigs had fatty changes in the liver and statistically significant increases in liver weights. The NOAEL for the guinea pigs of this study was 500 ppm.

In an occupational exposure study, cardiovascular and hepatic functions were unaffected in employees exposed to 1,1,1-trichloroethane at an 8-hour TWA of 4 to 217 ppm for approximately 6 years (Kramer et al., 1976).

# A.7.2.3 Carcinogenicity

Two oral carcinogenicity assays in animals were found. The NCI (1977) tested technical grade 1,1,1-trichloroethane in Osborne-Mendel rats. Fifty rats were given doses of 750 or 1,500 mg/kg/day, by gavage, 5 days/week for 78 weeks. The controls were untreated. An observation

period of 32 weeks followed. Treated males and females exhibited early mortality with a statistically significant dose-related trend (P<0.04). A variety of neoplasms was observed in both treated and matched control rats, but these were common to aged rats and were not dose-related. The investigators suggested that the low survival of rats of both sexes possibly precluded the detection of tumors late in life. The NCI (1977) also treated B6C3F<sub>1</sub> mice with time weighted average doses of 2,807 or 5615 mg 1,1,1-trichloroethane/kg/day, by gavage, 5 days/week for 78 weeks. An observation period of 12 weeks followed. A variety of neoplasms were observed in both treated and control groups, but only 25 to 45 percent of the treated animals survived until terminal sacrifice. Because of the high early mortality in both species, the investigators did not consider this study to be an adequate test of carcinogenicity.

Maltoni et al. (1986) conducted a carcinogenicity screening study in rats, using only one dose, a small sample size, and no statistical analyses. The animals received 500 mg/kg/day for 104 weeks and were examined for the induction of leukemia. An increase in the total incidence of "leukemias" (13 in treated rats and 4 in vehicle controls) was observed. The biological and statistical significance of these data were not clear. The investigators, unable to draw definite conclusions from these data because of limitations in experimental design, suggested that further carcinogenicity studies were needed.

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February 2, 2000

**Ted Simon** Region IV

ASSISTANCE REQUESTED:

Requested toxicity information on 1,1,2,2-tetrachloroethane. (Defense

Depot Memphis)

**ENCLOSED INFORMATION:** 

Attachment 1: Risk Assessment Issue Paper for: Evaluation

Cancer Assessment for 1,1,2,2-Tetrachloroethane (CASRN 79-34-5)

Attachment 2: Risk Assessment Issue Paper for: Evaluation of a Provisional RfC for 1,1,2,2-Tetrachloroethane (CASRN 79-34-5)

Attachment 3: Risk Assessment Issue Paper for: Derivation of a Provisional RfD for 1,1,2,2-Tetrachloroethane (CASRN 79-34-5)

BE ADVISED:

It is to be noted that the attached Risk Assessment Issue Papers have not been through the U.S. EPA's formal review process. Therefore, they do not represent a U S. EPA verified assessment. If you have any questions regarding this information, please contact the STSC at (513) 569-7300.

Attachments

Attachment 1

(97-024 / 06-24-98)

Risk Assessment Issue Paper for: Evaluation Cancer Assessment for 1,1,2,2-Tetrachloroethane (CASRN 79-34-5)

#### INTRODUCTION

A cancer assessment for 1,1,2,2-tetrachloroethane is currently available on IRIS (U.S. EPA, 1997). Based on the lack of human carcinogenicity data and the finding of increased incidences of hepatocellular carcinomas in male and female mice, U.S. EPA considered 1,1,2,2-tetrachloroethane a possible human carcinogen, weight-of-evidence category Group C (U.S. EPA, 1986). NCI (1978) found significant dose-related increases in the incidence of hepatocellular carcinomas in groups of 50 male and 50 female B6C3F1 mice exposed to 142 or 282 mg/kg-day 1,1,2,2-tetrachloroethane in corn oil administered via gavage 5 days/week for 78 weeks followed by a 32-week observation period. NCI (1978) did not find any significant increases in the incidence of neoplasms in Osborne Mendel rats similarly exposed to 62 or 108 mg/kg-day (males) or 43 and 76 mg/kg-day (females). Using the results of the mouse NCI (1978) study, U.S. EPA (1997) derived an oral slope factor of 2.0E-1 per (mg/kg-day) and an inhalation unit risk of 5.8E-5 per (μg/m³).

The cancer weight-of-evidence classification, oral slope factor, and inhalation unit risk were verified by the CRAVE Work Group in June 1986 (U.S. EPA, 1995). To determine if studies published after 1986 would impact the current cancer risk assessment, a recent ATSDR toxicological profile on 1,1,2,2-tetrachloroethane (ATSDR, 1996) and a literature search of the following databases: TOXLINE (1992-November 1997), CANCERLINE (1992-November 1997), RTECS, DART, CCRIS, EMIC, GENETOX, and TSCATS were reviewed.

Data on the carcinogenicity of 1,1,2,2-tetrachloroethane published after 1986 are limited to several genotoxicity studies; none of these studies would impact the current cancer assessment.

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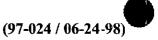
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Attachment 2



#### Risk Assessment Issue Paper for: Evaluation of a Provisional RfC for 1,1,2,2-Tetrachloroethane (CASRN 79-34-5)

#### INTRODUCTION

An RfC for 1,1,2,2-tetrachloroethane is not available on IRIS (U.S. EPA, 1997) or HEAST (U.S. EPA, 1997). ATSDR (1996) has derived an intermediate inhalation minimal risk level (MRL) of 0.4 ppm for 1,1,2,2-tetrachloroethane. This MRL is based an increase in relative liver weight and signs of hyperplasia, granulation, and cell vacuolization in the livers of rats exposed to 130 ppm 1,1,2,2-tetrachloroethane 5 days/week, 5-6 hours/day for 15 weeks (Truffert et al., 1977). ACGIH (1997) adopted a TWA TLV of 1 ppm with a skin notation for 1,1,2,2-tetrachloroethane; the NIOSH (1997) REL is also 1 ppm with a skin notation. The current enforceable OSHA PEL is 5 ppm with a skin notation (OSHA, 1997).

The most recent document on 1,1,2,2-tetrachloroethane listed in the CARA database (U.S. EPA, 1991, 1994) is a HEA (U.S. EPA, 1984). This HEA, the Toxicological Profile on 1,1,2,2-tetrachloroethane (ATSDR, 1996), and a literature search of the following databases (conducted in November 1997): TOXLINE (1992-November 1997), CANCERLINE (1992-November 1997), RTECS, DART, CCRIS, EMIC, GENETOX, and TSCATS were used to identify relevant data for the derivation of a provisional RfC for 1,1,2,2-tetrachloroethane:.

#### REVIEW OF PERTINENT LITERATURE

The toxicity of 1,1,2,2-tetrachloroethane was first reported in workers applying 1,1,2,2-tetrachloroethane to cloth airplane wings during World War I (as reviewed by NIOSH, 1976). The primary effects observed in these workers included symptoms of liver damage (jaundice, enlarged livers), gastrointestinal disturbances (anorexia, nausea), and neurological effects (hand tremors, headaches, reduced patellar reflexes, paresthesias in the extremities, and sensations of deafness). Exposure concentrations were not reported and it is likely that the workers were also dermally-exposed to 1,1,2,2-tetrachloroethane.

Lobo-Mendonca (1963) observed a number of adverse health effects in a group of 380 workers at 23 Indian bangle manufacturing facilities (80% of workers employed at these facilities were examined). In addition to the inhalation exposure, approximately 50% of the examined workers had a substantial amount of dermal exposure to the 1,1,2,2-tetrachloroethane. Some of the workers were exposed to a mixture of equal parts acetone and 1,1,2,2-tetrachloroethane. Air samples were collected at several work areas in seven facilities. Levels of 1,1,2,2-tetrachloroethane ranged from 9.1 to 98.00 ppm (1-14 mg/m³). High incidences of a number of effects were reported including anemia (33.7%), loss of appetite (22.6%), abdominal pain (23.7%), headaches (26.6%), vertigo (30.5%), and tremors (35%). The significance of these effects can not be

determined because a control group of unexposed workers was not examined. Lobo-Mendonca (1963) noted that the incidence of tremors appeared to be directly related to 1,1,2,2-tetrachloroethane exposure concentrations.

Over a three-year period, Jeney et al. (1957) examined 34-75 workers employed at a penicillin production facility. 1,1,2,2-Tetrachloroethane was used as an emulsifier and wide fluctuations in atmospheric levels occurred throughout the day. The investigators noted that the workers were only in the areas with high 1,1,2,2-tetrachloroethane concentrations for short periods of time and gauze masks with organic solvent filters were worn in these areas. During the first year of the study, 1,1,2,2-tetrachloroethane levels ranged from 0.016 to 1.7 mg/L (16-1700 mg/m³; 2-248 ppm). In the second year of the study, ventilation in the work room was improved and 1,1,2,2-tetrachloroethane levels ranged from 0.01 to 0.85 mg/L (10-850 mg/m<sup>3</sup>; 1-124 ppm). In the third year of the study, the workers were transferred to a newly built facility; 1,1,2,2-tetrachloroethane levels in the new facility ranged from 0.01 to 0.25 mg/L (10-250 mg/m<sup>3</sup>; 1-36 ppm). At 2-month intervals, the workers received a general physical examination, and blood was drawn for measurement of hematological parameters, serum bilirubin levels, and liver function tests; urinary hippuric acid levels were measured every 6 months. It appears that workers with positive signs of liver damage were transferred to other areas of the facility and were not examined further. In the first year of the study, 31% of the examined workers had "general or gastrointestinal symptoms." Loss of appetite, bad taste in the mouth, epigastric pain, and a "dull straining pressure feeling in the area of the liver" was reported by 66% of the workers (presumably this is 66% of the workers with symptoms). Other symptoms included headaches, general weakness, and fatigue in 29%, severe weight loss in 4%, and "tormenting itching" in 1%. Enlargement of the liver was observed in 38% of the screened workers. Urobilinogenuria was detected in 50% of the workers; 31% of the workers with urobilinogenuria also had palpable livers. In the second year of the study, there was a decline in the number of symptomatic workers (13% of examined workers) and in workers with positive urobilonogenuria findings (24%). Liver enlargement was observed in 20% of the examined workers. In the third year, the number of workers reporting symptoms decreased to 2% and positive urobilinogen findings were found in 12% (the investigators noted that the increased urobilinogen levels were probably secondary to excessive alcohol consumption or dietary excess). Enlarged livers were found in 5% of the examined workers. In the first 3 years of the study, no alterations in erythrocyte or hemoglobin levels were found. Leukopenia (defined as leukocyte levels of less than 5800) was found in 20% of the workers, but no relationship between the number of cases and duration of 1,1,2,2-tetrachloroethane exposure was found. A positive relationship between duration of exposure and frequency of abnormal liver function test results was found; statistically significant correlations were found on the thymol and Takata-Ucko liver function tests, but not the gold sol reaction test. Abnormal hippuric acid levels were only detected in 1% of the examined workers during the first 2 years and no abnormalities were observed during the third year. Increased serum bilirubin levels (greater than 1 mg/dL) were observed in 20, 18.7, and 7.6% of the workers during the first, second, and third years, respectively. The prevalence of hepatitis was assessed using sickness benefit files. In the 1-year period prior to the study, 21 cases of hepatitis were found (total number of workers not reported). Three cases of hepatitis were found in the first year of the study, 8 cases in the second year, and 4 cases in the third year The lack of a control group and poor reporting of study design and results, precludes using this study for quantitative risk assessment.

Several animal studies have assessed the toxicity of inhaled 1,1,2,2-tetrachloroethane in animals (Shmuter, 1977; Truffert et al., 1977; Schmidt et al., 1972; Horiuchi et al., 1962). As discussed below, there are

a number of limitations to these studies. A recently conducted oral exposure study (Microbiological Associates, 1994) is also discussed. Data on the reproductive and/or developmental toxicity study is limited to a subchronic study in which exposed males were mated to unexposed females (Schmidt et al., 1972).

Shmuter (1977) exposed groups of 12 Chinchilla rabbits to 0, 2, 10, or 100 mg/m³ (0.29, 1, and 14 ppm) 1,1,2,2-tetrachloroethane for 3 hours/day, 6 days/week for 8-10 months. Animals were vaccinated with 1 mL suspensions containing heated typhoid vaccine (1.5 billion), 1.5, 4.5-5, and 7.5-8 months after the initiation of 1,1,2,2-tetrachloroethane exposure. Significant increases and decreases in total antibody levels were observed in the 2 and 100 mg/m³ groups, respectively. No significant alterations in 7S-typhoid antibody levels were observed. Significant alterations in the levels of "normal hemolysins to the Forsman antigen of RAM erythrocytes" were observed in the 10 and 100 mg/m³ groups; levels were increased in the 10 mg/m³ after 1.5, 2, and 2.5 months of exposure, decreased in the 10 mg/m³ group after 4 months of exposure and decreased in the 100 mg/m³ group during the first 6 months of exposure. Shmuter (1977) also reported increases in the electrophoretic mobility of specific antibodies. Exposure to 100 mg/m³ resulted in a decrease in the relative content of antibodies in the  $\gamma$  globulin fraction and an increase in the T and  $\beta$  fractions.

Truffert et al. (1977) exposed a group of 55 female Sprague Dawley rats to 1,1,2,2-tetrachloroethane 5 days/week for 15 weeks (78 exposures). The daily exposure duration for the first 8 exposures was 6 hours, thereafter the duration was 5 hours (TWA daily exposure was 5.1 hours/day). The authors reported the calculated atmospheric concentration as 560 mL/m<sup>3</sup>, this would correspond to a concentration of approximately 888,000 mg/m<sup>3</sup> (130,000 ppm); it is likely that the reported concentration is not correct: (1) it is not likely that any animals would have survived 15 weeks of exposure to such a high concentration of 1,1,2,2tetrachloroethane [LC<sub>50</sub> is approximately 1300 ppm (ATSDR, 1996)] and (2) this concentration exceeds the saturation point of 6600 ppm at 21°C. A group of 55 rats was used as controls. Interim sacrifices were conducted after 2, 4, 9, 19, 39, and 63 exposures (number of animals killed at each time period was not reported). Abnormal clinical signs were limited to pronounced prostration after the first exposure to 1,1,2,2tetrachloroethane Decreases in weight gain were observed, however the authors did not report the magnitude of the change or the statistical significance. Increases in relative liver weights were observed beginning 2 weeks of exposure initiation. Hematological alterations were limited to a slight decrease in hematocrit. A dramatic increase (313%) in thymidine uptake in hepatic DNA was observed after 4 exposures; by the ninth exposure, thymidine uptake had decreased but still remained higher than in controls. Histological alterations were observed in the liver after nine exposures, these included granular appearance, cytoplasmic vacuolization, and evidence of hyperplasia (increase in number of binuclear cells and appearance of mitosis); the hepatic histological alterations regressed after 19 exposures and were no longer observed after 39 exposures. No histological alterations were observed in the kidneys, lungs, adrenals, ovaries, or uterus. Due to the uncertainty in the exposure concentration, a LOAEL can not be identified from this study.

In a subchronic inhalation study conducted by Schmidt et al. (1972), groups of 105 rats were exposed to 0 or 0.0133 mg/L (13.3 mg/m³; 1.94 ppm) "daily" for 4 hours/day for 265 days. Groups of seven rats were killed after 110 or 265 days of exposure and 60 days after exposure termination, the remaining animals were observed until natural death. No significant alterations in survival were observed. Significant decreases in body weight gain were observed after 90-170 days of exposure; after 110 days of exposure, the 1,1,2,2-

tetrachloroethane-exposed rats weighed 3% less than controls, body weight data were not provided for other time periods. The following statistically significant alterations were observed after 110 days of exposure: increases in leukocyte levels, increases in  $\beta_1$  globulin levels, and decreases in ACTH activity in the pituitary gland. After 265 days of exposure, there were significant increases in the percentage of segmented nucleated neutrophils, decreases in the percentage of lymphocytes, increases in total fat content of the liver, and decreases in pituitary ACTH activity (leukocyte levels did not differ from controls).  $\gamma$ -Globulin levels were not affected at either time period. This study is insufficient for identification of a NOAEL/LOAEL for subchronic exposure because the study design and results were poorly reported and gross and/or histological examinations of the major tissues/organs were not performed.

