US ERA ARCHIVE DOCUMENT

## ATTACHMENT D: EXAMPLE CALCULATIONS

Presents Example Calculations for Indirect Risks from Dioxin

Calculation of Adjusted Model Outputs

CONTAMINANT - TCDD				
			TINO	LIND
SOURCE	EMISSION RATE	7	DRY PARTICLE DEPOSITION WET PARTICLE DEPOSITION	WET PARTICLE DEPOSITION
	oes/6	Unitless	л <b>у</b> /2ш/б	g/m2/yr
CS - Arc. F. A Fug.	0	0.27	58.83418	2.3244
CS - Arc. F. B Fug.	0	0.27	58.83418	2.3244
CS - Baghouse A	0	0.27	2.20388	0.0259
CS - Baghouse B	0	0.27	0.03388	0.02154
CS - BH C, Arc F. A	0	0.27	0.04855	0.01338
CS - BH C, Arc F. B	0	0.27	0.04855	0.01338
NTC	8.62E-10	0.27	0.00478	1,000.0
Σ.	1.64E-08	0.27	0.00149	65600.0
Hoinam	9.88E-10	0.27	0.00085	0.0005
TOTAL				
CONTAMINANT - TCDD	900			
			ACTUAL	ACTUAL
SOURCE	<b>EMISSION RATE</b>	Ŧ	DRY PARTICLE DEPOSITION WET PARTICLE DEPOSITION	WET PARTICLE DEPOSITION
	oes/6	Unitless	g/m2/yr	g/m2/yr
CS - Arc. F. A Fug.	0	0.27	0	
CS - Arc. F. B Fug.	0	0.27	0	
S - Baghouse A	0	0.27	0	
CS - Baghouse B	0	0.27	0	
CS - BH C, Arc F. A	0	0.27	0	
CS - BH C, Arc F. B	0	0.27	0	
NTC	8.62E-10	0.27	3.0078628E-12	4.467746E-13
Σ.	1.64E-08	0.27	1.783828E-11	1.1481148E-10
Holnam	9.88E-10	0.27	6.13054E-13	3.6062E-13
TOTAL			2.15E-11	1 16F-10

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2E-08

2,3,7,8-TCDDioxin TEQ

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25-Jan-96

Cancer Risk for Individual Chemicals for Adult Resident Scenario Table 5.3.5

CR = (I\*ED\*EF\*CSF)/(BW\*AT\*365)

	8	Individual lifetime cancer risk			(unitless)
	_	Total daily intake of contamina Table 5.3.4	ble 5.3.4		(mg/day)
	입	Exposure duration		8	E
	Ш	Exposure frequency		33	350 (day/yr)
	BW	Body weight		2	<u> </u>
	ΑT	Averaging time		2	E
	385	Units conversion factor		385	(day/yr)
Chemical	8				
2.3.7.8-TCDDioxin TEQ	1.8E-08				

Total Daily Intake for Adult Resident Scenario Table 5.3.4

2,3,7,8-TCDDioxin TEQ 2.0E-11

Chemical Name

(mg/day)

Soil Intake for Adult Resident Scenario Table 5.3.1

|soil = Sc \* CRsoil \* Fsoil

Isoil Sc CRsoil Fsoil

Daily intakeof soil
Soil concentration
Consuption rate of soil
Fraction of consumed soil
contaminated

Table 4.1.1 (mg/kg) 0.0001 (kg/day) 1 (unitless)

(mg/day)

Soil

Chemical Name

1.<del>0</del>E-11

2,3,7,8-TCDDioxin TEQ

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Soil Concentration due to Deposition Table 4.1.1

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Average soil concentration over exposure duration

တွ မ	Average soil concentration			(mg/kg)	
ž Ļ	Deposition term Time period over which		Site specific	(kl)	IDETRAN
Sdc	deposition occurs Soil concentration at time Tc			(mg/kg)	
হ	Soil loss constant		Table 4.1.2	(yr <del>/</del> -1)	
7	Exposure duration		Senario specific	( <del>)</del>	30 yrs
	Soil concentration at time Tc	Soto			

p(-ks*Tc))/ks
[Ds*(1-ex

[100\*[(.31536\*Vdv\*Cyv+Dywv)+(Dydp+Dywp)]]/(z\*BD)

Depostion term

9	Units conversion factor	9	100 ([mg-m^2]/[kg-cm^2])	_
7	Soil mixing depth	•	(cm)	
윤	Soil bulk density	1.5	1.5 (g/cm^3)	
0.31536	Units conversion factor	0.31536	0.31536 (m-g-s/cm-ug-yr)	
λþ	Dry deposition velocity	n	3 (cm/s)	
<u></u>	e air	Modelled	(ug-s/g-m^2)	DISPC1-
	concentration			
Dyw	arly wet	Modelled	(s/m^2-yr)	DISPC1-
	deposition from vapor phase			
Dydp	Normalized yearly dry			
,	deposition from particle phase	Modelled	(s/m^2-yr)	DISPC1-
Dywp	Normalized yearly wet			
•	deposition from particle phase	Modelled	(s/m^2-yr)	DISPC1-

2,3,7,8-TCDDioxin TEQ

Chemical Name

Soil Loss Constant Table 4.1.2

ksi+kse+ksr+ksg+ksv

(yr^-1)	(yr^-1)	(yr^-1)	(yrv-1)	(yr^-1)
	Table 4.1.3	Table 4.1.4	Chemical specific (yrv-1)	Table 4.1.5
Soil loss constant due to all	Loss constant due to leaching Loss constant due to soil	erosion Loss constant due to surface	runoff Loss constant due to	Loss constant due to
ks	<u>a</u> 8	ksr	ĝ	ks

(yrv-1) ŝ Chemical Name

1.8E-02 2,3,7,8-TCDDioxin TEQ

Loss Constant Due to Leaching

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i	Table 4.1.3
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(P+I-R-Ev)/[Qs\*z\*(1+(BD\*Kds/Qs))]

IDETRAN	IDETRAN IDETRAN	IDETRAN			IDECHE
(yr*-1) (cm/yr)	(cm/kr)	(cm/yr)	0.2 (mL/cm^3)	1 (cm)	; (cm^3/g)
Site specific	Site specific	Site specific	0.2	•	Chemical specific (cm^3/g) IDECHE
Loss constant due to leaching Average annual precipitation			transporation Soil volumetric water content	Soil depth from which leaching nemoval occurs	Soil-water partition coefficient
<u>3</u> °	_ 0	<u>ش</u>	ő	7	Kds

ksi (yr^-1) Chemical Name

9.0E-05

2,3,7,8-TCDDioxin TEQ

Loss constant due to Runoff Table 4.1.4

	(yr^1) Site specific (cru/yr) IDETRAN 0.2 (cL/cm^3) 1 (cm) Chemical specific (cm^3/q) IDECHE 1.5 (g/cm^3)
	w c
[R/(Qs*z)]*[1/(1+(Kds*BD)/Qs)]	Loss constant due to runoff Average annual runoff Soil volumetric water content Soil mixing depth Soil-water partition coefficient Soil bulk density
[R/(Qs";	Kgs 7 Kgs 8 BD BD

Chemical Name ksr (yr^-1) 2,3,7,8-TCDDioxin TEQ 3.0E-05

Loss Constant due to Volitilization Table 4.1.5

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	Mandadi		DECHEM			IDETRAN-TC	IDETRAN			DECHEM	IDETRAN
(yr*-1)	(s/yr)	(cm)	(cm^3/g)	8.1E-05 (atm-m^3/mol-K)	1.5 (g/cm^3)	S	(ш/s)	(a/cm-s)	(b/cm/3)	(cm*2/s)	(m^2)
	)	Cremical specific (animality)	Chemical specific (cm <sup>3</sup> 3/g)	8.1E-05 (	1.5 (	Site specific (	Site specific	1.8E-04 (g/cm-s)	1.2E-03 (g/cm^3)	Chemical specific (cm^2/s)	Site speficic
Loss constant due to volatilization		Soil mixing depth	Soil-water partition coefficient	Universal gas constant	Soil bulk density	Ambient air temperature	Average annual wind speed	Viscosity of air	Density of air	Diffusivity of contaminant in air	Surface area of contaminated area
ksv	3.1536e7	L 2	Kds	œ	8	<b>-</b>	,	8n	8.	Ö	∢

Chemical Name ksv (yr\*-1)

1.8E-02

2,3,7,8-TCDDioxin TEQ

25-Jan-96

		(mg/day)	(mg/kg)	(тд/кд)	(mg/kg)	0.0197 (kg/day)	0.25 (unitless)
			Table 4.2.6 (mg/kg)	Table &.2.7 (mg/kg)	Table 4.2.8 (mg/kg)	0.0197	0.25
Above-Ground Produce Intake for Adult Resident Scenario Table 5.3.2	(Pd+Pv+Pr)*CRag*Fag	Daily intake of contaminant from soil	Concentration in above-ground produce due to deposition	Concentration in above-ground produce due t air-to-plant transfer	Concentration in above-ground produce due to root uptake	Consumption rate of above-ground produce	Fraction of above-ground produce contaminated
	(Pd+Pv	<u>g</u>	Pd	₹	ġ.	CRag	Fag

(mg/day)	
Bel	
Chemical Name	

3.5E-12

2,3,7,8-TCDDioxin TEQ

Above-Ground Produce Concentration Due to Direct Deposition

		Modelled
Table 4.2.6	[[1000*(Dydp+(Fw^Dywp)]*Rp*[(1-exp(-kp*Tp)]]/(Yp*kp)	Units conversion factor Normalized yearly dry deposition from particle phase
	[[1000	1000 Dydp

₹	Fraction of wet deposition that	Chemical specific (unitless)	(nuitless)	_
	adheres to plant			
9	Yearly particle phase wet	Modelled	(g/m^2/yr)	_
	deposition rate			
윤	Interception fraction of edible	. 0.05	0.05 (unitless)	
	portion of plant			
₽	Plant surface loss coefficient	18	18 (yr-1)	
Ē.	Length of plant exposure to	0.16	0.16 (yrs)	
-	deposition of edible portion of			
	plant, per harvest			
چ	Yield or standing crop biomass	1.6	1.6 (kgDW/M^2)	
	of the edible portion of the plant			

CHEMIC DISPC1-

(unitless) (s/m^2-yr)

DISPC1-

(mg/kg)
P
Chemical Name

1.2E-10

2,3,7,8-TCDDioxin TEQ

Above-Ground Produce Concentration Due to Air-to-Plant Transfer Table 4.2.7

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(Cyv\*Bv\*VGag)/pa

(mg/kg)	(ug-sec/g-m^3) DISPC1-	Chemical specific (mgplant/ugair) CHEMIC 0.01 (untitess)	1.2E+03 (g/m^3)
	Modelled	Chemical specific 0.01	1.2E+03
Concentration of pollutant in the	Normalization approximation	Concellutation Air-to-plant biotransfer factor Empirical correction factor for	above-ground produce Density of air
£	Cy.	Bv VGag	8.

Chemical Name Pv (mg/kg)

2,3,7,8-TCDDioxin TEQ 7.0E-11

Above-Ground Produce Concentration Due to Root Uptake Table 4.2.8

Sc\*Br

	g o	Concentration of pollutant in the Average soil concentration of pollutant over exposure duration		(mg/kg) (mg/kg)	
•	ă		al specific (u	Chemical specific (ug/gplant)/(ug/gsoil) CHEMIC	OHEMIC .
Chemical Name	Ā	(mg/kg)			
2,3,7,8-TCDDioxin TEQ	5.2E-10	0			

Soil Concentration due to Deposition Table 4.2.1

[(Ds\*Tc-Sctc)/ks]+[(Sctc/ks)\*(1-exp(-ks\*(T2-Tc)]]/(T2-T1)

	S Tc	entration which	30 Site specific	(mg/kg) (mg/kg-yr) (yr)
	Scic	deposition occurs Soil concentration at time Tc Soil loss constant	Table 4.1.2	(mg/kg) (yr^-1)
	22		30 Senario specific 0 Senario specific	
	[Ds*(1-ex	[DS*(1-exp(-ks*Tc))]/ks		
	[100*[(.31	[100*[(.31536*Vdv*Cyv+Dywv)+(Dydp+Dywp)]]/(z*BD)		
	100	Units conversion factor Soil mixing deigh	•	([mg-m^2)/[kg-cm^2])   (cm)
	, <u>8</u>	Soil bulk density	6.1	1.5 (g/cm^3)
	0.31536	Units conversion factor	0.31536	(m-g-s/cm-ug-yr)
	ð,	Dry deposition velocity		3 (cm/s)
	Š	Normalized vapor phase air concentration	Modelled	(ng-s/g-m^2)
	Dywv	Normalized yearly wet	Modelled	(s/m^2-yr)
	Dydp	deposition from vapor phase Normalized yearly dry		
		deposition from particle phase	Modelled	(s/m^2-yr)
	Š	deposition from particle phase	Modelled	(s/m^2-yr)
Chemical Name	8	(mg/kg)	å	(Maskerii)
2,3,7,8-TCDDioxin TEQ	1.6E-07	7 2.9E-07	1.3E-08	8

