C.6-4.2 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER NON-CANCER RISK

EPDR2 =	1.39E+03	EPD1MW =	0.00051032
EPDR3 =	1.26E+01	EPD1KOW=	0.05615738
EPDC2 =	2.41E+02	EPDMIN1=	-0.06831355
EPDC3 =	2.10E+00	EPDMAX1=	0.55769245
MINW1 =	-3.09E-01	EPD3MW =	-0.00051032
MAXW1 =	3.17E-01	EPD3KOW=	0.05615738
MINW3 =	-2.96E-01	EPDMIN3=	-0.30104241
MAXW3 =	1.81E-01	EPDMAX3=	0.17585639

Comparison of DAD using 95% L-UCI and Average value

CHEMICAL	EPD1-c Eq (3.9)	EPD2-c Eq (3.10)	outside EPD?	Chemicals outside EPD (*)	Kp 95% LCI	Kp (cm/hr) predicted	Kp 95% UCI	DA_event (mg/cm2-evt) 95% LCI Kp	DA_event (mg/cm2-evt) Average Kp	DA_event (mg/cm2-evt) 95% UCI Kp	DAD (mg/kg-day) 95% LCI Kp	DAD (mg/kg-day) Average Kp	DAD (mg/kg-day) 95% UCI Kp	Derm/ Drink 95% LCI Kp	Derm/ Drink Average Kp	Derm/ Drink 95% UCI Kp
Trichloroethane, 1,1,2-	0.183198903	0.047046344	N		2.6E-04	6.4E-03	1.6E-01									
Dichloroethane, 1,1-	0.151043082	0.050000328	N		2.7E-04	6.7E-03	1.7E-01	2.8E-07	6.9E-06	1.7E-04	1.4E-06	3.6E-05	8.9E-04	15%	382%	9465%
Dichloroethylene, 1,1-	0.169064925	0.070165502	N		4.7E-04	1.2E-02	2.9E-01									
Trichlorobenzene, 1,2,4	0.316128886	0.130883837	N		2.6E-03	6.6E-02	1.7E+00	5.3E-07	1.4E-05	3.5E-04	2.7E-06	7.0E-05	1.8E-03	151%	3889%	99821%
Dichlorobenzene, 1,3-	0.277183148	0.127149968	N		2.3E-03	5.8E-02	1.5E+00	3.5E-07	8.9E-06	2.3E-04	1.8E-06	4.6E-05	1.2E-03	121%	3090%	78721%
Dichlorobenzene, 1,4-	0.265390099	0.115356919	N		1.7E-03	4.2E-02	1.1E+00	2.7E-06	6.9E-05	1.8E-03	1.4E-05	3.6E-04	9.1E-03	92%	2322%	58688%
Benzene	0.159470967	0.079759461	N		5.9E-04	1.5E-02	3.7E-01	4.2E-07	1.1E-05	2.6E-04	2.2E-06	5.4E-05	1.4E-03	32%	807%	20176%
Bromomethane	0.115307388	0.018347170	N		1.1E-04	2.8E-03	7.0E-02									
Chlorobenzene	0.216948639	0.102025264	N		1.1E-03	2.8E-02	7.1E-01	1.7E-07	4.2E-06	1.0E-04	8.6E-07	2.1E-05	5.4E-04	61%	1525%	38249%
Chlorodibromomethane	0.231529970	0.018931933	N		1.3E-04	3.2E-03	7.9E-02	1.5E-09	3.7E-08	9.1E-07	7.9E-09	1.9E-07	4.7E-06	10%	235%	5734%
Chloroethane	0.113220492	0.047389607	N		2.4E-04	6.1E-03	1.5E-01									
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		4.4E-05			2.3E-04			612%	
Ethylbenzene	0.231091397	0.122700079	N		1.9E-03	4.9E-02	1.2E+00	6.0E-07	1.5E-05	3.8E-04	3.1E-06	7.8E-05	2.0E-03	99%	2500%	63436%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		9.8E-06			5.1E-05			120%	
Methylene chloride	0.113522630	0.026870813	N		1.4E-04	3.5E-03	8.8E-02									
Tetrachlorethylene	0.275545631	0.106324534	N		1.3E-03	3.3E-02	8.4E-01									
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01	1.2E-05	3.0E-04	7.5E-03	6.1E-05	1.5E-03	3.9E-02	65%	1632%	41070%
trans-1,2-Dichloroethen	0.166839043	0.067898794	N		NA	1.1E-02	NA		1.4E-06			7.2E-06			612%	
Trichloroethylene	0.202956499	0.068845207	N		4.7E-04	1.2E-02	2.9E-01	8.3E-09	2.1E-07	5.1E-06	4.3E-08	1.1E-06	2.6E-05	27%	678%	16777%
Vinyl chloride	0.108268842	0.044479224	N		2.2E-04	5.6E-03	1.4E-01	7.9E-07	2.0E-05	4.9E-04	4.1E-06	1.0E-04	2.5E-03	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		1.5E-05			8.0E-05			2402%	
p-Cresol	0.164692560	0.054321212	N		4.8E-03	7.7E-03	1.2E-02	7.5E-08	1.2E-07	1.9E-07	3.9E-07	6.2E-07	9.7E-07	276%	437%	692%
Naphthalene	0.250741977	0.119896713	N		1.8E-03	4.7E-02	1.2E+00	2.0E-07	5.1E-06	1.3E-04	1.0E-06	2.6E-05	6.6E-04	97%	2457%	62236%
2-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA									
Acenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA		2.2E-06			1.2E-05			4630%	
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	1.4E-07	3.6E-06	9.4E-05	7.0E-07	1.9E-05	4.9E-04	290%	7628%	200991%
Benzo-a-pyrene	0.470139236	0.214980766	Y		2.4E-02	7.0E-01	2.0E+01	4.6E-09	1.3E-07	3.9E-06	2.4E-08	7.0E-07	2.0E-05	2042%	59363%	1725935%
Dibenzo(a,h)anthracene	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	2.6E-09	8.1E-08	2.5E-06	1.4E-08	4.2E-07	1.3E-05	2977%	91997%	2842859%
TCDD	0.546192220	0.217548111	Y		2.7E-02	8.1E-01	2.5E+01	3.8E-13	1.2E-11	3.5E-10	2.0E-12	6.0E-11	1.8E-09	1786%	54409%	1657801%
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01									
DDD	0.489014209	0.162411367	N		6.4E-03	1.8E-01	5.0E+00	5.8E-08	1.6E-06	4.5E-05	3.0E-07	8.3E-06	2.3E-04	682%	19090%	534024%
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA		4.0E-08			2.1E-07			219%	

C.6-4.3 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER NON-CANCER RISK

FOR ORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Organic Chemicals from Aqueous Media (latest version 04/01)

Enter the Following Exposure Conditions: for site specific conditions, change values in Cells I8-I18
The default exposure conditions used in this spreadsheet assume exposure duration for carcinogenic effects of chemicals in water through showering

Concentration (mg/L*L/1000 cm3):			
Input site specific concentrations in Column marked "Conc"			
Area exposed (cm2):	SA =	3300	cm2
Event time (hr/event):	t_event =	8.00	hr/event
Event frequency (events/day):	EV =	1.0	event/day
Exposure frequency (days/year):	EF =	40.0	days/yr
Exposure duration (years):	ED =	1.0	years
for carcinogenic effects, ED = 30 years (used in this spreadsheet)			
for noncarcinogenic effects, ED = 9 years			
Body weight (kg):	BW =	70.0	kg
Averaging time (days):	AT =	365	days
for carcinogenic effects, AT=70 years (25,550 days)			
for noncarcinogenic effects, AT=ED (in days)			
Skin thickness (assumed to be 10 um):	lsc =	1.00E-03	cm

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV	IR =	50	(cm3/day = L/day * 1000 cm3/L)
Drinking (mg/day) = Conc * IR * ABSIG	ABSGI =	1.0	(assumed 100% GI absorption)

IR: Ingestion rate of drinking water
ABSIG: Absorption fraction in GI tract

Refer to Appendix A for equations to evaluate DA_event and DAD

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/min) Q = 1135500.0 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

(*): outside of the Effective Prediction Domain (EPD) determined by the Flynn's measured Kp data as evaluated using MLAB (Civilized Software, Bethesda, MD)
95% LCI and UCI are evaluated using STATA

(**): halogenated chemicals.
Note:

CHEMICAL	CAS No.	MWT	logKow	Kp 95% LCI	Kp (cm/hr) predicted	Kp (cm/hr) measured	Kp 95% UCI	Special Chemicals (*) or (**)	Derm/ Drink	Chem Assess	Derm/ Total Dose	B	tau (hr)	t_star (hr)	FA	Conc (mg/cm3)	Kp used in DA_event	DA_event (mg/cm2-evt)	DAD (mg/kg-day)	log(Ds/lsc)	Dsc/lsc	Dsc	b	c	t_star1 B>0.6	t_star3 B<=0.6
Trichloroethane, 1,1,2-	79005	1.33E+02	2.05E+00	2.61E-04	6.4E-03		1.58E-01	**	383%	Y	0%	0.0	0.60	1.43	1.0	4.00E-07	6.4E-03	2.3E-08	1.2E-07	-3.6E+00	2.79E-04	2.79E-07	3.2E-01	3.5E-01		1.43
Dichloroethane, 1,1-	75343	9.90E+01	1.79E+00	2.72E-04	6.7E-03		1.67E-01	**	382%	Y	0%	0.0	0.38	0.92	1.0	2.20E-04	6.7E-03	1.3E-05	6.6E-05	-3.4E+00	4.36E-04	4.36E-07	3.2E-01	3.5E-01		0.92
Dichloroethylene, 1,1-	75354	9.69E+01	2.13E+00	4.69E-04	1.2E-02		2.90E-01	**	649%	Y	0%	0.0	0.37	0.89	1.0	9.00E-06	1.2E-02	8.9E-07	4.6E-06	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Trichlorobenzene, 1,2,4-	120821	1.82E+02	3.98E+00	2.58E-03	6.6E-02		1.70E+00					0.3	1.11	2.66	1.0	ND	6.6E-02		N/A	-3.8E+00	1.50E-04	1.50E-07	5.6E-01	5.9E-01		2.66
Dichlorobenzene, 1,3-	541731	1.47E+02	3.60E+00	2.27E-03	5.8E-02		1.47E+00					0.3	0.71	1.71	1.0	ND	5.8E-02		N/A	-3.6E+00	2.34E-04	2.34E-07	4.9E-01	5.3E-01		1.71
Dichlorobenzene, 1,4-	106467	1.47E+02	3.39E+00	1.66E-03	4.2E-02		1.06E+00					0.2	0.71	1.71	1.0	ND	4.2E-02		N/A	-3.6E+00	2.34E-04	2.34E-07	4.4E-01	4.7E-01		1.71
Benzene	71432	7.81E+01	2.13E+00	5.95E-04	1.5E-02		3.72E-01		807%	Y	0%	0.1	0.29	0.70	1.0	1.60E-05	1.5E-02	2.0E-06	1.0E-05	-3.2E+00	5.71E-04	5.71E-07	3.3E-01	3.7E-01		0.70
Bromomethane	74839	9.50E+01	1.19E+00	1.14E-04	2.8E-03		7.04E-02	**	162%	Y	0%	0.0	0.36	0.87	1.0	1.00E-06	2.8E-03	2.5E-08	1.3E-07	-3.3E+00	4.59E-04	4.59E-07	3.1E-01	3.4E-01		0.87
Chlorobenzene	108907	1.13E+02	2.84E+00	1.12E-03	2.8E-02		7.08E-01		1525%	Y	0%	0.1	0.46	1.09	1.0	1.00E-06	2.8E-02	2.3E-07	1.2E-06	-3.4E+00	3.66E-04	3.66E-07	3.8E-01	4.1E-01		1.09
Chlorodibromomethane	124481	2.08E+02	2.23E+00	1.32E-04	3.2E-03		7.86E-02	**				0.0	1.57	3.77	1.0	ND	3.2E-03		N/A	-4.0E+00	1.06E-04	1.06E-07	3.1E-01	3.5E-01		3.77
Chloroethane	75003	6.45E+01	1.43E+00	2.43E-04	6.1E-03		1.52E-01	**	335%	Y	0%	0.0	0.24	0.59	1.0	5.00E-05	6.1E-03	2.5E-06	1.3E-05	-3.2E+00	6.81E-04	6.81E-07	3.1E-01	3.5E-01		0.59
cis-1,2-Dichloroethene	156592	9.69E+01	2.09E+00	NA	1.1E-02		NA	**	612%	Y	0%	0.0	0.37	0.89	1.0	1.90E-03	1.1E-02	1.8E-04	9.1E-04	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Ethylbenzene	100414	1.06E+02	3.15E+00	1.94E-03	4.9E-02		1.25E+00		2500%	Y	0%	0.2	0.42	1.01	1.0	2.30E-05	4.9E-02	8.7E-06	4.5E-05	-3.4E+00	3.97E-04	3.97E-07	4.4E-01	4.7E-01		1.01
Methyl tert-butyl ether	1634044	8.82E+01	9.40E-01	NA	2.1E-03		NA					0.0	0.33	0.80	1.0	ND	2.1E-03		N/A	-3.3E+00	5.01E-04	5.01E-07	3.1E-01	3.4E-01		0.80
Methylene chloride	75092	8.49E+01	1.25E+00	1.42E-04	3.5E-03		8.81E-02	**	200%	Y	0%	0.0	0.32	0.76	1.0	9.00E-05	3.5E-03	2.7E-06	1.4E-05	-3.3E+00	5.23E-04	5.23E-07	3.1E-01	3.4E-01		0.76
Tetrachlorethylene	127184	1.66E+02	3.40E+00	1.33E-03	3.3E-02		8.41E-01	**	1979%	Y	0%	0.2	0.91	2.18	1.0	7.00E-06	3.3E-02	2.1E-06	1.1E-05	-3.7E+00	1.84E-04	1.84E-07	4.1E-01	4.5E-01		2.18
Toluene	108883	9.21E+01	2.73E+00	1.23E-03	3.1E-02		7.82E-01		1632%	Y	0%	0.1	0.35	0.84	1.0	5.20E-05	3.1E-02	1.3E-05	6.6E-05	-3.3E+00	4.77E-04	4.77E-07	3.8E-01	4.1E-01		0.84
trans-1,2-Dichloroethene	156605	9.69E+01	2.09E+00	NA	1.1E-02		NA		612%	Y	0%	0.0	0.37	0.89	1.0	2.80E-05	1.1E-02	2.6E-06	1.3E-05	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Trichloroethylene	79016	1.31E+02	2.42E+00	4.70E-04	1.2E-02		2.88E-01	**	678%	Y	0%	0.1	0.58	1.39	1.0	4.20E-05	1.2E-02	4.3E-06	2.2E-05	-3.5E+00	2.87E-04	2.87E-07	3.4E-01	3.7E-01		1.39
Vinyl chloride	75014	6.25E+01	1.36E+00	2.24E-04	5.6E-03		1.40E-01	**	309%	Y	0%	0.0	0.24	0.57	1.0	6.00E-04	5.6E-03	2.8E-05	1.4E-04	-3.2E+00	6.99E-04	6.99E-07	3.1E-01	3.4E-01		0.57
Xylenes (total)	1330207	1.06E+02	3.12E+00	NA	4.7E-02		NA		2402%	Y	0%	0.2	0.42	1.01	1.0	1.10E-04	4.7E-02	4.0E-05	2.1E-04	-3.4E+00	3.97E-04	3.97E-07	4.3E-01	4.7E-01		1.01
p-Cresol	106445	1.08E+02	1.95E+00	4.84E-03	7.7E-03		1.21E-02		437%	Y	0%	0.0	0.43	1.03	1.0	2.50E-05	7.7E-03	1.7E-06	8.6E-06	-3.4E+00	3.87E-04	3.87E-07	3.2E-01	3.5E-01		1.03
Naphthalene	91203	1.28E+02	3.30E+00	1.84E-03	4.7E-02		1.18E+00		2457%	Y	0%	0.2	0.56	1.34	1.0	2.50E-05	4.7E-02	9.3E-06	4.8E-05	-3.5E+00	2.99E-04	2.99E-07	4.4E-01	4.8E-01		1.34
2-Methylnaphthalene	91576	1.42E+02	3.86E+00	NA	9.2E-02		NA		4526%	Y	0%	0.4	0.67	1.60	1.0	1.10E-05	9.2E-02	7.5E-06	3.9E-05	-3.6E+00	2.49E-04	2.49E-07	6.3E-01	6.6E-01		1.60
Acenaphthylene	208968	1.52E+02	3.94E+00	NA	9.1E-02		NA					0.4	0.76	1.82	1.0	ND	9.1E-02		N/A	-3.7E+00	2.19E-04	2.19E-07	6.4E-01	6.6E-01		1.82
Phenanthrene	85018	1.78E+02	4.46E+00	5.47E-03	1.4E-01		3.80E+00	*	7628%	Y	0%	0.7	1.06	4.11	1.0	1.00E-05	1.4E-01	1.2E-05	6.0E-05	-3.8E+00	1.57E-04	1.57E-07	1.0E+00	9.3E-01	4.11	2.55
Benzo-a-pyrene	50328	2.50E+02	6.10E+00	2.41E-02	7.0E-01		2.04E+01	*				4.3	2.69	11.67	1.0	ND	7.0E-01		N/A	-4.2E+00	6.19E-05	6.19E-08	1.3E+01	4.3E+00	11.67	6.46
Dibenzo(a,h)anthracene	53703	2.78E+02	6.84E+00	4.88E-02	1.5E+00		4.66E+01	*				9.7	3.88	17.57	0.6	ND	1.5E+00		N/A	-4.4E+00	4.29E-05	4.29E-08	6.3E+01	9.7E+00	17.57	9.32
TCDD	1746016	3.22E+02	6.80E+00	2.65E-02	8.1E-01		2.46E+01	*	54409%	Y	0%	5.6	6.82	30.09	0.5	1.20E-12	8.1E-01	9.9E-12	5.1E-11	-4.6E+00	2.44E-05	2.44E-08	2.2E+01	5.6E+00	30.09	16.37
Dieldrin	60571	3.81E+02	4.56E+00	4.72E-04	1.2E-02		3.17E-01					0.1	14.62	35.09	0.8	ND	1.2E-02		N/A	-4.9E+00	1.14E-05	1.14E-08	3.6E-01	4.0E-01		35.09
DDD	72548	3.20E+02	5.80E+00	6.41E-03	1.8E-01		5.02E+00	*				1.2	6.65	25.99	0.8	ND	1.8E-01		N/A	-4.6E+00	2.51E-05	2.51E-08	1.8E+00	1.4E+00	25.99	15.96
Acetophenone	98862.0	1.20E+02	1.58E+00	NA	3.7E-03		NA					0.0	0.50	1.21	1.0	ND	3.7E-03		N/A	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01	#NUM!	1.21

C.6-4.3 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER NON-CANCER RISK

EPDR2 =	1.39E+03	EPD1MW =	0.00051032
EPDR3 =	1.26E+01	EPD1KOW=	0.05615738
EPDC2 =	2.41E+02	EPDMIN1=	-0.06831355
EPDC3 =	2.10E+00	EPDMAX1=	0.55769245
MINW1 =	-3.09E-01	EPD3MW =	-0.00051032
MAXW1 =	3.17E-01	EPD3KOW=	0.05615738
MINW3 =	-2.96E-01	EPDMIN3=	-0.30104241
MAXW3 =	1.81E-01	EPDMAX3=	0.17585639

Comparison of DAD using 95% L-UCI and Average value

CHEMICAL	EPD1-c Eq (3.9)	EPD2-c Eq (3.10)	outside EPD?	Chemicals outside EPD (*)	Kp 95% LCI	Kp (cm/hr) predicted	Kp 95% UCI	DA_event (mg/cm2-evt) 95% LCI Kp	DA_event (mg/cm2-evt) Average Kp	DA_event (mg/cm2-evt) 95% UCI Kp	DAD (mg/kg-day) 95% LCI Kp	DAD (mg/kg-day) Average Kp	DAD (mg/kg-day) 95% UCI Kp	Derm/ Drink 95% LCI Kp	Derm/ Drink Average Kp	Derm/ Drink 95% UCI Kp
Trichloroethane, 1,1,2-	0.183198903	0.047046344	N		2.6E-04	6.4E-03	1.6E-01	9.4E-10	2.3E-08	5.7E-07	4.9E-09	1.2E-07	2.9E-06	16%	383%	9419%
Dichloroethane, 1,1-	0.151043082	0.050000328	N		2.7E-04	6.7E-03	1.7E-01	5.1E-07	1.3E-05	3.2E-04	2.7E-06	6.6E-05	1.6E-03	15%	382%	9465%
Dichloroethylene, 1,1-	0.169064925	0.070165502	N		4.7E-04	1.2E-02	2.9E-01	3.6E-08	8.9E-07	2.2E-05	1.8E-07	4.6E-06	1.1E-04	26%	649%	16140%
Trichlorobenzene, 1,2,4-	0.316128886	0.130883837	N		2.6E-03	6.6E-02	1.7E+00									
Dichlorobenzene, 1,3-	0.277183148	0.127149968	N		2.3E-03	5.8E-02	1.5E+00									
Dichlorobenzene, 1,4-	0.265390099	0.115356919	N		1.7E-03	4.2E-02	1.1E+00									
Benzene	0.159470967	0.079759461	N		5.9E-04	1.5E-02	3.7E-01	7.8E-08	2.0E-06	4.9E-05	4.0E-07	1.0E-05	2.5E-04	32%	807%	20176%
Bromomethane	0.115307388	0.018347170	N		1.1E-04	2.8E-03	7.0E-02	9.9E-10	2.5E-08	6.1E-07	5.1E-09	1.3E-07	3.1E-06	7%	162%	4021%
Chlorobenzene	0.216948639	0.102025264	N		1.1E-03	2.8E-02	7.1E-01	9.2E-09	2.3E-07	5.8E-06	4.8E-08	1.2E-06	3.0E-05	61%	1525%	38249%
Chlorodibromomethane	0.231529970	0.018931933	N		1.3E-04	3.2E-03	7.9E-02									
Chloroethane	0.113220492	0.047389607	N		2.4E-04	6.1E-03	1.5E-01	1.0E-07	2.5E-06	6.3E-05	5.2E-07	1.3E-05	3.3E-04	13%	335%	8364%
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		1.8E-04			9.1E-04			612%	
Ethylbenzene	0.231091397	0.122700079	N		1.9E-03	4.9E-02	1.2E+00	3.4E-07	8.7E-06	2.2E-04	1.8E-06	4.5E-05	1.1E-03	99%	2500%	63436%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA									
Methylene chloride	0.113522630	0.026870813	N		1.4E-04	3.5E-03	8.8E-02	1.1E-07	2.7E-06	6.8E-05	5.7E-07	1.4E-05	3.5E-04	8%	200%	4970%
Tetrachlorethylene	0.275545631	0.106324534	N		1.3E-03	3.3E-02	8.4E-01	8.3E-08	2.1E-06	5.3E-05	4.3E-07	1.1E-05	2.7E-04	79%	1979%	49791%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01	5.1E-07	1.3E-05	3.2E-04	2.6E-06	6.6E-05	1.7E-03	65%	1632%	41070%
trans-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		2.6E-06			1.3E-05			612%	
Trichloroethylene	0.202956499	0.068845207	N		4.7E-04	1.2E-02	2.9E-01	1.7E-07	4.3E-06	1.1E-04	9.0E-07	2.2E-05	5.5E-04	27%	678%	16777%
Vinyl chloride	0.108268842	0.044479224	N		2.2E-04	5.6E-03	1.4E-01	1.1E-06	2.8E-05	7.0E-04	5.8E-06	1.4E-04	3.6E-03	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		4.0E-05			2.1E-04			2402%	
p-Cresol	0.164692560	0.054321212	N		4.8E-03	7.7E-03	1.2E-02	1.0E-06	1.7E-06	2.6E-06	5.4E-06	8.6E-06	1.4E-05	276%	437%	692%
Naphthalene	0.250741977	0.119896713	N		1.8E-03	4.7E-02	1.2E+00	3.7E-07	9.3E-06	2.4E-04	1.9E-06	4.8E-05	1.2E-03	97%	2457%	62236%
2-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA		7.5E-06			3.9E-05			4526%	
cenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA									
henanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	4.4E-07	1.2E-05	3.0E-04	2.3E-06	6.0E-05	1.6E-03	290%	7628%	200991%
Benzo-a-pyrene	0.470139236	0.214980766	Y		2.4E-02	7.0E-01	2.0E+01									
Dibenzo(a,h)anthracene	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01									
TCDD	0.546192220	0.217548111	Y		2.7E-02	8.1E-01	2.5E+01	3.2E-13	9.9E-12	3.0E-10	1.7E-12	5.1E-11	1.6E-09	1786%	54409%	1657801%
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01									
DDD	0.489014209	0.162411367	N		6.4E-03	1.8E-01	5.0E+00									
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA									

C.6-5 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE ADULT RESIDENT CANCER RISK

FOR ORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Organic Chemicals from Aqueous Media (latest version 04/01)

Enter the Following Exposure Conditions: for site specific conditions, change values in Cells I8-I18
The default exposure conditions used in this spreadsheet assume exposure duration for carcinogenic effects of chemicals in water through showering

Concentration (mg/L*L/1000 cm3):			
Input site specific concentrations in Column marked "Conc"			
Area exposed (cm2):	SA =	18000	cm2
Event time (hr/event):	t_event =	0.58	hr/event
Event frequency (events/day):	EV =	1	event/day
Exposure frequency (days/year):	EF =	350	days/yr
Exposure duration (years):	ED =	24	years
for carcinogenic effects, ED = 30 years (used in this spreadsheet)			
for noncarcinogenic effects, ED = 9 years			
Body weight (kg):	BW =	70	kg
Averaging time (days):	AT =	25500	days
for carcinogenic effects, AT=70 years (25,550 days)			
for noncarcinogenic effects, AT=ED (in days)			
Skin thickness (assumed to be 10 um):	Isc =	1.00E-03	cm

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV	IR =	2000	(cm3/day = L/day * 1000 cm3/L)
Drinking (mg/day) = Conc * IR * ABSIG	ABSGI =	1.0	(assumed 100% GI absorption)