The Schmidt et al. (1972) study also included a reproductive/developmental toxicity substudy. One week before the end of the 9-month exposure, groups of seven control and 1,1,2,2-tetrachloroethane-exposed rats were mated with unexposed virgin female rats. It appears that each male with was mated with five females. The offspring were observed for 12 weeks and were examined macroscopically for malformations. No significant differences in the percentage of females having offspring (77.1% in controls vs 62.9% in exposed), number of pups per litter, average birth weight, gestation length, sex ratio, offspring mortality at postnatal days 1, 2, 7, 14, 21, and 84), and average weight on postnatal day 84). No macroscopic malformations were found.

Horiuchi et al. (1962) exposed an adult male monkey (*Macaca cynomolga Linné*) to 1,1,2,2-tetrachloroethane 2 hours/day, 6 days/week for 9 months (190 exposures). The 1,1,2,2-tetrachloroethane exposure level was 2000-4000 ppm (291-583 mg/m³) for the first 20 exposures, 1000-2000 ppm (146-291 mg/m³) for the next 140 exposures, and 3000-4000 ppm (437-583 mg/m³) for the last 30 exposures. The authors noted that the monkey was weak after seven exposures and had diarrhea and anorexia between the twelfth and fifteenth exposures. Beginning at the fifteenth exposure, the monkey was "almost completely unconscious falling upon his side" 20 to 60 minutes after each exposure. Although the authors noted some changes in body weight gain and hematological parameters, the significance of these findings can not be determined because only one monkey was tested and there was no control group. Histological alterations consisted of fatty degeneration in the liver and splenic congestion. This study can not be used to identify a NOAEL/LOAEL for subchronic exposure because only one animal was tested.

In a subchronic study conducted for NTP (Microbiological Associates, 1994), groups of male and female F344 rats and B6C3F1 mice (10/sex/group/species) were fed diets containing microencapsulated 1,1,2,2-tetrachloroethane for 13 weeks. The reported dosages were 18, 37, 75, 150, and 300 mg/kg-day for rats and 88, 175, 350, 700, and 1400 mg/kg-day for mice; vehicle and untreated control groups were used for each species. In the rats, no chemical-related alterations in mortality were observed. Significant decreases in body weight gain were observed in the male and female rats exposed to 75 (10.5 and 24.1% difference from vehicle controls for males and females) and 150 (45.4 and 63.2%) mg/kg-day, and weight loss was observed at the 300 mg/kg-day dose level. The decrease in body weight gain in the 150 mg/kg-day group and weight loss in the 300 mg/kg-day group were associated with reductions in food consumption. Thinness and pallor were observed in all animals in the 150 and 300 mg/kg-day groups. Statistically significant increases in absolute and relative liver weights were observed in males and females exposed to 37 mg/kg-day and higher. Significant alterations in absolute and/or relative weights were also observed in several other organs, these changes were considered secondary to the decreased body weight gain. A number of alterations in serum clinical chemistry parameters

consistent with liver damage were found: increased alanine aminotransferase, alkaline phosphatase, and sorbitol dehydrogenase levels in the 150 and 300 mg/kg-day groups, increased bile acid levels in the 300 mg/kg-day group, and decreased total protein, cholesterol, and/or albumin levels in the 150 and 300 mg/kg-day groups. Other alterations in serum chemistry parameters were not considered chemical-related. The liver appeared to be the primary target of 1,1,2,2-tetrachloroethane toxicity, histopathological alterations consisted of basophilic, eosinophilic, mixed cell, and/or clear cell foci of cellular alterations (incidence significantly higher in males exposed to 300 mg/kg-day and females exposed to ≥150 mg/kg-day), hepatocyte necrosis (males and females: ≥150 mg/kg-day), mitotic alterations in hepatocytes (males: 300 mg/kg-day; females: ≥150 mg/kg-day), liver pigmentation (males and females: ≥150 mg/kg-day), bile duct hyperplasia (males: 300 mg/kg-day; females: ≥150 mg/kg-day), hepatocyte hypertrophy (males: ≥150 mg/kg-day; females. ≥75 mg/kg-day), and cytoplasmic vacuolization (males: ≥18 mg/kg-day; females: ≥37 mg/kg-day). Other histopathological alterations consisted of spleen pigmentation (males: ≥75 mg/kg-day; females: ≥150 mg/kg-day), bone marrow atrophy (males and females: ≥150 mg/kg-day), spleen red pulp atrophy (males: ≥150 mg/kg-day; females: 300 mg/kg-day), clitoral gland and uterus atrophy (females: ≥150 mg/kg-day), bone metaphysis atrophy (males: 300 mg/kg-day; females: ≥150 mg/kg-day), and atrophy of the preputial gland, prostate, seminal vesicle, and testes (males: 300 mg/kg-day); the atrophy was considered secondary to the decrease in body weight gain. To summarize, this study provides evidence that the liver is a primary target of 1,1,2,2-tetrachloroethane toxicity. At the lowest dose tested, 18 mg/kg-day, there was a significant increase in the incidence of cytoplasmic vacuolization, this minimal effect was not considered adverse. At 37 mg/kg-day, significant increases in absolute and relative liver weights were observed, hepatocellular hypertrophy, spleen pigmentation, and decreases in body weight gain were observed at the next highest dosage (75 mg/kg-day). At 150 and 300 mg/kg-day, alterations in liverrelated serum chemistry parameters (e.g., alanine aminotransferase, cholesterol), hepatocyte necrosis, bile duct hyperplasia, hepatocellular mitotic alterations, foci of cellular alterations, and liver pigmentation were observed (other effects observed at these dose levels were probably related to the marked decrease in body weight gain). Thus, this study identifies a NOAEL of 18 mg/kg-day and LOAEL of 37 mg/kg-day for liver effects in rats fed a diet containing microencapsulated 1,1,2,2-tetrachloroethane for 13 weeks.

In mice, no chemical-related deaths were observed (Microbiological Associates, 1994). Significant decreases in body weight gain were observed in the male and female mice exposed to 350, 700, or 1400 mg/kg-day (difference from vehicle control: 43.8, 52.1, and 69.8%, respectively, for males and 13.5, 28.4, and 39.2% for females). Significant increases in absolute and relative liver weights were observed in the male mice exposed to 175 mg/kg-day or higher and in female mice exposed to 88 mg/kg-day or higher. Other changes in organ weights were considered to be secondary to the body weight changes. Chemical-related alterations in serum clinical chemistry consisted of decreases in total protein levels (males exposed to ≥175 mg/kg-day and females exposed to ≥700 mg/kg-day), decreases in cholesterol levels (males and females: ≥175 mg/kg-day), and increases in alamine aminotransferase, alkaline phosphatase, sorbitol dehydrogenase, and bile acids (males and females: ≥350 mg/kg-day). Histopathological evidence suggested that the liver was the most sensitive target of 1,1,2,2-tetrachloroethane toxicity. The hepatic alterations consisted of hepatocyte hypertrophy (males: ≥175 mg/kg-day); females: ≥88 mg/kg-day), and hepatocyte necrosis, focal pigmentation, bile duct hyperplasia, and/or hepatocyte hypertrophy (male and female: ≥ 350 mg/kg-day). An increase in lung focal lymphocyte cellular infiltration was observed in the female mice exposed to 700 or 1400 mg/kg-day, however the number of infiltrates was within the normal range and was not considered to be related to 1,1,2,2-tetrachloroethane

exposure. An increase in the number of residual bodies present in the seminiferous tubules of mice exposed to 1400 mg/kg-day and increases in the incidence of thymus atrophy in male and female mice exposed to 1400 mg/kg-day were observed; these effects were considered to be secondary to the decrease in body weight gain. Thus, this study identifies a minimal LOAEL of 88 mg/kg-day for liver effects (increased absolute and relative liver weights and hepatocyte hypertrophy at 88 mg/kg-day and multiple liver effects at higher doses) in mice exposed to dietary 1,1,2,2-tetrachloroethane for 13 weeks; a NOAEL was not identified.

#### **DERIVATION OF PROVISIONAL RfC**

The human and animal inhalation studies are inadequate for the derivation of a provisional RfC for 1,1,2,2-tetrachloroethane. However, the results of these studies suggest that the liver is a sensitive target of toxicity following inhalation exposure. Additionally, the available inhalation data suggest that the respiratory tract is not a particularly sensitive target. The oral toxicity database is sufficient to support derivation of a provisional RfD for 1,1,2,2-tetrachloroethane. A provisional RfD of 6E-2 mg/kg-day was derived from the Microbiological Associates (1994) study using an uncertainty factor of 300 (for additional information, please see the Issue Paper for the Provisional RfD).

In the absence of adequate inhalation data, a route-to-route extrapolation was considered. This approach is supported by the toxicokinetic data (as reviewed by ATSDR, 1996) which suggest that 1,1,2,2-tetrachloroethane is well-absorbed following oral or inhalation exposure and toxicity data which provide evidence that the liver may be the most sensitive target of toxicity following oral or inhalation exposure. The mechanisms of toxicity of 1,1,2,2-tetrachloroethane on the liver most likely involves oxidative and/or reductive reactions to form the proximate toxicant. Following oral exposure, 1,1,2,2-tetrachloroethane is likely to be delivered to the liver via the portal vein and metabolized prior to entering the systemic circulation ("first pass" effect). Thus, it is likely that orally administered 1,1,2,2-tetrachloroethane will be more potent than inhaled 1,1,2,2-tetrachloroethane. No pharmacokinetic/pharmacodynamic data are available for this chemical which could be used to make adjustments for the first pass effect. It is likely that deriving an RfC based on oral exposure data will result in a value that is overprotective of liver effects following inhalation exposure. However, this uncertainty coupled with other uncertainties in the 1,1,2,2-tetrachloroethane database (lack of adequate reproductive and/or developmental toxicity data) precludes deriving an RfC for 1,1,2,2-tetrachloroethane.

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Attachment 3

(97-0024 / 06-24-98)

# Risk Assessment Issue Paper for: Derivation of a Provisional RfD for 1,1,2,2-Tetrachloroethane (CASRN 79-34-5)

#### INTRODUCTION

An RfD for 1,1,2,2-tetrachloroethane is not available on IRIS (U.S. EPA, 1997a) or HEAST (U.S. EPA, 1997b). Drinking water health advisories have not been derived for 1,1,2,2-tetrachloroethane. ATSDR (1996) derived an intermediate oral minimal risk level (MRL) and a chronic oral MRL for this chemical. The intermediate MRL of 0.6 mg/kg-day is based on a NOAEL of 56 mg/kg for decreases in body weight gain in female rats receiving gavage doses of 100 mg/kg 1,1,2,2-tetrachloroethane 5 days/week for 6 weeks (NCI, 1978). The basis for the chronic MRL of 0.04 mg/kg-day is a LOAEL for labored respiration, wheezing, and nasal discharge observed in female rats receiving gavage doses of 43 mg/kg 5 days/week for 78 weeks (NCI, 1978).

The most recent document on 1,1,2,2-tetrachloroethane listed in the CARA database (U.S. EPA, 1991, 1994) is a HEA (U.S. EPA, 1984). The HEA, Toxicological Profile on 1,1,2,2-tetrachloroethane (ATSDR, 1996), and a literature search of the following databases (conducted in November 1997): TOXLINE (1992-November 1997), CANCERLINE (1992-November 1997), RTECS, DART, CCRIS, EMIC, GENETOX, and TSCATS were used to identify relevant data for the derivation of a provisional RfD for 1,1,2,2-tetrachloroethane.

#### REVIEW OF PERTINENT LITERATURE

There are several reports of accidental and intentional ingestion of a single dose of 1,1,2,2-tetrachloroethane (as reviewed by NIOSH, 1976). Loss of consciousness, CNS depression, and death were the most common outcomes. Data on the effects associated with repeated oral exposure are not available for humans.

NCI (1978) and NTP (1996; Microbiological Associates, 1994) have investigated the subchronic and chronic oral toxicity of 1,1,2,2-tetrachloroethane in rats and mice. Data on the reproductive and developmental toxicity of 1,1,2,2-tetrachloroethane is limited to an inhalation study in which subchronically exposed male rats were mated to unexposed female rats (Schmidt et al., 1972).

In the NCI (1978) study, groups of male and female Osborne-Mendel rats and B6C3F1 mice (50/sex/group/species) were administered 1,1,2,2-tetrachloroethane in corn oil via gavage 5 days/week for 78 weeks. The TWA average doses were 62 and 109 mg/kg for male rats, 43 and 77 mg/kg for female rats, and 142 and 283 mg/kg for male and female mice. The exposure period was followed by a 32- or 12-week period in

which the rats and mice, respectively, were not exposed to 1,1,2,2-tetrachloroethane. Vehicle control and untreated control groups (20 animals/sex/species/group) were also used. A statistically significant association between increased mortality and dose was observed in the female rats; 10 of the high-dose females died during the first 5 weeks of the study (8 had pneumonia and no lesions were reported in the other 2 rats); NCI (1978) considered the deaths to be related to 1,1,2,2-tetrachloroethane exposure. No significant effects on survival were observed in the low-dose female rats and in both male dose groups. Clinical signs observed in the rats included a hunched appearance in the high-dose females and squinted or reddened eyes in both groups of 1,1,2,2-tetrachloroethane-exposed rats. The investigators noted that there was a low or moderate incidence of labored breathing, wheezing, and/or nasal discharge in all groups of animals during the first year of the study; near the end of the study, these respiratory signs were more frequently observed in the 1,1,2,2tetrachloroethane-exposed animals; no additional information on this effect was provided. Dose-related decreases in body weight gain were observed in the rats; the differences between body weights of the vehicle control rats and the low- and high-dose rats were less than 10% for the low-dose group and 20 and 15% for the high-dose male and female rats, respectively. No significant increases in tumor incidence were observed in the rats. The incidences of hepatic fatty metamorphosis in high-dose male rats (0/20, 2/50, 9/49 in the vehicle control, low, and high-dose groups) and chronic murine pneumonia in low- and high-dose female rats (8/20, 34/50, 38/50, respectively) were significantly increased (p<0.05, Fisher Exact Test). Thus, this study identifies a LOAEL of 43 mg/kg (31 mg/kg-day) for an increased incidence of chronic murine pneumonia in female rats exposed to gavage doses of 1,1,2,2-tetrachloroethane for 78 weeks and FEL of 77 mg/kg (55 mg/kg-day).

A statistically significant association between mortality and dose was found in mice (NCI, 1978). There was a dramatic decrease in probability of survival after 45 weeks of exposure in the high-dose male and female mice. Acute toxic tubular nephrosis was determined to be the apparent cause of death in 33 high-dose males dying between weeks 69 and 70; the cause of death was not reported in the female mice. A high incidence (95%) of pronounced abdominal distension, probably resulting from liver tumors, was observed in the high-dose females beginning in week 60 and continuing throughout the recovery period. A very slight decrease in body weight gain (less than 10%) was observed in the high dose male mice; no other effects on body weight gain were observed. Significant increases in the incidence of hepatocellular carcinoma were observed in the low- and high-dose male and female mice. Significant increases in the incidence of nonneoplastic lesions were limited to hydronephrosis (0/20, 0/46, 16/46 in the control, low and high dose groups) and chronic inflammation (0/20, 0/46, and 5/46) in the kidneys of high-dose females. This study identifies a NOAEL of 142 mg/kg (101 mg/kg-day) and a FEL of 283 mg/kg (202 mg/kg-day) in mice exposed to 1,1,2,2-tetrachloroethane for 78 weeks.

NCI (1978) also conducted a subchronic range-finding study in rats and mice. In this study, groups of five male and five female Osborne Mendel rats received gavage doses of 0 (vehicle control group), 56, 100, 178, 316, and 562 mg/kg 1,1,2,2-tetrachloroethane in corn oil 5 days/week for 6 weeks followed by a 2 week observation period. Groups of five male and five female B6C3F1 mice were similarly exposed to 0, 32, 56, 100, 178, and 316 mg/kg 1,1,2,2-tetrachloroethane. It appears that mortality and body weight gain were the only endpoints used to assess toxicity. In the rats, increased mortality was observed in one male exposed to 100 mg/kg, and all five females exposed to 316 mg/kg (mortality rates in the 516 mg/kg group were not discussed). Decreases in body weight gain were observed in the rats at the 56, 100, and 178 mg/kg doses; the differences were 3, 9, and 38% for the males and 9, 24, and 41% for the females. No deaths were observed in the mice and

there were no significant alterations in body weight gain. The limited number of endpoints examined in this study precludes identifying NOAELs and/or LOAELs for subchronic exposure.