Soil Loss Constant

1.2.2
•
Table

ks|+kse+ksr+ksg+ksv

(yr^-1)	(yr-1)	(yr)-1) (yr)-1)
0	Table 4.2.4	Chemical specific (yr²-1) Table 4.2.5 (yr²-1)
Soil constatn due to leaching Loss constant due to soil erosion	Loss constant due to surface runoff	Loss constant due to degradation Loss constant due to volatilization
s ss	ksr	ksy vsv

(yr^-1) ks Chemical Name

1.8E-02

2,3,7,8-TCDDioxin TEQ

**k**sg Loss Constant due to Degradation Appendix A

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(P+I-R-Ev)/[Qs\*z\*(1+(BD\*Kds/Qs))]

(yr^-1) Site specific (cm/yr)	Site specific (cm/yr) Site specific (cm/yr)		0.2 (mLcm^3) 1 (cm)	Chemical specific (cm^3/g)
Loss constant due to leaching Average annual precipitation	Average annual imgation Average annual runoff	Average annual evapo- transporation	Soil volumetric water content Soil depth from which leaching	Soil-water partition coefficient
23 °	_ œ	Ā	S z	Kds

(yr-1)

9.0E-05 

2,3,7,8-TCDDioxin TEQ

Chemical Name

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[R/(Qs\*z)]\*[1/(1+(Kds\*BD)/Qs)]

	IDETRAN			DECHEM	
(yr\-1)	(cm/yr)	2 (cL/cm^3)	(cm)	(cm^3/g)	5 (g/cm^3)
	Site specific (cm/yr)	0		Chemical specific	7
Loss constant due to runoff	Average annual runoff	Soil volumetric water content	Soil mixing depth	Soil-water partition coefficient	Soil bulk density
ksr	œ	ő	2	Kds	90

(y-y-1)	
ksr	
Nате	
Chemical	

3.0E-05

2,3,7,8-TCDDioxin TEQ

Loss Constant due to Volitilization Table 4.2.5

		/ IDECHE		DECHE	/mol-K)		IDETRAN	IDETRAN			DECHE	DETRAN
	(yr*-1)	(s/yr) (atm-m^3	<u></u>	(cm^3/g)	8.1E-05 (atm-m^3/mol-K)	1.5 (g/cm^3)	દ	(S/EL)	1.8E-04 (g/cm-s)	1.2E-03 (g/cm <sup>2</sup> 3)	(cm*2/s)	(m^2)
(4*A/(Pi))^.5)^11]		(s/yr) Chemical specific (atm-m <sup>-3</sup> / IDECHE	_	Chemical specific (cm^3/g) IDECHE	8.1E-05	1.5	Site specific	Site specific	1.86-04	1.2E-03	Chemical specific (cm*2/s) IDECHE	Site speficic
[(3.1538e+7*H)/(z*Kds*R*T*BD)]*[.482*u^.78*(ua/(pa*Da)^67]*[((4*A/(Pi))^.5)^11]	ksv Loss constant due to volatilization	3.1536e7 Conversion constant H Henry's Law constant	z Soil mixing depth	Kds Soil-water partition coefficient	R Universal gas constant	BD Soil bulk density	T Ambient air temperature	u Average annual wind speed	ua Viscosity of air	pa Density of air	Da Diffusivity of contaminant in air	A Surface area of contaminated area

Chemical Name ksv (yr^-1)

2,3,7,8-TCDDioxin TEQ 1.8E-02

Drinking Water Intake for Adult Resident Scenario Table 5.3.3

dw Daily intake of contaminant		(mg/day)
Cow Dissolved contaminant	Table 4.4.24	(mg/L)
CROW Consumption rate of drinking		1.4 (L/day)
Fow Fraction of drinking water	-	1 (unitless)
) L N E	2	Daily intake of contaminant from drinking water Dissolved contaminant concentration in drinking water water Fraction of drinking water contaminated

idw (mg/day)

3.0E-13

2,3,7,8-TCDDioxin TEQ

Chemical Name

Dissolved Water Concentration

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Cwt/(1+Kdsw\*TSS\*1e-6)

		CHEMIC		
(mg/L)	(mg/L)	fic (UNg)	10 (mg/L)	1.0E-06 (kg/mg)
	Table 4.5.23	Chemical specific (L/kg)		1.0E-
Dissolved phase water concentration	Total concentration in water column	Suspended sediment/surface water partition coefficient	Total suspended solids	Conversion factor
Cdw	CM	Kdsw	TSS	1e-8

Cdw (mg/L)

Chemical Name

2.1E-13

2,3,7,8-TCDDioxin TEQ

					IDESW-G
	(mg/L)			0.03 (m)	Ē
	Table 4.4.15			0	Site specific
occurs in the water column	Total water concentration in	surface water system, including	water column and bed sediment	Depth of upper benthic layer	Depth of the water column
	Cwtot			용	₹

(unitless) (mg/L)

Table 4.4.16

	_	#		Site specific
endana water evetem includion	Surface water ayarem, moderny	water column and bed sediment	Depth of upper benthic layer	Depth of the water column
ı			용	₹

(mg/L)
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emical Name

Chemical Name

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roody Concentration	
Mate	4.4.1
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LU[(Vfx"Fwater)+Kw("WAw"(dw+db))

Total chemical load into water Table 4.4.7 (g/yr) body, including deposition, runoff and erosion Average volumetric flow rate through water body siter fraction of total water body couraninat concentration that occurs in the water column Overall total waterbody dissipation rate constant  w Waterbody surface area Site specific (m*3) I bepth of water column Site specific (m*3) I benth of upper benthic laver on 3 (m) benth of upper benthic laver on 3 (m)	Tot.				
body, including deposition, runoff and erosion Average volumetric flow rate Through water body comtaminat concentration that occurs in the water column Overall total waterbody dissipation rate constant  v Waterbody surface area Depth of water column Openh of uncer benthic layer  0.03 (m)	•	al chemical load into water	Table 4.4.7	(b/yi)	
Average volumetric flow rate  Average volumetric flow rate  Average volumetric flow rate  through water body  comtaminat concentration that  occurs in the water column  Overall total waterbody dissipation  rate constant  v Waterbody surface area  Depth of water column  Depth of water column  On 3 (m)	pod .	y, including deposition,			
Average volumetric flow rate through water body through water body ter Fraction of total water body comtaminat concentration that occurs in the water column Overall total waterbody dissipation rate constant waterbody surface area Site specific (m <sup>2</sup> 3) I Should be to water column of one benthic layer of one of one of the constant of one of the column of one of the colu	יחת	off and erosion			
through water body  ier Fraction of total water body comtaminat concentration that occurs in the water column Overall total waterbody dissipation rate constant  Waterbody surface area Depth of water column Overall total water column		rage volumetric flow rate	Site specific	(m^3/yr)	IDESW-E
comtaminat concentration that occurs in the water column Overall total waterbody dissipation rate constant waterbody dissipation Table 4.4.17 (unitless) rate constant Waterbody surface area Site specific (m <sup>4</sup> 3) i Depth of water column Overall total water column O	thro	ugh water body			
comtaminat concentration that occurs in the water column  Overall total waterbody dissipation  Table 4.4.17 (unitless)  rate constant  Waterbody surface area  Depth of water column  Depth of upoer benthic layer  Occursion to provide the surface area on the surface area of the specific (m <sup>2</sup> ) in the surface area of the surfac		ction of total water body	Table 4,416	(unitless)	
occurs in the water column  Overall total waterbody dissipation  Table 4.4.17 (unitless)  rate constant  Waterbody surface area  Depth of water column  Depth of upoer benthic layer  0.03 (m)	T00	taminat concentration that			
Overall total waterbody dissipation  rate constant  w Waterbody surface area  Depth of water column  Decorb of upper benthic layer  0.03 (m)	000	urs in the water column			
rate constant  • Waterbody surface area  • Waterbody surface area  • Depth of water column  • Depth of upper benthic faver		erall total waterbody dissipation	Table 4.4.17	(unitless)	
v Waterbody surface area Site specific (m <sup>3</sup> ) 1  Depth of water column  Depth of upper benthic faver  0.03 (m)	rate	constant		•	
Depth of water column  Depth of upper benthlic layer	· >	terbody surface area	Site specific	(m <sup>4</sup> 3)	IDESW-B
Deoth of upper benthic laver		th of water column	Site specific	Ξ	IDESW-G
	de Dep	Depth of upper benthic layer	0.03	Œ	

Cwtot (mg/L)

Chemical Name

2.1E-10

2,3,7,8-TCDDioxin TEQ

Fraction in Water Column and Benthic Sediment Table 4.4.16

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8-8)*(dw/(dw+db))]/(1+Kdsw*
e-8)*(dw/(dw+db))]/[(1+Kdsw*

(unitless)	Chemical specific (L/kg) CHEMIC	10 (mg/L) 1.0E-08 (kg/mg)	Site specific (m) IDESW-G	(dw+db) (m) 18.53	Chemical specific (LNg) CHEMIC	1 (g/cm^3)
Fraction of total water body contaminant concentration that occurs in the water column	Suspended sediment/surface	Total suspended solids Conversion factor	Depthof water column Depth of upper benthic layer	Total waterbody depth  Red sediment comsity	Bed sediment/sediment pore	Bed sediment concentration
Fwater	Kdsw	TSS 4	₹€	4 6 6	Kdbs	BS

1-Fwater

Fbenth Fraction of total water body contaminant concentration that occurs in the benthic

(unitless)

Fwater (unitless)

1.0E-02

2,3,7,8-TCDDioxin TEQ

Chemical Name

Total Waterbody Load Table 4.4.7

Ldep+Ldif+Lri+Lr+Le

	Lt	) water	Table 4.4.8	(g/yı) (g/yı)
	Laiff	deposition load to waterbody Vapor phase contaminat  I at the second to waterbody	Table 4.4.12 (g/yr)	(g/yr)
	5		Table 4.4.9 (g/yr)	(b/yr)
	ځ	d from pervious	Table 4.4.10 (g/yr)	(g/yr)
	Le	on load	Table 4.4.11 (g/yr)	(a/yr)
Chemical Name	5	(Gr/yr)		
2,3,7,8-TCDDioxin TEQ	7.2E-01			

Overall Total Waterbody Dissipation Rate Constant

		(yr*-1)	Table 4.4.16		Table 4.4.18 (yr*-1)	Table 4.4.16				Table 4.4.22 (yr-1)
			Table		Table	Table				Table
17	c*kb)	Overall total waterbody dissipation rate constant	Fraction of total waterbody contaminant concentreation	that occurs in the water column	Water column volatilization rate	Fraction o total waterbody	contaminant concentreation	that occurs in the benthic		Benthic burial rate constant
Table 4.4.17	(Fwater*kv)+(Fbenthic*kb)	Overall total w	Fraction o	that occur	Water col	Fraction o	contamine	that occur	sediments	Benthic b
	(Fwater±	¥	fwater		.≱	fbenth				₽

Kwt (yr^-1)

on to Waterboo	<b>8</b> 9.
Deposit	Table 4

(Dywwv+Dytwp)"WAw

(9/yr)	(s/m^2-Yr	(s/m^2-Yr	(m^2)
	Modeled	Modeled	Site-specific (m^2)
Total particle phase and wet phase contaminant direct load to waterbody	Normalized yearly watershed average wet deposition from vapor phase	Normalized yearly watershed average total deposition from particle phase	Water body area
Ldep	Dywwv	Dytwp	WAW

Ldep (g/yr) Chemical Name

2.7E-03 2,3,7,8-TCDDioxin TEQ

Diffusion Load to Waterbody

MAIGING	
3	
5	Table 4.4.12

(Kv\*Cywv\*WAw\*1e-6)/[(H/(R\*T)]

(a/yr)	Tabel 4.4.19 (m/yr) Modeled (ug-s/g-m^3)	Site-specific (m^2) Chemical-specific (atm-m^3/mol)	6.1⊏-US (erm-m~3/mol-K) 296 (K) 1.0E-06 (g/ug)
Dry vapor phase contaminant diffusion load to waterbody	Diffusive mass transfer coefficient Normalized yearly watershed average vapor phase air	Waterbody surface area Waterbody surface area	Universal gas constant Waterbody temperature Conversion factor
Fqiţ	Cymv	WAX	x ⊨ ← \$ ⊕

Ldif (g/yr)

6.6E-01

2,3,7,8-TCDDioxin TEQ

Chemical Name

Impervious Runoff Load to Waterbody

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o,
₹.
4
<u>•</u>
묩
₽
•

(Dywwv+Dytwp)\*WAi

	VA.	75	(g/yr) Site-specific (m^2)	(g/yr) (m^2)
	Dywwv	receiving politically deposition  Normalized yearly watershed average wet deposition from	Modeled	(s/m^2-yr)
	Dytwp	vapor phase Normalized yearly watershed average total deposition from particle phase	Modeled	(s/m^2-yr)
Chemical Nате	<b>'</b> 5	(g/yr)		
2,3,7,8-TCDDioxin TEQ	8.1E-04			

Impervious Runoff Load to Waterbody Table 4.4.9

(g/yr)

5

Chemical Name

8.1E-04

2,3,7,8-TCDDioxin TEQ

areroody	
KUNOTI LOSO TO Waterbod	
Pervious Kunon	Table 4.4.10
Σ	Ë

R\*(WAL-WAi)\*[(Sc\*1.5\*.01)/(.2+(1.5\*2.8e+5))]