IR: Ingestion rate of drinking water
ABSIG: Absorption fraction in GI tract

Refer to Appendix A for equations to evaluate DA_event and DAD

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/min) Q = 1135500.0 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

(*): outside of the Effective Prediction Domain (EPD) determined by the Flynn's measured Kp data as evaluated using MLAB (Civilized Software, Bethesda, MD)
95% LCI and UCI are evaluated using STATA

(**): halogenated chemicals.
Note:

CHEMICAL	CAS No.	MWT	logKow	Kp 95% LCI	Kp (cm/hr) predicted	Kp (cm/hr) measured	Kp 95% UCI	Special Chemicals (*) or (**)	Derm/ Drink	Chem Assess	Derm/ Total Dose	B	tau (hr)	t_star (hr)	FA	Max Conc (mg/cm3)	Kp used in DA_event	DA_event (mg/cm2-evt)	DAD (mg/kg-day)	log(Ds/Isc)	Dsc/Isc	Dsc	b	c	t_star1 B>0.6	t_star3 B<=0.6
Trichloroethane, 1,1,2-	79005	1.33E+02	2.05E+00	2.61E-04	6.4E-03		1.58E-01	**	9%	N	0%	0.0	0.60	1.43	1.0	4.00E-07	6.4E-03	4.2E-09	3.5E-07	-3.6E+00	2.79E-04	2.79E-07	3.2E-01	3.5E-01	#NUM!	1.43
Dichloroethane, 1,1-	75343	9.90E+01	1.79E+00	2.72E-04	6.7E-03		1.67E-01	**	8%	N	0%	0.0	0.38	0.92	1.0	2.20E-04	6.7E-03	1.9E-06	1.6E-04	-3.4E+00	4.36E-04	4.36E-07	3.2E-01	3.5E-01	#NUM!	0.92
Dichloroethylene, 1,1-	75354	9.69E+01	2.13E+00	4.69E-04	1.2E-02		2.90E-01	**	13%	Y	0%	0.0	0.37	0.89	1.0	9.00E-06	1.2E-02	1.3E-07	1.1E-05	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01	#NUM!	0.89
Trichlorobenzene, 1,2,4-	120821	1.82E+02	3.98E+00	2.58E-03	6.6E-02		1.70E+00		132%	Y	0%	0.3	1.11	2.66	1.0	2.30E-05	6.6E-02	3.4E-06	2.9E-04	-3.8E+00	1.50E-04	1.50E-07	5.6E-01	5.9E-01	#NUM!	2.66
Dichlorobenzene, 1,3-	541731	1.47E+02	3.60E+00	2.27E-03	5.8E-02		1.47E+00		92%	Y	0%	0.3	0.71	1.71	1.0	1.90E-05	5.8E-02	2.0E-06	1.7E-04	-3.6E+00	2.34E-04	2.34E-07	4.9E-01	5.3E-01	#NUM!	1.71
Dichlorobenzene, 1,4-	106467	1.47E+02	3.39E+00	1.66E-03	4.2E-02		1.06E+00		67%	Y	0%	0.2	0.71	1.71	1.0	1.97E-04	4.2E-02	1.5E-05	1.2E-03	-3.6E+00	2.34E-04	2.34E-07	4.4E-01	4.7E-01	#NUM!	1.71
Benzene	71432	7.81E+01	2.13E+00	5.95E-04	1.5E-02		3.72E-01		15%	Y	0%	0.1	0.29	0.70	1.0	8.60E-05	1.5E-02	1.5E-06	1.2E-04	-3.2E+00	5.71E-04	5.71E-07	3.3E-01	3.7E-01	#NUM!	0.70
Bromomethane	74839	9.50E+01	1.19E+00	1.14E-04	2.8E-03		7.04E-02	**	3%	N	0%	0.0	0.36	0.87	1.0	1.00E-06	2.8E-03	3.6E-09	3.0E-07	-3.3E+00	4.59E-04	4.59E-07	3.1E-01	3.4E-01	#NUM!	0.87
Chlorobenzene	108907	1.13E+02	2.84E+00	1.12E-03	2.8E-02		7.08E-01		36%	Y	0%	0.1	0.46	1.09	1.0	1.80E-05	2.8E-02	7.2E-07	6.1E-05	-3.4E+00	3.66E-04	3.66E-07	3.8E-01	4.1E-01	#NUM!	1.09
Chlorodibromomethane	124481	2.08E+02	2.23E+00	1.32E-04	3.2E-03		7.86E-02	**	8%	N	0%	0.0	1.57	3.77	1.0	1.51E-06	3.2E-03	1.3E-08	1.1E-06	-4.0E+00	1.06E-04	1.06E-07	3.1E-01	3.5E-01	#NUM!	3.77
Chloroethane	75003	6.45E+01	1.43E+00	2.43E-04	6.1E-03		1.52E-01	**	6%	N	0%	0.0	0.24	0.59	1.0	5.00E-05	6.1E-03	3.2E-07	2.7E-05	-3.2E+00	6.81E-04	6.81E-07	3.1E-01	3.5E-01	#NUM!	0.59
cis-1,2-Dichloroethene	156592	9.69E+01	2.09E+00	NA	1.1E-02		NA	**	13%	Y	0%	0.0	0.37	0.89	1.0	1.90E-03	1.1E-02	2.7E-05	2.3E-03	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01	#NUM!	0.89
Ethylbenzene	100414	1.06E+02	3.15E+00	1.94E-03	4.9E-02		1.25E+00		60%	Y	0%	0.2	0.42	1.01	1.0	4.00E-05	4.9E-02	2.7E-06	2.3E-04	-3.4E+00	3.97E-04	3.97E-07	4.4E-01	4.7E-01	#NUM!	1.01
Methyl tert-butyl ether	1634044	8.82E+01	9.40E-01	NA	2.1E-03		NA		2%	N	0%	0.0	0.33	0.80	1.0	5.40E-04	2.1E-03	1.4E-06	1.2E-04	-3.3E+00	5.01E-04	5.01E-07	3.1E-01	3.4E-01	#NUM!	0.80
Methylene chloride	75092	8.49E+01	1.25E+00	1.42E-04	3.5E-03		8.81E-02	**	4%	N	0%	0.0	0.32	0.76	1.0	9.00E-05	3.5E-03	3.8E-07	3.2E-05	-3.3E+00	5.23E-04	5.23E-07	3.1E-01	3.4E-01	#NUM!	0.76
Tetrachlorethylene	127184	1.66E+02	3.40E+00	1.33E-03	3.3E-02		8.41E-01	**	60%	Y	0%	0.2	0.91	2.18	1.0	3.60E-05	3.3E-02	2.4E-06	2.0E-04	-3.7E+00	1.84E-04	1.84E-07	4.1E-01	4.5E-01	#NUM!	2.18
Toluene	108883	9.21E+01	2.73E+00	1.23E-03	3.1E-02		7.82E-01		35%	Y	0%	0.1	0.35	0.84	1.0	1.20E-03	3.1E-02	4.6E-05	3.9E-03	-3.3E+00	4.77E-04	4.77E-07	3.8E-01	4.1E-01	#NUM!	0.84
trans-1,2-Dichloroethene	156605	9.69E+01	2.09E+00	NA	1.1E-02		NA		13%	Y	0%	0.0	0.37	0.89	1.0	2.80E-05	1.1E-02	3.9E-07	3.3E-05	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01	#NUM!	0.89
Trichloroethylene	79016	1.31E+02	2.42E+00	4.70E-04	1.2E-02		2.88E-01	**	17%	Y	0%	0.1	0.58	1.39	1.0	1.60E-04	1.2E-02	3.0E-06	2.5E-04	-3.5E+00	2.87E-04	2.87E-07	3.4E-01	3.7E-01	#NUM!	1.39
Vinyl chloride	75014	6.25E+01	1.36E+00	2.24E-04	5.6E-03		1.40E-01	**	5%	N	0%	0.0	0.24	0.57	1.0	6.00E-04	5.6E-03	3.5E-06	3.0E-04	-3.2E+00	6.99E-04	6.99E-07	3.1E-01	3.4E-01	#NUM!	0.57
Xylenes (total)	1330207	1.06E+02	3.12E+00	NA	4.7E-02		NA		58%	Y	0%	0.2	0.42	1.01	1.0	1.10E-04	4.7E-02	7.1E-06	6.0E-04	-3.4E+00	3.97E-04	3.97E-07	4.3E-01	4.7E-01	#NUM!	1.01
p-Cresol	106445	1.08E+02	1.95E+00	4.84E-03	7.7E-03		1.21E-02		10%	N	0%	0.0	0.43	1.03	1.0	2.50E-05	7.7E-03	2.6E-07	2.2E-05	-3.4E+00	3.87E-04	3.87E-07	3.2E-01	3.5E-01	#NUM!	1.03
Naphthalene	91203	1.28E+02	3.30E+00	1.84E-03	4.7E-02		1.18E+00		66%	Y	0%	0.2	0.56	1.34	1.0	2.50E-05	4.7E-02	1.8E-06	1.6E-04	-3.5E+00	2.99E-04	2.99E-07	4.4E-01	4.8E-01	#NUM!	1.34
2-Methylnaphthalene	91576	1.42E+02	3.86E+00	NA	9.2E-02		NA		142%	Y	0%	0.4	0.67	1.60	1.0	1.10E-05	9.2E-02	1.7E-06	1.5E-04	-3.6E+00	2.49E-04	2.49E-07	6.3E-01	6.6E-01	#NUM!	1.60
Acenaphthylene	208968	1.52E+02	3.94E+00	NA	9.1E-02		NA		150%	Y	0%	0.4	0.76	1.82	1.0	3.20E-06	9.1E-02	5.3E-07	4.5E-05	-3.7E+00	2.19E-04	2.19E-07	6.4E-01	6.6E-01	#NUM!	1.82
Phenanthrene	85018	1.78E+02	4.46E+00	5.47E-03	1.4E-01		3.80E+00	*	282%	Y	1%	0.7	1.06	4.11	1.0	1.00E-05	1.4E-01	3.1E-06	2.7E-04	-3.8E+00	1.57E-04	1.57E-07	1.0E+00	9.3E-01	4.11	2.55
Benzo-a-pyrene	50328	2.50E+02	6.10E+00	2.41E-02	7.0E-01		2.04E+01	*	2180%	Y	7%	4.3	2.69	11.67	1.0	1.50E-08	7.0E-01	3.6E-08	3.1E-06	-4.2E+00	6.19E-05	6.19E-08	1.3E+01	4.3E+00	11.67	6.46
Dibenzo(a,h)anthracene	53703	2.78E+02	6.84E+00	4.88E-02	1.5E+00		4.66E+01	*	3378%	Y	10%	9.7	3.88	17.57	0.6	1.30E-08	1.5E+00	4.9E-08	4.1E-06	-4.4E+00	4.29E-05	4.29E-08	6.3E+01	9.7E+00	17.57	9.32
TCDD	1746016	3.22E+02	6.80E+00	2.65E-02	8.1E-01		2.46E+01	*	1998%	Y	6%	5.6	6.82	30.09	0.5	2.90E-12	8.1E-01	6.4E-12	5.5E-10	-4.6E+00	2.44E-05	2.44E-08	2.2E+01	5.6E+00	30.09	16.37
Dieldrin	60571	3.81E+02	4.56E+00	4.72E-04	1.2E-02		3.17E-01		71%	Y	0%	0.1	14.62	35.09	0.8	1.40E-08	1.2E-02	1.1E-09	9.3E-08	-4.9E+00	1.14E-05	1.14E-08	3.6E-01	4.0E-01	#NUM!	35.09
DDD	72548	3.20E+02	5.80E+00	6.41E-03	1.8E-01		5.02E+00	*	701%	Y	2%	1.2	6.65	25.99	0.8	5.58E-07	1.8E-01	4.3E-07	3.7E-05	-4.6E+00	2.51E-05	2.51E-08	1.8E+00	1.4E+00	25.99	15.96
Acetophenone	98862.0	1.20E+02	1.58E+00	NA	3.7E-03		NA		5%	N	0%	0.0	0.50	1.21	1.0	1.20E-06	3.7E-03	6.7E-09	5.6E-07	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01	#NUM!	1.21

C.6-5 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE ADULT RESIDENT CANCER RISK

EPDR2 =	1.39E+03	EPD1MW =	0.00051032
EPDR3 =	1.26E+01	EPD1KOW=	0.05615738
EPDC2 =	2.41E+02	EPDMIN1=	-0.06831355
EPDC3 =	2.10E+00	EPDMAX1=	0.55769245
MINW1 =	-3.09E-01	EPD3MW =	-0.00051032
MAXW1 =	3.17E-01	EPD3KOW=	0.05615738
MINW3 =	-2.96E-01	EPDMIN3=	-0.30104241
MAXW3 =	1.81E-01	EPDMAX3=	0.17585639