In a subchronic study conducted for NTP (Microbiological Associates, 1994), groups of male and female F344 rats and B6C3F1 mice (10/sex/group/species) were fed diets containing microencapsulated 1,1,2,2tetrachloroethane for 13 weeks. The reported dosages were 18, 37, 75, 150, and 300 mg/kg-day for rats and 88, 175, 350, 700, and 1400 mg/kg-day for mice; vehicle and untreated control groups were used for each species. In the rats, no chemical-related alterations in mortality were observed. Significant decreases in body weight gain were observed in the male and female rats exposed to 75 (10.5 and 24.1% difference from vehicle controls for males and females) and 150 (45.4 and 63.2%) mg/kg-day, and weight loss was observed at the 300 mg/kgday dose level. The decrease in body weight gain in the 150 mg/kg-day group and weight loss in the 300 mg/kg-day group were associated with reductions in food consumption. Thinness and pallor were observed in all animals in the 150 and 300 mg/kg-day groups. Statistically significant increases in absolute and relative liver weights were observed in males and females exposed to 37 mg/kg-day and higher. Significant alterations in absolute and/or relative weights were also observed in several other organs, these changes were considered secondary to the decreased body weight gain. A number of alterations in serum clinical chemistry parameters consistent with liver damage were found: increased alanine aminotransferase, alkaline phosphatase, and sorbitol dehydrogenase levels in the 150 and 300 mg/kg-day groups, increased bile acid levels in the 300 mg/kg-day group, and decreased total protein, cholesterol, and/or albumin levels in the 150 and 300 mg/kg-day groups. Other alterations in serum chemistry parameters were not considered chemical-related. The liver appeared to be the primary target of 1,1,2,2-tetrachloroethane toxicity, histopathological alterations consisted of basophilic, eosinophilic, mixed cell, and/or clear cell foci of cellular alterations (incidence significantly higher in males exposed to 300 mg/kg-day and females exposed to ≥150 mg/kg-day), hepatocyte necrosis (males and females: ≥150 mg/kg-day), mitotic alterations in hepatocytes (males: 300 mg/kg-day; females: ≥150 mg/kg-day), liver pigmentation (males and females: ≥150 mg/kg-day), bile duct hyperplasia (males: 300 mg/kg-day; females: ≥150 mg/kg-day), hepatocyte hypertrophy (males: ≥150 mg/kg-day; females: ≥75 mg/kg-day), and cytoplasmic vacuolization (males: ≥18 mg/kg-day; females: ≥37 mg/kg-day). Other histopathological alterations consisted of spleen pigmentation (males: ≥75 mg/kg-day; females ≥150 mg/kg-day), bone marrow atrophy (males and females: ≥150 mg/kg-day), spleen red pulp atrophy (males: ≥150 mg/kg-day; females: 300 mg/kg-day), clitoral gland and uterus atrophy (females: ≥150 mg/kg-day), bone metaphysis atrophy (males: 300 mg/kg-day; females: ≥150 mg/kg-day), and atrophy of the preputial gland, prostate, seminal vesicle, and testes (males: 300 mg/kg-day); the atrophy was considered secondary to the decrease in body weight gain. To summarize, this study provides evidence that the liver is a primary target of 1,1,2,2-tetrachloroethane toxicity. At the lowest dose tested, 18 mg/kg-day, there was a significant increase in the incidence of cytoplasmic vacuolization, this minimal effect was not considered adverse. At 37 mg/kg-day, significant increases in absolute and relative liver weights were observed; hepatocellular hypertrophy, spleen pigmentation, and decreases in body weight gain were observed at the next highest dosage (75 mg/kg-day). At 150 and 300 mg/kg-day, alterations in liverrelated serum chemistry parameters (e.g., alanine aminotransferase, cholesterol), hepatocyte necrosis, bile duct hyperplasia, hepatocellular mitotic alterations, foci of cellular alterations, and liver pigmentation were observed (other effects observed at these dose levels were probably related to the marked decrease in body weight gain). Thus, this study identifies a NOAEL of 18 mg/kg-day and LOAEL of 37 mg/kg-day for liver effects in rats fed a diet containing microencapsulated 1,1,2,2-tetrachloroethane for 13 weeks.

In mice, no chemical-related deaths were observed (Microbiological Associates, 1994). Significant decreases in body weight gain were observed in the male and female mice exposed to 350, 700, or 1400 mg/kgday (difference from vehicle control. 43.8, 52.1, and 69.8%, respectively, for males and 13.5, 28.4, and 39.2% for females). Significant increases in absolute and relative liver weights were observed in the male mice exposed to 175 mg/kg-day or higher and in female mice exposed to 88 mg/kg-day or higher. Other changes in organ weights were considered to be secondary to the body weight changes. Chemical-related alterations in serum clinical chemistry consisted of decreases in total protein levels (males exposed to ≥175 mg/kg-day and females exposed to ≥700 mg/kg-day), decreases in cholesterol levels (males and females: ≥175 mg/kg-day), and increases in alanine aminotransferase, alkaline phosphatase, sorbitol dehydrogenase, and bile acids (males and females: ≥350 mg/kg-day). Histopathological evidence suggested that the liver was the most sensitive target of 1,1,2,2-tetrachloroethane toxicity. The hepatic alterations consisted of hepatocyte hypertrophy (males: ≥175 mg/kg-day; females: ≥88 mg/kg-day), and hepatocyte necrosis, focal pigmentation, bile duct hyperplasia, and/or hepatocyte hypertrophy (male and female: ≥ 350 mg/kg-day). An increase in lung focal lymphocyte cellular infiltration was observed in the female mice exposed to 700 or 1400 mg/kg-day, however the number of infiltrates was within the normal range and was not considered to be related to 1,1,2,2-tetrachloroethane exposure. An increase in the number of residual bodies present in the seminiferous tubules of mice exposed to 1400 mg/kg-day and increases in the incidence of thymus atrophy in male and female mice exposed to 1400 mg/kg-day were observed; these effects were considered to be secondary to the decrease in body weight gain. Thus, this study identifies a minimal LOAEL of 88 mg/kg-day for liver effects (increased absolute and relative liver weights and hepatocyte hypertrophy at 88 mg/kg-day and multiple liver effects at higher doses) in mice exposed to dietary 1,1,2,2-tetrachloroethane for 13 weeks, a NOAEL was not identified.

In a study examining the potential renal toxicity of orally administered halogenated ethanes, groups of five male F344/N rats received via gavage 0, 0.62, or 1.24 mmol/kg-day 1,1,2,2-tetrachloroethane in corn oil (0, 104, 208 mg/kg-day) daily for 21 days (NTP, 1996). All animals were grossly examined, the right kidney, liver, and right testis were weighed and the right kidney, left liver lobe, and gross lesions were examined histopathologically. Rats in the high-dose group died or were killed moribund before the end of the study; clinical observations included thin and lethargic (5/5 animals) and diarrhea accompanied by abnormal breathing and ruffled fur (3/5). In the low-dose group, no effects on survival, body weight gain, absolute and relative liver and kidney weights, or kidney histopathology were observed. Mild to moderate cytoplasmic vacuolization, consisting of multifocal areas of hepatocytes with clear droplets within the cytoplasm, was observed in the hepatocytes of all rats in the low dose group. The cytoplasmic vacuolization observed at 104 mg/kg-day was considered a minimal effect. Thus, the 104 mg/kg-day dose is a NOAEL in rats exposed to 1,1,2,2-tetrachloroethane for 21 days and 208 mg/kg-day is a FEL.

In a 9-month inhalation study conducted by Schmidt et al. (1972), groups of 105 male rats were exposed to 0 or 0.0133 mg/L (1.94 ppm) 1,1,2,2-tetrachloroethane "daily" for 4 hours/day. One week before the end of the study, groups of seven control and 1,1,2,2-tetrachloroethane-exposed rats were mated with unexposed virgin female rats. It appears that each male was mated with five females. The offspring were observed for 12 weeks and were examined macroscopically for malformations. There were no statistically significant differences in the percentage of females having offspring (77.1% in controls vs 62.9% in exposed), number of pups per litter,

average birth weight, gestation length, sex ratio, offspring mortality at postnatal days 1, 2, 7, 14, 21, and 84, or average weight on postnatal day 84. No macroscopic malformations were found.

#### **DERIVATION OF PROVISIONAL RfD**

The subchronic toxicity studies conducted by Microbiological Associates (1994) for NTP suggest that the liver may be the most sensitive endpoint. Liver effects were observed at the lowest doses tested in rats and mice (18 and 88 mg/kg-day, respectively). The liver effects consisted of hepatocellular vacuolization and increases in absolute and relative liver weights at the low doses and hepatocyte necrosis and bile duct hyperplasia at higher doses. In the rat study, the increased incidence of cytoplasmic vacuolization observed at 18 mg/kg-day was not considered adverse. The increases in absolute and relative liver weight observed in rats exposed to 37 mg/kg-day were considered adverse and this dose was identified as the LOAEL. Liver effects were also reported in the 21-day rat study by NTP (1996) and the NCI (1978) chronic rat study. NTP (1996) found an increase in the incidence of cytoplasmic vacuolization in rats receiving gavage doses of 104 mg/kg-day (lowest dose tested) for 21 days and NCI (1978) observed a slight increase in the incidence of hepatic fatty metamorphosis in rats gavaged with 55 mg/kg-day (no liver effects were observed at 31 mg/kg-day) for 78 weeks. No nonneoplastic liver effects were observed in mice receiving gavage doses of 101 or 202 mg/kg-day for 78 weeks (an increase in the incidence of chronic murine pneumonia was observed in rats receiving gavage doses of 31 mg/kg-day for 78 weeks (NCI, 1978).

Derivation of a provisional RfD for 1,1,2,2-tetrachloroethane based on the NOAEL of 18 mg/kg-day and LOAEL of 37 mg/kg-day identified in the rat subchronic study (Microbiological Associates, 1994) is recommended. The chronic rat study was not selected as the basis for the RfD because the chronic murine pneumonia observed at the lowest dose tested has not been observed in other oral or inhalation studies, is common age-related effect (incidence in the untreated control group was 90%), and the incidence was not dose-related. The NOAEL of 18 mg/kg-day was divided by an uncertainty factor of 300 (10 for interspecies extrapolation, 10 for intrahuman variability, and 3 for database deficiencies) to yield a provisional RfD of 6E-2 mg/kg-day. An uncertainty factor to account for the extrapolation from a subchronic study was not used because the results of the chronic rat study (NCI, 1978) do not suggest that more serious liver effects would occur at lower doses following chronic exposure. Thus, a partial uncertainty factor was used to extrapolate from a subchronic study to a chronic study. The uncertainty factor for database deficiencies was used to account for the lack of a 2-generation reproductive performance study and adequate developmental toxicity studies in two species.

Confidence in the Microbiological Associates (1994) study is high, it is a well-conducted study using an adequate number of animals and monitoring appropriate toxicity endpoints. Confidence in the database is low-to-medium because a NOAEL was not identified for hepatic effects and adequate reproductive and developmental toxicity studies are not available. Reflecting the low-to-medium confidence in the database, confidence in this provisional RfD is low.

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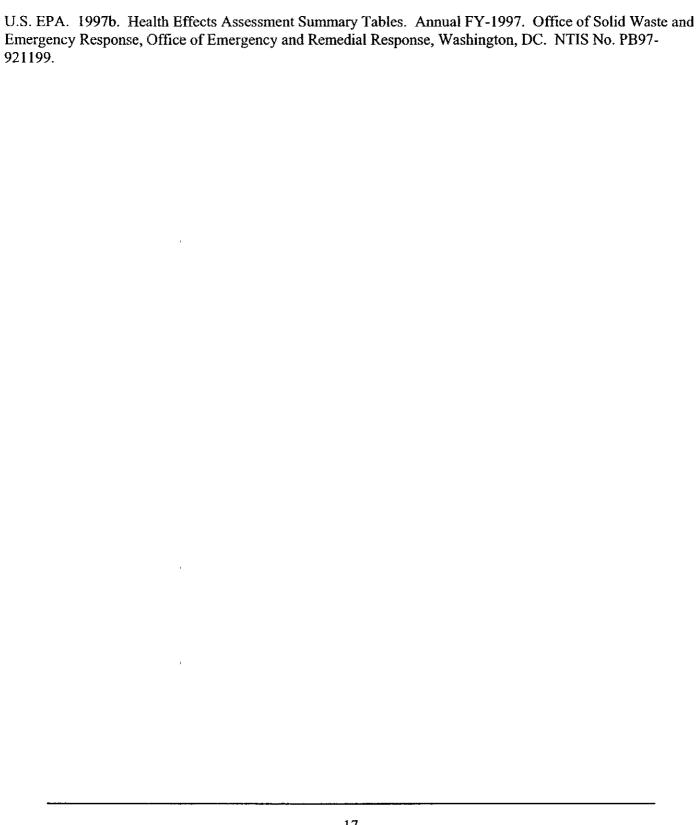
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# TAB

Appendix J

APPENDIX J

# **Ecological Assessment Checklist**

# **Checklist for Ecological Assessment**

#### I. SITE DESCRIPTION

1.	Site Name:	Northeast Open Area					
	Location Dunn Field						
	County:	Shelby	City: _	Memphis	State: TN		
2.	Latitude:			Longitude:			
3.	What is the ap	oproximate area of the site?	16 acı	res			
	·						
4	Is this the first available.	t site visit? Yes No If no, attach trip report of previous site visit(s), if					
	Date(s) of pre	of previous site visit(s):					
5.	Please attach to the checklist USGS topographic map(s) of the site, if available. See Section 2 of main report for site topographic map.						
6.		other site photographs available?  Yes No If yes, please attach any to(s) to the site map at the conclusion of this section. see attached					
7.	The land use	on the site is:		The area surround	ding the site is:		

	% Urban		% Urb	an	
	% Rural		% Rural		
	% Residential		30% Resider	ntiał	
	100_% Industrial (⊠light ☐heavy)% Agriculture		70% Industria	al (⊠light □heavy)	
			% Agriculture		
	(Crops)		(Crops)		
	% Recreational		% Recreational		
	(Describe; note if it is	a park, etc )	(Describe; no	ote if it is a park, etc.)	
	% Undisturbed		% Undi	sturbed	
	% Other		% Othe	er	
8	Has any movement of most likely cause of the	soil taken place at the site?	□Yes ⊠No	If yes, please identify the	
	Agricultural Use	☐Heavy Equipment	∏Mır	ning	
	☐Natural Events	☐ Erosion	□Oth	ner	
	Please describe.				
9.	rederal and State park	s, National and State monu s and wetlands are not alwa	ments, wetlands,	or in proximity to the site, e.g., prairie potholes? not answer "no" without	
	Tennessee Departmen	rce(s) of information used to n the site map. <u>Correspond</u> t of Environment and Conse ervice National Wetland Inve	ence with US Fiservation regarding	ensitive areas, and indicate h and Wildlife Service and protected species (1996),	
10	What type of facility is I	ocated at the site?			
	☐ Chemical	Manufacturing	☐Mixing	☐Waste Disposal	
	⊠Other (specify) s	everal former pistol ranges,		·	
11.	concentration levels? \	contaminants of concern a farious inorganic and organ ee Section 8 of RFI report fo	c chemicals dete	nown, what are the maximum ected in surface soils, surface	

3

12	2. Check any potential routes of off-site migration of contaminants observed at the site				
	Swales	Depression	s	☑Drainage Ditches	
	Runoff	Windblown	Particulates	☐Vehicular Traffic	
	Other(specify)				
13.	. If known, what is the appro	ximate depth to the wate	er table? <u>37 bgs</u>		
14. Is the direction of surface runoff apparent from site observations? ⊠Yes ☐No If yes, to which of the following does the surface runoff discharge? Indicate all that apply.					
	⊠Suface Water	☐Groundwater	Sewer	Collection Impoundment	
15	is there a navigable waterb	ody or tributary to a nav	igable waterbody	v? ∐Yes ⊠No	
16.				ves, also complete Section III: : Aquatic Habitat Checklist –	
	☐Yes (approximate distant	ce)	⊠No		
17.				plains are not always obvious le Section V <sup>.</sup> Wetland Habitat	
18.	If a field guide was used to estimate the time spent ide text.] A Field Guide to the Esite observing site condition	ntifying fauna. <i>[Use a bl</i> <u>3irds - Peterson, R.T., 1</u>	ank sheet if addit	ional space is needed for	
19.		s, you are required to ve	rify this information	own to inhabit the area of the on with the U.S Fish and	

20	Record weather conditions at the time this checklist was prepared.				
	DATE: <u>6/19/97</u>				
	80oF Temperature (°C/°F)	Normal daily high temperature			
	calm_Wind (direction/speed)	OPrecipitation (rain, snow)			
	30% Cloud cover				

#### IA. SUMMARY OF OBSERVATIONS AND SITE SETTING

The Northeast Open Area is a relatively inactive portion of Dunn Field that is completely grassed with patches of mature hardwood trees. The area is generally open with a sloping terrain that is routinely maintained by mowing. There are no open water bodies onsite; an onsite system of concrete lined stormwater drainageways is typically dry except during rainfall events. The site is surrounded by residential areas to the north and east (beyond the perimeter fence), and by Dunn Field property to the west and south. Overall, the maintained terrestrial areas provide minimal ecological habitat for plants or animals. This site is expected to serve as a future public open space for recreational purposes, therefore no future improvement in wildlife habitat quality is expected.