Sit-specific Table 4.4.1  Table 4.4.1  Chemical-specific ng Site-specific	(J/A)	(cm/yr)	(mg/kg)		1.5 (g/cm^3)	(§	(m^2)		(m^2)		0.01 (kg-cm^2/mg-m^2)	0.2 (cm^3/cm^3)
unface runoff load nnual surface runoff concentration in soils ensity partition coefficient rashed area receiving eposition s watershed area pollutant deposition n factor		Sit-specific	Table 4.4.1		=	Chemical-specific	Site-specific		Site-specific		0.0	Ö
Pervious s Average a Average a Pollutant c watershed Soil bulk d Soil-water Total water pollutant d Impervious receiving I	Pervious surface runoff load	Average annual surface runoff	Pollutant concentration in	watershed soils	Soil bulk density	Soil-water partition coefficient	Total watershed area receiving	pollutant deposition	Impervious watershed area	receiving pollutant deposition	Conversion factor	Volumetric soil water content
S Kds Sc WAI	۲	œ	သွ		8	Kds	WAI		WAi		0.01	ő

Emsion Load to Waterbody Table 4.4.11

	e e	Soil erosion load		(g/yr)
	×	Unit soil loss	Table 4.4.13	(kg/m^2/yr)
	တွ	Pollutant concentration in	Table 4.4.1	(mg/kg)
		watershed soils		
	8	Soil bulk density	1.5	1.5 (g/cm^3)
	Š	Volumetric soil water content	0.2	0.2 (cm <sup>A</sup> 3/cm <sup>A</sup> 3)
	Kds	Soil-water partition coefficient	Chemical-specific (L/kg)	( <u>7</u>
	WA	Total watershed area recieving	Site-specific	(m^2)
		pollutant deposition		
	WAi	Impervious watershed area	Site-specific	(m^2)
		recieving pollutant deposition		
	S	Watershed sediment delivery	Table 4.4.14	(nuitless)
		ratio		
	Æ	Soil snrichment ratio	60	3 (unitless)
	0.001	Conversion factor	0.001	0.001 [(g/kg)]/[(mg/kg)]
Chemical Name	Le	(Ø/Yr)		

Water Column Volatiliziation Loss Rafe Constant Table 4.4.18

	Kv/[(d₩+	Kv/[(dw+.03)*(1+2.1e+6*10*1e-6)]		
	KV dz Kdsw TSS	Water column volatilization rate Overall transfer rate Total waterbody depth Suspended sediments/surface water partition coefficient Total suspended solids	(yr^-1) Table 4.4.19 (m/yr) dw+db (m) Chemical-specific (L/kg)	(yr^-1) (m/yr) (m) (L/kg)
	16-6	Conversion factor	1.0E-06	1.0E-06 (kg/mg)
Chemical Name	<b>≩</b>	(yr^-1)		
2,3,7,8-TCDDioxin TEQ	6.5E+02	)2		

Benthic Burial Rate Constant Table 4.4.22

	[(Xe*WA	[(Xe*WAI*SD*1e+3-Vfx*10)/(WAw*10)]/[(10*1e-6)/(1*.03)]	)*1e-6)/(1*.03)]	
	₽	Benthic bunal rate constant		(yr^-1)
	×	Unit soil loss	Table 4.4.13 (kg/m^2/yr)	(kg/m^2/yr)
	WA	Watershed area recieving fallo Site-specific	Site-specific	(m^2)
	S	Watershed sediment delivery	Table 4.4.14 (unitless)	(nuitless)
		ratio		
	1e3	Conversion factor	1.0E+03 (g/kg)	(g/kg)
	Χ¥	Average volumetric flow rate	Site-specific (m^3/yr)	(m^3/yr)
		through watershed		
	TSS	Total suspended solids	5	10 (mg/L)
	WAW	Waterbody surface area	Site-specific (m^2)	(m^2)
	BS	Benthic soilds concentration	_	(kg/L)
	용	Depth of upper benthic sedime	0.03	0.03 (m)
		layer		
	16-6	Conversion factor	1.0E-06	1.0E-06 (kg/mg)
Chemical Name	ð	(yrr-1)		

1.4E-01

Overall Transfer Rate Table 4.4.19

	[KI^-1+[6	[Ki^-1+[(Kg*H)/(Rg*Tw)]^-1]^-1*Q^(Tw-2)		
	≩	Overall transfer rate		(m/yr)
	₹	Liquid phase transfer coefficien Tabel 4.4.20	Tabel 4.4.20	(m/yr)
	<b>⋧</b>	Gas phase transfer coefficient Table 4.4.21	Table 4.4.21	(m/yr)
	ı	Henry's Law constant	Chemical-specific (atm-m^3/mol)	(atm-m^3/mol)
	2	_	8.1E-05	8.1E-05 (atm-m^3/mol-K)
	≱	Waterbody temperature	298 (K)	€
	σ	Temperature correction factor	1.026	1.026 (unitless)
Chemical Name	Š	(m/yr)		

1.2E+05

Watershed Soil Concentration Due to Deposition Table 4.4.1

လွ

Average soil concentration over exposure duration

Sc	Average soil concentration over		(mg/kg)	
S	exposure duration Depostion term		(ma/ka-vr)	
ည	Time period over which	Site-specific	(k)	
	deposition occurs			
Sctc	Soil concentration at time Tc		( <b>т</b> д/kg)	
ķ	Soil loss constant	Table 4.4.2	(gr*-1)	
2	Exposure duration		30 (A)	
F	Time at beginning of exposure		(yr)	
	Soil concentration at time Tc Sctc			
[Ds*(1-e	jDs*(1-exp(-ks*Tc))]/ks			
Sctc	Soil concentration at time To		(mg/kg)	
S O	Depostion term		(mg/kg-yr)	
S	Soil loss constant	Table 4.4.2	(yr <sup>4</sup> -1)	
12	Exposure duration	Scenario-specific		
	Depostion term Ds			
[100+][:3	[100*[[.31536*Vdv*Cywv]+Dywwv+Dytwp]]/z*BD			
Ds	Depostion term		(mg/kg-yr)	
₽,	Dry deposition velocuty		3 (cm/s)	
Cywv	Normalized yearly watershed average vapor phase air	Modeled	(ug-s/g-m^3) DISPERS	DISPER
	concentration			
D/wwv	Normalized yearly watershed	Modeled	(s/m/2-yr)	DISPERS

		average wet deposition from vacor phase				
	Dytwp	Normalized yearly watershed average total (wet and dry)		Modeled (s/m//	2-yr) [	(s/m^2-yr) DISPERS
	90	deposition from particle phase Soil bulk density Soil miving death		1.5 (g/cm^3) 1 (cm)	(ç)	
	100	Units conversion factor		m-gm]	[mg-m^2]/[kg-cm^2]	cm^2]
Chemical Name	8	) ps. ( <b>(1)(0,1)</b>	(mg/kg)	S B	Ş	
2,3,7,8-TCDDioxin TEQ	1,46.07	7 1.9E-07		1860		

(RF\*K\*LS\*C\*PF\*(907.18/4047)

Unit soil loss
USLE rainfall factor
USLE erodibility factor
USLE length-slope factor
USLE cover management factor
USLE supporting practice factor
Conversion factor

(kg/m^2/yr)
Site-specific (yr^-1)
0.36 (ton/acre)
1.5 (unitless)
0.1 (unitless)
1 (unitless)
407.18 (kg/ton)
4047 (m^2/acre)

Xe RF K LS C C PF 907.18

(kg/m^2/yr) ×

Chemical Name

3.6E+00 2,3,7,8-TCDDioxin TEQ

Sediment Delivery Ratio Table 4.4.14

a\*(WAI)^-.125

Site-specific (m²2) IDESW Watershed-specific (untiless) 0.125 (untiless) Watershed sediment delivery ratio
Watershed area recieving fallout Empirical infercept coefficient Empirical slope coefficient ه ه ≷ SD

(unitless)

Chemical Name

SD

1.0E-01 2,3,7,8-TCDDioxin TEQ

Liquid Phase Transfer Coefficient (Quiescent lake or pond) Table 4.4.20

(Cd^0.5\*W)\*(pa/pw)^0.5\*(vK^0.33/y2)\*(uw/(pw\*Dw))^-0.67\*31500000)

(m/yr) Chemical-specific (cm^22s)	0.0011 (unitless)	Site-specific (m/s)	1.2E-03 (g/cm^3)	1 (g/cm^2)	0.4 (unitless)	4 (untiless)	1.7E-02 (g/cm-s)	3.2E+07 (s/yr)
Liquid phase transfer coefficient Diffusivity of chemical in water	Drag coefficient	Wind velocity, 10 m above water Surface	Density of air corresponding to water temperature	Density of water corresponding to water temperature	von Karman's constant	Dimensionless viscous sublayer thickness	Viscosity of water corresponding to the water temperature	Conversion constant
⊽ ਨੂੰ	3	<b>š</b>	ed.	¥	*	у2	*	3.15e7

Chemical Name KI (m/yr)

2,3,7,8-TCDDioxin TEQ 2.0E+02

Gas Phase Transfer Coefficient (Quiescent lake or pond) Table 4.4.21

		Table 4.4.21	
	(Cd^.5"W	(Cd^.5*VV)*(vk^.33/y2)*[ua/(pa*Da)]^.67*3.15e+7	
	χ.	er coefficient	(m/yr)
	ర్ ≥	Und velocity, 10 m above	O.DOTT (UNITIESS) fic (m/s)
		water surface	
	*	van Kaman's constant	0.4 (unitless)
	<sub>y2</sub>	Dimensionless viscous sublayer	4 (unitless)
	ı	thickness	
	<b>6</b> 0	Viscosity of air corresponding	1.8E-04 (g/cm-s)
		to the air temperature	
	pa	Density of air corresponding to 1.2E	1.2E-03 (g/cm^3)
		water temperature	
	Ö	Diffusivity of chemical in air Chemical-specific (cm^2/s)	ific (cm^2/s)
	3.15e7	Conversion constatn 3.2E	3.2E+07 (s/yr)
Chemical Name	\$	(m/yr)	

4.5E+05

Soil Loss Constant Table 4.4.2

ks|+kse+ksr+ksg+ksv

	sy	Soil loss constant due to all		(yr²-1)
		processes		
	S	Loss constant due to leaching	Table 4.4.3	(VP <sup>4</sup> -1)
	kse	Los constan due to soil	Talbe 4.4.4	(yrv-1)
		erosion		
	ksr	Loss constant due to surface	Table 4.4.5	(yr^-1)
		runoff		
	S	Loss constant due to degradation	Chemical-speci	ific (yr^-1)
	ks	Loss constan due to volatilization	Table 4.4.6 (yr'-1)	(yrv-1)
Chemical Name	ķ	(yr^-1)		
2,3,7,8-TCDDioxin TEQ	9.2E-02	02		

ĭ	4.0
ξ	4
2	흥
Š	Table
_	_

(P+I-R-Ev)/[Qs\*z\*(1+(BD\*Kds/BD))]

	1			41.7
	Š	Loss constant due to leaching		(- L- A)
	۵	Average annual precipitation	Site-specific	(cm/yr)
	_	Average annual irrigation	Site-specific	(cm/yr)
	œ	Average annual runoff	Site-specific	(cm/yr)
	Щ.	Average annual	Site-specific	(cm/yr)
		evapotranspiration		•
	ő	Soil volumetric water content	0.2	2 (mL/cm^3)
	7	Soil depth from which leaching		- (cm)
		removal occurs		
	Kds	Soil-water partition coefficient	Chemical-specific (cm^3/g)	(cm^3/g)
	80	Soil bulkdensity	Ŧ	1.5 (g/cm^3)
Chemical Name				
	<u> 5</u>	(y-y-1)		
2,3,7,8-TCDDioxin TEQ	9.0E-05			

5	
3	
	4
)	)e 4.4
3	Table

	[(.1*Xe	[(.1*Xe*SD*ER)/(BD*z)]*[(Kds*BD)/(Qs+(Kds*BD))]		
	x × 0	Loss constant due to erosion Unit soil loss Sediment delivery ration Contaminant enrichment ratio Soil mixing depth Soil volumetric water content Soil-water partition coefficient	ੰ ਨ	Chemical
Chemical Name	<b>&amp;</b> .	Soil bulk density	1.5 (g/cm^3)	

kse (yr^-1) 7.4E-02

e to Runoff	
ss constant due	Table 4.4.5
Loss	_ _

[R/(Qs\*z)]\*[1/(1+(Kds\*BD)/Qs)]