Comparison of DAD using 95% L-UCI and Average value

CHEMICAL	EPD1-c Eq (3.9)	EPD2-c Eq (3.10)	outside EPD?	Chemicals outside EPD (*)	Kp 95% LCI	Kp (cm/hr) predicted	Kp 95% UCI	DA_event (mg/cm2-evt) 95% LCI Kp	DA_event (mg/cm2-evt) Average Kp	DA_event (mg/cm2-evt) 95% UCI Kp	DAD (mg/kg-day) 95% LCI Kp	DAD (mg/kg-day) Average Kp	DAD (mg/kg-day) 95% UCI Kp	Derm/ Drink 95% LCI Kp	Derm/ Drink Average Kp	Derm/ Drink 95% UCI Kp
Trichloroethane, 1,1,2-	0.183198903	0.047046344	N		2.6E-04	6.4E-03	1.6E-01	1.7E-10	4.2E-09	1.0E-07	1.4E-08	3.5E-07	8.7E-06	0%	9%	232%
Dichloroethane, 1,1-	0.151043082	0.050000328	N		2.7E-04	6.7E-03	1.7E-01	7.8E-08	1.9E-06	4.8E-05	6.6E-06	1.6E-04	4.1E-03	0%	8%	196%
Dichloroethylene, 1,1-	0.169064925	0.070165502	N		4.7E-04	1.2E-02	2.9E-01	5.4E-09	1.3E-07	3.3E-06	4.6E-07	1.1E-05	2.8E-04	1%	13%	335%
Trichlorobenzene, 1,2,4-	0.316128886	0.130883837	N		2.6E-03	6.6E-02	1.7E+00	1.3E-07	3.4E-06	8.7E-05	1.1E-05	2.9E-04	7.4E-03	5%	132%	3397%
Dichlorobenzene, 1,3-	0.277183148	0.127149968	N		2.3E-03	5.8E-02	1.5E+00	7.7E-08	2.0E-06	5.0E-05	6.5E-06	1.7E-04	4.2E-03	4%	92%	2356%
Dichlorobenzene, 1,4-	0.265390099	0.115356919	N		1.7E-03	4.2E-02	1.1E+00	5.8E-07	1.5E-05	3.7E-04	4.9E-05	1.2E-03	3.1E-02	3%	67%	1694%
Benzene	0.159470967	0.079759461	N		5.9E-04	1.5E-02	3.7E-01	5.8E-08	1.5E-06	3.6E-05	4.9E-06	1.2E-04	3.1E-03	1%	15%	380%
Bromomethane	0.115307388	0.018347170	N		1.1E-04	2.8E-03	7.0E-02	1.4E-10	3.6E-09	8.9E-08	1.2E-08	3.0E-07	7.6E-06	0%	3%	80%
Chlorobenzene	0.216948639	0.102025264	N		1.1E-03	2.8E-02	7.1E-01	2.9E-08	7.2E-07	1.8E-05	2.4E-06	6.1E-05	1.5E-03	1%	36%	905%
Chlorodibromomethane	0.231529970	0.018931933	N		1.3E-04	3.2E-03	7.9E-02	5.3E-10	1.3E-08	3.1E-07	4.5E-08	1.1E-06	2.7E-05	0%	8%	187%
Chloroethane	0.113220492	0.047389607	N		2.4E-04	6.1E-03	1.5E-01	1.3E-08	3.2E-07	7.9E-06	1.1E-06	2.7E-05	6.7E-04	0%	6%	142%
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		2.7E-05			2.3E-03			13%	
Ethylbenzene	0.231091397	0.122700079	N		1.9E-03	4.9E-02	1.2E+00	1.1E-07	2.7E-06	6.8E-05	9.0E-06	2.3E-04	5.8E-03	2%	60%	1533%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		1.4E-06			1.2E-04			2%	
Methylene chloride	0.113522630	0.026870813	N		1.4E-04	3.5E-03	8.8E-02	1.5E-08	3.8E-07	9.4E-06	1.3E-06	3.2E-05	8.0E-04	0%	4%	94%
Tetrachlorethylene	0.275545631	0.106324534	N		1.3E-03	3.3E-02	8.4E-01	9.6E-08	2.4E-06	6.1E-05	8.1E-06	2.0E-04	5.1E-03	2%	60%	1517%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01	1.8E-06	4.6E-05	1.2E-03	1.6E-04	3.9E-03	9.9E-02	1%	35%	876%
trans-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		3.9E-07			3.3E-05			13%	
Trichloroethylene	0.202956499	0.068845207	N		4.7E-04	1.2E-02	2.9E-01	1.2E-07	3.0E-06	7.4E-05	1.0E-05	2.5E-04	6.3E-03	1%	17%	416%
Vinyl chloride	0.108268842	0.044479224	N		2.2E-04	5.6E-03	1.4E-01	1.4E-07	3.5E-06	8.9E-05	1.2E-05	3.0E-04	7.5E-03	0%	5%	133%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		7.1E-06			6.0E-04			58%	
p-Cresol	0.164692560	0.054321212	N		4.8E-03	7.7E-03	1.2E-02	1.7E-07	2.6E-07	4.2E-07	1.4E-05	2.2E-05	3.5E-05	6%	10%	15%
Naphthalene	0.250741977	0.119896713	N		1.8E-03	4.7E-02	1.2E+00	7.2E-08	1.8E-06	4.6E-05	6.1E-06	1.6E-04	3.9E-03	3%	66%	1671%
2-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA		1.7E-06			1.5E-04			142%	
Acenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA		5.3E-07			4.5E-05			150%	
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	1.2E-07	3.1E-06	8.2E-05	1.0E-05	2.7E-04	7.0E-03	11%	282%	7425%
Benzo-a-pyrene	0.470139236	0.214980766	Y		2.4E-02	7.0E-01	2.0E+01	1.2E-09	3.6E-08	1.1E-06	1.1E-07	3.1E-06	8.9E-05	75%	2180%	63371%
Dibenzo(a,h)anthracene	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	1.6E-09	4.9E-08	1.5E-06	1.3E-07	4.1E-06	1.3E-04	109%	3378%	104381%
TCDD	0.546192220	0.217548111	Y		2.7E-02	8.1E-01	2.5E+01	2.1E-13	6.4E-12	2.0E-10	1.8E-11	5.5E-10	1.7E-08	66%	1998%	60870%
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01	4.3E-11	1.1E-09	2.9E-08	3.6E-09	9.3E-08	2.4E-06	3%	71%	1836%
DDD	0.489014209	0.162411367	N		6.4E-03	1.8E-01	5.0E+00	1.6E-08	4.3E-07	1.2E-05	1.3E-06	3.7E-05	1.0E-03	25%	701%	19608%
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA	#VALUE!	6.7E-09	#VALUE!	#VALUE!	5.6E-07	#VALUE!	#VALUE!	5%	#VALUE!

C.6-6 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE ADULT RESIDENT CANCER RISK

FOR ORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Organic Chemicals from Aqueous Media (latest version 04/01)

Enter the Following Exposure Conditions: for site specific conditions, change values in Cells I8-I18
The default exposure conditions used in this spreadsheet assume exposure duration for carcinogenic effects of chemicals in water through showering

Concentration (mg/L*L/1000 cm3):			
Input site specific concentrations in Column marked "Conc"			
Area exposed (cm2):	SA =	18000	cm2
Event time (hr/event):	t_event =	0.25	hr/event
Event frequency (events/day):	EV =	1	event/day
Exposure frequency (days/year):	EF =	350	days/yr
Exposure duration (years):	ED =	7	years
for carcinogenic effects, ED = 30 years (used in this spreadsheet)			
for noncarcinogenic effects, ED = 9 years			
Body weight (kg):	BW =	70	kg
Averaging time (days):	AT =	25550	days
for carcinogenic effects, AT=70 years (25,550 days)			
for noncarcinogenic effects, AT=ED (in days)			
Skin thickness (assumed to be 10 um):	lsc =	1.00E-03	cm

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV	IR =	1400	(cm3/day = L/day * 1000 cm3/L)
Drinking (mg/day) = Conc * IR * ABSIG	ABSGI =	1.0	(assumed 100% GI absorption)

IR: Ingestion rate of drinking water
ABSIG: Absorption fraction in GI tract

Refer to Appendix A for equations to evaluate DA_event and DAD

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/min) Q = 1135500.0 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

(*): outside of the Effective Prediction Domain (EPD) determined by the Flynn's measured Kp data as evaluated using MLAB (Civilized Software, Bethesda, MD)
95% LCI and UCI are evaluated using STATA

(**): halogenated chemicals.
Note:

CHEMICAL	CAS No.	MWT	logKow	Kp 95% LCI	Kp (cm/hr) predicted	Kp (cm/hr) measured	Kp 95% UCI	Special Chemicals (*) or (**)	Derm/ Drink	Chem Assess	Derm/ Total Dose	B	tau (hr)	t_star (hr)	FA	Mean Conc (mg/cm3)	Kp used in DA_event	DA_event (mg/cm2-evt)	DAD (mg/kg-day)	og(Ds/lsc)	Dsc/lsc	Dsc	b	c	t_star1 B>0.6	t_star3 B<=0.6
Trichloroethane, 1,1,2-	79005	1.33E+02	2.05E+00	2.61E-04	6.4E-03		1.58E-01	**	9%	N	0%	0.0	0.60	1.43	1.0	5.64E-06	6.4E-03	3.9E-08	9.6E-07	-3.6E+00	2.79E-04	2.79E-07	3.2E-01	3.5E-01		1.43
Dichloroethane, 1,1-	75343	9.90E+01	1.79E+00	2.72E-04	6.7E-03		1.67E-01	**	7%	N	0%	0.0	0.38	0.92	1.0	1.96E-05	6.7E-03	1.1E-07	2.8E-06	-3.4E+00	4.36E-04	4.36E-07	3.2E-01	3.5E-01		0.92
Dichloroethylene, 1,1-	75354	9.69E+01	2.13E+00	4.69E-04	1.2E-02		2.90E-01	**	13%	Y	0%	0.0	0.37	0.89	1.0	4.75E-06	1.2E-02	4.7E-08	1.2E-06	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Trichlorobenzene, 1,2,4-	120821	1.82E+02	3.98E+00	2.58E-03	6.6E-02		1.70E+00		124%	Y	1%	0.3	1.11	2.66	1.0	6.63E-06	6.6E-02	6.4E-07	1.6E-05	-3.8E+00	1.50E-04	1.50E-07	5.6E-01	5.9E-01		2.66
Dichlorobenzene, 1,3-	541731	1.47E+02	3.60E+00	2.27E-03	5.8E-02		1.47E+00		87%	Y	0%	0.3	0.71	1.71	1.0	6.17E-06	5.8E-02	4.2E-07	1.0E-05	-3.6E+00	2.34E-04	2.34E-07	4.9E-01	5.3E-01		1.71
Dichlorobenzene, 1,4-	106467	1.47E+02	3.39E+00	1.66E-03	4.2E-02		1.06E+00		63%	Y	0%	0.2	0.71	1.71	1.0	9.67E-06	4.2E-02	4.7E-07	1.2E-05	-3.6E+00	2.34E-04	2.34E-07	4.4E-01	4.7E-01		1.71
Benzene	71432	7.81E+01	2.13E+00	5.95E-04	1.5E-02		3.72E-01		14%	Y	0%	0.1	0.29	0.70	1.0	3.94E-06	1.5E-02	4.4E-08	1.1E-06	-3.2E+00	5.71E-04	5.71E-07	3.3E-01	3.7E-01		0.70
Bromomethane	74839	9.50E+01	1.19E+00	1.14E-04	2.8E-03		7.04E-02	**	3%	N	0%	0.0	0.36	0.87	1.0	5.55E-06	2.8E-03	1.3E-08	3.2E-07	-3.3E+00	4.59E-04	4.59E-07	3.1E-01	3.4E-01		0.87
Chlorobenzene	108907	1.13E+02	2.84E+00	1.12E-03	2.8E-02		7.08E-01		34%	Y	0%	0.1	0.46	1.09	1.0	6.45E-06	2.8E-02	1.7E-07	4.2E-06	-3.4E+00	3.66E-04	3.66E-07	3.8E-01	4.1E-01		1.09
Chlorodibromomethane	124481	2.08E+02	2.23E+00	1.32E-04	3.2E-03		7.86E-02	**	7%	N	0%	0.0	1.57	3.77	1.0	5.73E-06	3.2E-03	3.2E-08	7.9E-07	-4.0E+00	1.06E-04	1.06E-07	3.1E-01	3.5E-01		3.77
Chloroethane	75003	6.45E+01	1.43E+00	2.43E-04	6.1E-03		1.52E-01	**	5%	N	0%	0.0	0.24	0.59	1.0	6.88E-06	6.1E-03	2.9E-08	7.0E-07	-3.2E+00	6.81E-04	6.81E-07	3.1E-01	3.5E-01		0.59
cis-1,2-Dichloroethene	156592	9.69E+01	2.09E+00	NA	1.1E-02		NA	**	12%	Y	0%	0.0	0.37	0.89	1.0	1.10E-04	1.1E-02	1.0E-06	2.5E-05	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Ethylbenzene	100414	1.06E+02	3.15E+00	1.94E-03	4.9E-02		1.25E+00		57%	Y	0%	0.2	0.42	1.01	1.0	3.02E-06	4.9E-02	1.3E-07	3.3E-06	-3.4E+00	3.97E-04	3.97E-07	4.4E-01	4.7E-01		1.01
Methyl tert-butyl ether	1634044	8.82E+01	9.40E-01	NA	2.1E-03		NA		2%	N	0%	0.0	0.33	0.80	1.0	1.65E-05	2.1E-03	2.8E-08	6.8E-07	-3.3E+00	5.01E-04	5.01E-07	3.1E-01	3.4E-01		0.80
Methylene chloride	75092	8.49E+01	1.25E+00	1.42E-04	3.5E-03		8.81E-02	**	4%	N	0%	0.0	0.32	0.76	1.0	3.89E-06	3.5E-03	1.1E-08	2.6E-07	-3.3E+00	5.23E-04	5.23E-07	3.1E-01	3.4E-01		0.76
Tetrachlorethylene	127184	1.66E+02	3.40E+00	1.33E-03	3.3E-02		8.41E-01	**	57%	Y	0%	0.2	0.91	2.18	1.0	7.35E-06	3.3E-02	3.2E-07	8.0E-06	-3.7E+00	1.84E-04	1.84E-07	4.1E-01	4.5E-01		2.18
Toluene	108883	9.21E+01	2.73E+00	1.23E-03	3.1E-02		7.82E-01		33%	Y	0%	0.1	0.35	0.84	1.0	2.88E-05	3.1E-02	7.3E-07	1.8E-05	-3.3E+00	4.77E-04	4.77E-07	3.8E-01	4.1E-01		0.84
trans-1,2-Dichloroethene	156605	9.69E+01	2.09E+00	NA	1.1E-02		NA		12%	Y	0%	0.0	0.37	0.89	1.0	4.80E-06	1.1E-02	4.4E-08	1.1E-06	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Trichloroethylene	79016	1.31E+02	2.42E+00	4.70E-04	1.2E-02		2.88E-01	**	16%	Y	0%	0.1	0.58	1.39	1.0	1.18E-05	1.2E-02	1.5E-07	3.6E-06	-3.5E+00	2.87E-04	2.87E-07	3.4E-01	3.7E-01		1.39
Vinyl chloride	75014	6.25E+01	1.36E+00	2.24E-04	5.6E-03		1.40E-01	**	5%	N	0%	0.0	0.24	0.57	1.0	3.38E-05	5.6E-03	1.3E-07	3.1E-06	-3.2E+00	6.99E-04	6.99E-07	3.1E-01	3.4E-01		0.57
Xylenes (total)	1330207	1.06E+02	3.12E+00	NA	4.7E-02		NA		54%	Y	0%	0.2	0.42	1.01	1.0	6.81E-06	4.7E-02	2.9E-07	7.1E-06	-3.4E+00	3.97E-04	3.97E-07	4.3E-01	4.7E-01		1.01
p-Cresol	106445	1.08E+02	1.95E+00	4.84E-03	7.7E-03		1.21E-02		9%	N	0%	0.0	0.43	1.03	1.0	5.63E-06	7.7E-03	3.9E-08	9.6E-07	-3.4E+00	3.87E-04	3.87E-07	3.2E-01	3.5E-01		1.03
Naphthalene	91203	1.28E+02	3.30E+00	1.84E-03	4.7E-02		1.18E+00		62%	Y	0%	0.2	0.56	1.34	1.0	4.64E-06	4.7E-02	2.2E-07	5.5E-06	-3.5E+00	2.99E-04	2.99E-07	4.4E-01	4.8E-01		1.34
2-Methylnaphthalene	91576	1.42E+02	3.86E+00	NA	9.2E-02		NA		133%	Y	1%	0.4	0.67	1.60	1.0	4.82E-06	9.2E-02	5.0E-07	1.2E-05	-3.6E+00	2.49E-04	2.49E-07	6.3E-01	6.6E-01		1.60
Acenaphthylene	208968	1.52E+02	3.94E+00	NA	9.1E-02		NA		141%	Y	1%	0.4	0.76	1.82	1.0	4.63E-06	9.1E-02	5.1E-07	1.3E-05	-3.7E+00	2.19E-04	2.19E-07	6.4E-01	6.6E-01		1.82
Phenanthrene	85018	1.78E+02	4.46E+00	5.47E-03	1.4E-01		3.80E+00	*	264%	Y	1%	0.7	1.06	4.11	1.0	4.74E-06	1.4E-01	9.7E-07	2.4E-05	-3.8E+00	1.57E-04	1.57E-07	1.0E+00	9.3E-01	4.11	2.55
Benzo-a-pyrene	50328	2.50E+02	6.10E+00	2.41E-02	7.0E-01		2.04E+01	*	2044%	Y	10%	4.3	2.69	11.67	1.0	3.87E-06	7.0E-01	6.1E-06	1.5E-04	-4.2E+00	6.19E-05	6.19E-08	1.3E+01	4.3E+00	11.67	6.46
Dibenzo(a,h)anthracene	53703	2.78E+02	6.84E+00	4.88E-02	1.5E+00		4.66E+01	*	3168%	Y	16%	9.7	3.88	17.57	0.6	3.87E-06	1.5E+00	9.5E-06	2.3E-04	-4.4E+00	4.29E-05	4.29E-08	6.3E+01	9.7E+00	17.57	9.32
TCDD	1746016	3.22E+02	6.80E+00	2.65E-02	8.1E-01		2.46E+01	*	1874%	Y	9%	5.6	6.82	30.09	0.5	1.35E-12	8.1E-01	2.0E-12	4.9E-11	-4.6E+00	2.44E-05	2.44E-08	2.2E+01	5.6E+00	30.09	16.37
Dieldrin	60571	3.81E+02	4.56E+00	4.72E-04	1.2E-02		3.17E-01		66%	Y	0%	0.1	14.62	35.09	0.8	1.40E-08	1.2E-02	7.2E-10	1.8E-08	-4.9E+00	1.14E-05	1.14E-08	3.6E-01	4.0E-01		35.09
DDD	72548	3.20E+02	5.80E+00	6.41E-03	1.8E-01		5.02E+00	*	657%	Y	3%	1.2	6.65	25.99	0.8	1.89E-07	1.8E-01	9.7E-08	2.4E-06	-4.6E+00	2.51E-05	2.51E-08	1.8E+00	1.4E+00	25.99	15.96
Acetophenone	98862	1.20E+02	1.58E+00	NA	3.7E-03		NA		5%	N	0%	0.0	0.50	1.21	1.0	5.07E-06	3.7E-03	1.8E-08	4.6E-07	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01		1.21

C.6-7 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE ADULT RESIDENT NON-CANCER RISK

EPDR2 =	1.39E+03	EPD1MW =	0.00051032
EPDR3 =	1.26E+01	EPD1KOW=	0.05615738
EPDC2 =	2.41E+02	EPDMIN1=	-0.06831355
EPDC3 =	2.10E+00	EPDMAX1=	0.55769245
MINW1 =	-3.09E-01	EPD3MW =	-0.00051032
MAXW1 =	3.17E-01	EPD3KOW=	0.05615738
MINW3 =	-2.96E-01	EPDMIN3=	-0.30104241
MAXW3 =	1.81E-01	EPDMAX3=	0.17585639

Comparison of DAD using 95% L-UCI and Average value

CHEMICAL	EPD1-c Eq (3.9)	EPD2-c Eq (3.10)	outside EPD?	Chemicals outside EPD (*)	Kp 95% LCI	Kp (cm/hr) predicted	Kp 95% UCI	DA_event (mg/cm2-evt) 95% LCI Kp	DA_event (mg/cm2-evt) Average Kp	DA_event (mg/cm2-evt) 95% UCI Kp	DAD (mg/kg-day) 95% LCI Kp	DAD (mg/kg-day) Average Kp	DAD (mg/kg-day) 95% UCI Kp	Derm/ Drink 95% LCI Kp	Derm/ Drink Average Kp	Derm/ Drink 95% UCI Kp
Trichloroethane, 1,1,2-	0.183198903	0.047046344	N		2.6E-04	6.4E-03	1.6E-01	1.7E-10	4.2E-09	1.0E-07	4.2E-08	1.0E-06	2.5E-05	0%	9%	232%
Dichloroethane, 1,1-	0.151043082	0.050000328	N		2.7E-04	6.7E-03	1.7E-01	7.8E-08	1.9E-06	4.8E-05	1.9E-05	4.8E-04	1.2E-02	0%	8%	196%
Dichloroethylene, 1,1-	0.169064925	0.070165502	N		4.7E-04	1.2E-02	2.9E-01	5.4E-09	1.3E-07	3.3E-06	1.3E-06	3.3E-05	8.3E-04	1%	13%	335%
Trichlorobenzene, 1,2,4-	0.316128886	0.130883837	N		2.6E-03	6.6E-02	1.7E+00	1.3E-07	3.4E-06	8.7E-05	3.2E-05	8.3E-04	2.1E-02	5%	132%	3397%
Dichlorobenzene, 1,3-	0.277183148	0.127149968	N		2.3E-03	5.8E-02	1.5E+00	7.7E-08	2.0E-06	5.0E-05	1.9E-05	4.8E-04	1.2E-02	4%	92%	2356%
Dichlorobenzene, 1,4-	0.265390099	0.115356919	N		1.7E-03	4.2E-02	1.1E+00	5.8E-07	1.5E-05	3.7E-04	1.4E-04	3.6E-03	9.1E-02	3%	67%	1694%
Benzene	0.159470967	0.079759461	N		5.9E-04	1.5E-02	3.7E-01	5.8E-08	1.5E-06	3.6E-05	1.4E-05	3.6E-04	9.0E-03	1%	15%	380%
Bromomethane	0.115307388	0.018347170	N		1.1E-04	2.8E-03	7.0E-02	1.4E-10	3.6E-09	8.9E-08	3.6E-08	8.9E-07	2.2E-05	0%	3%	80%
Chlorobenzene	0.216948639	0.102025264	N		1.1E-03	2.8E-02	7.1E-01	2.9E-08	7.2E-07	1.8E-05	7.1E-06	1.8E-04	4.5E-03	1%	36%	905%
Chlorodibromomethane	0.231529970	0.018931933	N		1.3E-04	3.2E-03	7.9E-02	5.3E-10	1.3E-08	3.1E-07	1.3E-07	3.2E-06	7.7E-05	0%	8%	187%
Chloroethane	0.113220492	0.047389607	N		2.4E-04	6.1E-03	1.5E-01	1.3E-08	3.2E-07	7.9E-06	3.1E-06	7.8E-05	1.9E-03	0%	6%	142%
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		2.7E-05			6.6E-03			13%	
Ethylbenzene	0.231091397	0.122700079	N		1.9E-03	4.9E-02	1.2E+00	1.1E-07	2.7E-06	6.8E-05	2.6E-05	6.6E-04	1.7E-02	2%	60%	1533%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		1.4E-06			3.4E-04			2%	
Methylene chloride	0.113522630	0.026870813	N		1.4E-04	3.5E-03	8.8E-02	1.5E-08	3.8E-07	9.4E-06	3.8E-06	9.3E-05	2.3E-03	0%	4%	94%
Tetrachlorethylene	0.275545631	0.106324534	N		1.3E-03	3.3E-02	8.4E-01	9.6E-08	2.4E-06	6.1E-05	2.4E-05	5.9E-04	1.5E-02	2%	60%	1517%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01	1.8E-06	4.6E-05	1.2E-03	4.5E-04	1.1E-02	2.9E-01	1%	35%	876%
trans-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		3.9E-07			9.7E-05			13%	
Trichloroethylene	0.202956499	0.068845207	N		4.7E-04	1.2E-02	2.9E-01	1.2E-07	3.0E-06	7.4E-05	3.0E-05	7.4E-04	1.8E-02	1%	17%	416%
Vinyl chloride	0.108268842	0.044479224	N		2.2E-04	5.6E-03	1.4E-01	1.4E-07	3.5E-06	8.9E-05	3.5E-05	8.7E-04	2.2E-02	0%	5%	133%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		7.1E-06			1.7E-03			58%	
p-Cresol	0.164692560	0.054321212	N		4.8E-03	7.7E-03	1.2E-02	1.7E-07	2.6E-07	4.2E-07	4.1E-05	6.5E-05	1.0E-04	6%	10%	15%
Naphthalene	0.250741977	0.119896713	N		1.8E-03	4.7E-02	1.2E+00	7.2E-08	1.8E-06	4.6E-05	1.8E-05	4.5E-04	1.1E-02	3%	66%	1671%
1-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA		1.7E-06			4.3E-04			142%	
Acenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA		5.3E-07			1.3E-04			150%	
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	1.2E-07	3.1E-06	8.2E-05	2.9E-05	7.7E-04	2.0E-02	11%	282%	7425%
Benzo-a-pyrene	0.470139236	0.214980766	Y		2.4E-02	7.0E-01	2.0E+01	1.2E-09	3.6E-08	1.1E-06	3.1E-07	9.0E-06	2.6E-04	75%	2180%	63371%
Dibenzo(a,h)anthracene	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	1.6E-09	4.9E-08	1.5E-06	3.9E-07	1.2E-05	3.7E-04	109%	3378%	104381%
TCDD	0.546192220	0.217548111	Y		2.7E-02	8.1E-01	2.5E+01	2.1E-13	6.4E-12	2.0E-10	5.2E-11	1.6E-09	4.8E-08	66%	1998%	60870%
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01	4.3E-11	1.1E-09	2.9E-08	1.0E-08	2.7E-07	7.0E-06	3%	71%	1836%
DDD	0.489014209	0.162411367	N		6.4E-03	1.8E-01	5.0E+00	1.6E-08	4.3E-07	1.2E-05	3.8E-06	1.1E-04	3.0E-03	25%	701%	19608%
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA		6.7E-09			1.6E-06			5%	