A few urban adapted wildlife species have been observed at Dunn Field. Species observed at Dunn Field include eastern gray squirrel, red fox, northern mockingbird, American kestrel, boat-tailed grackle, European starling, mourning dove, common bobwhite, rock dove, and killdeer. It is possible that other small mammals (e.g. mice, shrews, rabbits), birds (e.g. American robin, sparrows), and reptiles (e.g. five-lined skink, eastern garter snake) may also occur in the grassed areas at the site. The entire facility is fenced and therefore reduces use by large mammals (e.g. whitetail deer). A few wild dogs have been consistently observed roaming the Northeast Open Area. Overall the terrestrial habitat within the Northeast Open Area is of poor quality and provides limited habitat value for terrestrial wildlife.

There are no wetlands, and no state or federally listed or proposed endangered or threatened species are known to inhabit the area of the site.

Land use within a one-mile radius of Dunn Field is highly developed and is primarily residential or industrial. A few undeveloped and isolated forested areas also occur in the general area.

CHECKLIST FOR ECOLOGICAL ASSESSMENT/SAMPLING

Completed by:	John R Martin	Affiliation	CH2M HILL
Additional Preparers:	NA		
Site Manager:			
Date:	6/19/97		

IIA. WOODED

#### II. TERRESTRIAL HABITAT CHECKLIST

site map which is attached to a copy of this checklist. Please identify what in determine the wooded area of the site Qualitative field estimate  3. What is the dominant type of vegetation in the wooded area?  (Check one: □Evergreen ☑Deciduous □Mixed) Provide a photograph.  Dominant plant, if known: Qaks  4. What is the predominant size of the trees at the site? Use diameter at breast.  □0-6 inches □6-12 inches ☑> 12 inches	e the wooded area on the t information was used to oh, if available.					
site map which is attached to a copy of this checklist. Please identify what in determine the wooded area of the site Qualitative field estimate  3. What is the dominant type of vegetation in the wooded area?  (Check one:	t information was used to					
(Check one: ☐Evergreen ☑Deciduous ☐Mixed) Provide a photograph.  Dominant plant, if known: Oaks  4. What is the predominant size of the trees at the site? Use diameter at breast. ☐0-6 inches ☐6-12 inches ☒> 12 inches  5. Specify type of understory present, if known. Provide a photograph, if available and other grasses  IIB. SHRUB/SCRUB  1. Is shrub/scrub vegetation present at the site? ☐Yes ☒No If no, go to Sect.  2. What percentage of the site is covered by scrub/shrub vegetation? (☐ % areas of shrub/scrub on the site map. Please identify what information was use						
Dominant plant, if known: Oaks  4. What is the predominant size of the trees at the site? Use diameter at breast □0-6 inches □6-12 inches □> 12 inches  5. Specify type of understory present, if known. Provide a photograph, if available and other grasses  IIB. SHRUB/SCRUB  1. Is shrub/scrub vegetation present at the site? □Yes ☑No If no, go to Section 2. What percentage of the site is covered by scrub/shrub vegetation? (□% areas of shrub/scrub on the site map. Please identify what information was use						
<ul> <li>4. What is the predominant size of the trees at the site? Use diameter at breast □0-6 inches □6-12 inches □&gt; 12 inches</li> <li>5. Specify type of understory present, if known. Provide a photograph, if available and other grasses</li> <li>IIB. SHRUB/SCRUB</li> <li>1. Is shrub/scrub vegetation present at the site? □Yes □No If no, go to Section 2. What percentage of the site is covered by scrub/shrub vegetation? (□% areas of shrub/scrub on the site map. Please identify what information was use</li> </ul>	ast height.					
□ 0-6 inches □ 6-12 inches □ > 12 inches  5. Specify type of understory present, if known. Provide a photograph, if available and other grasses  IIB. SHRUB/SCRUB  1. Is shrub/scrub vegetation present at the site? □ Yes □ No If no, go to Section 2. What percentage of the site is covered by scrub/shrub vegetation? (□ % □ areas of shrub/scrub on the site map. Please identify what information was use	ast height.					
<ol> <li>Specify type of understory present, if known. Provide a photograph, if available and other grasses</li> <li>IIB. SHRUB/SCRUB</li> <li>Is shrub/scrub vegetation present at the site? ☐Yes ☑No If no, go to Section 2. What percentage of the site is covered by scrub/shrub vegetation? (%</li></ol>						
<ul> <li>IIB. SHRUB/SCRUB</li> <li>1. Is shrub/scrub vegetation present at the site? ☐Yes ☒No If no, go to Section 2. What percentage of the site is covered by scrub/shrub vegetation? (%</li></ul>						
2. What percentage of the site is covered by scrub/shrub vegetation? (% areas of shrub/scrub on the site map. Please identify what information was use						
2. What percentage of the site is covered by scrub/shrub vegetation? (% areas of shrub/scrub on the site map. Please identify what information was use						
areas of shrub/scrub on the site map. Please identify what information was use	ction IIC: Open Field.					
3. What is the dominant type of scrub/shrub vegetation, if known? Provide a photo						
4. What is the approximate average height of the scrub/shrub vegetation?	otograph, if available.					
□0-2 feet □2-5 feet □>5 feet	otograph, if available.					

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5.	. Based on site observations, how dense is the scrub/shrub vegetation?					
110	Dense	□Patchy	□Sparse			
IIC.	OPEN FIELD					
1.	Are there open (bare, barre type below:	n) field present at the s	ite? ∐Yes ⊠No <i>li</i>	fyes, please indicate the		
	Prarie/Plains	Savannah	☐Old Field	☐Other (specify)		
2.	What percentage of the site site map.	s s open field? (9	%acres). Indic	ate the open fields on the		
3.	What is/are the dominant plant(s)? Provide a photograph, if available.					
IID. MISCELLANEOUS						
1	Are other types of terrestrial field? ⊠Yes □No If yes	habitats present at the s, identify and describe	site, other than woods them below.	, scrub/shrub, and open		
2. <u>prim</u>	Describe the terrestrial misc parily open grass Low quality	ellaneous habitat(s) and y ecological habitat.Prir	d identify these area(s) narily Bermuda grass,	on the site map. Entire site frequently mowed.		
	What observations, if any, w fish, birds, mammals, etc.?r starling, rock doves, killdeer. mammals.	10rthern mockinabird. A	merican kestreli boat-t	ailed grackle. European		
4.	Review the questions in Sec completed for this site.	tion I to determine if an	y additional habitat che	ecklists should be		

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## Northeast Open Area - 6/19/97



Southeast corner showing mowed grass, concrete lined drainage ditch, eastern perimeter fence, offsite residential area.



Northeast corner showing extensive mowed grass, few mature trees, concrete lined drainage ditch, and part of shed at Site 60 Pistol Range.

# **Checklist for Ecological Assessment**

### I. SITE DESCRIPTION

1.	Site Name:	Stockpile Area	<del></del>				
	Location.	Dunn Field					
	County:	Shelby	City: _	Memphis	State:	TN	
2.	Latitude:			Longitude:			
3.	What is the a	e approximate area of the site? 30 acres					
4.	Is this the firs	st site visit? ⊠Yes □No If no, attach trip report of previous site visit(s), if					
	Date(s) of pre	of previous site visit(s).					
5.	Please attach to the checklist USGS topographic map(s) of the site, if available. See Section 2 of main report for site topographic map.						
6.	Are aerial or c available pho	other site photographs available?  Yes  No  If yes, please attach any oto(s) to the site map at the conclusion of this section. see attached 2 photos					
7.	The land use	on the site is:		The area surround 0.5 mile radius	ling the s	site is:	

	% Urban		% Urba	n	
	% Rural		% Rura	İ	
	% Residential		40% Resident	ıal	
	100_% Industrial (⊠li	ght ∐heavy)	60% Industrial	l (⊠light ⊟heavy)	
	% Agriculture		% Agric	ulture	
	(Crops:)		(Crops)		
	% Recreational		% Recre	eational	
	(Describe; note if it is a	a park, etc.)	(Describe; not	e if it is a park, etc.)	
	% Undisturbed		% Undis	turbed	
	% Other		% Other		
8.	most likely cause of thi	soil taken place at the site? is disturbance:	⊠Yes □No	If yes, please identify the	
	☐Agricultural Use	⊠Heavy Equipment	∭Minı	ng	
	Natural Events	☐Erosion	□Othe	er	
	Please describe. This a bauxite. Recently all su	area was used for long term irface material was remove	storage of massind, and a clean cov	ve piles of fluorspar and er of soil was put in place.	
9	Federal and State park	s, National and State monu s <i>and wetlands are not alwa</i>	ments, wetlands,	in proximity to the site, e.g. prairie potholes? of answer "no" without	
	their general location or Tennessee Department	rce(s) of information used to the site map. <u>Correspond</u> tof Environment and Conse ervice National Wetland Inve	ence with US Fish ervation regarding	and Wildlife Service and	
10.	What type of facility is lo	ocated at the site?			
	Chemical	Manufacturing	☐Mixing	☐Waste Disposal	
	⊠Other (specify) S	urface storage of mineral o	res, including fluor	spar and bauxite	

11. What are the suspected contaminants of concern at the site? If known, what are the maximum concentration levels? A few inorganic and organic chemicals detected in the surface soil fill material. See Section 11 of RFI report for specifics.

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12	Check any potential routes of off-site migration of contaminants observed at the site:					
	□Swales	☐Depression	s	☐Drainage Ditche	s	
	□Runoff	⊠Wındblown	Particulates	⊠Vehicular Traffic	<b>:</b>	
	☐Other(specify)					
13.	. If known, what is the appro	eximate depth to the water	er table? 37 bgs			
14	Is the direction of surface runoff apparent from site observations?   Yes  No If yes, to which of the following does the surface runoff discharge? Indicate all that apply.					
	☐Suface Water	☐Groundwater	□Sewer	Collection Impou	ındment	
15.	Is there a navigable watert	pody or tributary to a navi	gable waterbody	? ∐Yes ⊠No		
16	Is there a waterbody anywhere on or in the vicinity of the site? If yes, also complete Section Aquatic Habitat Checklist – Non-Flowing Systems and/or Section IV: Aquatic Habitat Checklist Flowing Systems.					
	☐Yes (approximate distan	св)	⊠No			
17.	Is there evidence of floodin do not answer "no" without Checklist.	g? □Yes ⊠No Wet confirming information.	ands and flood p If yes, complete	laıns are not always e Section V: Wetland	obvious, Habitat	
18	If a field guide was used to estimate the time spent ide text.] A Field Guide to the Esite observing site condition	nurying tauna. <i>[Use a bia</i> Birds - Peterson, R.T., 19	nk sheet if additii	anal snaco is noodor	t for	
19.	Are any threatened and/or este? ☐Yes ⊠No If yes Wildlife Service. If species'	s, you are required to ver	ITV this intormatio	n with tha LLS Eich	a of the and	

20.	. Record weather conditions at the time this checklist was prepared.				
	DATE:6/19/97				
	80oF Temperature (°C/°F)	Normal daily high temperature			
	calm_Wirid (direction/speed)	OPrecipitation (rain, snow)			
	Cloud cover				

#### IA. SUMMARY OF OBSERVATIONS AND SITE SETTING

The Stockpile Area is a currently inactive portion of Dunn Field that is completely grassed and has no trees. The area is entirely open with a relatively level terrain that is routinely maintained by mowing. Former large piles of fluorspar and bauxite were recently removed and clean soil was added as a cover in portions of the site. There are no water bodies onsite. The site is surrounded by a residential area to the east (beyond the perimeter fence), by Dunn Field property to the north (Northeast Open Area) and west (Disposal Area), and by DDMT Main Installation to the south beyond the perimeter fence and Dunn Avenue. Overall, the maintained terrestrial areas provide insignificant ecological habitat for plants or animals. This site is expected to be developed into a light industrial area, therefore no future improvement in wildlife habitat quality is expected.

A few urban adapted wildlife species have been observed at Dunn Field. Species observed at Dunn Field that may occur in the grassed Stockpile Area include red fox, northern mockingbird, American kestrel, boat-tailed grackle, European starting, mourning dove, common bobwhite, rock dove, and killdeer. It is possible that other small mammals (e.g. mice, shrews, rabbits), birds (e.g. American robin, sparrows), and reptiles (e.g. five-lined skink, eastern garter snake) may also occur at the site. The entire facility is fenced and therefore reduces use by large mammals (e.g. whitetail deer). Overall the terrestrial habitat within the Stockpile Area is of poor quality and provides limited habitat value for terrestrial wildlife.

There are no wetlands onsite, and no state or federally listed or proposed endangered or threatened species are known to inhabit the area of the site (TDEC, 1996, USFWS, 1996; Appendix ?).

Land use within a one-mile radius of Dunn Field is highly developed and is primarily residential or industrial. A few undeveloped and isolated forested areas also occur in the general area.

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Completed by.	John R. Martin	Affiliation	CH2M HILL	·····
Additional Preparers:	_NA			
Site Manager:				
Date:	6/19/97			

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### II. TERRESTRIAL HABITAT CHECKLIST

#### IIA. WOODED

1.	Are there any wooded are	as at the site?  ☐Yes  ☑No	If no, go to Section IIB: Shrub/Scrub.
2.	What percentage of area on the site map which is a used to determine the woo	of the site is wooded? (% ttached to a copy of this checkli oded area of the site.0	acres). Indicate the wooded area ist. Please identify what information was
3.		of vegetation in the wooded are	ea? Provide a photograph, if available.
	Dominant plant, if known:	2	
4.	What is the predominant s  ☐0-6 inches	ize of the trees at the site? $U$	se diameter at breast height.
5.		present, if known. Provide a ph	> 12 inches
IIB	. SHRUB/SCRUB		
1.	Is shrub/scrub vegetation p	oresent at the site? ☐Yes ☒⋀	lo If no, go to Section IIC: Open Field.
2.	What percentage of the site areas of shrub/scrub on the area.	e is covered by scrub/shrub veg e site map. Please identify what	petation? (%acres). Indicate th tinformation was used to determine this
3.	What is the dominant type	of scrub/shrub vegetation, if kno	own? Provide a photograph, if available.
4	What is the approximate as	verage height of the scrub/shrub	vegetation?
	☐0-2 feet	☐2-5 feet	□>5 feet
5.	Based on site observations	, how dense is the scrub/shrub	vegetation?
	Dense	□Patchy	□Sparse

#### **IIC. OPEN FIELD**

1.	Are there open (bare, barren) field present at the site?   Yes  No If yes, please indicate the type below.
	Prarie/Plains Savannah Old Field Other (specify)
2.	What percentage of the site is open field? (%acres). Indicate the open fields on the site map
3.	What is/are the dominant plant(s)? Provide a photograph, if available.
IID.	MISCELLANEOUS
1.	Are other types of terrestrial habitats present at the site, other than woods, scrub/shrub, and open field?   Yes  No If yes, identify and describe them below.
2. <u>op∈</u>	Describe the terrestrial miscellaneous habitat(s) and identify these area(s) on the site map. Entire site on grass Low quality ecological habitat Primarily Bermuda grass, frequently mowed.
3.	What observations, if any, were made at the site regarding the presence and/or absence of insects, fish, birds, mammals, etc.? northern mockingbird, American kestrel, boat-tailed grackle, European starting, rock doves, killdeer. No mammals observed, but likely to include squirrels and other small mammals
4	Review the questions in Section I to determine if any additional habitat checklists should be completed for this site.