	ķ	loss constant due to month	(vr4-1)	
	Ž		/r- i/	;
	œ		Site specific (cm/yr) IDETRAN	z
	ő	r content	0.2 (mL/cm^3)	
	7		1 (cm)	
	Kds	Soil-water partition coefficient	Chemical specific (cm^3/g) IDECHE	ш
	8	Soil bulk density	1.5 (g/cm^3)	
Chemical Name	}	***		

ksr (yr^-1) 3.0E-05

Loss Constant due to Volitilization Table 4.4.6

[(3.1536e+7\*H)/(z\*Kds\*R\*T\*BD)]\*[.482\*u^.78\*(us/(pa\*Ds))^-.67]\*[((4\*A/(Pi))^.5)^-.11]

	ksv	Loss constant due to	(yr <sup>2</sup> -1)	
		volatilization		
	3.1536e7	3.1536e7 Conversion constant	3.2E+07 (s/yr)	
	I	Henry's Law constant	Chemical specific (atm-m^3/mol)	DECHEM
	Z	Soil mixing depth	1 (cm)	
	Kds	Soil-water partition coefficient	Chemical specific (cm^3/g)	IDECHEM
	œ	Universal Gas constant	8.1E-05 (atm-m^3/mol-K)	
	8	Soil bulk density	1.5 (g/cm^3)	
	<b>-</b>	Ambient air temperature	Site specific (K)	IDETRAN-TC
	_	Average annual wind speed	Site specific (m/s)	IDETRAN
	en	Viscosity of air	1.8E-04 (g/cm-s)	
	<b>8</b> 0	Density of air	1.2E-03 (g/cm^3)	
	රී	Diffusivity of contaminant in air	Chemical specific (cm^2/s)	DECHEM
	∢	Surface area of contaminated area	Site speficic (m^2)	IDESW
Chemical Name	ksv	(باس-1)		

2,3,7,8-TCDDioxin TEQ 1.8E-02

- -----

2,3,7,8-TCDDioxin TEQ

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1E-06

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Cancer Risk for Individual Chemicals for Subsistence Farmer Scenario Table 5.1.6

		0:::0	
	C R = (I*E	C R = (I*ED*EF*CSF)/(BW*AT*365)	
	g -	Individual lifetime cancer risk Total deliv intere of contamine Totals \$ 1.5	(unitless)
	. 🚨	Exposure duration	40 (yr)
	丑	Exposure frequency	350 (day/yr)
	BW	Body weight	70 (kg)
	¥⊥	Averaging time	70 (yr)
	365	Units conversion factor	365 (day/yr)
Chemical	S.		
2,3,7,8-TCDDioxin TEQ	1.0E-06	ø	

Hazard Quotient for Individual Chemicals for Subsi Table 5.1.7

 $HQ = I/(BW^*RfD)$ 

(unitless)	.4 (mg/day)		70 (kg)	Chemical-specific (mg/kg/da
	f Table 5.1.			Chemical
Hazard Quotiem	Total daily intake of Table 5.1.4	contaminant	Body weight	Reference dose
ğ	_		æ	5

Chemical Name HQ (unitless)

ž

2,3,7,8-TCDDiexin TEQ

Total Daily Intake for Subsistence Farmer Scenario Table 5.1.5

| = Isoil + lag + Ibeef + Imilk + Idw

(тв/дау)	(mg/day)	(mg/day)	(mg/day)	(mg/day)	(тр/day)
ŧ	Table 5.1.1	Table 5.1.2	Table 5.1.3	Table 5.1.3	n Table 5.1.4
otal daily intake of contaminan	Saily intake of contaminant rom soil	Daily intake of contaminant agove-ground produce	Jaily intake of contaminant rom beef	Daily intake of contaminant rom milk	Daily intake of contaminant from Table 5.1.4 drinking water
_	ios i	[ag	lbeef	Ē	Mpi
	I Total daily intake of contaminant (mg/day)	Total daily intake of contaminant Daily intake of contaminant from soil	Total daily intake of contaminant  Daily intake of contaminant  from soil  Daily intake of contaminant  Table 5.1.2  agove-ground produce	Total daily intake of contaminant  Daily intake of contaminant  from soil  Daily intake of contaminant  agove-ground produce from beef	Total daily intake of contaminant Daily intake of contaminant from soil Daily intake of contaminant Table 5.1.2 agove-ground produce Daily intake of contaminant Table 5.1.3 from beef  Daily intake of contaminant Table 5.1.3 from milk

Chemical Name I (mg/day)

2,3,7,8-TCDDioxin TEQ 8.4E-10

Soil Intake for Subsistence Farmer Scenario Table 5.1.1

Isoil = Sc \* CRsoil \* Fsoil

Daily intakeof soil
Soil concentration
Consuption rate of soil
Fraction of consumed soil
contaminated Isoil Sc CRsoil Fsoil

Table 4.1.1 (mg/kg) 0.0001 (kg/day) 1 (unitless)

Isoil (mg/day)

Chemical Name

2.0E-11 2,3,7,8-TCDDioxin TEQ

Soil Concentration due to Deposition Table 4.1.1

		(mg/kg) (mg/kg-vr)	(A)	(mg/kg)	(A)	
1			Site specific	Table 4 1 2	Ę	
၁၄	Tc)]]/(T2-T1)					Sdc
Average soil concentration over exposure duration	[[(Ds*Tc-Sac)/ks]+[(Sac/ks)*(1-exp(-ks*(T2-Tc)]]/(T2-T1)	Average soil concentration Deposition term	Time period over which deposition occurs	Soil loss constant	Exposure duration	Soil concentration at time Tc
	[[(Ds⁴T¢	S <sub>C</sub>	ဍ	Sctc	27	

IDETRAN

30 yrs

[Ds\*(1-exp(-ks\*Tc))]/ks

õ

Depostion term

	100 ([mg-m^2]/[kg-cm^2]) 1 (cm)	1.5 (g/cm^3) 0.31536 (m-g-s/cm-ug-yr)	3 (cm/s) Modelled (ug-s/g-m^2) DISPC1-	Modelled (s/m²2-yr) DISPC1-	Modelled (s/m²2-yr) DISPC1-	Modelled (s/m^2-yr) DISPC1-
[100*[(.31536*Vdv*Cyv+Dywv)+(Dydp+Dywp)]]/(z*BD)	100 Units conversion factor z Soil mixing depth	BD Soil bulk density 0.31536 Units conversion factor	Vdv Dry deposition velocity Cyv Normalized vapor phase air	concentration  Dywy Normalized yearly wet	deposition from vapor priase  Dydp Normalized yearly dry  deposition from particle phase	Dywp Normalized yearly wet deposition from particle phase

Sic (mysta) 2 0E-07	) Ds (mp/kg-yr)	
St. (myka) z 0E-07	(mg/kg)	
St. (myka) z 0E-07	ડુલ૯	3.6E-07
Chemical Name	St. (mg/kg)	205.07
	Chemical Name	2.3.7.8-TCDDioxin TEO

Soil Loss Constant Table 4.1.2

ksi+kse+ksr+ksg+ksv

(yr/-1)		( <del>, , ,</del>	(yrv-1)		(yry-1)		c (yry-1)		(yry-1)	
		Table 4.1.3			Table 4.1.4		Chemical specific (yr*-1)		Table 4.1.5	
Soil loss constant due to all	processes	Loss constant due to leaching	Loss constant due to soil	erosion	Loss constant due to surface	runoff	Loss constant due to	degradation	Loss constant due to	volatilization
S		ŝ	kse		ks		gs		ksv	

(yr^-1)	
হ	
Chemical Name	

1.8E-02

Loss Constant Due to Leaching Table 4.1.3

	IDETRAN IDETRAN IDETRAN IDETRAN	DECHE
	(yr^-1) (cm/yr) (cm/yr) (cm/yr) (cm/yr) 1 (cm)	(cm^3/g)
	Site specific Site specific Site specific Site specific	Chemical specific
(P+I-R-Ev)/[Qs*z*(1+(BD*Kds/Qs))]	ue to leaching precipitation irrigation runoff evapo- water content which leaching	Soil-water pertition coefficient Chemical specific (cm^3/g) IDECHE
(P+I-R-I	፳፻-ጜ፵ &^	Kds

2,3,7,8-TCDDioxin TEQ 9.0E-05

(yrv-1)

<u>s</u>

Chemical Name

[R/(Qs\*z)]\*[1/(1+(Kds\*BD)/Qs)]

DETRAN	IDECHE
(yr^-1) (cm/yr) 0.2 (cL/cm^3)	1 (cm) (cm^3/g) 5 (g/cm^3)
Site specific 0.2	1 (cm) Chemical specific (cm^3/g) IDE 1.5 (g/cm^3)
Loss constant due to runoff Average annual runoff Soil volumetric water content	Soil mixing depth Soil-water partition coefficient Soil bulk density
ž ~ Q	z Kds BD Gs

ksr (yr^-1) 3.0E-05 2,3,7,8-TCDDioxin TEQ Chemical Name

Loss Constant due to Volitilization Table 4.1.5

[(3.1536e+7\*H)/(z\*Kds\*R\*T\*BD)]\*[.482\*u^.78\*(ua/(pa\*Da)^.67]\*[((4\*A/(P))^.5)^.11]

		DECHEM		IDECHEM			IDETRAN-To	IDETRAN			DECHEM	DETRAN
(yr*-1)	(a/yr)		(F <sub>0</sub> )	(cm^3/g)	8.1E-05 (atm-m^3/mol-K)	(g/cm^3)		(m/s)	(a/cm-s)	(g/cm^3)	(cm^2/s)	(m^2)
		Chemical specific (atm-m^3/mol)	-	Chemical specific (cm^3/g)	8.1E-05 (	1.5E+00 (g/cm^3)	Site specific	Site specific	1.8E-04 (g/cm-s)	1.2E-03 (g/cm^3)	Chemical specific (cm^2/s)	Site speficic
Loss constant due to volatilization	Conversion constant	Henry's Law constant	Soil mixing depth	Soil-water partition coefficient	Universal gas constant	Soil bulk density	Ambient air temperature	Average annual wind speed	Viscosity of air	Density of air	Diffusivity of contaminant in air	Surface area of contaminated area
ksv	3.1536e7	I	2	Kds	œ	8	<b>-</b>	_	en en	Pa Bd	ជី	∢

Chemical Name ksv

(yr4-1)

1.8E-02

Above-Ground Produce Intake for Subsistence Farmer Scenario Table 5.1.2

⊃r)*CRag*Fag
H+V4+D4)

	lag	Daily intake of contaminant from soil		(mg/day)
	B	Concentration in above-ground Table	4.2.6	Table 4.2.6 (mg/kg)
	ď	ation in above-ground tue t air-to-plant	4.2.7	Table 4.2.7 (mg/kg)
	ፈ	uansier Concentration in above-ground produce due to not untake	4.2.8	Table 4.2.8 (mg/kg)
	CRag	produce doctors upware control produce control produce control produce control	0.028	0.028 (kg/day)
	Fag	Fraction of above-ground produce contaminated	-	1 (unitless)
Chemical Name	lag	(mg/day)		

2,3,7,8-TCDDioxin TEQ 2.0E-11

Above-Ground Produce Concentration Due to Direct Deposition

			DISPC1-	CHEMIC	DISPC1-				
		(unitless)	(s/m^2-yr)	(unitless)	(g/m^2/yr)	0.04 (unitless)	18 (yr^-1)	(vrs)	1.7 (kgDW/M^2)
			Modelled	Chemical specific (unitless)	Modelled	0.04	18	0.16 (yrs)	1.7
Above-Glouin Flounce Collection Due to Direct Deposition Table 4.2.6	[[1000*(Dydp+(Fw*Dywp)]*Rp*[(1-exp(-kp*Tp)]]/(Yp*kp)	Units conversion factor	Normalized yearly dry deposition from particle phase	Fraction of wet deposition that adheres to plant	Yearly particle phase wet deposition rate	Intercetion fraction of edible portion of plant	Plant surface loss coefficient	Length of plant exposure to deposition of edible portion of parties of edible portion of clant per harvest	Yield or standing crop biomass of the edible portion of the plant
	(1000±(	1000	Dydp	<b>3</b> ↓	Dywp	&	₽	<u>۴</u>	Ϋ́

Pd (mg/kg)	1.1E-10
Chemical Name	2,3,7,8-TCDDioxin TEQ

Above-Ground Produce Concentration Due to Air-to-Plant Transfer Table 4.2.7

(Cyv*Bv*VGag)/pa

(mg/kg)	(ug-sec/g-m^3) DISPC1-	Chemical specific (mgplant/ugair) CHEMIC 0.01 (unitless)	.2E+03 (g/m^3)
	Modelled	Chemical specific 0.01	1.2E+03
Concentration of pollutant in the plant due to air-to-plant transfer	Normalized vapor phase air concentration	Air-to-plant biotransfer factor Empirical correction factor for above-ground produce	Density of air
ď	Cyv	Bv VGag	2

Chemical Name Pv (mg/kg) 2,3,7,8-TCDDioxin TEQ 7.0E-11

Above-Ground Produce Concentration Due to Root Uptake Table 4.2.8

Sc\*Br

	g o	Concentration of pollutant in the Average soil concentration of pollutant over exposure duration	Table 4.2.1	(mg/kg) (mg/kg)	
	ā	Plant-soil bioconcentration factor for above-ground produce	Chemical specific	Chemical specific (ug/gp/ant)/(ug/gsoil) CHEMIC	H <b>EM</b> IC
Chemical Name	ģ	(mg/kg)			
2,3,7,8-TCDDioxin TEQ	5.2E-10	01			