C.6-8 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE ADULT RESIDENT NON-CANCER RISK

FOR ORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Organic Chemicals from Aqueous Media (latest version 04/01)

Enter the Following Exposure Conditions: for site specific conditions, change values in Cells I8-I18
The default exposure conditions used in this spreadsheet assume exposure duration for carcinogenic effects of chemicals in water through showering

Concentration (mg/L*L/1000 cm3):			
Input site specific concentrations in Column marked "Conc"			
Area exposed (cm2):	SA =	18000	cm2
Event time (hr/event):	t_event =	0.25	hr/event
Event frequency (events/day):	EV =	1	event/day
Exposure frequency (days/year):	EF =	350	days/yr
Exposure duration (years):	ED =	7	years
for carcinogenic effects, ED = 30 years (used in this spreadsheet)			
for noncarcinogenic effects, ED = 9 years			
Body weight (kg):	BW =	70	kg
Averaging time (days):	AT =	2555	days
for carcinogenic effects, AT=70 years (25,550 days)			
for noncarcinogenic effects, AT=ED (in days)			
Skin thickness (assumed to be 10 um):	lsc =	1.00E-03	cm

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV	IR =	1400	(cm3/day = L/day * 1000 cm3/L)
Drinking (mg/day) = Conc * IR * ABSIG	ABSGI =	1.0	(assumed 100% GI absorption)

IR: Ingestion rate of drinking water
ABSIG: Absorption fraction in GI tract

Refer to Appendix A for equations to evaluate DA_event and DAD

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/min)	Q =	1135500.0	(cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

(*): outside of the Effective Prediction Domain (EPD) determined by the Flynn's measured Kp data as evaluated using MLAB (Civilized Software, Bethesda, MD)
95% LCI and UCI are evaluated using STATA

(**): halogenated chemicals.
Note:

CHEMICAL	CAS No.	MWT	logKow	Kp 95% LCI	Kp (cm/hr) predicted	Kp (cm/hr) measured	Kp 95% UCI	Special Chemicals (*) or (**)	Derm/ Drink	Chem Assess	Derm/ Total Dose	B	tau (hr)	t_star (hr)	FA	Mean Conc (mg/cm3)	Kp used in DA_event	DA_event (mg/cm2-evt)	DAD (mg/kg-day)	log(Ds/lsc)	Dsc/lsc	Dsc	b	c	t_star1 B>0.6	t_star3 B<=0.6
Trichloroethane, 1,1,2-	79005	1.33E+02	2.05E+00	2.61E-04	6.4E-03		1.58E-01	**	9%	N	0%	0.0	0.60	1.43	1.0	5.64E-06	6.4E-03	3.9E-08	9.6E-06	-3.6E+00	2.79E-04	2.79E-07	3.2E-01	3.5E-01		1.43
Dichloroethane, 1,1-	75343	9.90E+01	1.79E+00	2.72E-04	6.7E-03		1.67E-01	**	7%	N	0%	0.0	0.38	0.92	1.0	1.96E-05	6.7E-03	1.1E-07	2.8E-05	-3.4E+00	4.36E-04	4.36E-07	3.2E-01	3.5E-01		0.92
Dichloroethylene, 1,1-	75354	9.69E+01	2.13E+00	4.69E-04	1.2E-02		2.90E-01	**	13%	Y	0%	0.0	0.37	0.89	1.0	4.75E-06	1.2E-02	4.7E-08	1.2E-05	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Trichlorobenzene, 1,2,4-	120821	1.82E+02	3.98E+00	2.58E-03	6.6E-02		1.70E+00		124%	Y	1%	0.3	1.11	2.66	1.0	6.63E-06	6.6E-02	6.4E-07	1.6E-04	-3.8E+00	1.50E-04	1.50E-07	5.6E-01	5.9E-01		2.66
Dichlorobenzene, 1,3-	541731	1.47E+02	3.60E+00	2.27E-03	5.8E-02		1.47E+00		87%	Y	0%	0.3	0.71	1.71	1.0	6.17E-06	5.8E-02	4.2E-07	1.0E-04	-3.6E+00	2.34E-04	2.34E-07	4.9E-01	5.3E-01		1.71
Dichlorobenzene, 1,4-	106467	1.47E+02	3.39E+00	1.66E-03	4.2E-02		1.06E+00		63%	Y	0%	0.2	0.71	1.71	1.0	9.67E-06	4.2E-02	4.7E-07	1.2E-04	-3.6E+00	2.34E-04	2.34E-07	4.4E-01	4.7E-01		1.71
Benzene	71432	7.81E+01	2.13E+00	5.95E-04	1.5E-02		3.72E-01		14%	Y	0%	0.1	0.29	0.70	1.0	3.94E-06	1.5E-02	4.4E-08	1.1E-05	-3.2E+00	5.71E-04	5.71E-07	3.3E-01	3.7E-01		0.70
Bromomethane	74839	9.50E+01	1.19E+00	1.14E-04	2.8E-03		7.04E-02	**	3%	N	0%	0.0	0.36	0.87	1.0	5.55E-06	2.8E-03	1.3E-08	3.2E-06	-3.3E+00	4.59E-04	4.59E-07	3.1E-01	3.4E-01		0.87
Chlorobenzene	108907	1.13E+02	2.84E+00	1.12E-03	2.8E-02		7.08E-01		34%	Y	0%	0.1	0.46	1.09	1.0	6.45E-06	2.8E-02	1.7E-07	4.2E-05	-3.4E+00	3.66E-04	3.66E-07	3.8E-01	4.1E-01		1.09
Chlorodibromomethane	124481	2.08E+02	2.23E+00	1.32E-04	3.2E-03		7.86E-02	**	7%	N	0%	0.0	1.57	3.77	1.0	5.73E-06	3.2E-03	3.2E-08	7.9E-06	-4.0E+00	1.06E-04	1.06E-07	3.1E-01	3.5E-01		3.77
Chloroethane	75003	6.45E+01	1.43E+00	2.43E-04	6.1E-03		1.52E-01	**	5%	N	0%	0.0	0.24	0.59	1.0	6.88E-06	6.1E-03	2.9E-08	7.0E-06	-3.2E+00	6.81E-04	6.81E-07	3.1E-01	3.5E-01		0.59
cis-1,2-Dichloroethene	156592	9.69E+01	2.09E+00	NA	1.1E-02		NA	**	12%	Y	0%	0.0	0.37	0.89	1.0	1.10E-04	1.1E-02	1.0E-06	2.5E-04	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Ethylbenzene	100414	1.06E+02	3.15E+00	1.94E-03	4.9E-02		1.25E+00		57%	Y	0%	0.2	0.42	1.01	1.0	3.02E-06	4.9E-02	1.3E-07	3.3E-05	-3.4E+00	3.97E-04	3.97E-07	4.4E-01	4.7E-01		1.01
Methyl tert-butyl ether	1634044	8.82E+01	9.40E-01	NA	2.1E-03		NA		2%	N	0%	0.0	0.33	0.80	1.0	1.65E-05	2.1E-03	2.8E-08	6.8E-06	-3.3E+00	5.01E-04	5.01E-07	3.1E-01	3.4E-01		0.80
Methylene chloride	75092	8.49E+01	1.25E+00	1.42E-04	3.5E-03		8.81E-02	**	4%	N	0%	0.0	0.32	0.76	1.0	3.89E-06	3.5E-03	1.1E-08	2.6E-06	-3.3E+00	5.23E-04	5.23E-07	3.1E-01	3.4E-01		0.76
Tetrachlorethylene	127184	1.66E+02	3.40E+00	1.33E-03	3.3E-02		8.41E-01	**	57%	Y	0%	0.2	0.91	2.18	1.0	7.35E-06	3.3E-02	3.2E-07	8.0E-05	-3.7E+00	1.84E-04	1.84E-07	4.1E-01	4.5E-01		2.18
Toluene	108883	9.21E+01	2.73E+00	1.23E-03	3.1E-02		7.82E-01		33%	Y	0%	0.1	0.35	0.84	1.0	2.88E-05	3.1E-02	7.3E-07	1.8E-04	-3.3E+00	4.77E-04	4.77E-07	3.8E-01	4.1E-01		0.84
trans-1,2-Dichloroethene	156605	9.69E+01	2.09E+00	NA	1.1E-02		NA		12%	Y	0%	0.0	0.37	0.89	1.0	4.80E-06	1.1E-02	4.4E-08	1.1E-05	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Trichloroethylene	79016	1.31E+02	2.42E+00	4.70E-04	1.2E-02		2.88E-01	**	16%	Y	0%	0.1	0.58	1.39	1.0	1.18E-05	1.2E-02	1.5E-07	3.6E-05	-3.5E+00	2.87E-04	2.87E-07	3.4E-01	3.7E-01		1.39
Vinyl chloride	75014	6.25E+01	1.36E+00	2.24E-04	5.6E-03		1.40E-01	**	5%	N	0%	0.0	0.24	0.57	1.0	3.38E-05	5.6E-03	1.3E-07	3.1E-05	-3.2E+00	6.99E-04	6.99E-07	3.1E-01	3.4E-01		0.57
Xylenes (total)	1330207	1.06E+02	3.12E+00	NA	4.7E-02		NA		54%	Y	0%	0.2	0.42	1.01	1.0	6.81E-06	4.7E-02	2.9E-07	7.1E-05	-3.4E+00	3.97E-04	3.97E-07	4.3E-01	4.7E-01		1.01
p-Cresol	106445	1.08E+02	1.95E+00	4.84E-03	7.7E-03		1.21E-02		9%	N	0%	0.0	0.43	1.03	1.0	5.63E-06	7.7E-03	3.9E-08	9.6E-06	-3.4E+00	3.87E-04	3.87E-07	3.2E-01	3.5E-01		1.03
Naphthalene	91203	1.28E+02	3.30E+00	1.84E-03	4.7E-02		1.18E+00		62%	Y	0%	0.2	0.56	1.34	1.0	4.64E-06	4.7E-02	2.2E-07	5.5E-05	-3.5E+00	2.99E-04	2.99E-07	4.4E-01	4.8E-01		1.34
2-Methylnaphthalene	91576	1.42E+02	3.86E+00	NA	9.2E-02		NA		133%	Y	1%	0.4	0.67	1.60	1.0	4.82E-06	9.2E-02	5.0E-07	1.2E-04	-3.6E+00	2.49E-04	2.49E-07	6.3E-01	6.6E-01		1.60
Acenaphthylene	208968	1.52E+02	3.94E+00	NA	9.1E-02		NA		141%	Y	1%	0.4	0.76	1.82	1.0	4.63E-06	9.1E-02	5.1E-07	1.3E-04	-3.7E+00	2.19E-04	2.19E-07	6.4E-01	6.6E-01		1.82
Phenanthrene	85018	1.78E+02	4.46E+00	5.47E-03	1.4E-01		3.80E+00	*	264%	Y	1%	0.7	1.06	4.11	1.0	4.74E-06	1.4E-01	9.7E-07	2.4E-04	-3.8E+00	1.57E-04	1.57E-07	1.0E+00	9.3E-01	4.11	2.55
Benzo-a-pyrene	50328	2.50E+02	6.10E+00	2.41E-02	7.0E-01		2.04E+01	*	2044%	Y	10%	4.3	2.69	11.67	1.0	3.87E-06	7.0E-01	6.1E-06	1.5E-03	-4.2E+00	6.19E-05	6.19E-08	1.3E+01	4.3E+00	11.67	6.46
Dibenzo(a,h)anthracene	53703	2.78E+02	6.84E+00	4.88E-02	1.5E+00		4.66E+01	*	5280%	Y	26%	9.7	3.88	17.57	1.0	3.87E-06	1.5E+00	1.6E-05	3.9E-03	-4.4E+00	4.29E-05	4.29E-08	6.3E+01	9.7E+00	17.57	9.32
TEQ (no 170/193/180) Humans*	1746016	3.22E+02	6.80E+00	2.65E-02	8.1E-01		2.46E+01	*	3747%	Y	18%	5.6	6.82	30.09	1.0	1.35E-12	8.1E-01	3.9E-12	9.7E-10	-4.6E+00	2.44E-05	2.44E-08	2.2E+01	5.6E+00	30.09	16.37
Dieldrin	60571	3.81E+02	4.56E+00	4.72E-04	1.2E-02		3.17E-01		83%	Y	0%	0.1	14.62	35.09	1.0	1.40E-08	1.2E-02	9.0E-10	2.2E-07	-4.9E+00	1.14E-05	1.14E-08	3.6E-01	4.0E-01		35.09
DDD	72548	3.20E+02	5.80E+00	6.41E-03	1.8E-01		5.02E+00	*	822%	Y	4%	1.2	6.65	25.99	1.0	1.89E-07	1.8E-01	1.2E-07	3.0E-05	-4.6E+00	2.51E-05	2.51E-08	1.8E+00	1.4E+00	25.99	15.96
Acetophenone	98862	1.20E+02	1.58E+00	NA	3.7E-03		NA		9%	N	0%	0.0	0.50	1.21	2.0	5.07E-06	3.7E-03	3.7E-08	9.1E-06	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01		1.21