## Stockpile Area - 6/19/97



Central portion showing stockpiles, truck hauling activity, railroad tracks, mowed grass. The treeline is offsite beyond the perimeter fence



View of the southwest corner of the area showing mowed grass, perimeter fence, Dunn Avenue and Main Installation in background, and offsite active warehouse to the west

# **Checklist for Ecological Assessment**

#### I. SITE DESCRIPTION

1.	Site Name:	Disposal Area				
	Location:	Dunn Field	·			
	County:	Shelby	City	Memphis	State: TN	
2.	Latitude <sup>.</sup>	<del></del>		Longitude:		
3.	What is the a	pproximate area of the site?	10 a	cres		
4.	Is this the firs	t site visit? ⊠Yes □No	If no, a	ttach trıp report o	f previous sıte visit(s)	, if
	Date(s) of pre	evious site visit(s):				
5.		n to the checklist USGS topo or site topographic map	graphic	map(s) of the sit	e, if avaılable. <u>See S</u> e	ection 2 of
6.		other site photographs availa to(s) to the site map at the c				
7.	The land use	on the site is:			rounding the site is:	

	% Urban		% Urba	n
	% Rural		% Rura	I
	% Residential		10% Resident	ial
	100 % Industrial (⊠light	□heavy)	90% Industrial	l (⊠light ⊟heavy)
	% Agriculture		% Agrıc	ulture
	(Crops)		(Crops)	
	% Recreational		% Recre	eational
	(Describe; note if it is a pa	ark, etc.)	(Describe; not	e ıf it is a park, etc.)
	% Undisturbed		% Undis	sturbed
	% Other		% Other	
8.	Has any movement of soil most likely cause of this d	taken place at the site?	∐Yes ⊠No	If yes, please identify the
	☐Agricultural Use	☐Heavy Equipment	<b>∏M</b> ini	ing
	☐Natural Events	Erosion	□Othe	er
	Please describe:			
9.	Do any potentially sensitive Federal and State parks, No Remember, flood plains as confirming information, No	National and State monun	nents, wetlands,	r in proximity to the site, e.g prairie potholes? ot answer "no" without
	their general location on th	ie site map. Corresponde Environment and Consei	nce with US Fish vation regarding	ensitive areas, and indicate a and Wildlife Service and protected species (1996);
10.	What type of facility is local	ited at the site?		
	☐Chemical [	Manufacturing	☐Mixing	
	⊠Other (specify) Sub	surface disposal of hazard	dous waste mate	erials
	What are the suspected co concentration levels? Vari Section 11 of RFI report to	ous inorganic and organic	the site? If kn	own, what are the maximul cted in surface soils. See

12.	Check any potential ro	outes of off-site migration o	of contaminants of	bserved at the s	ate.
	⊠Swales	Depressi	ons	□Drainage	Ditches
	Runoff	<b>∐</b> Windblov	vn Particulates	∐Vehicular	Traffic
	Other(specify)				
13.	If known, what is the a	pproximate depth to the w	ater table? 37 bgs	<u> </u>	
14.	Is the direction of surfa which of the following of	ce runoff apparent from si does the surface runoff dis	te observations? scharge? Indicate	⊠Yes □No all that apply.	If yes, to
	⊠Suface Water	Groundwater	□Sewer	Collection	Impoundment
15.	Is there a navigable wa	aterbody or tributary to a n	avigable waterboo	dy? ∐Yes ⊠i	No
16.	Is there a waterbody ar Aquatic Habitat Checkl Flowing Systems.	nywhere on or in the vicinil list – Non-Flowing System	ty of the site? In a site? In a site?	f yes, also comp V: Aquatic Habi	olete Section III itat Checklist –
	☐Yes (approximate di	stance)	⊠No		
17.	Is there evidence of flood not answer "no" with Checklist.	oding?	etlands and flood If yes, comple	l plains are not a ete Section V: V	always obvious Vetland Habitat
	estimate the time spent	d to aid any of the identific identifying fauna. [Use a line he Birds - Peterson, R.T., litions.	blank sheet if add	litional space is	needed for
	site? L_]Yes ⊠No _/i	Vor endangered species (p f yes, you are required to v ies' identities are known, p	erify this information	tion with the U.S	the area of the S. Fish and

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20.	Record weather conditions at the time this of	hecklist was prepared
	DATE: <u>6/19/97</u>	
	80oF_Temperature (°C/°F)	Normal daily high temperature
	calm Wind (direction/speed)	OPrecipitation (rain, snow)
	30% Cloud cover	

#### IA. SUMMARY OF OBSERVATIONS AND SITE SETTING

The Disposal Area is a currently inactive portion of Dunn Field that is completely grassed and has no trees. The area is entirely open with a relatively level terrain that is routinely maintained by mowing. There are no water bodies onsite. A large drainage swale occurs near the southwest corner of the Disposal Area that discharges to the western fenceline through Outfall 010, however this swale does not retain water following storm events. The site is surrounded by a sparse residential area to the north (beyond the perimeter fence), by Dunn Field property to the east (Northeast Open Area) and south (Stockpile Area), and by an active warehouse and MLGW substation opposite the west fenceline. Overall, the maintained terrestrial areas provide insignificant ecological habitat for plants or animals. This site is expected to be developed into a light industrial area, therefore no future improvement in wildlife habitat quality is expected

A few urban adapted wildlife species have been observed at Dunn Field. Species observed at Dunn Field that may occur in the grassed Disposal Area include red fox, northern mockingbird, American kestrel, boat-tailed grackle, European starling, mourning dove, common bobwhite, rock dove, and killdeer. It is possible that other small mammals (e.g. mice, shrews, rabbits), birds (e.g. American robin, sparrows), and reptiles (e.g. five-lined skink, eastern garter snake) may also occur at the site. The entire facility is fenced and therefore reduces use by large mammals (e.g. whitetail deer). Overall the terrestrial habitat within the Disposal Area is of poor quality and provides limited habitat value for terrestrial wildlife.

There are no wetlands onsite, and no state or federally listed or proposed endangered or threatened species are known to inhabit the area of the site

Land use within a one-mile radius of Dunn Field is highly developed and is primarily residential or industrial. A few undeveloped and isolated forested areas also occur in the general area.

Completed by	John R Martin	Affiliation	CH2M HILL	
Additional Preparers:	NA			
Site Manager:				
Date.	6/19/97_			

IIA. WOODED

7

#### II. TERRESTRIAL HABITAT CHECKLIST

1.	1. Are there any wooded areas at the site? ☐Yes ☒No If no, go to Section	n IIB: Shrub/Scrub.
2.		dicate the wooded area ify what information was
3.	3. What is the dominant type of vegetation in the wooded area?	
	(Check one: Evergreen Deciduous Mixed) Provide a photogra	ph, if available.
	Dominant plant, if known:0	
4.	4. What is the predominant size of the trees at the site? Use diameter at bre	ast height.
	□0-6 inches □6-12 inches □> 12 inches	
5.	5. Specify type of understory present, if known. Provide a photograph, if available	ble.
IIB	IIB. SHRUB/SCRUB	
1.	1. Is shrub/scrub vegetation present at the site? ☐Yes ☒No If no, go to So	ection IIC: Open Field.
2.	2. What percentage of the site is covered by scrub/shrub vegetation? (% areas of shrub/scrub on the site map. Please identify what information was a area.	acres) Indicate the used to determine this
3.	3. What is the dominant type of scrub/shrub vegetation, if known? Provide a ph	otograph, if available.
4.	4. What is the approximate average height of the scrub/shrub vegetation?	
	□0-2 feet □2-5 feet □>5 feet	
5.	5. Based on site observations, how dense is the scrub/shrub vegetation?	
	□Dense □Patchy □Sparse	

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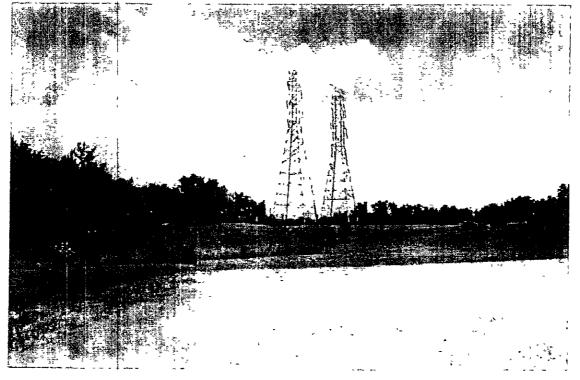
#### **IIC. OPEN FIELD**

1.	Are there open (bare, barren) field present at the site? ☐Yes ☒No
	☐Prarie/Plains ☐Savannah ☐Old Field ☐Other (specify)
2.	What percentage of the site is open field? (%acres). Indicate the open fields on the site map.
3.	What is/are the dominant plant(s)? Provide a photograph, if available.
IID	MISCELLANEOUS
1.	Are other types of terrestrial habitats present at the site, other than woods, scrub/shrub, and open field?
2. <u>ope</u>	Describe the terrestrial miscellaneous habitat(s) and identify these area(s) on the site map. Entire site n grass. Low quality ecological habitat Primarily Bermuda grass, frequently mowed.
3.	What observations, if any, were made at the site regarding the presence and/or absence of insects, fish, birds, mammals, etc.? northern mockingbird, American kestrel, boat-tailed grackle, European starling, rock doves, killdeer. No mammals observed, but likely to include squirrels and other small mammals.
4.	Review the questions in Section I to determine if any additional habitat checklists should be completed for this site.

70415**47** Disposal Area - 6/19/97



Northern portion showing extensive mowed grass, western perimeter fence and onsite monitoring wells, and offsite MLG&W substation.



View from the southern end, facing north, showing concrete pad in foreground, extensive mowed grass, and drainage swale leading to western perimeter fence.

# TAB

Appendix K

APPENDIX K

# Chemical Warfare Materiel Removal Conformation Soil Sample Analytical Data Summary

StationID SiteID		CWM-1 Site 01	CWM-1 Site 01	CWM-1 Site 01	CWM-24 Site 24A	CWM-24 S48 248	CWM-24	CWM-24	CWM-24	CWM-24
Sample Type SampleID	_	Floor Sample DFCWM001FD1	Floor Sample DFCWM001FS001	Floor Sample DFCWM001FS002	Floor Sampte DFCWM24AFS001	Sidewall Sample DFCWM24ASW001	Sidewail Sample DFCWM24ASW002	Floor Sample DFCWM248FS01	Site 24B Floor Sample DFCWM24BFS02	Site 24B Sidewall Sample DFCWM24BSS01
Uate Collected : Time Collected	.,	06/21/2000	06/21/2000 12 55 PM	06/21/2000 1 05 PM	10/30/2000 4 50 PM	11/14/2000 3 00 PM	11/14/2000 3 15 PM	03/09/2001 10 15 AM	03/09/2001	03/09/2001
Sample Matrix Sample Type		Sail Duplicate of FS001	So z	So z	Soil	Soil	Š z	S S	100 100 100 100 100 100 100 100 100 100	50 Z
Parameters	Units								2	2
АТОМІНИМ	MG/KG	10500 =	12700 =	10200 =	7880 =	11200 =	11200 =	= 0066	7100 =	12208 -
ANTIMONY	MG/KG	26J	43.5	33.1	2 U	1900	1803	2.0	2001	= 00/71
ARSENIC	MG/KG	723	L 7.7	6	147=	103J	14.7 =	L89	, 6.9	14.1
BARIUM BEBOT 1 14.1	MG/KG	114 =	124 =	146 =	125 =	209 =	98 4 ≈	63.2 ≖	737=	123 =
DERYTHIOM	MG/KG	053	0.59 J	0 52 J	048J	£ 20	047J	0.28 J	053	0 47 J
CAUCILIA	MG/KG	033	0.38 J	0.37.J	023 J	0.17.J	0 22 J	0.17.0	0 27 U	0 38 U
CHROMIUM, TOTAL	MOKO	3800 =	180	13000 =	1960 =	1420 J	1070 J	940 J	1440 =	859 J
COBALT	MG/KG	77.	18	68.1	73.1	10.6.)	78.5	13.3 =	113=	= 9 09
COPPER	MG/KG	173=	18.3 =	214=	181=	20.1=	205=	148=	18.1=	53.7
IRON I EAST	MG/KG	20000 =	22100 =	18500 =	20800 =	21500 =	22900 =	19100 =	15900 ≈	24000 =
MAGNESHM	MG/KG	= 2 51	112=	22.8=	20 =	15 =	29.1=	166=	17.7 =	302=
MANGANESE	MG/KG	517 =	3280 =	2640 ≈	2040=	2550 =	1950 =	2080 =	1860 =	2470 =
MERCURY	MG/KG	0 03 U	0 03 U	0 03 3	0.04 J	11 60 0	100 1	394 =	456 =	226 =
NICKEL	MG/KG	20≖	203=	19=	176=	211=	17.2 =	168=	167=	10.3
POTASSIUM	MG/KG	1010.1	1530 J	845 J	6813	818 J	771 J	811.J	526.1	1240.1
SELENIUM	MG/KG	0 44 UJ	0 44 UJ	0 42 UJ	045 U	0.45 U	0 42 U	O 60 0	U 60 0	0.600
South Manager	MG/KG	0.38 0	0380	0.36.U	0 4 U	0380	0.36.U	0.25 U	0.25 U	0.25 U
THALLIUM	2 (2)	177	C 8 /8	7347	5563	63 J	41.J	582J	832J	218 J
VANADIUM	WG/KG	289=	33.6 =	23.7 =	22.9 -	0.34 U	0.510	0 21 J	0 18 J	0.42 J
ZINC	MG/KG	567=	816=	56.2 =	62.3=	64.5 =	57 =	243=	194 =	283 ≖
TCL PCBs									2	- 647
PCB-1016 (AROCHLOR 1016)	UG/KG	42 U	42 ∪	. n es	42 U	410	400	810 U	820 U	8401)
PCB-1221 (AROCHLOR 1221)	UG/KG	85 ∪	85 U	80 U	85.0	83 U	81.0	1600 U	1700 U	1700 U
PCB-1232 (AROCHLOR 1232)	OG/KG	42.0	42 U	39 U	42 ∪	41 U	40 U	810 U	820 U	840 U
PCB-1248 (AROCHIOR 1242)	9 00/0	42.0	42.0	39.0	42 ∪	U 1.4	40 U	810 U	820 U	840 U
PCB-1254 (AROCHLOR 1254)	DG/KG	127	75.0	20 80	42.0	410	400	810 U	820 U	840 U
PCB-1260 (AROCHLOR 1260)	UG/KG	42 U	42 0	39.0	42.0	411	401	8100	8200	840 0
s DECACHLOROBIPHENYL	%	88 =	89 =	91=	88 =	83 =	85=	128 =	133 =	111 #
TCL Pesticides										
ALDRIN AI PHA BHC (AI PHA DEXACUI OBCOVO: OLITICALIE)	UG/KG	220	22∪	20	0913	210	2.0	21 UR	21 UR	22 UR
ALPHA ENDOSIII FAN (FNDOS: II FAN I)	2 0	077	077	2.0	220	210	2 U	21 UR	140 J	22 UR
ALPHA-CHLORDANE	OOKO	220	220	210	0.25	210	20	21 UR	14.5	22 UR
BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	UG/KG	22U	220	20	22.0	211)	- //	9116	21 UR	Z 0X
BETA ENDOSULFAN (ENDOSULFAN II)	UG/KG	42n	420	390	420	410	410	41118	41.19	Q1167
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	OG/KG	22∪	22U	20	220	210	20	21 UR	21 UR	22 UR
DIELDRIN	UG/KG	0.74.3	420	12.J	42U	410	40	31 J	41 UR	42 UR
ENDOSOLFAN SOLFATE	OGXGO	420	420	390	420	4103	4 UJ	41.3	41 UR	42 UR
ENDRIN ALDEHYDE	5 CS. CS.	420	420	390	420	410	4 0	41 UR	41 UR	42 UR
(ENDRIN KETONS	2 0	024	024	088	4.2 UJ	4100	4 0.3	41.0	41 UR	42 UR
GAMMA BHC (LINDANE)	OCKG	220	1166	0.00	200	210	7	41 J	41 UR	42 UR
GAMMA-CHLORDANE	UG/KG	220	220	20	220	210	10=	2012	33.0	22 UK
HEPTACHLOR	UG/KG	220	220	2.0	22U	210	17.	21 UR	21 UR	22 UR
HEP LACHLON EPOXIDE	OG/KG	220	220	2.0	220	210	2.0	21 UR	21 UR	22 UR
	OGYKG	1 0 22	22 U	15.1	22 U	21 U	20 U	210.1	210 UR	220 UR