Soil Concentration due to Deposition Table 4.2.1

	(mg/kg) (mg/kg-yr) 30 Site specific (yr)	(mg/kg) Table 4.1.2 (yr^-1) 30 Senario specific (yr) 0 Senario specific (yr)		([c <sub>v</sub> m-s <sub>0</sub> ])	1 (Cm) 1	1.5 (g/cm~3) 0.31536 (m-g-s/cm-ug-yr)	3 (cm/s) Modelled (uncelled)		Modelled (s/m^2-yr)	Modelled (s/m^2-yr)	Modelled (s/m^2-yr)	) Ds (mg/tg-jr)	1.3E-08
[[(Ds*Tc-Sdc)/ks]+[(Sdc/ks)*(1-exp(-ks*(T2-Tc)]]/(T2-T1)	sentration which	deposition occurs Soil concentration at time Tc Soil loss constant Exposure duration Exposure duration	[Ds*(1-exp(-ks*Tc))]/ks	[100=[(.31536=VGV-CyV+UyWV)+(Uydp+UyWp)]j/(z*BU)	Soil mixing depth	Soil bulk density Units conversion factor	Dry deposition velocity	concentration	Normalized yearly wet deposition from vapor phase	Normalized yearly dry deposition from particle phase	Normalized yearly wet deposition from particle phase	(mg/kg) Scic (mg/kg)	2.9E-07
S->T*20)jj	<b>S</b> O	Scic ks 12 11	[Ds*(1-ex	[1007](.31	2 2	BD 0.31536	<b>^p/</b>		Dywv	Dydp	Dymp	Chemical Name &c	2,3,7,8-TCDDioxin TEQ 1.6E-07

(yr^1)	0 (47-1)	(yr*-1)		lic (yr*-1)	(yry-1)
		Table 4.2.4		Chemical specif	Table 4,2.5 (yr/-1)
Soil constatn due to leaching	Loss constant due to soil erosion	Loss constant due to surface	runoff	Loss constant due to degradation	Loss constant due to volatilization
ķ	kse	ksr		ž,	ksv

ŏ	Loss constant due to volatilization
<b>\$</b>	KSV

Loss constant due to degrad	Loss constant due to volatili:	
<u> </u>	ksv	

(yr\*-1)

ন

Chemical Name

1.8E-02

	0.0E+00
	tsg S
Loss Constant due to Degradation	Appendix A

	g	
HOUSE BOOK OF THE SECOND SECOND	Appendix A	0.0E+00

	Table 4.2.3		
P+I-R	(P+I-R-Ev)/[Qs*z*(1+(BD*Kds/Qs))]		
ks	Loss constant due to leaching		(yr^-1)
0	Average annual precipitation	Site specific	(cm/yr)
	Average annual irrigation	Site specific	(cm/hl)
~	Average annual runoff	Site specific	(cm/yr)
Ę.	Average annual evapo-	Site specific	(Cm/yr)
	transporation		
ő	Soil volumetric water content	Ö	0.2 (mL/cm <sup>3</sup> )
	Soil depth from which leaching		1 (cm)
	removal occurs		
Kds	Soil-water partition coefficient	Chemical specific (cm^3/a)	(CTT^3/0)

0.2 (mLcm^3) 1 (cm)

(yr*-1)	
3	
Chemical Name	

9.0E-05

01 and 10	
งดราสก	Table 4.2.4
200	Table

[R/(Qs\*z)]\*[1/(1+(Kds\*BD)/Qs)]

ksr Loss constant due to runoff R Average annual runoff Qs Soil volumetric water content z Soil mixing depth Kds Soil-water partition coefficient Chemical specific (cm/3/g) II SOI bulk density 1.5 (g/cm/3)	IDETRAN			DECHEM	
Loss constant due to runoff Average annual runoff Soil volumetric water content Soil mixing depth Soil-water partition coefficient Soil bulk density	(yr^-1) (cm/yr)	0.2 (cL/cm^3)	1 (CIII)	fic (cm^3/g)	1.5 (g/cm^3)
	Site specific			Chemical speci	
R C C S K K K K K K K K K K K K K K K K K	Loss constant due to runoff Average annual runoff	Soil volumetric water content	Soil mixing depth	Soil-water partition coefficient	Soil bulk density
	Ŗα	ő	7	Kds	80

ksr (yr^-1)

3.0E-05

2,3,7,8-TCDDioxin TEQ

Chemical Name

Loss Constant due to Volitilization Table 4.2.5

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ksv	Loss constant due to volatilization		(yr-1)	
3.1536e7	3.1536e7 Conversion constant		(s/yr)	
I	Henry's Law constant	Chemical specific (atm-m <sup>3</sup> / IDECHE	(atm-m^3/	IDECHE
2	Soil mixing depth		1 (cm)	
SPX	Soil-water partition coefficient	Chemical specific (cm^3/g) IDECHE	(cm^3/g)	IDECHE
œ	Universal gas constant	8.1E-05	8.1E-05 (atm-m^3/mol-K)	mol-K)
<b>8</b>	Soil bulk density	1.5	1.5 (g/cm^3)	i
F	Ambient air temperature	Site specific	£	IDETRAN
-	Average annual wind speed	Site specific	(m/s)	IDETRAN
RI	Viscosity of air	1.6E-04	1.EE-04 (g/cm-s)	
ed.	Density of air	1.2E-03	1.2E-03 (g/cm^3)	
Pa Oa	Diffusivity of contaminant in air	Chemical specific (cm^2/s) IDECHE	(cm, 2/s)	DECHE
4	Surface area of contaminated area	Site speficio	(m^2)	IDETRAN

Chemical Name ksv (yr^-1)

2,3,7,8-TCDDioxin TEQ 1.8E-02

ner Scenario			(mg/kg)	Table 4.3.9 (mg/kg)	0.057 (kg/day)	1 (unitless)	(mg/kg)	Table 4.3.10 (mg/kg)	0.18 (kg/day)	1 (unitless)
Beef and Milk Intake for Subsistence Farmer Scenario Taibe 5.1.3	lbeef = Tbeef * CRbeef * Fbeef	Imilk = Amilk * CRmilk * Fmilk	Daily intake of comtaminated beef	Concentration in beef	Consumption rate of beef	Fraction of beef contaminated	Daily intake of comtaminated milk	Concentration in milk	Consumption rate of milk	Fraction of milk contaminated
	lbeef = T	Imilk = A	lbeef	Abeef	CRbeef	Fbeef	mik	Amilk	CRMik	Ĭ.

Beef Concentration due to Plant and Soil Ingestion

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	(mg/kg) 1 (unitless)	6.76 (kg/day)	Table 4.3.6, (mg/kg) 4.3.7, 4.3.8	0.5 (kg/day) Table 4.1.1 (mg/kg) Chemical-specific (d/kg)
Abeef = (F * Qp * Pe + Qs * Sc) * Babeef	Concentration of pollutant in beef Franction of plant grown on contaminated soil and	eaten by animal Quantity of plant eaten by the	Total concentration of pollutant in the plant eaten by animal	Quantity of soil eaten by animal Soil concentration Biotransfer factor for beef
Abeef = (	Abeef F	ਰੈ	Pe	Os Sc Babeef

Abeef (mg/kg) Chemical Name

8.6E-09 2,3,7,8-TCDDioxin TEQ

Pe = Pd + Pv + Pr

Chemical Name

1.7E-08 2,3,7,8-TCDDioxin TEQ

Above-Ground Produce Concentration Due to Direct Deposition Table 4.2 6

		Table 4.2.6	
	Pd = [[1	$Pd = [[1000*(Dydp+(Fw^{2}Dywp)]^{P}Rp^{*}[(1-exp(-kp^{*}Tp)]]/(Yp^{*}kp)$	
	1000	Units conversion factor	(unitless)
	충	Normalized yearly dry deposition Modelled	Modelled (s/m^2-yr) DiSPC1-
		from particle phase	
	¥	Fraction of wet deposition that	Chemical (unitless) CHEMIC
		adheres to plant	
	Dywp	Yearly particle phase wet	Modelled (g/m^2/yr) DISPC1-
		deposition rate	
	8	Intercetion fraction of edible 0.5	0.5 (unitless)
		portion of plant	
	9	Plant surface loss coefficient	18 (yr^-1)
	٩	Length of plant exposure to 0.12	(yrs)
	-	of	
		plant, per harvest	
	Ϋ́	Yield or standing crop biomass 0.24	0.24 (kgDW/M^2)
		of the edible portion of the plant	
Chemical Name	Pd	(mg/kg)	
2,3,7,8-TCDDioxin TEQ	9.3E-09		

Forage (Pasture Grass/Hay) concentration due to Air-to-Plant Transf Table 4.3.7

		(mg/kg)	(ng/m2)	: [(mg/kg)]/ 1 (unitless)	(g/m3)
		t	Modeled	Chemical-specific [(mg/kg)]/ 1 (unitless)	1.2E+03 (g/m3)
Table 4.3.7	Pv = (Cyv*Bv*VGag)/pa	Concentration of pollutant in the plant due to air-to-plant transfer	Vapor phase air concentration of pollutant in air due to direct emissions	Air-to-plant biotransfer factor Empirical correction factor that reduces produce concentration because By was developed for	Azalea leaves Density of air
	Pv = (C)	£	Cyv	Bv VGag	<b>B</b> d

Pv 7.0E-09

2,3,7,8-TCDDioxin TEQ

Chemical Name

Forage/Silage/Grain concentration due to Root Uptake Table 4.3.8

		Table 4.3.8		
	Pr = Sc*Br	<b>.8</b>		
	ĕ	concentration of polutant in the plant due to direct untake from soil		(mg/kg)
	တွ	Average soil concentration of pollutant Table 4.1.1	Table 4.1.1	(mg/kg)
	ă	Plant-soil bioconcentration factor	Chemical-specific (ug/g)/(ug	6n)/(6/6n)
Chemical Name	ď	(mg/kg)		
2,3,7,8-TCDDioxin TEQ	6.6E-10	0		

1.6E-07 8.0E-08

Ingestion	
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and	
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Milk concentration due to Plant and Soil Ingestion	Table 4.3.10

	ш	Fraction of plant grown on contaminated soil and	-	1 (unitless)
	,	eaten by aminal	•	
	ô	Quantity of plant eaten by the animal each day	9.63	9.63 (kg/day)
	Pe	Total concentration of pollutant	Table 4.3.6,	(mg/kg)
		in the plant eaten by animal	4.3.7, 4.3.8	
	ő	Quantity of soil eaten by animal	4.0	0.4 (kg/day)
	လွ	Soil concentration	Table 4.1.1	(mg/kg)
	Bamilk	Biotransfer factor for milk	Chemical-specific (d/kg)	(d/kg)
Chemicel Name	Amilk	(mg/kg)		
2.3.7.8-TCDDioxin TEQ	1.7E-09			

Drinking Water Intake for Adult Resident Scenario Table 5.3.3

Cdw\*CRdw\*Fdw

	Αþ	Daily intake of contaminant	(mg/day)
	Cdw	Displaying water Displaying water Displaying Table 4.4.24	(mg/L)
	CRdw	Consumption rate of drinking	1.4 (L/day)
	Fdw	water Fraction of drinking water contaminated	1 (unitless)
Chemical Name	Αþ	(/wp/gm)	
2,3,7,8-TCDDioxin TEQ	3.0E-13		

Cwt/(1+Kdsw\*TSS\*1e-8)

		CHEMIC		
(mg/L)	(mg/L)	ic (L/kg)	0 (mg/L)	1.0E-06 (kg/mg)
	Table 4.5.23	Chemical specific (L/kg)	•	1.0E-0
Dissolved phase water concentration	Total concentration in water column	Suspended sediment/surface water partition coefficient	Total suspended solids	Conversion factor
Šg	Š	Kdsw	TSS	1e-6

Cdw (mg/L)

2.2E-13

2,3,7,8-TCDDioxin TEQ

Chemical Name

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3	Table
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Fwater\*Cwtot\*[(dw+db)/dw]

	Š	Total concentration in water		(mg/L)	
		co nwu			
	Fwater	Fraction of total water body	Table 4.4.16	(unitless)	
		contaminant concentration that			
		occurs in the water column			
	Cwtot	Total water concentration in	Table 4.4.15 (mg/L)	(mg/L)	
		surface water system, including			
		water column and bed sediment			
	용	Depth of upper benthic layer		0.03 (m)	
	ş	Depth of the water column	Site specific	Œ)	IDESW-G
Chemical Name	₹	(mg/L)			

2,3,7,8-TCDDioxin TEQ 2.2E-12

Total Waterbody Concentration Table 4.4.15

LV[(Vfx\*Fwater)+Kwt\*WAw\*(dw+db)]

	IDESW-E			IDESW-B IDESW-G
(mg/L) (g/yr)	(m^3/yr)	(unitless)	(unitless)	(m) (m) (m)
Table 4.4.7	Site specific (m^3/yr) IDESW-E	Table 4.416 (unitless)	Table 4.4.17 (unitless)	Site specific (m^3) Site specific (m) 0.03 (m)
Total water body concentration Total chemical load into water body, including deposition, runoff and erosion	Average volumetric flow rate through water body	Fraction of total water body comtaminat concentration that occurs in the water column	Overall total waterbody dissipation rate constant	Waterbody surface area Depth of water column Depth of upper benthic layer
Cwlot	¥	Fwater	kwt	WAw ⊕ ⊕

Cwtot (mg/L)