A	StationID . SiteID: Sample Type SampleID.	J	- 5	CWM-1 Site 01 Floor Sample DFCWM001FS001	CWM-1 S.te 01 Floor Sample DFCWM001FS002	CWM-24 Site 24A Floor Sample DFCWM24AFS001	CWM-24 Site 24A Sidewall Sample DFCWM24ASW001	CWM-24 Sub 24A Sub wall Sample DFCWM24ASW002	CWM-24 S.te 24B Floor Sample DFCWM248FS01	CWM-24 Sre 24B Floor Sample DFCWM24BFS02	CWM-24 Site 24B Sidewall Sample DFCWM24BSS01
420         78         A 10         A 11         124         418         A 118			06/21/2000 12 5 Soil	ર્જે	06/21/2000 1 05 PM SoJ	10/30/2000 4 50 PM Soil	11/14/2000 3 00 PM Soil	11/14/2000 3 15 PM Soil	03/09/2001 10 15 AM Soil	03/09/2001 10 30 AM So:l	03/09/2001 10 00 AM Scal
4.2.U         2.8.L         4.5.U         4.1.L <th< th=""><th>Salts</th><th></th><th>Duplicate of FS001</th><th>Z</th><th>z</th><th>z</th><th>Ż</th><th>z</th><th>z</th><th>Z</th><th>z</th></th<>	Salts		Duplicate of FS001	Z	z	z	Ż	z	z	Z	z
4.20         1.2 *         4.09         4.10         7.2 *         4.10         7.2 *         4.10         7.2 *         4.10         7.2 *         4.10         7.2 *         4.10         7.2 *         4.10	UG/KG	f	420	420	283	420	410	0.4	F E 6	1 41 UR	120.1
420         74.1         420.0         410.0         24.1         24.0         410.0           585-         586-         775-         885-         885-         685-         710.0           785-         585-         585-         77	UGAKG	- 1	280	420	12 =	095.3	410	12J	15 J	41 UR	42 UR
98 =         78 = <th< td=""><td>S C</td><td>- 1</td><td>420</td><td>420</td><td>14.1</td><td>42W</td><td>410</td><td>24J</td><td>f 1.9</td><td>41 UR</td><td>42 UR</td></th<>	S C	- 1	420	420	14.1	42W	410	24J	f 1.9	41 UR	42 UR
736         581         682         78.5         78	2 2	1	82 =	89=	2000	220 UJ	210 U	200 U	2100 J	2100 UR	2200 UR
420.0         380.0         560.0         500.0         520.1         580.0 <th< td=""><td>*</td><td>4</td><td>75 =</td><td>79 =</td><td>88 =</td><td>= 89</td><td>76 =</td><td>74 =</td><td>8 0</td><td>= 0</td><td>200</td></th<>	*	4	75 =	79 =	88 =	= 89	76 =	74 =	8 0	= 0	200
420.U         330.U         640.U         810.U         680.U         810.U <th< td=""><td></td><td>1  </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>,</td><td></td></th<>		1								,	
420.U         330.U         840.U         810.U         800.U         810.U         800.U         810.U         800.U         810.U         800.U         810.U         820.U <th< td=""><td>UG/KG</td><td></td><td>420 U</td><td>420 U</td><td>390 U</td><td>840 U</td><td>810 U</td><td>800 U</td><td>230 J</td><td>f 86</td><td>840 U</td></th<>	UG/KG		420 U	420 U	390 U	840 U	810 U	800 U	230 J	f 86	840 U
420 U         330 U         840 U         810 U         800 U         810 U         820 U <th< td=""><td>UG/KG</td><td></td><td>420 U</td><td>420 U</td><td>390 U</td><td>840 U</td><td>810 U</td><td>800 U</td><td>810 U</td><td>910=</td><td>280 J</td></th<>	UG/KG		420 U	420 U	390 U	840 U	810 U	800 U	810 U	910=	280 J
4201         3801         8401         8101         8001         8101 <th< td=""><td>9</td><td></td><td>420 N</td><td>420 U</td><td>330.0</td><td>240 U</td><td>810 U</td><td>900 U</td><td>810 U</td><td>820 U</td><td>840 €</td></th<>	9		420 N	420 U	330.0	240 U	810 U	900 U	810 U	820 U	840 €
1,000   390   2100   2100   2000	DG/KG	- 1		420 C	390 U	20 D	810 U	008	810 U	820 U	670
1,000 U   2,00	O KG		420 0	420 U	390 0	840 U	810 U	800 U	810 U	820 U	840 U
420.U         380.U         840.U         810.U         360.U <th< td=""><td>9 KG</td><td></td><td>1000</td><td>1000</td><td>ے 1066</td><td>2100 U</td><td>7000 □</td><td>2000 U</td><td>2000 U</td><td>2100 UJ</td><td>2100 U</td></th<>	9 KG		1000	1000	ے 1066	2100 U	7000 □	2000 U	2000 U	2100 UJ	2100 U
1,000	S CONTRACT	- [	12024	420.0	0.066	240.0	8100	800 U	3000 =	520 J	840 U
J. 1900 U.J.         590 U.J.         2100 U.J.         2000 U.J.         2000 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2100 U.J.         2000 U.J.         2100 U.J.         2100 U.J.         2100 U.J.         2200 U.J.         2100 U.J.         2200 U.J.	UG/KG	1	420 0 -	420 U	3900	840	84011	0.008	210.0	820 0	840 0
420 U         390 U         610 U         610 U         600 U         610 U         620 U         610 U         620 U         610 U         620 U         610 U         620 U         610 U         620 U         610 U         620 U         610 U         620 U         610 U         620 U         610 U         620 U <th< td=""><td>UG/KG</td><td>]</td><td>1000 UJ</td><td>1000 UJ</td><td>CD 066</td><td>2100 U</td><td>2000</td><td>2000</td><td>10002</td><td>2400111</td><td>2400 1</td></th<>	UG/KG	]	1000 UJ	1000 UJ	CD 066	2100 U	2000	2000	10002	2400111	2400 1
420 U         390 U         840 U         810 U         850 U         810 U         850 U         810 U         850 U         810 U         820 U         810 U         820 U <th< td=""><td>UGVKG</td><td>  1</td><td>420 U</td><td>420 U_</td><td>390 U</td><td>840.0</td><td>B10 U</td><td>B00 U</td><td>810 U</td><td>820 0</td><td>108</td></th<>	UGVKG	1	420 U	420 U_	390 U	840.0	B10 U	B00 U	810 U	820 0	108
420 U         380 U         840 U         810 U         600 U         810 U         620 U           420 U         380 U         840 U         810 U         800 U         810 U         460 U           420 U         380 U         840 U         810 U         800 U         810 U         460 U           420 U         380 U         2100 U         200 U         2100 U         460 U         460 U           420 U         380 U         2100 U         200 U         2100 U         2100 U         460 U           420 U         380 U         840 U         810 U         800 U         810 U         820 U           420 U         380 U         840 U         810 U         800 U         810 U         820 U           420 U         380 U         840 U         810 U         800 U         810 U         820 U           420 U         380 U         840 U         810 U         800 U         810 U         820 U           420 U         380 U         840 U         810 U         800 U         810 U         820 U           420 U         380 U         840 U         810 U         800 U         810 U         820 U           420 U         380 U	UG/KG		420 U	420 U	390 U	840 U	810 U	800 U	810 U	820 U	840 U
420.U         330.U         840.U         810.U         800.U         810.U         820.U           420.U         330.U         840.U         810.U         800.U         810.U         820.U           420.U         330.U         840.U         810.U         800.U         810.U         820.U           420.U         330.U         840.U         810.U         800.U         810.U         820.U           420.U         330.U         840.U         810.U         800.U         810.U         820.U           420.U         330.U         840.U         810.U         800.U         810.U         820.U           420.U         330.U         840.U         810.U         800.U         810.U         820.U           420.U         330.U         840.U         810.U         800.U         810.U         820.U           420.U         330.U         840.U         810.U         800.U         810.U         820.U           420.U         330.U         840.U         810.U         800.U         810.U         820.U           420.U         330.U         840.U         810.U         800.U         810.U         820.U           420.U         330.U         <	DG/KG	-	420 U	420 U	390 ₪	840 U	810 U	900 U	810 U	820 U	840 U
420 U         390 U         840 U         810 U         860 U         810 U         870 U           1000 U         390 U         2100 U         2000 U         2000 U         2100 U         2000 U         2100 U	OSKG USKG	į	420.0	1007	0.080	840.0	8100	800 0	810 U	820 U3	840 U
1000 U         \$90 U         \$100 U         \$90 U         \$100 U <td>UG/KG</td> <td>1</td> <td>420 U</td> <td>420 U</td> <td>390 U</td> <td>84010</td> <td>81011</td> <td>0.008</td> <td>6100</td> <td>140 J</td> <td>400 J</td>	UG/KG	1	420 U	420 U	390 U	84010	81011	0.008	6100	140 J	400 J
420 U         390 U         640 U         610 U         610 U         610 U         610 U         610 U         610 U         610 U         650 U         250 U <th< td=""><td>UG/KG</td><td>1</td><td>1000 U</td><td>1000 U</td><td>D 066</td><td>2100 U</td><td>2000 U</td><td>2000 €</td><td>2000</td><td>2100</td><td>2400</td></th<>	UG/KG	1	1000 U	1000 U	D 066	2100 U	2000 U	2000 €	2000	2100	2400
420 U         390 U         640 U         1600 U         1600 U         1600 U         1600 U         1600 U         1600 U         1600 U         1600 U         1600 U         1600 U         1600 U         1600 U         2000 U         2000 U         2100 U <td>UG/KG</td> <td>- 1</td> <td>420 U</td> <td>420 U</td> <td>390 U</td> <td>840 U</td> <td>810 U</td> <td>0008</td> <td>810 U</td> <td>820 U</td> <td>840 U</td>	UG/KG	- 1	420 U	420 U	390 U	840 U	810 U	0008	810 U	820 U	840 U
1000U         990 U         2100 U         2000 U         2100 U <td>UGIKG</td> <td>- 1</td> <td>420 U</td> <td>420 ∪</td> <td>390 U</td> <td>840 U</td> <td>1600 U</td> <td>1600 U</td> <td>1600 U</td> <td>1600 U</td> <td>1700 U</td>	UGIKG	- 1	420 U	420 ∪	390 U	840 U	1600 U	1600 U	1600 U	1600 U	1700 U
4200 U         390 U         2100 U         2000 U         2100 U         2100 U         2100 U         2100 U         2100 U         2100 U         2100 U         2100 U         2100 U         2100 U         2100 U         2100 U         2100 U         2100 U         2100 U         2100 U         2100 U         22	DO'NG		0000	10001	990 0	2100 €	2000 ∪	2000 ∪	2000 U	2100 ∪	2100 U
420 U         330 U         840 U         810 U         800 U         810 U         820 U           420 U         330 U         840 U         810 U         800 U         810 U         820 U           420 U         330 U         840 U         810 U         800 U         810 U         820 U           420 U         330 U         840 U         810 U         800 U         810 U         820 U           420 U         330 U         840 U         810 U         810 U         820 U         820 U           1000 U         330 U         840 U         810 U         810 U         810 U         820 U           420 U         330 U         840 U         810 U         810 U         810 U         820 U           420 U         330 U         840 U         810 U         810 U         810 U         820 U           420 U         330 U         840 U         810 U         810 U         810 U         820 U           420 U         330 U         840 U         810 U         810 U         810 U         820 U           420 U         330 U         840 U         810 U         810 U         820 U         820 U           420 U         330 U	2 0		1000	1900	0.086	2100 U	2000 U	2000 ∩	2000 ∩	2100 U	2100 U
420 L         330 U         840 U         810 U         800 U         810 U         820 U           420 L         330 U         840 U         810 U         800 U         810 U         820 U           420 L         330 U         840 U         810 U         800 U         810 U         820 U           1000 U         330 U         840 U         810 U         2000 U         2000 U         2100 U           420 U         330 U         840 U         810 U         800 U         810 U         820 U           420 U         330 U         840 U         810 U         810 U         820 U         820 U           420 U         330 U         840 U         810 U         810 U         820 U         820 U           420 U         330 U         840 U         810 U         810 U         810 U         820 U           420 U         330 U         840 U         810 U         810 U         820 U         820 U           420 U         330 U         840 U         810 U         810 U         810 U         820 U           420 U         330 U         840 U         810 U         810 U         810 U         820 U           420 U         330 U	SWG GWG		12002	420 0	390.00	2000	0.018	0.00	810 U	820 U	840 U
450 U         330 U         840 U         810 U         800 U         810 U         820 U           1600 U         330 U         240 U         310 U         2000 U         2000 U         2100 U           1600 U         390 U         2100 U         2000 U         2000 U         2100 U           420 U         390 U         2100 U         2000 U         2100 U         2100 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U	UGWKG	1	420 U	420 U	390 11	1078	1018	0000	870.0	820 0	840 0
420 U         390 U         840 U         810 U         820 U         810 U         820 U           1000 U         390 U         2100 U         2000 U         2000 U         2100 U         220 U	UG/KG		420 □	420 U	390 U	840 U	810 U	1008	840	0.70	640.0
1000U         990 U         2100 U         2000 U         2000 U         2100 U         2200 U         2100 U         2200 U <td>UG/KG</td> <td>1</td> <td>420 U</td> <td>420 ∪</td> <td>390 U</td> <td>840 ∪</td> <td>910 U</td> <td>∩ 008</td> <td>810 U</td> <td>820 UJ</td> <td>200</td>	UG/KG	1	420 U	420 ∪	390 U	840 ∪	910 U	∩ 008	810 U	820 UJ	200
1000 U         390 U         2100 U         2000 U         2000 U         2100 U </td <td>3/KG</td> <td>- 1</td> <td>1000</td> <td>1000 U</td> <td>O 066</td> <td>2100 U</td> <td>2000 U</td> <td>2000 U</td> <td>2000 ∪</td> <td>2100 U</td> <td>2100 U</td>	3/KG	- 1	1000	1000 U	O 066	2100 U	2000 U	2000 U	2000 ∪	2100 U	2100 U
420 U         330 U         840 U         810 U         810 U         810 U         820 U <th< td=""><td>200</td><td>- 1</td><td>0.000</td><td>1000 U</td><td>D 066</td><td>2100 U</td><td>2000 U</td><td>2000 ∪</td><td>2000 ∪</td><td>2100 UJ</td><td>2100 U</td></th<>	200	- 1	0.000	1000 U	D 066	2100 U	2000 U	2000 ∪	2000 ∪	2100 UJ	2100 U
420 U         380 U         840 U         810 U         850 U         820 U           420 U         380 U         840 U         810 U         810 U         820 U           420 U         380 U         840 U         810 U         820 U         820 U           420 U         380 U         840 U         810 U         820 U         820 U           420 U         380 U         840 U         810 U         820 U         820 U           420 U         380 U         840 U         810 U         810 U         810 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         810 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         810 U	3 000	- 1	0.024	420 0	390 U	20 CE	810 U	B00 U	810 U	820 €	840 U
420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         800 U         810 U         820 U           420 U         390 U         840 U         810 U         800 U         810 U         820 U           420 U         390 U         840 U         810 U         800 U         820 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         <	2 0		0.024	0.024	380	840 0	810 U	008	910 €	820 U	840 U
420 U         330 U         840 U         810 U         810 U         820 U           420 U         330 U         840 U         810 U         800 U         810 U         820 U           420 U         330 U         840 U         810 U         800 U         810 U         820 U           420 U         330 U         840 U         810 U         810 U         820 U         820 U           420 U         330 U         840 U         810 U         810 U         820 U         820 U           420 U         330 U         840 U         810 U         800 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U	2000		11007	1700	2000	0.040	510 0	800 U	810 U	820 U	840 U
420 U         390 U         840 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         810 U	1)GKG		120.0	1007	390.0	040	8100	0.008	910 U	820 U	840 U
420 U         330 U         840 U         810 U         800 U         810 U         820 U           420 U         330 U         840 U         810 U         800 U         810 U         820 U           420 U         330 U         840 U         810 U         810 U         820 U         820 U           420 U         330 U         840 U         810 U         820 U         820 U         820 U           420 U         330 U         840 U         810 U         800 U         810 U         820 U           420 U         330 U         840 U         810 U         810 U         820 U         820 U           420 U         330 U         840 U         810 U         810 U         820 U         820 U           420 U         330 U         840 U         810 U         80 U         810 U         820 U           420 U         330 U         840 U         810 U         80 U         810 U         820 U           420 U         330 U         840 U         810 U         80 U         810 U         810 U	UGVKG		420 U	4201	39011	200	200	0.000	0.00	820 U	840 ∪
420 U         390 U         840 U         810 U         800 U         310 U         820 U           420 U         390 U         840 U         810 U         800 U         810 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         80 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U	S/KG		420 U	420 U	390 U	840 1)	2100	200	1000	920.0	20.0
420 U         390 U         840 U         810 U         800 U         810 U         820 U           420 U         390 U         840 U         810 U         800 U         810 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         820 U           420 U         390 U         840 U         810 U         820 U           420 U         390 U         840 U         810 U         820 U           420 U         390 U         840 U         810 U         820 U           420 U         390 U         840 U         810 U         820 U           420 U         390 U         840 U         810 U         820 U	UG/KG		420 U	420 U	390 U	840 (3	2018	300	0100	920 0	840 U
420 U         390 U         840 U         810 U         800 U         810 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           110 U         110 J         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         810 U         820 U	UG/KG	ı	420 U	420 U	390 U	840 U	810 19	800	200	0.000	0.000
420 U         390 U         840 U         810 U         800 U         810 U         820 U           110 U         115 J         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         820 U         820 U           420 U         390 U         840 U         810 U         80 U         820 U           420 U         390 U         840 U         810 U         80 U         810 U         810 U	UG/KG	1	420 N	420 U	390 ∪	840 U	810 U	0 008	8101	1020	1000
110 U         110 J         840 U         810 U         800 U         810 U         820 U           420 U         390 U         840 U         810 U         800 U         820 U           420 U         390 U         840 U         810 U         80 U         820 U           420 U         390 U         840 U         810 U         810 U         810 U         150 J	bis(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHE UGING	1	420 U	420 ∩	390 ∪	840 U	810 U	008	810 U	8201	1000
420 U         390 U         840 U         810 U         810 U         820 U         820 U           420 U         330 U         840 U         810 U         800 U         840 U         150 J	ngke	ł	110 C	110 U	110 J	840 U	810 ∪	008	810 U	820 U	840 ()
420 390 840 810 800 56J 820U 420U 390U 840U 810U 800U 810U 156J	UGAKG	- 1	420 U	420 U	390 U	840 U			810 U	820 U	840 U
4200 3500 8100 1503	OGKG	- 1	420 U	420 U	390 U	840 U	810 U	900 U	, OS	820 U	840 U
	ייייייייייייייייייייייייייייייייייייייי	- 1	20.02	4200	0.060	D 040 U	810 U	900 N	810 U	150 J	6300 =

pp         Potential Processing         Section Sample         Processing <th< th=""><th>StationID</th><th></th><th>CWM-1 Site 01</th><th>CWM-1 Sile 01</th><th>CWM-1 Site 01</th><th>CWM-24 Site 24A</th><th>CWM-24 Site 24A</th><th>CWM-24 Site 24A</th><th>CWM-24 Sue 24B</th><th>CWM-24 Sub 248</th><th>CWM-24</th></th<>	StationID		CWM-1 Site 01	CWM-1 Sile 01	CWM-1 Site 01	CWM-24 Site 24A	CWM-24 Site 24A	CWM-24 Site 24A	CWM-24 Sue 24B	CWM-24 Sub 248	CWM-24
Column	ed Type Sample Type Open Sample District Sample Open S		Floor Sample DFCWM001FD1	Floor Sample DFCWM001FS001	Floor Sample DFCWM001FS002	Floor Sample DFCWM24AFS001	Sidewall Sample DFCWM24ASW001	Sidewall Sample DFCWM24ASWn02	Floor Sample	Floor Sample	Sidewall Sample
Chief   Chie	Date Collected			06/21/2000	06/21/2000	10/30/2000 4 50 PM	11/14/2000	11/14/2000	03/09/2001	03/09/2001	03/09/2001
The color of the	Sample Matrix		<u> </u>		Soll I	Soil	Soil	800	Soil	Soil	Soil
Color		Calts	Duplicate of FS001	z	z	z	z	z	Z.	z	z
The color   Color	DIBENZ(a,h,ANTHRACENE	UG/KG	420 U	420 U	390 U	840 U	810 U	800 U	81013	8200	0 0PB
The color	DIBENZOFURAN	UG/KG	420 U	420 U	390 U	840 U	810 U	800 U	810 U	820 U	940 U
Colored   Colo	DIETHYL PHTHALATE	UGKG	420 ∪	420 ∪	390 ∪	840 U	810 U	800 U	810 U	82 J	160 J
Color   Colo	COMETHYL PHINALATE	UGKG	420 0	420 U	390 U	940 U	810 U	800 U	810 U	820 U	840 U
Part		3 CA	7007	4200	390 0	0.048	0.018	0 008	120 J	73.5	86 )
Particular   United   Carolin   Ca	HEXACH OROBENZENE	י פעט פעט	420 0	420 0	380.0	840 U	0.010	0.008	670	820 U	840 U
Particular   University   Uni	HEXACHLOROBUTADIENE	- SKG	120.04	42011	390	1078	84011	0.008	84011	1000	0.000
REME         UGKKG         420.U         430.U         840.U         840.U         860.U	HEXACHLOROCYCLOPENTADIENE	OG/KG	420 U	420 U	390 U	840 U	810 UJ	800114	81013	8201	0000
Partyamine   USAKG   420.0   420.0   380.0   40.0   810.0   800.0   810.0   820.0	HEXACHLOROETHANE	UGWG	420 U	420 ∪	390 ∪	840 U	810 U	800 U	810 U	820 U	840 [
Very Name   Very	INDENO(1,2,3-c,d)PYRENE	UGAKG	420 U	420 U	390 U	840 U	810 U	800 U	810 U	820 U	840 U
CAMMINE   UGANG 4200   4200   5800   6400   6100   6500   6200	ISOPHORONE	UQ.KG	420 U	420 U	390 U	840 U	810 U	800 ∪	810 U	820 ∪	840 ∪
CONTROL   COUNTROL	N-NITROSODI-n-PROPYLAMINE	UG/KG	420 ∪	420 U	390 U	840 U	810 UJ	800 UJ	810 U	820 U	840 ∪
CHANGE   C	N-NITROSODIPHENYLAMINE	COKG	420 U	420 U	390 U	840 U	810 U	800 U	810 U	820 U	840 ∪
NO.L         CORRELATION         CORREST         420 U	NAPHINE	OGKG	420 0	420 U	390 U	840 U	810 U	800 U	810 U	73.)	1000 =
March   Marc	NI ROBENZENE DENTA OLI DOODI PRO	ogke ogke	420 0	420 U	390 U	840 U	810 U	900 U	810 U	820 U	840 U
March   Marc	PENIACHUSACI	9 Kg	210.0	210 0	200 C	420 U	410 U	400 U	3200 =	570 J	420 U
Horicold   150 cm	ICNSHO!	200	130.0	0.007	2000	0.040	9100	0.000	0.00	0.029	7 80
HOL, R. S. B. B. B. B. B. B. B. B. B. B. B. B. B.	PYRENE	I GIKG	420	42011	300 (1	840	1018	0.000	9100	970.03	20.0
HANE         W. SS = ROS =		%	83 =	77 =	84=	85.2	87 =	84=	101 =	200	2 90
%         92 =         82 =         82 =         82 =         77 =         97 =         77 =         97 =         77 =         102 =         103 =         103 =         103 =         103 =         103 =         103 =         103 =         104 =         103 =         103 =         103 =         103 =         103 =         103 =         103 =         103 =         103 =         104 =	3 2-FLUOROBIPHENYL	%	= 36	82 =	92 ≖	89 =	≖ 26	= 96	± 48	86 =	= 18
No.   No.	s 2-FLUOROPHENOL	%	92 =	82 ≖	= 88	92 =	= 77	91=	103 =	10=	35 ≈
FINALISE         RS = 86 = 87	s NITROBENZENE-D5	%	83=	÷ 29	79 n	= 22	82 =	= 68	85 =	77 =	73 ==
Fighthe   Figh	S PHENOL-US	%	85 =	71 =	75=	85 =	+ 68	87 =	= 86	=0	83 =
Interpretation   Inte	STENFORME-DIA	,	94	= 99	93 =	94 =	93 ≈	≈ 96 ≈	101=	105 =	94 =
E	14 4 4 TRIGHT OBOUTT 14 11			,							
USANG   13 U   12 U	1.1.1-1 KICHLOROE I RANE	5 KG	13.0	73.0	12 0	90	09	9	12 U	12 07	13 U
UGMC   13 U   13 U   12 U	1, 1, 2, 4-1 ELIXACHLONGE ITANE	D GVKG	3.00	250	0.21	90	080	7 9 0	12.0	12 UJ	13 U
UGKG         13 U         12 U         6 U         6 U         6 U         6 U         6 U         12 U	14 1.DICHE OBOSTUANE	200	250	25.5	0.21	00	000	0	0.21	75.00	13.0
UGKG         13 U         12 U         6 U         6 U         6 U         6 U         12	1 1-DIOX: OBORTARNA	D WE	2 2	5 5	1163	000	0 8	0 4	12.0	12.00	13.0
UGKG         13 U         12 U         6 U         6 U         6 U         6 U         6 U         12 U	11.2-DICHLOROETHANE	UGKG	13.0	13.0	12.0	90	90	90	12.0	12 15.1	13.1
UGKG         13 U         13 U         12 U <th< td=""><td>11.2-DICHLOROPROPANE</td><td>UG/KG</td><td>13.0</td><td>13.0</td><td>12 U</td><td>6.0</td><td>6.0</td><td>60</td><td>12.0</td><td>12 03</td><td>130</td></th<>	11.2-DICHLOROPROPANE	UG/KG	13.0	13.0	12 U	6.0	6.0	60	12.0	12 03	130
UGKG         23 J         21 J         30 J         32 U         27 J         28 =         12 U         24 UU         24 UU         24 UU         24 UU         24 UU         24 UU         24 UU         24 UU         24 UU         24 UU         27 J         6 U <th< td=""><td>2-HEXANONE</td><td>UG/KG</td><td>13 U</td><td>13 U</td><td>12.0</td><td>32 U</td><td>31 U</td><td>30 U</td><td>12 U</td><td>12 UJ</td><td>13.0</td></th<>	2-HEXANONE	UG/KG	13 U	13 U	12.0	32 U	31 U	30 U	12 U	12 UJ	13.0
UGKG         13 U         12 U         6 U         6 U         6 U         12 U         13 U         12	ACETONE	UG/KG	23 J	21.J	30 J	32 U	27 J	28=	12 UJ	24 UJ	90 J
UGKG         13 U         12 U         6 U         6 U         6 U         6 U         12	BENZENE	UG/KG	13 U	13.0	12.0	6.0	6 U	0.9	12 U	1.1	190 J
UGKG         13 U         12 U         6 U	BROMODICALOROMEIMANE	OSKG OSKG	13.0	13.0	12.0	9 0	6.0	0.9	12.0	12 00	13.0
UGKG         13 U         13 U         13 U         13 U         13 U         13 U         12 U <t< td=""><td>BOWOWELLAND</td><td>9 0</td><td>200</td><td>0.00</td><td>0.71</td><td>0 0</td><td>0.00</td><td>0.0</td><td>0 2 2</td><td>0.21</td><td>13.0</td></t<>	BOWOWELLAND	9 0	200	0.00	0.71	0 0	0.00	0.0	0 2 2	0.21	13.0
UGKG         13 U         12 U         6 U         6 U         6 U         6 U         6 U         12	CARBON DISULFIDE	DOKO!	2 22	13.0	2	519	300		12.5	12 11	11
UGKG         13 U         12 U         6 U         6 U         6 U         6 U         12	CARBON TETRACHLORIDE	UG/KG	13.0	13 🗆	12 []	913	6.11	9 11	12 (1	12 (1.)	1361
UGKG         13 UJ         12 UJ         6 UJ         7 UJ	CHLOROBENZENE	UGKG	13.0	13.0	12.0	60	90	90	12.0	12 WJ	13 =
UGKG         13 U         12 U         6 U         6 U         6 U         6 U         110 J         12 U         110 J           UGKG         13 U         13 U         12	CHLOROETHANE	UG/KG	13 🔱	13 UJ	12 UJ	6 0.3	6 UJ	e uu	15 U	12 W	13.0
UGKG         13 U         12 U         13 U <th< td=""><td>CHLOROFORM</td><td>UG/KG</td><td>13 U</td><td>13 U</td><td>12 U</td><td>90</td><td>6.0</td><td>0.0</td><td>12≖</td><td>110 J</td><td>13.0</td></th<>	CHLOROFORM	UG/KG	13 U	13 U	12 U	90	6.0	0.0	12≖	110 J	13.0
UGKG         13U         12U         6U         6U         6U         12U         12U           UGKG         13U         13U         12U         12U         12U         12U           UGKG         13U         13U         12U         6U         6U         6U         12U         12U           UGKG         13U         13U         12U         13         12U         13	CHLOROMETHANE	UG/KG	13.0	13 U	12.0	9	6.0	0.8	12 U	12 UJ	13.0
UGKG         13 U         12 U         6 U         6 U         6 U         12 U         12 U           UGKG         13 U         13 U         12 U         6 U         6 U         6 U         12 U         12 U           UGKG         13 U         13 U         12 U         6 U         12 U         13 U	CIP-1,2-DICHLOROETHYLENE	UGKG				09	9.0	0.9			
13U 12U 6U 6U 12U 13U 13U 13U 13U 13U 13U 13U 13U 13U 13	SIS-1,3-DICHLOROPROPENE	UG/KG	130	13 U	12 U	09	09	09	12 U	12 U	13.0
110 00 1110 3011	ETHYL BENYEVE	CANG CANG	250	13.0	12.0	00	000	000	12.1	12.00	120.1
	M D.YY! FNE (S.IM OF ISOMERS)	2 (X)	2	22	0 71	1100	94.13	0.00	0.71	7	201

Sample Type Sample Type SampletDate Collected Time Collected	<b>9 -</b> 0	Site 01 Floor Sample DFCWM001FD1 06/21/2000	Site 01 Fixor Sampte DECWM001FS00 06/21/2000	Site 01 Site 01 Floor Sample 01 DFCWW001FS002 [ 04 DFCW 04 05 DW	Site 24A Site 24A Floor Sample DECWM24AFS0 4 50 DM	CWM-24 Ste 24A Stewal Sample 61 DFCWM24ASW001 [	CWM-24 Site 24A Sidewall Sample DFCWM24ASW002 11/14/2000	CWM-24 Site 248 Floor Sample DFCWM24BFS01 03/09/2001	CWM-24 Site 24B Floor Sample DFCWM24BFS02 03/09/2001	CWM-24 Site 24B Sidewall Sample 2: DFCWM248SS01 03/09/2001
Sample Matrix	.E	Soil S	Soli	Sol	E 5	2 2 2 3 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4	S P P	1015 AM	10 30 AM	10:00 AM
Sample Type	<u>\$</u>	Duplicate of FS001		z	z	z	ß z	ğ z	g z	, Z
METHYL ETHYL KETONE (2-BUTANONE)	DG/KG	8.	69	f /	32.13	. 4	. 9			
ETHYL ISOBUTYL KETONE (4-METHYL-2-PENTANON UGKG	N UG/KG	130	13 U	12.0	32.0	3411	3011	12.0	20.7	-01
ETHYLENE CHLORIDE	UG/KG	130	13.0	12 U	909	1.1	3 -	12.0	202	0.00
O-XYLENE (1,2-DIMETHYLBENZENE)	UGAKG				80	811		7	Sec	200
STYRENE	UG/KG	13.0	13.0	12.0	0.8	9 11	19	131	11.67	
E IRACHLOROETHYLENE(PCE)	UC/KG	13.0	130	3.1	8.0		119		1	
OLUENE	UGAKG	130	130	12			700	7		ا ا د ا
OTAL 1,2-01CHLOROETHENE	UCXC		1 = 5	= = = = = = = = = = = = = = = = = = = =		3	00	0.71	1200	40#
rans-1,2-DICHLOROETHENE	+ UCAKO		2	2 + 1 .			1 1 1 1 1 1 1	120	1200	130
rans-1,3-DICHLOROPROPENE	UXC)	13.1	13 [1	1			09		-	
RICHLOROETHYLENE (TCE)	UGAKG	130	, = <u>5</u>	, = 12.		2.5	, , , , ,	12.0	12 0	130
INYL CHLORIDE	HGMG	1311	1					120	12 UU	130
YLENES, TOTAL	S C	2	215	0.71		1 60	0.9	120	12 W	130
-BROMO-4-FLUOROBENZENE (4-BROMOELLIOBOBEN		315	2 2	0 77				3.1	14.)	1200 =
JIBROMOFI JOROMETHANE	1	1 2 2		1	- N	102 "	91=	105 =	82=	105 =
AC ENTIL C	•	200	3	100 =	E88 =	108 =	105 =	107 =	= 56	114 =
	2	128	101 =	# 86	91=	103 =	= 56	100=	64 =	105