Chemical Name

2.2E-10

Fraction in Water Column and Benthic Sediment Table 4.4.16

	Fwater	Fraction of total water body		(unitless)	•
		contaminant concentration that			
		occurs in the water column			
	Kdsw	Suspended sediment/surface	Chemical specific (L/kg)	fic (L/kg)	CHEMIC
		partition coeficient			
	1SS	Total suspended solids		10 (mg/L)	
	16-6	Conversion factor	1.05	1.0E-08 (kg/mg)	
	₽	Depthof water column	Site specific	Œ	IDESW-G
	ə	Depth of upper benthic layer	0	0.03 (m)	
	qz	Total waterbody depth	(qp+*Ap)	Έ	16.53
	SQO	Bed sediment porosity		0.6 (Lwater/L)	
	Kdbs	Bed sediment/sediment pone	Chemical specific (L/kg)	Fic. (C/kg)	CHEMIC
		water partition coefficient		<b>;</b>	
	88	Bed sediment concentration		1 (g/cm^3)	<b>≅</b>
	1-Fwater				
	Fbenth	Fraction of total water body contaminant concentration that occurs in the benthic		(unitless)	ଜ
Chemical Name	Fwater	(unitless)	Plantific (tables)		
2,3,7,8-TCDDioxin TEQ	1.0E-02	~	B. D.C. D.I		

Total Waterbody Load Table 4.4.7

Ldep+Ldif+Lri+Lr+Le

	5	Total contaminant load to the water		(B/yr)
	Ldep	Total particle phase and wet	Table 4.4.8	(JA/B)
		phase contaminant direct		
		deposition load to waterbody		
	Ldiff	Vapor phase contaminat	Table 4.4.12 (g/yr)	(p/yr)
		diffusion load to waterbody		
	5	Rnoff load from impervious	Table 4.4.9	(b/yt)
		surfaces		
	۲	Runoff load from pervious	Table 4.4.10 (g/yr)	(g/yr)
		surfaces		
	Ę.	Soil erosion load	Table 4.4.11 (g/yr)	(a/yr)
Chemical Name	=	(Q/yl)		
2,3,7,8-TCDDioxin TEQ	7.3E-01	-		

Overall Total Waterbody Dissipation Rate Constant

		Overall Total evaluation of Dissipation rate Constant Table 4.4.17	
	(Fwater*)	(Fwater*kv)+(Fbenthic*kb)	
	¥.	Overall total waterbody dissipation rate constant	(yr^.1)
	fwater	Fraction of total waterbody Table 4.4.16 contaminant concentraation	<b>6</b>
	Š	that occurs in the water column Water column valetilization rate	(LA)
	fbenth		5
		contaminant concernreation that occurs in the benthic sediments	
	₽	Benthic burial rate constant Table 4.4.22 (yr-1)	2 (yr^-1)
Chemical Name	Κ	(٨١٧-١)	

6.6E+00

Deposition to Waterbody

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(Dywwv+Dytwp)\*WAw

	Ldep	Total particle phase and wet phase contaminant direct load		(a/yr)
	Dywwv	to waterbody Normalized yearly watershed Modeled average wet deposition from	73	(s/m^2-Yr
	Dytwp	vapor phase Normalized yearly watershed average total deposition from		(s/m^2-Yr
	WAW		Site-specific (m^2)	(m^2)
Chemical Name	rdeb	(g/yri)		

2.7E-03

to Waterbody	
Diffusion Load	Table 4.4.12

(Kv\*Cywv\*WAw\*1e-8)/[(H/(R\*T)]

Ldif Dry vapor phase contaminant diffusion load to waterbody Kv Diffusive mass transfer coefficient Cywv Normalized yearly watershed average vapor phase air concentration WAw Waterbody surface area H Henry's Law constant R Universal gas constant Tw Waterbody temperature 1e-6 Conversion factor	(ð/ði)	Tabel 4.4.19 (m/yr)	Modeled (ug-s/g-m^3)			Site-specific (m^2)	Chemical-specific (atm-m^3/mol)	8.2E-05 (atm-m^3/mol-K)	298 (K)	1.0E-06 (g/ug)
C C C C C C C C C C C C C C C C C C C	Dry vapor phase contaminant diffusion load to waterbody	Diffusive mass transfer coefficient	Normalized yearly watershed	average vapor phase air	concentration	Waterbody surface area	Henry's Law constant	Universal gas constant	Waterbody temperature	Conversion factor
	rqi <u>f</u>	⋧	C)			WAW	I	œ	≱	1e 6

Ldif (9/yr) Chemical Name

6.7E-01 2,3,7,8-TCDDioxin TEQ

Impervious Runoff Load to Waterbody

01 DE	
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>	Table 4
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(Dywwv+Dytwp)\*WAi

	. WA	Impervious surface runoff load Impervious watershed area	Site-specific	(g/yr) (m^2)
	Dywwv	Normalized yearly watershed average wet deposition from	Modeled	(s/m^2-yr)
	Dytwp	vapor phase Normalized yearly watershed average total deposition from particle phase	Modeled	(s/m^2-yr)
Chemical Name	ž	(Qryn)		

8.1E-04

Pervious Runoff Load to Waterbody Table 4.4.10

R\*(WAI-WAI)\*[(Sc\*1.5\*.01)/(.2+(1.5\*2.8e+5))]

	ت	Pervious surface runoff load		(B/AL)
	œ	Average annual surface runoff	Sit-specific	(cm/hr)
	တွ	Pollutant concentration in	Table 4.4.1	(mg/kg)
		watershed soils		
	28	Soil bulk density	7.5	1.5 (g/cm^3)
	X Sg	Soil-water partition coefficient	Chemical-specific	(L/kg)
	WA	Total watershed area receiving	Site-specific (m^2)	(m^2)
		pollutant deposition		
	WAi	Impervious watershed area	Site-specific	(m^2)
		receiving pollutant deposition		
	0.01	Conversion factor	0.01	(kg-cm^2/mg-m^2)
	S	Volumetric soil water content	0.2	0.2 (cm^3/cm^3)
Chemical Name	ے	(Ø/AL)		
2,3,7,8-TCDDioxin TEQ	2.2E-05	50		

Erosion Load to Waterbody Table 4.4.11

Xe\*(WAI-WAI)\*SD\*3\*[(Sc\*2.8e+5\*1.5)/(.2+2.8e+5\*1.5)]\*.001

	9	Sail oracion load		(aha)
	נים			(9/31)
	×	Unit soil loss	Table 4.4.13	(kg/m^2/yr)
	Sc	Pollutant concentration in	Table 4.4.1	(mg/kg)
		watershed soils		;
	윱	Soil bulk density	1.5	1.5 (g/cm^3)
	ő	Volumetric soil water content	0.2	0.2 (cm^3/cm^3)
	Kds	Soil-water partition coefficient	Chemical-specific	( <b>9</b> (2)
	ΚA	Total watershed area recieving	Site-specific (m^2)	(m^2)
		pollutant deposition		
	WAi	Impervious watershed area	Site-specific	(m^2)
		recieving pollutant deposition		
	S	Watershed sediment delivery	Table 4.4.14	(unitless)
		ratio		
	딾	Soil snrichment ratio	60	3 (unifiless)
	0.001	Conversion factor	0.001	0.001 {(g/kg)}/[(mg/kg)]
Chemical Name	e F	(J/A/L)		

5.4E-02

Water Column Volatiliziation Loss Rate Constant Table 4.4.18

		(yr^-1)	4.4.19 (m/yr)	Œ,	cal-specific (L/kg)		1.0E+01 (mg/L)	1.0E-08 (kg/mg)
			Table 4	qp+wp	Chemi			
4.4.10	Kv/[(dw+.03)*(1+2.1e+6*10*1e-6)]	Water column volatilization rate	Overall transfer rate	Total waterbody depth	Suspended sediments/surface	water partition coefficient	Total suspended solids	Conversion factor
	Kv/[(dw-	Ķ	₹	<b>dz</b>	Kdsw		TSS	16-6

(yr--1)

<u>≥</u>

Chemical Name

tate Constant	
Benthic Burial R	

	[(Xe*WA	[(Xe*WAI*SD*1e+3-Vfx*10)/(WAw*10)]/[(10*1e-6)/(1*.03)]		
	ð	Benthic burial rate constant		(yrv-1)
	å	Unit soil loss Ta	ble 4.4.13	Table 4.4.13 (kg/m^2/yr)
	WAI	Watershed area recieving fallout Sit	Site-specific	(m^2)
	S	Watershed sediment delivery Ta	Table 4.4.14 (unitless)	(unitless)
		ratio		
	1e3	Conversion factor	1.0E+03 (g/kg)	(g/kg)
	ζ¥	Average volumetric flow rate	Site-specific (m^3/yr)	(m^3/yr)
	TSS	Total suspended solids	5	10 (mg/L)
	WAW		te-specific	(m <sup>4</sup> 2)
	BS	tion	1 (kg/L)	(kg/L)
	용	Depth of upper benthic sediment	0.03	0.03 (m)
		layer		
	18-6	Conversion factor	1.0E-06	1.0E-06 (kg/mg)
Chemical Name	€	(بالب-1)		
2,3,7,8-TCDDioxin TEQ	1.4E-01	-		

Overall Transfer Rate

2	<del>1</del> 0
	Table 4.4.19
•	

[KI^-1+[(Kg\*H)/(Rg\*Tw)]^-1]^-1\*Q^(Tw-2)

(m/yr) 21 (m/yr) 21 (m/yr) specific (atm-m-3/mol) 8.1E-05 (atm-m-3/mol-K) 298 (K) 1.026 (unitless)	
Tabel 4.4.20 (Cable 4.4.21 (Chemical-specific (B.1E-05 (1.028))	
Overall transfer rate Liquid phase transfer coefficient Tabel 4.4.20 Gas phase transfer coefficient Table 4.4.21 Henry's Law constant Universal gas constant Waterbody temperature Temperature correction factor	•
Ş≅Zıg'∮α	

Kv (m/yr) 2,3,7,8-TCDDioxin TEQ 1.2E+05 Chemical Name

Watershed soil Concentration Due to Deposition Table 4.4.1

တွ

Average soil concentration over exposure duration

							DISPERS	DISPERS
	(mg/kg) (mg/kg-yr) (yr)	(mg/kg) (ym²-1) 30 (ym) 0 (yr)		(mg/kg) (mg/kg-yr) (yr^-1) c (yr)			(mg/kg-yr) 3 (cm/s) (ug-s/g-m^3) DISPERS	(s/m^2-yr)
	Site-specific			Table 4.1.2 Scenario-specific			Modeled	Modeled
2-Tc)]J/(T2-T1)			Sac		Ds	/z*BD		
[[(Ds*Tc-Sac)/ks]+[(Sac/ks)*(1-exp(-ks*(T2-Tc)]]/(T2-T1)	Average soil concentration over exposure duration Depostion term	deposition occurs Soil concentration at time Tc Soil loss constant Exposure duration Time at beginning of exposure	Soil concentration at time Tc [Ds*(1-exp(-ks*Tc))]/ks	Soil concentration at time Tc Depostion term Soil loss constant Exposure duration	Depostion term	[100*[[.31536*Vdv*Cywv]+Dywwv+Dytwp]]/z*BD	Depostion term Dry deposition velocuty Normalized yearly watershed average vapor phase air	Normalized yearly watershed
[[(DsTc-S	ა გე <u>გ</u>	Scic 12 11	[Ds*(1-exp	Sdc Ds ks T2		[100*[[.315	oyw Cyw	Dywwv

		average wet deposition from				
		vapor phase				
	Dytwp	Normalized yearly watershed		Modeled (s/r	(s/m^2-yr) DISPERS	DISPERS
		average total (wet and dry)				
	8	Soil bulk density		1.5 (g/	/cm^3)	
	Z	Soil mixing depth		<u>-</u>	Ê	
	100	Units conversion factor		Ē	[mg-m^2]/[kg-cm^2]	-cm^2]
Chemical Name	8	(mohd) Salc (	(mg/kg)	8	(Jack)	
2,3,7,8-TCDDioxin TEQ	1.46-07	T 1.9E-07		1,05.09		

Universal Soil Loss Equation (USLE) Table 4.4.13

(RF\*K\*LS\*C\*PF\*(907.18/4047)

(kg/m^2/yr)
Site-specific (yr^.1)
0.36 (tor/acre)
1.5 (unitless)
0.1 (unitless)
1 (unitless)
407.18 (kg/ton)
4047 (m^2/acre)

Unit soil loss
USLE rainfall factor
USLE erodibility factor
USLE length-slope factor
USLE cover management factor
USLE supporting practice factor
Conversion factor 867.78 C C PF 187.78

(kg/m^2/yr)

ş

Chemical Name

3.6E+00 2,3,7,8-TCDDioxin TEQ

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Sediment Delivery Ratio Table 4.4.14

a\*(WAI)^-.125

Watershed sediment delivery SD

ratio Watershed area recieving fallout Empirical intercept coefficient Empirical slope coefficient × вq

Site-specific (m^2) IDESW Watershed-specific (unitless) 0.125 (unitless)

(unitless)

2,3,7,8-TCDDioxin TEQ

1.0E-01

S

Chemical Name

25-Jan-96

Soil Loss Constant Table 4.4.2

ksl+kse+ksr+ksg+ksv

(yr-1)		(yr <sup>2</sup> -1)	(yr1)		(yry-1)		offic (yr*-1)	(yr-1)
		Table 4.4.3	Talbe 4.4.4		Table 4,4,5		Chemical-spe	Table 4.4.6 (yr1)
Soil loss constant due to all	processes	Loss constant due to leaching	Los constan due to soil	erosion	Loss constant due to surface	runoff	Loss constant due to degradation	Loss constan due to volatilization
ks		<u>ks</u>	kse		ksr		Ş	KSV

(yr^-1)

Š

Chemical Name

Liquid Phase Transfer Coefficient (Quiescent lake or pond) Table 4.4.20

ć	5
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Ī	2
į	5
3	i
į	2
į	J
į	ċ
S	?
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;	2
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Ş	7
1	ì
1	9
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(m/yr) Chemical-specific (cm^2/s) 0.0011 (unitless) Site-specific (m/s)	1.2E-03 (g/cm <sup>3</sup> )	1 (g/cm^2)	0.4 (unitless) 4 (unitless)	1.7E-02 (g/cm-s)	3.2E+07 (s/yr)
Liquid phase transfer coefficient Diffusivity of chemical in water Drag coefficient Wind velocity, 10 m above water	Surface Density of air corresponding to	Density of water corresponding	von Karman's constant Dimensionless viscous sublayer	Viscosity of water corresponding	to the water temperature Conversion constant
<b>₹</b> 88	ed.	ž	¥ %	Š	3.15e7

Chemical Name KI

(m/yr)

2,3,7,8-TCDDioxin TEQ 2.0E+02

Gas Phase Transfer Coefficient (Quiescent lake or pond) Table 4.4.21

(Cd^.5\*V)\*(vk^.33/y2)\*[ua/(pa\*Da)]^-.67\*3.15e+7

	\$	Gas phase transfer coefficient	(JĄ/EL)
	8	Drag coefficient	0.0011 (unitless)
	≯	Wind velocity, 10 m above	Site-specific (m/s)
		water surface	
	¥	van Kaman's constant	0.4 (unitless)
	y2	Dimensionless viscous sublayer	4 (unitless)
		thickness	
	e n	Viscosity of air corresponding	1.8E-04 (g/cm-s)
		to the air temperature	
	EQ.	Density of air corresponding to	1.2E-03 (g/cm^3)
	•	water temperature	
	ρ	Diffusivity of chemical in air	Chemical-specific (cm^2/s)
	3.15e7	Conversion constatin	3.2E+07 (s/yr)
Chemical Name	Ş.	(m/yr)	

Loss Constant Due to Leaching

	Table 4.4.3
3	Table 4
3	Tat

(P+I-R-Ev)/[QS\*z\*(1+(BD\*Kds/BD))]

	<u>გ</u>	Loss constant due to leaching Average annual precipitation Average annual imgation Average annual runoff Average annual	Site-specific Site-specific Site-specific Site-specific	(yr'-1) (cm/yr) (cm/yr) (cm/yr)
	s os	evaporranspiration Soil volumetric water content Soil depth from which leaching	0.2	0.2 (mL/cm^3) 1 (cm)
	Kds OD	Soil-water partition coefficient Soil bulkdensity	Chemical-specific (cm^3/g) 1.5 (g/cm^3)	offic (cm^3/g) 1.5 (g/cm^3)
Chemical Name	হ	(yr^-1)		

9.0E-05

Loss Constant due to Erosion Table 4.4.4

[(.1\*Xe\*SD\*ER)/(BD\*2)]\*[(Kds\*BD)/(Qs+(Kds\*BD))]

	kse	Loss constant due to erosion		(yr1)	
	×	Unit soil loss	Table 4.4.13	(kg/m^2/yr)	
	SD	Sediment delivery ration		(unitless)	
	띪	Contaminant enrichment ratio	3	(unitiess)	
	7	Soil mixing depth	***	, (cm)	
	ð	Soil volumetric water content	0.2	0.2 (mL/cm^3)	
	Kds	Soil-water partition coefficient	Chemical-specific	(cm^3/g)	Chemical
	8	Soil bulk density	1.5 (g/cm^3)	(g/cm^3)	
Chemical Name	33	(yr^-1)			
2,3,7,8-TCDDioxin TEQ	7.4E-02	02			

[R/(Qs\*z)]\*[1/(1+(Kds\*BD)/Qs)]

Loss constant due to runoff	Average annual runoff	Soil volumetric water content	Soil mixing depth	Soil-water partition coefficient	Soil bulk density
ksr	œ	S	7	Kds	2

(yr^-1)
Site specific (cm/yr) IDETRAN
0.2 (mL/cm^3)
1 (cm)
Chemical specific (cm^3/g) IDECHE
1.5 (g/cm^3)

z Soil mixing deptin Kds Soil-water partition coefficient BD Soil bulk density	Chemical Name ksr (vr²-1)	2,3,7,8-TCDDioxin TEQ 3.0E-05
	Chemical	2,3,7,8-T(

Loss Constant due to Volitilization Table 4.4.6

	[(3.1536e	[(3.1536e+7*H)/(z*Kds*R*T*BD)]*[.482*u^.78*(ua/(pa*Da))^67]*[((4*A/(Pi))^.5)^11]	(Pi))^.5)^.11]	
	ksv	Loss constant due to volatilization	(yr^-1)	
	3.1536e7	3.1538e7 Conversion constant	3.2E+07 (s/yr)	
	I	Henry's Law constant Ch	Chemical specific (atm-m^3/mol)	DECHEM
	2	Soil mixing depth	1 (cm)	
	Kds	Soil-water partition coefficient Ch	Chemical specific (cm <sup>A</sup> 3/g)	DECHEM
	œ		8.1E-05 (atm-m^3/mol-K)	
	<b>8</b>	Soil bulk density	1.5 (g/cm <sup>2</sup> 3)	
	<b>-</b>	Ambient air temperature Sit	Site specific (K)	IDETRAN-TC
	7	Average annual wind speed	Site specific (m/s)	IDETRAN
	ra n	Viscosity of air	1.8E-04 (g/cm-s)	
	ed.	Density of air	1.2E-03 (g/cm^3)	
	ß	Diffusivity of contaminant in air	Chemical specific (cm^2/s)	DECHEM
	∢	Surface area of contaminated area	Site spericic (m^2)	IDESW
Chemical Name	ksv	(٨٠٠-١)		

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Cancer Risk for Individual Chemicals for subsistence Fisher Scenario Table 5.2.6

	(unitless) (mg/day) 30 (yr) 350 (day/yr) 70 (kg) 70 (yr) 365 (day/yr)
	Table 5.3.4
C R = (I*ED*EF*CSF)/(BW*AT*365)	Individual lifetime cancer risk Total daily intake of contamina Table 5.3.4 Exposure duration Exposure frequency Body weight Averaging time Units conversion factor
CR = (I*E	CR EFD ATA 365

띥

Chemical

Hazard Quotient for Individual Chemicals for Subsi Table 5.2.6

 $HQ = I/(BW^*RfD)$ 

(unitless) (mg/day) g

Hazard Quotient
Total daily intake of Table 5.2.4
contaminant
Body weight
Reference dose Chemical-spec R G

70 (kg) Chemical-specific (mg/kg/da

(unitless) 엳 Chemical Name

2,3,7,8-TCDDioxin TEQ

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Total Daily Intake for Subsistence Fisher Scenario Table 5.2.5

		Table 5.2.1 (mg/day)	from Table 5.2.2 (mg/day)	from Table 5.2.3 (mg/day)	from Table 5.2.4 (mg/day)
! = Isoil + lag + Ifish + Idw	Total daily intake of contaminant	Daily intake of conteminent from soil	Daily intake of contaminant from Table 5.2.2 agove-ground produce	Daily intake of contaminant from Table 5.2.3 fish	Daily intake of contaminant from Table 5.2.4 drinking water
= Isoil	_	Isoil	ße	Ifish	¥ PI

Chemical Name I (mg/day) 2,3,7,8-TCDDioxin TEQ 8.5E-10

Soil Intake for Susbsistence Fisher Scenario Table 5.2.1

Isoil = Sc \* CRsoil \* Fsoil

Daily intakeof soil
Soil concentration
Consuption rate of soil
Fraction of consumed soil
contaminated Isoil Sc CRsoil Fsoil

Table 4.1.1 (mg/kg) 0.0001 (kg/day) 1 (unitless)

(mg/day)

Isoi

Chemical Name

1.6E-11

2,3,7,8-TCDDioxin TEQ

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Soil Concentration due to Deposition Table 4.1.1

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Average soil concentration over exposure duration

	IDETRAN		30 yrs								DISPC1-	DISPC1-		DISPC1-	200	- - - -
(ma/ka)	(mg/kg-yr) (yr)	(mg/kg) (yr^-1)	(yr)					100 ([mg-m^2]/[kg-cm^2]) 1 (cm)	(g/cm^3)	. (m-g-s/cm-ug-yr) . (cm/s)	(ug-s/g-m^2)	(s/m^2-vr)	,	(s/m^2-yr)	4 C4—14/	(s/m"2-yr)
	Site specific	Table 4.1.2	Senario specific					901	1.5	95315.0 3	Modelled	Modelled		Modelled		Dallabow
[[(Ds*To-Scic)/ks]+[(Scic/ks)*(1-exp(-ks*(T2-Tc)]]/(T2-T1) Sc Average soil concentration	n /er which	urs tion at time Tc ant	tion	Soil concentration at time Tc Sctc		n Ds	[100*[(.31538^Vdv*Cyv+Dywv)+(Dydp+Dywp)]]/(z*BD)	on factor rath	, in	on factor velocity	spor phase air	sariv wet	deposition from vapor phase	Normalized yearly dry deposition from particle phase	sary wet	deposition from particle phase
Sac)/ks]+[(Sac/ks)*(1-exp(-h Average soil concentration	Deposition term Time period over which	deposition occurs Soil concentration at time Tc Soil loss constant	Exposure duration	Soil concentral	[Ds*(1-exp(-ks*Tc))]/ks	Depostion term	1536"Vdv"Cyv+[	Units conversion factor	Soil bulk density	Units conversion factor Dry deposition velocity	Normalized vapor phase air	concentration Normalized yearly wet	deposition from	Normalized yearly dry deposition from particle	Normalized yearly wet	deposition fro
[[(Ds⁴T⇔8 Sc	225	Scic is	12		[Ds*(1-ex		[100*[(.31	100	. 8	0.31536 Vdv	Š	C C	î	Dydp	Dywp	

menom) Section
mg/kg)
Sct. (mg/mg) Sct. 1.9E.07 2.9E-07
Chemical Name 2,3,7,8-TCDDioxin TEQ

Soil Loss Constant Table 4.1.2

ksi+kse+ksr+ksg+ksv

stant due to all t due to soil t due to surface t due to t due to		(yr4-1)	(yr^-1)	(yr*-1)
Soil loss constant due to all processes Loss constant due to leaching Loss constant due to soil erosion Loss constant due to surface runoff Loss constant due to degradation Loss constant due to	Table 4.1.3	Table 4.1.4	Chemical specific (yrk-1)	Table 4.1.5
	processes Loss constant due to leaching Loss constant due to soil	erosion Loss constant due to surface runoff	Loss constant due to	Loss constant due to volatilization
ks	ह ह	ষ্ট্র	rk Sg	ksv

Chemical Name ks (yr\*-1)

2,3,7,8-TCDDioxin TEQ 1.8E-02

Loss Constant Due to Leaching Table 4.1.3

(P+I-R-Ev)/[Qs\*z\*(1+(BD\*Kds/Qs))]

IDETRAN	IDETRAN IDETRAN	IDETRAN		IDECHE
(yr*-1) (cm/yr)	(cm/yr) (cm/yr)	(cm/yr)	0.2 (mL/cm^3) 1 (cm)	(сш^3/g)
Site specific	Site specific Site specific	Site specific	0	Chemical specific
Loss constant due to leaching Average annual precipitation	Average annual irrigation Average annual runoff	Average annual evapo- transporation	Soil volumetric water content Soil depth from which leaching removal occurs.	Soil-water partition coefficient Chemical specific (cm^3/g) IDECHE
<u>ड</u> व	œ	ğ	S z	Kds

Chemical Name ksl

(yr-1)

2,3,7,8-TCDDioxin TEQ 9.0E-05

'BD)/Qs)]
1/(1+(Kds
[R/(Qs*z)]*[

Loss constant due to runoff	Average annual runoff	Soil volumetric water content	Soil mixing depth	Soil-water partition coefficient	Soil bulk density
ķ	œ	ő	7	Kds	8

(yr^-1)
Site specific (cm/yr) IDETRAN
0.2 (cL/cm^3)
1 (cm)
1 (cm)
1.5 (g/cm^3)
1.5 (g/cm^3)

(yr<sup>2</sup>-1) ķŠ Chemical Name

3.0E-05 2,3,7,8-TCDDioxin TEQ

Loss Constant due to Volitilization Table 4.1.5

	(yr*-1)
[(3.1536e+77H)/(z*KdS*K*1*BD)]*[.482*u*.75*(u&(pa*DB)**.57]*[((4*A((Pl))*.5)**.11]	
9+/TH)/(Z*KdS*K*I*BU)/J.48Z*U	Loss constant due to
(3.1536	ksv