UG/KG - micrograms per kilogram

U'-not detected

z' - detected concentra

· rejected value

StationID: CWM-1 FIELDQC
SampleID: DFCWM001EB1 TRIP BLANK

 Date Collected :
 06/21/2000
 10/30/2000

 Time Collected :
 12:00 PM
 5 20 PM

 Sample Matrix :
 SQ
 WQ

	Sample Matrix :	SQ	WQ
	Sample Type :	EB	TB
Parameter	Units		
Metals			
ALUMINUM	UG/L	17 U	<u> </u>
ANTIMONY	UG/L	14 U	
ARSENIC	UG/L	06U	
BARIUM	UG/L	1 U	
BERYLLIUM	UG/L	1 U	
CADMIUM	UG/L	1 U	
CALCIUM	UG/L	99.8 J	
CHROMIUM, TOTAL	UG/L	13 =	
COBALT	UG/L	2 U	
COPPER	UG/L	2 U	
IRON	UG/L	84.8 J	
LEAD	UG/L	06U	
MAGNESIUM	UG/L	31 U	
MANGANÉSE	UG/L	25 J	
MERCURY	UG/L	0 1 U	1
NICKEL	UG/L	119J	
POTASSIUM	UG/L	370 U	
SELENIUM	UG/L	04U	
SILVER	UG/L	2 U	
SODIUM	UG/L	66 U	
THALLIUM	UG/L	0 24 J	1
VANADIUM	UG/L	1 U	
ZINC	UG/L	33J	
PCBs			
PCB-1016 (AROCHLOR 1016)	UG/L	1 U	
PCB-1221 (AROCHLOR 1221)	UG/L	2 U	
PCB-1232 (AROCHLOR 1232)	UG/L	10	<u> </u>
PCB-1242 (AROCHLOR 1242)	UG/L	10	<b>-</b>
PCB-1242 (AROCHLOR 1242)	UG/L	10	
PCB-1254 (AROCHLOR 1254)	UG/L	10	<del> </del>
PCB-1260 (AROCHLOR 1260)	UG/L	1 U	
S DECACHLOROBIPHENÝL	%	42 =	
Pesticides	//	42 -	<del> </del>
	1 104	0.05.11	<u> </u>
ALDRIN	UG/L	0.05 U	<del> </del>
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEX		0.05 U	<u> </u>
ALPHA ENDOSULFAN (ENDOSULFAN I)	UG/L	0.05 U	1
ALPHA-CHLORDANE	UG/L	0.05 U	
BETA BHC (BETA HEXACHLOROCYCLOHEXAN		0.05 U	<b></b>
BETA ENDOSULFAN (ENDOSULFAN II)	UG/L	0.1 U	<del> </del>
DELTA BHC (DELTA HEXACHLOROCYCLOHEX		0.05 U	<b> </b>
DIELDRIN	UG/L	0.1 U	<b> </b>
ENDOSULFAN SULFATE	UG/L	0.1 U	<u> </u>
ENDRIN	UG/L	0.1 U	
ENDRIN ALDEHYDE	UG/L	0.1 U	
ENDRIN KETONE	UG/L	0.1 U	
GAMMA BHC (LINDANE)	ŪG/L	0 05 U	
GAMMA-CHLORDANE	UG/L	0.05 U	<u> </u>

SampleID : DFCWM001EB1 TRIP BLAN   Date Collected : 06/21/2000   10/30/2000   Time Collected : 12.00 PM   5.20 PM   Sample Matrix : SQ   WQ   WQ   Wolk
Date Collected : 06/21/2000   10/30/2000   10/30/2000   10/30/2000   10/30/2000   10/30/2000   10/30/2000   12.00 PM   5.20
Sample Matrix   SQ   WQ
Sample Type:         EB         TB           Parameter         Units           HEPTACHLOR         UG/L         0.05 U           HEPTACHLOR EPOXIDE         UG/L         0.05 U           METHOXYCHLOR         UG/L         0.5 U           p.p*-DDD         UG/L         0.1 U           p.p*-DDE         UG/L         0.1 U           p.p*-DDT         UG/L         0.1 U           TOXAPHENE         UG/L         5 U           S 2,4,5,6-TETRACHLORO-META-XYLENE         %         98 =           S DECACHLOROBIPHENYL         %         43 =           SVOCs         UG/L         10 U           1,2,4-TRICHLOROBENZENE         UG/L         10 U           1,2-DICHLOROBENZENE         UG/L         10 U           1,3-DICHLOROBENZENE         UG/L         10 U           1,4-DICHLOROBENZENE         UG/L         10 U           2,2'-OXYBIS(1-CHLORO)PROPANE         UG/L         10 U           2,4,5-TRICHLOROPHENOL         UG/L         10 U           2,4,6-TRICHLOROPHENOL         UG/L         10 U           2,4-DICHLOROPHENOL         UG/L         10 U           2,4-DICHLOROPHENOL         UG/L         10 U
HEPTACHLOR
HEPTACHLOR
HEPTACHLOR EPOXIDE
HEPTACHLOR EPOXIDE
METHOXYCHLOR
D,p'-DDD
p,p'-DDE
TOXAPHENE
S       2,4,5,6-TETRACHLORO-META-XYLENE       %       98 =         S       DECACHLOROBIPHENYL       %       43 =         SVOCs       1,2,4-TRICHLOROBENZENE       UG/L       10 U         1,2-DICHLOROBENZENE       UG/L       10 U         1,3-DICHLOROBENZENE       UG/L       10 U         1,4-DICHLOROBENZENE       UG/L       10 U         2,2'-OXYBIS(1-CHLORO)PROPANE       UG/L       10 U         2,4,5-TRICHLOROPHENOL       UG/L       25 U         2,4-DICHLOROPHENOL       UG/L       10 U         2,4-DICHLOROPHENOL       UG/L       10 U         2,4-DIMETHYLPHENOL       UG/L       10 U
S DECACHLOROBIPHENYL         %         43 =           SVOCs           1,2,4-TRICHLOROBENZENE         UG/L         10 U           1,2-DICHLOROBENZENE         UG/L         10 U           1,3-DICHLOROBENZENE         UG/L         10 U           1,4-DICHLOROBENZENE         UG/L         10 U           2,2'-OXYBIS(1-CHLORO)PROPANE         UG/L         10 U           2,4,5-TRICHLOROPHENOL         UG/L         25 U           2,4-DICHLOROPHENOL         UG/L         10 U           2,4-DICHLOROPHENOL         UG/L         10 U           2,4-DIMETHYLPHENOL         UG/L         10 U
S   DECACHLOROBIPHENYL
1,2,4-TRICHLOROBENZENE       UG/L       10 U         1,2-DICHLOROBENZENE       UG/L       10 U         1,3-DICHLOROBENZENE       UG/L       10 U         1,4-DICHLOROBENZENE       UG/L       10 U         2,2'-OXYBIS(1-CHLORO)PROPANE       UG/L       10 U         2,4,5-TRICHLOROPHENOL       UG/L       25 U         2,4-DICHLOROPHENOL       UG/L       10 U         2,4-DICHLOROPHENOL       UG/L       10 U         2,4-DIMETHYLPHENOL       UG/L       10 U
1,2-DICHLOROBENZENE       UG/L       10 U         1,3-DICHLOROBENZENE       UG/L       10 U         1,4-DICHLOROBENZENE       UG/L       10 U         2,2'-OXYBIS(1-CHLORO)PROPANE       UG/L       10 U         2,4,5-TRICHLOROPHENOL       UG/L       25 U         2,4,6-TRICHLOROPHENOL       UG/L       10 U         2,4-DICHLOROPHENOL       UG/L       10 U         2,4-DIMETHYLPHENOL       UG/L       10 U
1,2-DICHLOROBENZENE       UG/L       10 U         1,3-DICHLOROBENZENE       UG/L       10 U         1,4-DICHLOROBENZENE       UG/L       10 U         2,2'-OXYBIS(1-CHLORO)PROPANE       UG/L       10 U         2,4,5-TRICHLOROPHENOL       UG/L       25 U         2,4,6-TRICHLOROPHENOL       UG/L       10 U         2,4-DICHLOROPHENOL       UG/L       10 U         2,4-DIMETHYLPHENOL       UG/L       10 U
1,3-DICHLOROBENZENE       UG/L       10 U         1,4-DICHLOROBENZENE       UG/L       10 U         2,2'-OXYBIS(1-CHLORO)PROPANE       UG/L       10 U         2,4,5-TRICHLOROPHENOL       UG/L       25 U         2,4,6-TRICHLOROPHENOL       UG/L       10 U         2,4-DICHLOROPHENOL       UG/L       10 U         2,4-DIMETHYLPHENOL       UG/L       10 U
1,4-DICHLOROBENZENE       UG/L       10 U         2,2'-OXYBIS(1-CHLORO)PROPANE       UG/L       10 U         2,4,5-TRICHLOROPHENOL       UG/L       25 U         2,4,6-TRICHLOROPHENOL       UG/L       10 U         2,4-DICHLOROPHENOL       UG/L       10 U         2,4-DIMETHYLPHENOL       UG/L       10 U
2,2'-OXYBIS(1-CHLORO)PROPANE
2,4,5-TRICHLOROPHENOL       UG/L       25 U         2,4,6-TRICHLOROPHENOL       UG/L       10 U         2,4-DICHLOROPHENOL       UG/L       10 U         2,4-DIMETHYLPHENOL       UG/L       10 U
2,4,6-TRICHLOROPHENOL       UG/L       10 U         2,4-DICHLOROPHENOL       UG/L       10 U         2,4-DIMETHYLPHENOL       UG/L       10 U
2,4-DICHLOROPHENOL         UG/L         10 U           2,4-DIMETHYLPHENOL         UG/L         10 U
2,4-DIMETHYLPHENOL UG/L 10 U
2 A DIMITO OCUENCA
Z,4-DINTROPHENOL UG/L 25 U
2,4-DINITROTOLUENE UG/I 10 II
2,6-DINITROTOLUENE UG/L 10 U
2-CHLORONAPHTHALENE UG/L 10 U
2-CHLOROPHENOL UG/L 10 U
2-METHYLNAPHTHALENE UG/L 10 U
2-METHYLPHENOL (o-CRESOL)  UG/L  10 U
2-NITROANILINE UG/L 25 U
2-NITROPHENOL UG/L 10 U
3,3'-DICHLOROBENZIDINE UG/L 10 U
3-NITROANILINE UG/L 25 U
4,6-DINITRO-2-METHYLPHENOL UG/L 25 U
4-BROMOPHENYL PHENYL ETHER UG/L 10 U
4-CHLORO-3-METHYLPHENOL UG/L 10 U
4-CHLOROANILINE UG/L 10 U
4-CHLOROPHENYL PHENYL ETHER UG/L 10 U
4-METHYLPHENOL (p-CRESOL) UG/L 10 U
4-NITROANILINE UG/L 25 U
4-NITROPHENOL UG/L 25 U
ACENAPHTHENE UG/L 10 U
ACENAPHTHYLENE UG/L 10 U
ANTHRACENE UG/L 10 U
BENZO(a)ANTHRACENE UG/L 10 U
BENZO(a)PYRENE UG/L 10 U
BENZO(b)FLUORANTHENE UG/L 10 U
BENZO(g,h,ı)PERYLENE UG/L 10 U
BENZO(k)FLUORANTHENE UG/L 10 U
BENZYL BUTYL PHTHALATE UG/L 10 U
bis(2-CHLOROETHOXY) METHANE UG/L 10 U

CARBON TETRACHLORIDE

SampleID: DFCWM001EB1 TRIP BLANK **Date Collected:** 06/21/2000 10/30/2000 Time Collected: 12:00 PM 5:20 PM Sample Matrix: SQ WQ Sample Type : EΒ TB Parameter Units bis(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER) UG/L 10 U bis(2-ETHYLHEXYL) PHTHALATE UG/L 10 U CARBAZOLE UG/L 10 U CHRYSENE UG/L 10 U DI-n-BUTYL PHTHALATE UG/L 10 U DI-n-OCTYLPHTHALATE UG/L 10 U DIBENZ(a,h)ANTHRACENE UG/L 10 U DIBENZOFURAN UG/L 10 U DIETHYL PHTHALATE UG/L 0.9 J DIMETHYL PHTHALATE UG/L 10 U **FLUORANTHENE** 10 U UG/L UG/L FLUORENE 10 U HEXACHLOROBENZENE UG/L 10 U HEXACHLOROBUTADIENE UG/L 10 U HEXACHLOROCYCLOPENTADIENE UG/L 10 U HEXACHLOROETHANE UG/L 10 U INDENO(1,2,3-c,d)PYRENE UG/L 10 U UG/L 10 U ISOPHORONE N-NITROSODI-n-PROPYLAMINE UG/L 10 U N-NITROSODIPHENYLAMINE UG/L 10 U NAPHTHALENE UG/L 10 U NITROBENZENE UG/L 10 U PENTACHLOROPHENOL UG/L 5 U PHENANTHRENE UG/L 10 U PHENOL 10 U UG/L PYRENE UG/L 10 U S 2,4,6-TRIBROMOPHENOL % 90 =S 2-FLUOROBIPHENYL % 88 = S 2-FLUOROPHENOL % 96 = S NITROBENZENE-D5 % 86 = S PHENOL-D5 % 91 = S TERPHENYL-D14 % 85 = VOCs 1,1,1-TRICHLOROETHANE UG/L 10 U 1 U 1,1,2,2-TETRACHLOROETHANE UG/L 10 U 1 U 1,1,2-TRICHLOROETHANE UG/L 10 U 1 U 1,1-DICHLOROETHANE UG/L 10 U 1 U 1,1-DICHLOROETHENE UG/L 10 U 1 U 1,2-DICHLOROETHANE 10 U 1 U UG/L 1,2-DICHLOROPROPANE UG/L 10 U 1 U 2-HEXANONE UG/L 10 U 5 U ACETONE UG/L 2 J 5 U BENZENE UG/L 10 U 1 U BROMODICHLOROMETHANE 1 U UG/L 10 U BROMOFORM UG/L 10 U 1 U BROMOMETHANE UG/L 10 U 1 U CARBON DISULFIDE 10 U 1 U UG/L

StationID:

UG/L

10 U

1 U

CWM-1

**FIELDQC** 

		StationID : SampleID : Date Collected : Time Collected : Sample Matrix : Sample Type : Units	DFCWM001EB1 06/21/2000 12.00 PM SQ EB	FIELDQC TRIP BLANK 10/30/2000 5.20 PM WQ TB
	CHLOROETHANE	UG/L	10 U	1 U
	CHLOROFORM	UG/L	10 U	1 U
	CHLOROMETHANE	UG/L	10 U	1 U
	IS-1,2-DICHLOROETHYLENE	UG/L	10 U	1 U
	is-1,3-DICHLOROPROPENE	UG/L		1 U
	DIBROMOCHLOROMETHANE	UG/L	10 U	1 U
	THYLBENZENE	UG/L	10 U	1 U
	M.P-XYLENE (SUM OF ISOMERS)	UG/L	10 U	1 U
<u> </u>	METHYL ETHYL METONE (2 BUTANIONE)	UG/L		2 U
	METHYL ETHYL KETONE (2-BUTANONE)	UG/L	10 U	5 U
	METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE) METHYLENE CHLORIDE	UG/L	10 U	5 U
		UG/L	03J	03J
	D-XYLENE (1,2-DIMETHYLBENZENE) TYRENE	UG/L		1 U
		UG/L	10 U	1 U
	ETRACHLOROETHYLENE(PCE) OLUENE	UG/L	10 U	1 U
		UG/L	10 U	1 U
	OTAL 1,2-DICHLOROETHENE	UG/L	10 U	
	ans-1,2-DICHLOROETHENE	UG/L		1 U
	ans-1,3-DICHLOROPROPENE	UG/L	10 U	1 U
	RICHLOROETHYLENE (TCE)	UG/L	10 U	1 U
	INYL CHLORIDE	UG/L	10 U	1 U
	YLENES, TOTAL	UG/L	10 U	
s 1	-BROMO-4-FLUOROBENZENE (4-BROMOFLUOROBENZENE)	%	102 =	98 =
S D	IBROMOFLUOROMETHANE	%	94 =	95 =
	OLUENE-D8 IG/L - milligrams per liter	%	105 =	100 =

MG/L - milligrams per liter

UG/L - micrograms per liter

'U' - not detected

'=' - detected concentration

'J' - estimated value

'R' - rejected value

s - surrogate

EB - equipment blank

TB - trip blank

# FINAL PAGE

# **ADMINISTRATIVE RECORD**

**FINAL PAGE**