		IDECHEM		DECHEM			IDETRAN-TC	IDETRAN			DECHEM	IDETRAN
	(s/yr)	themical specific (atm-m^3/mol)	1 (cm)	(cm^3/g)	8.1E-05 (atm-m^3/mol-K)	1.5E+00 (g/cm^3)	દ	(m/s)	1.8E-04 (g/cm-s)	1.2E-03 (g/cm^3)	(cm*2/s)	(m^2)
		Chemical specific	-	Chemical specific (cm^3/g)	8.1E-05	1.56+00	Site specific	Site specific	1.8E-04	1.2E-03	Chemical specific (cm <sup>2</sup> 2/s)	Site speficic
volatiiization	3.1536e7 Conversion constant	Henry's Law constant	Soil mixing depth	Soil-water partition coefficient	Universal gas constant	Soil bulk density	Ambient air temperature	Averege annual wind speed	Viscosity of air	Density of air	Diffusivity of contaminant in air	Surface area of contaminated area
	3.1536e7	I	7	Kds	œ	80	<b>-</b>	_	ВП	Bd	ő	∢

Chemical Name ksv (yr\*-1)

1.8E-02

2,3,7,8-TCDDioxin TEQ

Above-Ground Produce Intake for Adult Resident Scenario Table 5.2.2

(Pd+Pv+Pr)*CRag*Fag lag Daily intake of co soil Pd Concentration in produce due to di Pv Concentration in produce due to in transfer Pr Concentration in CRag Consumption rat produce due to r consumption rat produce contami		Daily intake of contaminant from (mg/day) soil	Concentration in above-ground Table 4.2.6 (mg/kg) produce due to deposition	Concentration in above-ground  Table 4.2.7 (mg/kg) produce due t air-to-plant transfer	Concentration in above-ground Table 4.2.8 (mg/kg) produce due to root uptake	Consumption rate of above-ground 0.028 (kg/day) produce	Fraction of above-ground 0.25 (untiless) produce contaminated
---	--	--	---	--	--	---	---

2,3,7,8-TCDDioxin TEQ 5.0E-12

(mg/day)

lag

Chemical Name

Above-Ground Produce Concentration Due to Direct Deposition Table 4.2.6

[[1000\*(Dydp+(Fw\*Dywp)]\*Rp\*[(1-exp(-kp\*Tp)]]/(Yp\*kp)

	1000	Units conversion factor		(unitless)	
	Dydp	Nomalized yearly dry deposition from particle phase	Modelled	(s/m^2-yr)	DISPC1-
	£	Fraction of wet deposition that adheres to plant	Chemical specific (unitless)	(unitless)	CHEMIC
	Dywp	Yearly particle phase wet deposition rate	Modelled	(g/m^2/yr)	DISPC1-
	8	Intercetion fraction of edible portion of plant	. 0.05	0.05 (unitless)	
	9	Plant surface loss coefficient	18	(yr^-1)	
	<u> </u>	Length of plant exposure to deposition of edible portion of	0.16	0.16 (yrs)	
		plant, per harvest			
	۲	Yield or standing crop biomass	1.6	1.6 (kgDW/M^2)	
		of the edible portion of the plant			
Chemical Name	<b>P</b>	(mg/kg)			
2,3,7,8-TCDDioxin TEQ	1.2E-10				

Above-Ground Produce Concentration Due to Air-to-Plant Transfer Table 4.2.7

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ð	Concentration of pollutant in the	(mg/kg)
Š	-	Modelled (ug-sec/g-m^3) DISPC1-
	concentration	
<b>&amp;</b>		Chemical specific (mgplant/ugair) CHEMIC
VGag	Empirical correction factor for	0.01 (unitless)
	above-ground produce	
ed.	Density of air	1.2E+03 (g/m^3)

Chemical Name Pv (mg/kg)

7.0E-11

2,3,7,8-TCDDioxin TEQ

Above-Ground Produce Concentration Due to Root Uptake Table 4.2.8

Sc\*Br

	፵ ଊ	Concentration of pollutant in the Average soil concentration of Tabl	Table 4.2.1	(mg/kg) (mg/kg)	
	Б.		emical specific	Chemical specific (ug/gplant)/(ug/gsoit) CHEMIC	ဋ
Chemical Name	ā	(mg/kg)			
2,3,7,8-TCDDioxin TEQ	5.2E-10	0			

Soil Concentration due to Deposition Table 4.2.1

 $[[(Ds^*Tc\cdot Sctc)/ks] + [(Sctc/ks)^*(1\cdot exp(\cdot ks^*(T2\cdot Tc))]/(T2\cdot T1)]$ 

(mg/kg) (mg/kg-yr) 30 Site specific (yr)	(mg/kg) Table 4.1.2 (yr^-1)			([mg-m^2]/[kg-cm^2])	1 (cm) 1 5 (c/cm/3)	0.31536 (m-o-s/cm-uo-vr)	3 (cm/s)	Modelled (ug-s/g-m^2)		Modelled (s/m^2-yr)		Modelled (s/m^2-yr)		Modelled (s/m^2-yr)	Ds (mp/tp://)	1.3E-08
entration which	deposition occurs Soil concentration at time Tc Soil concentration at time Tc Experience direction	,	[DS*(1-exp(-ks*Tc))]/ks	Units conversion factor	Soil mixing depth Soil built density	Units conversion factor	Dry deposition velocity	Normalized vapor phase air	concentration	Normalized yearly wet	deposition from Vapor phase Normalized yearly dry	deposition from particle phase	Normalized yearly wet	deposition from particle phase	(mg/kg) Satc (mg/kg)	2.9E-07
SC	<b>8</b> 8	3 E	[Ds*(1-ex	9	, G	0.31536	À,	ςλ		Oyw.	dpAQ		Dywp		8	1.6E-07
															Chemical Name	2,3,7,8-TCDDioxin TEQ

Soil Loss Constant Table 4.2.2

	ks +kse	ksi+kse+ksr+ksg+ksv		
	য	Soil constatn due to leaching		(yr*-1)
	kse	Loss constant due to soil erosion		0 (yrv-1)
	ksr	Loss constant due to surface	Table 4.2.4	(yr-1)
		runoff		
	S	Loss constant due to degradation	Chemical specific	c (yrt-1)
	ksv	Loss constant due to volatilization	Table 4.2.5 (yr^-1)	(yrv-1)
Chemical Name	ā	(yr <sup>A.</sup> -1)		
2.3.7.8-TCDDioxin TEQ	1.8E-02	-02		

	S.
Loss Constant due to Degradation	Appendix A

0.0E+00

0.0E+00

Loss Constant Due to Leaching Table 4.2.3

(P+I-R-Ev)/[Qs\*z\*(1+(BD\*Kds/Qs))]

(yrv-1) (cm/yr) (cm/yr) (cm/yr)	0.2 (mL/cm^3) 1 (cm)	(cm^3/g)
Site specific Site specific Site specific Site specific	0.2	Chemical specific (cm^3/g)
Loss constant due to leaching Average annual precipitation Average annual inflation Average annual runoff Average annual evapo-	transporation Soil volumetric water content Soil depth from which leaching	Soil-water partition coefficient
<u>გ</u> ு — ແ ဤ	Qs z	¥ds

0.2 (mL/cm^3) 1 (cm)

(yr\*-1) ŝ Chemical Name

9.0E-05 2,3,7,8-TCDDioxin TEQ

Coss Constant due to	Table 4.2.4

[R/(Qs\*z)]\*[1/(1+(Kds\*BD)/Qs)]

(yrv-1) Site specific (cm/yr) IDETRAN	0.2 (aL/cm^3) 1 (cm)	al specific (cm^3/g) iDECHEM 1.5 (g/cm^3)
Loss constant due to runoff Average annual runoff		Soil-water partition coefficient Soil bulk density
zz s.	o s	Kds BD

(yr\*-1) ķ Chemical Name

3.0E-05 2,3,7,8-TCDDioxin TEQ

Loss Constant due to Volitilization Table 4.2.5

[(3.1536e+7\*H)/(z\*Kds\*R\*T\*BD)]\*[.482\*u^.78\*(ua/(pa\*Da)^-.67]\*[((4\*A/(Pi))^.5)^-.11]

(yr^-1)	(JA,KS)	Chemical specific (atm-m <sup>-3</sup> / IDECHE	1 (cm)	Chemical specific (cm^3/g) IDECHE	8.1E-05 (atm-m <sup>-3</sup> /mol-K)	1.5 (g/cm^3)	Site specific (K) IDETRAN	Site specific (m/s) IDETRAN	1.8E-04 (g/cm-s)	1.2E-03 (g/cm^3)	Chemical specific (cm^2/s) IDECHE	Site speficic (m^2) IDETRAN
Loss constant due to volatilization	3.1538e7 Conversion constant	Henry's Law constant	Soil mixing depth	Soil-water partition coefficient	Universal gas constant	Soil bulk density	Ambient air temperature	Average annual wind speed	Viscosity of air	Density of air	Diffusivity of contaminant in air	Surface area of contaminated area
ksv	3.15386	I	7	Kds	œ	8	⊢	_	na	pa	ద	∢

ksv (yr²-1) Chemical Name

1.8E-02 2,3,7,8-TCDDioxin TEQ

Fish Intake for Subsistence Fisher Scenario Table 5.2.3

	ntaminant (mg/day)	n Table Cfish (mg/kg) of fish 0.06 (kg/day) ontaminated 1 (unitless)	
lfish = Cfish * CRfish * Ffish	Daily intakeof contaminant from fish	Fish concentration Consumption rate of fish Fraction of fish contaminated	(тд/дау)
Ifish = C	lfish	Cfish CRfish Ffish	Ifish
			Chemical Name

8.3E-10

2,3,7,8-TCDDioxin TEQ

Cfish (mg/kg)

Chemical Name

1.4E-08 2,3,7,8-TCDDioxin TEQ

25-Jan-96

Fish Concentration from Dissolved Water concentration  Table 4.4.26

fish concentration

Dissolved water concentration Table 4.4.24 (mg/L)

Biocontration Chemical-specific (L/kg) (mg/kg) Cfish Cfish BCF Chemical Name

0.0E+00 2,3,7,8-TCDDioxin TEQ

Fish Concentration from Dissolved Water concentration Table 4.4.26

1 8DIE 4.4.25		
Cfish = Cdw * BCF		
		(mg/kg) (mg/L)
	ecific	(로 기)
Cíish (mg/kg)		
0.0E+00		
Cfish = Cfish Cdw BCF Cfish Cfish 0.0E+	Cdw* BCF fish concentration Dissolved water concentration Biocontration (mg/kg)	pentration d water concentration ation

Fish concentration from Total Water Column Concentration Table 4.4.27

Cfish=Cwt\*BAF

	Cfish Cwt BAF	Fish concentration Total water coumn concentratio Table 4.4.23 Bioaccumulation factor Chemical-specific	(mg/kg) (mg/L) (L/kg)
Chemical Name	Cfish	(mg/kg)	
2,3,7,8-TCDDioxin TEQ	0.0E+00		

Fish Concentration from Bed Sediments

		(mg/kg)	(mg/kg)		0.07 (unitless)	(unitless)	0.04 (unitless)	
			Table 4.4.25		0.07	Chemical-specific (unitless)	0.04	
Tish Concentration from Bed Securions Table 4.4.28	Cfish = (Csb * flipid * BSAF)/OCsed	Fish concentration	Concentration of contaminant	sorbed to bed sediment	fish lipid content	Biota to sediment accumulation factor	Fraction organic carbon in bottom	sediment
	Cfish = (	Cfish	QS Q		flipid	BSAF	OCsed	

1.4E-08 2,3,7,8-TCDDioxin TEQ

Cfish (mg/kg)

Chemical Name

Concentration Sorbed to Bed Sediment Table 4.4.25

	Csb=fbe	Csb=fbenth*Cwfot*[Kdbs/(Qbs+Kdbs*BS)]*(dw+db)/db		
	Csb	Concentration sorbed to bed sediment		(mg/kg)
	fbenth	Fraction of total water body contaminant concentration that corrus in bod codiment	Table 4.4.16	(unitless)
	Cwtot	Total water concentration in Surface water system, including water column	Table 4.4.15	(mg/L)
	\$ <del>6</del> 8 8	water column r berthic layer porosity	Site-specific (m) 0.03 (m) 0.6 (unit	(m) ).03 (m) 0.6 (unitless)
	S S	bed sediment bore water partition coefficient Bedsediment concentration	Chemical-specific (L/kg/L)	(L/kg) (kg/L)
Chemical Name	ds SS	(mg/kg)		
2,3,7,8-TCDDioxin TEQ	1.2E-07			

Drinking Water Intake for Subsistence Fisher Scenario Table 5.2.4

Cdw\*CRdw\*Fdw

Table 4.4.24	¥pi	Daily intake of contaminant		(mg/day)
concentration in drinking water  Consumption rate of drinking water Fraction of drinking water contaminated	MP.	from drinking water Dissolved contaminant	Table 4.4.24	(mg/L)
water Fraction of drinking water contaminated	CRdw	concentration in drinking water Consumption rate of drinking		1.4 (∪day)
	₽d₩	water Fraction of drinking water contaminated		1 (unitless)

Idw (mg/day)

3.0E-13

2,3,7,8-TCDDioxin TEQ

Chemical Name