C.6-8 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE ADULT RESIDENT NON-CANCER RISK

EPDR2 =	1.39E+03	EPD1MW =	0.00051032
EPDR3 =	1.26E+01	EPD1KOW=	0.05615738
EPDC2 =	2.41E+02	EPDMIN1=	-0.06831355
EPDC3 =	2.10E+00	EPDMAX1=	0.55769245
MINW1 =	-3.09E-01	EPD3MW =	-0.00051032
MAXW1 =	3.17E-01	EPD3KOW=	0.05615738
MINW3 =	-2.96E-01	EPDMIN3=	-0.30104241
MAXW3 =	1.81E-01	EPDMAX3=	0.17585639

Comparison of DAD using 95% L-UCI and Average value

CHEMICAL	EPD1-c Eq (3.9)	EPD2-c Eq (3.10)	outside EPD?	Chemicals outside EPD (*)	Kp 95% LCI	Kp (cm/hr) predicted	Kp 95% UCI	DA_event (mg/cm2-evt) 95% LCI Kp	DA_event (mg/cm2-evt) Average Kp	DA_event (mg/cm2-evt) 95% UCI Kp	DAD (mg/kg-day) 95% LCI Kp	DAD (mg/kg-day) Average Kp	DAD (mg/kg-day) 95% UCI Kp	Derm/ Drink 95% LCI Kp	Derm/ Drink Average Kp	Derm/ Drink 95% UCI Kp
Trichloroethane, 1,1,2-	0.183198903	0.047046344	N		2.6E-04	6.4E-03	1.6E-01	1.6E-09	3.9E-08	9.5E-07	3.9E-07	9.6E-06	2.4E-04	0%	9%	217%
Dichloroethane, 1,1-	0.151043082	0.050000328	N		2.7E-04	6.7E-03	1.7E-01	4.5E-09	1.1E-07	2.8E-06	1.1E-06	2.8E-05	6.9E-04	0%	7%	184%
Dichloroethylene, 1,1-	0.169064925	0.070165502	N		4.7E-04	1.2E-02	2.9E-01	1.9E-09	4.7E-08	1.2E-06	4.6E-07	1.2E-05	2.9E-04	1%	13%	314%
Trichlorobenzene, 1,2,4-	0.316128886	0.130883837	N		2.6E-03	6.6E-02	1.7E+00	2.5E-08	6.4E-07	1.6E-05	6.1E-06	1.6E-04	4.1E-03	5%	124%	3186%
Dichlorobenzene, 1,3-	0.277183148	0.127149968	N		2.3E-03	5.8E-02	1.5E+00	1.6E-08	4.2E-07	1.1E-05	4.0E-06	1.0E-04	2.6E-03	3%	87%	2209%
Dichlorobenzene, 1,4-	0.265390099	0.115356919	N		1.7E-03	4.2E-02	1.1E+00	1.9E-08	4.7E-07	1.2E-05	4.6E-06	1.2E-04	2.9E-03	2%	63%	1589%
Benzene	0.159470967	0.079759461	N		5.9E-04	1.5E-02	3.7E-01	1.8E-09	4.4E-08	1.1E-06	4.3E-07	1.1E-05	2.7E-04	1%	14%	357%
Bromomethane	0.115307388	0.018347170	N		1.1E-04	2.8E-03	7.0E-02	5.3E-10	1.3E-08	3.3E-07	1.3E-07	3.2E-06	8.0E-05	0%	3%	75%
Chlorobenzene	0.216948639	0.102025264	N		1.1E-03	2.8E-02	7.1E-01	6.8E-09	1.7E-07	4.3E-06	1.7E-06	4.2E-05	1.1E-03	1%	34%	849%
Chlorodibromomethane	0.231529970	0.018931933	N		1.3E-04	3.2E-03	7.9E-02	1.3E-09	3.2E-08	7.8E-07	3.2E-07	7.9E-06	1.9E-04	0%	7%	175%
Chloroethane	0.113220492	0.047389607	N		2.4E-04	6.1E-03	1.5E-01	1.1E-09	2.9E-08	7.1E-07	2.8E-07	7.0E-06	1.8E-04	0%	5%	133%
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		1.0E-06			2.5E-04			12%	
Ethylbenzene	0.231091397	0.122700079	N		1.9E-03	4.9E-02	1.2E+00	5.2E-09	1.3E-07	3.4E-06	1.3E-06	3.3E-05	8.3E-04	2%	57%	1438%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		2.8E-08			6.8E-06			2%	
Methylene chloride	0.113522630	0.026870813	N		1.4E-04	3.5E-03	8.8E-02	4.3E-10	1.1E-08	2.7E-07	1.1E-07	2.6E-06	6.6E-05	0%	4%	88%
Tetrachlorethylene	0.275545631	0.106324534	N		1.3E-03	3.3E-02	8.4E-01	1.3E-08	3.2E-07	8.1E-06	3.2E-06	8.0E-05	2.0E-03	2%	57%	1423%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01	2.9E-08	7.3E-07	1.8E-05	7.2E-06	1.8E-04	4.5E-03	1%	33%	822%
trans-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		4.4E-08			1.1E-05			12%	
Trichloroethylene	0.202956499	0.068845207	N		4.7E-04	1.2E-02	2.9E-01	5.9E-09	1.5E-07	3.6E-06	1.4E-06	3.6E-05	8.8E-04	1%	16%	390%
Vinyl chloride	0.108268842	0.044479224	N		2.2E-04	5.6E-03	1.4E-01	5.1E-09	1.3E-07	3.2E-06	1.3E-06	3.1E-05	7.9E-04	0%	5%	122%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		2.9E-07			7.1E-05			54%	
p-Cresol	0.164692560	0.054321212	N		4.8E-03	7.7E-03	1.2E-02	2.5E-08	3.9E-08	6.2E-08	6.1E-06	9.6E-06	1.5E-05	6%	9%	14%
Naphthalene	0.250741977	0.119896713	N		1.8E-03	4.7E-02	1.2E+00	8.8E-09	2.2E-07	5.7E-06	2.2E-06	5.5E-05	1.4E-03	2%	62%	1567%
2-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA		5.0E-07			1.2E-04			133%	
Acenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA		5.1E-07			1.3E-04			141%	
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	3.7E-08	9.7E-07	2.6E-05	9.1E-06	2.4E-04	6.3E-03	10%	264%	6964%
Benzo-a-pyrene	0.470139236	0.214980766	Y		2.4E-02	7.0E-01	2.0E+01	2.1E-07	6.1E-06	1.8E-04	5.2E-05	1.5E-03	4.4E-02	70%	2044%	59436%
Dibenzo(a,h)anthracene	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	5.1E-07	1.6E-05	4.9E-04	1.3E-04	3.9E-03	1.2E-01	171%	5280%	163166%
TEQ (no 170/193/180) Human:	0.546192220	0.217548111	Y		2.7E-02	8.1E-01	2.5E+01	1.3E-13	3.9E-12	1.2E-10	3.2E-11	9.7E-10	3.0E-08	123%	3747%	114179%
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01	3.5E-11	9.0E-10	2.3E-08	8.6E-09	2.2E-07	5.8E-06	3%	83%	2152%
DDD	0.489014209	0.162411367	N		6.4E-03	1.8E-01	5.0E+00	4.3E-09	1.2E-07	3.4E-06	1.1E-06	3.0E-05	8.3E-04	29%	822%	22988%
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA		3.7E-08						9%	

C.6-9 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE CHILD RESIDENT CANCER RISK

FOR ORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Organic Chemicals from Aqueous Media (latest version 04/01)

Enter the Following Exposure Conditions: for site specific conditions, change values in Cells I8-I18
The default exposure conditions used in this spreadsheet assume exposure duration for carcinogenic effects of chemicals in water through showering

Concentration (mg/L*L/1000 cm3):			
Input site specific concentrations in Column marked "Conc"			
Area exposed (cm2):	SA =	6600	cm2
Event time (hr/event):	t_event =	1	hr/event
Event frequency (events/day):	EV =	1	event/day
Exposure frequency (days/year):	EF =	350	days/yr
Exposure duration (years):	ED =	6	years
for carcinogenic effects, ED = 30 years (used in this spreadsheet)			
for noncarcinogenic effects, ED = 9 years			
Body weight (kg):	BW =	15	kg
Averaging time (days):	AT =	25500	days
for carcinogenic effects, AT=70 years (25,550 days)			
for noncarcinogenic effects, AT=ED (in days)			
Skin thickness (assumed to be 10 um):	lsc =	1.00E-03	cm

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV	IR =	1500	(cm3/day = L/day * 1000 cm3/L)
Drinking (mg/day) = Conc * IR * ABSIG	ABSGI =	1.0	(assumed 100% GI absorption)

IR: Ingestion rate of drinking water
ABSIG: Absorption fraction in GI tract

Refer to Appendix A for equations to evaluate DA_event and DAD

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/min) Q = 1135500.0 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

(*): outside of the Effective Prediction Domain (EPD) determined by the Flynn's measured Kp data as evaluated using MLAB (Civilized Software, Bethesda, MD)
95% LCI and UCI are evaluated using STATA

(**): halogenated chemicals.
Note:

CHEMICAL	CAS No.	MWT	logKow	Kp 95% LCI	Kp (cm/hr) predicted	Kp (cm/hr) measured	Kp 95% UCI	Special Chemicals (*) or (**)	Derm/ Drink	Chem Assess	Derm/ Total Dose	B	tau (hr)	t_star (hr)	FA	Max Conc (mg/cm3)	Kp used in DA_event	DA_event (mg/cm2-evt)	DAD (mg/kg-day)	log(Ds/lsc)	Dsc/lsc	Dsc	b	c	t_star1 B>0.6	t_star3 B<=0.6
Trichloroethane, 1,1,2-	79005	1.33E+02	2.05E+00	2.61E-04	6.4E-03		1.58E-01	**	6%	N	0%	0.0	0.60	1.43	1.0	4.00E-07	6.4E-03	5.5E-09	2.0E-07	-3.6E+00	2.79E-04	2.79E-07	3.2E-01	3.5E-01		1.43
Dichloroethane, 1,1-	75343	9.90E+01	1.79E+00	2.72E-04	6.7E-03		1.67E-01	**	5%	N	0%	0.0	0.38	0.92	1.0	2.20E-04	6.7E-03	2.6E-06	9.5E-05	-3.4E+00	4.36E-04	4.36E-07	3.2E-01	3.5E-01		0.92
Dichloroethylene, 1,1-	75354	9.69E+01	2.13E+00	4.69E-04	1.2E-02		2.90E-01	**	9%	N	0%	0.0	0.37	0.89	1.0	9.00E-06	1.2E-02	1.8E-07	6.6E-06	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Trichlorobenzene, 1,2,4-	120821	1.82E+02	3.98E+00	2.58E-03	6.6E-02		1.70E+00		85%	Y	0%	0.3	1.11	2.66	1.0	2.30E-05	6.6E-02	4.4E-06	1.6E-04	-3.8E+00	1.50E-04	1.50E-07	5.6E-01	5.9E-01		2.66
Dichlorobenzene, 1,3-	541731	1.47E+02	3.60E+00	2.27E-03	5.8E-02		1.47E+00		59%	Y	0%	0.3	0.71	1.71	1.0	1.90E-05	5.8E-02	2.6E-06	9.3E-05	-3.6E+00	2.34E-04	2.34E-07	4.9E-01	5.3E-01		1.71
Dichlorobenzene, 1,4-	106467	1.47E+02	3.39E+00	1.66E-03	4.2E-02		1.06E+00		43%	Y	0%	0.2	0.71	1.71	1.0	1.97E-04	4.2E-02	1.9E-05	7.0E-04	-3.6E+00	2.34E-04	2.34E-07	4.4E-01	4.7E-01		1.71
Benzene	71432	7.81E+01	2.13E+00	5.95E-04	1.5E-02		3.72E-01		10%	Y	0%	0.1	0.29	0.70	1.0	8.60E-05	1.5E-02	2.0E-06	7.3E-05	-3.2E+00	5.71E-04	5.71E-07	3.3E-01	3.7E-01		0.70
Bromomethane	74839	9.50E+01	1.19E+00	1.14E-04	2.8E-03		7.04E-02	**	2%	N	0%	0.0	0.36	0.87	1.0	1.00E-06	2.8E-03	4.9E-09	1.8E-07	-3.3E+00	4.59E-04	4.59E-07	3.1E-01	3.4E-01		0.87
Chlorobenzene	108907	1.13E+02	2.84E+00	1.12E-03	2.8E-02		7.08E-01		23%	Y	0%	0.1	0.46	1.09	1.0	1.80E-05	2.8E-02	9.5E-07	3.4E-05	-3.4E+00	3.66E-04	3.66E-07	3.8E-01	4.1E-01		1.09
Chlorodibromomethane	124481	2.08E+02	2.23E+00	1.32E-04	3.2E-03		7.86E-02	**	5%	N	0%	0.0	1.57	3.77	1.0	1.51E-06	3.2E-03	1.7E-08	6.1E-07	-4.0E+00	1.06E-04	1.06E-07	3.1E-01	3.5E-01		3.77
Chloroethane	75003	6.45E+01	1.43E+00	2.43E-04	6.1E-03		1.52E-01	**	4%	N	0%	0.0	0.24	0.59	1.0	5.00E-05	6.1E-03	4.5E-07	1.6E-05	-3.2E+00	6.81E-04	6.81E-07	3.1E-01	3.5E-01		0.59
cis-1,2-Dichloroethene	156592	9.69E+01	2.09E+00	NA	1.1E-02		NA	**	8%	N	0%	0.0	0.37	0.89	1.0	1.90E-03	1.1E-02	3.6E-05	1.3E-03	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Ethylbenzene	100414	1.06E+02	3.15E+00	1.94E-03	4.9E-02		1.25E+00		39%	Y	0%	0.2	0.42	1.01	1.0	4.00E-05	4.9E-02	3.5E-06	1.3E-04	-3.4E+00	3.97E-04	3.97E-07	4.4E-01	4.7E-01		1.01
Methyl tert-butyl ether	1634044	8.82E+01	9.40E-01	NA	2.1E-03		NA		2%	N	0%	0.0	0.33	0.80	1.0	5.40E-04	2.1E-03	1.9E-06	6.9E-05	-3.3E+00	5.01E-04	5.01E-07	3.1E-01	3.4E-01		0.80
Methylene chloride	75092	8.49E+01	1.25E+00	1.42E-04	3.5E-03		8.81E-02	**	3%	N	0%	0.0	0.32	0.76	1.0	9.00E-05	3.5E-03	5.2E-07	1.9E-05	-3.3E+00	5.23E-04	5.23E-07	3.1E-01	3.4E-01		0.76
Tetrachlorethylene	127184	1.66E+02	3.40E+00	1.33E-03	3.3E-02		8.41E-01	**	39%	Y	0%	0.2	0.91	2.18	1.0	3.60E-05	3.3E-02	3.2E-06	1.1E-04	-3.7E+00	1.84E-04	1.84E-07	4.1E-01	4.5E-01		2.18
Toluene	108883	9.21E+01	2.73E+00	1.23E-03	3.1E-02		7.82E-01		23%	Y	0%	0.1	0.35	0.84	1.0	1.20E-03	3.1E-02	6.2E-05	2.3E-03	-3.3E+00	4.77E-04	4.77E-07	3.8E-01	4.1E-01		0.84
trans-1,2-Dichloroethene	156605	9.69E+01	2.09E+00	NA	1.1E-02		NA		8%	N	0%	0.0	0.37	0.89	1.0	2.80E-05	1.1E-02	5.3E-07	1.9E-05	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Trichloroethylene	79016	1.31E+02	2.42E+00	4.70E-04	1.2E-02		2.88E-01	**	11%	Y	0%	0.1	0.58	1.39	1.0	1.60E-04	1.2E-02	3.9E-06	1.4E-04	-3.5E+00	2.87E-04	2.87E-07	3.4E-01	3.7E-01		1.39
Vinyl chloride	75014	6.25E+01	1.36E+00	2.24E-04	5.6E-03		1.40E-01	**	4%	N	0%	0.0	0.24	0.57	1.0	6.00E-04	5.6E-03	4.9E-06	1.8E-04	-3.2E+00	6.99E-04	6.99E-07	3.1E-01	3.4E-01		0.57
Xylenes (total)	1330207	1.06E+02	3.12E+00	NA	4.7E-02		NA		37%	Y	0%	0.2	0.42	1.01	1.0	1.10E-04	4.7E-02	9.3E-06	3.4E-04	-3.4E+00	3.97E-04	3.97E-07	4.3E-01	4.7E-01		1.01
p-Cresol	106445	1.08E+02	1.95E+00	4.84E-03	7.7E-03		1.21E-02		6%	N	0%	0.0	0.43	1.03	1.0	2.50E-05	7.7E-03	3.5E-07	1.3E-05	-3.4E+00	3.87E-04	3.87E-07	3.2E-01	3.5E-01		1.03
Naphthalene	91203	1.28E+02	3.30E+00	1.84E-03	4.7E-02		1.18E+00		42%	Y	0%	0.2	0.56	1.34	1.0	2.50E-05	4.7E-02	2.4E-06	8.7E-05	-3.5E+00	2.99E-04	2.99E-07	4.4E-01	4.8E-01		1.34
2-Methylnaphthalene	91576	1.42E+02	3.86E+00	NA	9.2E-02		NA		91%	Y	0%	0.4	0.67	1.60	1.0	1.10E-05	9.2E-02	2.3E-06	8.3E-05	-3.6E+00	2.49E-04	2.49E-07	6.3E-01	6.6E-01		1.60
Acenaphthylene	208968	1.52E+02	3.94E+00	NA	9.1E-02		NA		97%	Y	0%	0.4	0.76	1.82	1.0	3.20E-06	9.1E-02	7.0E-07	2.5E-05	-3.7E+00	2.19E-04	2.19E-07	6.4E-01	6.6E-01		1.82
Phenanthrene	85018	1.78E+02	4.46E+00	5.47E-03	1.4E-01		3.80E+00	*	181%	Y	0%	0.7	1.06	4.11	1.0	1.00E-05	1.4E-01	4.1E-06	1.5E-04	-3.8E+00	1.57E-04	1.57E-07	1.0E+00	9.3E-01	4.11	2.55
Benzo-a-pyrene	50328	2.50E+02	6.10E+00	2.41E-02	7.0E-01		2.04E+01	*	1399%	Y	2%	4.3	2.69	11.67	1.0	1.50E-08	7.0E-01	4.8E-08	1.7E-06	-4.2E+00	6.19E-05	6.19E-08	1.3E+01	4.3E+00	11.67	6.46
Dibenzo(a,h)anthracene	53703	2.78E+02	6.84E+00	4.88E-02	1.5E+00		4.66E+01	*	2168%	Y	3%	9.7	3.88	17.57	0.6	1.30E-08	1.5E+00	6.4E-08	2.3E-06	-4.4E+00	4.29E-05	4.29E-08	6.3E+01	9.7E+00	17.57	9.32
TCDD	1746016	3.22E+02	6.80E+00	2.65E-02	8.1E-01		2.46E+01	*	1282%	Y	2%	5.6	6.82	30.09	0.5	2.90E-12	8.1E-01	8.5E-12	3.1E-10	-4.6E+00	2.44E-05	2.44E-08	2.2E+01	5.6E+00	30.09	16.37
Dieldrin	60571	3.81E+02	4.56E+00	4.72E-04	1.2E-02		3.17E-01		45%	Y	0%	0.1	14.62	35.09	0.8	1.40E-08	1.2E-02	1.4E-09	5.2E-08	-4.9E+00	1.14E-05	1.14E-08	3.6E-01	4.0E-01		35.09
DDD	72548	3.20E+02	5.80E+00	6.41E-03	1.8E-01		5.02E+00	*	450%	Y	1%	1.2	6.65	25.99	0.8	5.58E-07	1.8E-01	5.7E-07	2.1E-05	-4.6E+00	2.51E-05	2.51E-08	1.8E+00	1.4E+00	25.99	15.96
Acetophenone	98862	1.20E+02	1.58E+00	NA	3.7E-03		NA		3%	N	0%	0.0	0.50	1.21	1.0	1.20E-06	3.7E-03	8.8E-09	3.2E-07	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01		1.21

C.6-9 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE CHILD RESIDENT CANCER RISK

EPDR2 =	1.39E+03	EPD1MW =	0.00051032
EPDR3 =	1.26E+01	EPD1KOW=	0.05615738
EPDC2 =	2.41E+02	EPDMIN1=	-0.06831355
EPDC3 =	2.10E+00	EPDMAX1=	0.55769245
MINW1 =	-3.09E-01	EPD3MW =	-0.00051032
MAXW1 =	3.17E-01	EPD3KOW=	0.05615738
MINW3 =	-2.96E-01	EPDMIN3=	-0.30104241
MAXW3 =	1.81E-01	EPDMAX3=	0.17585639

Comparison of DAD using 95% L-UCI and Average value

CHEMICAL	EPD1-c Eq (3.9)	EPD2-c Eq (3.10)	outside EPD?	Chemicals outside EPD (*)	Kp 95% LCI	Kp (cm/hr) predicted	Kp 95% UCI	DA_event (mg/cm2-evt) 95% LCI Kp	DA_event (mg/cm2-evt) Average Kp	DA_event (mg/cm2-evt) 95% UCI Kp	DAD (mg/kg-day) 95% LCI Kp	DAD (mg/kg-day) Average Kp	DAD (mg/kg-day) 95% UCI Kp	Derm/ Drink 95% LCI Kp	Derm/ Drink Average Kp	Derm/ Drink 95% UCI Kp
Trichloroethane, 1,1,2-	0.183198903	0.047046344	N		2.6E-04	6.4E-03	1.6E-01	2.2E-10	5.5E-09	1.4E-07	8.1E-09	2.0E-07	4.9E-06	0%	6%	149%
Dichloroethane, 1,1-	0.151043082	0.050000328	N		2.7E-04	6.7E-03	1.7E-01	1.1E-07	2.6E-06	6.5E-05	3.8E-06	9.5E-05	2.3E-03	0%	5%	129%
Dichloroethylene, 1,1-	0.169064925	0.070165502	N		4.7E-04	1.2E-02	2.9E-01	7.3E-09	1.8E-07	4.5E-06	2.7E-07	6.6E-06	1.6E-04	0%	9%	221%
Trichlorobenzene, 1,2,4	0.316128886	0.130883837	N		2.6E-03	6.6E-02	1.7E+00	1.7E-07	4.4E-06	1.1E-04	6.3E-06	1.6E-04	4.1E-03	3%	85%	2181%
Dichlorobenzene, 1,3-	0.277183148	0.127149968	N		2.3E-03	5.8E-02	1.5E+00	1.0E-07	2.6E-06	6.5E-05	3.6E-06	9.3E-05	2.4E-03	2%	59%	1512%
Dichlorobenzene, 1,4-	0.265390099	0.115356919	N		1.7E-03	4.2E-02	1.1E+00	7.6E-07	1.9E-05	4.9E-04	2.8E-05	7.0E-04	1.8E-02	2%	43%	1088%
Benzene	0.159470967	0.079759461	N		5.9E-04	1.5E-02	3.7E-01	8.0E-08	2.0E-06	5.0E-05	2.9E-06	7.3E-05	1.8E-03	0%	10%	256%
Bromomethane	0.115307388	0.018347170	N		1.1E-04	2.8E-03	7.0E-02	2.0E-10	4.9E-09	1.2E-07	7.1E-09	1.8E-07	4.4E-06	0%	2%	53%
Chlorobenzene	0.216948639	0.102025264	N		1.1E-03	2.8E-02	7.1E-01	3.8E-08	9.5E-07	2.4E-05	1.4E-06	3.4E-05	8.6E-04	1%	23%	581%
Chlorodibromomethane	0.231529970	0.018931933	N		1.3E-04	3.2E-03	7.9E-02	6.9E-10	1.7E-08	4.1E-07	2.5E-08	6.1E-07	1.5E-05	0%	5%	120%
Chloroethane	0.113220492	0.047389607	N		2.4E-04	6.1E-03	1.5E-01	1.8E-08	4.5E-07	1.1E-05	6.5E-07	1.6E-05	4.1E-04	0%	4%	99%
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		3.6E-05			1.3E-03			8%	
Ethylbenzene	0.231091397	0.122700079	N		1.9E-03	4.9E-02	1.2E+00	1.4E-07	3.5E-06	8.9E-05	5.0E-06	1.3E-04	3.2E-03	2%	39%	984%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		1.9E-06			6.9E-05			2%	
Methylene chloride	0.113522630	0.026870813	N		1.4E-04	3.5E-03	8.8E-02	2.1E-08	5.2E-07	1.3E-05	7.6E-07	1.9E-05	4.7E-04	0%	3%	63%
Tetrachlorethylene	0.275545631	0.106324534	N		1.3E-03	3.3E-02	8.4E-01	1.3E-07	3.2E-06	8.0E-05	4.6E-06	1.1E-04	2.9E-03	2%	39%	974%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01	2.5E-06	6.2E-05	1.6E-03	9.0E-05	2.3E-03	5.7E-02	1%	23%	577%
trans-1,2-Dichloroethen	0.166839043	0.067898794	N		NA	1.1E-02	NA		5.3E-07			1.9E-05			8%	
Trichloroethylene	0.202956499	0.068845207	N		4.7E-04	1.2E-02	2.9E-01	1.6E-07	3.9E-06	9.7E-05	5.7E-06	1.4E-04	3.5E-03	0%	11%	267%
Vinyl chloride	0.108268842	0.044479224	N		2.2E-04	5.6E-03	1.4E-01	2.0E-07	4.9E-06	1.2E-04	7.1E-06	1.8E-04	4.5E-03	0%	4%	90%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		9.3E-06			3.4E-04			37%	
p-Cresol	0.164692560	0.054321212	N		4.8E-03	7.7E-03	1.2E-02	2.2E-07	3.5E-07	5.5E-07	7.9E-06	1.3E-05	2.0E-05	4%	6%	10%
Naphthalene	0.250741977	0.119896713	N		1.8E-03	4.7E-02	1.2E+00	9.5E-08	2.4E-06	6.1E-05	3.4E-06	8.7E-05	2.2E-03	2%	42%	1072%
2-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA		2.3E-06			8.3E-05			91%	
Acenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA		7.0E-07			2.5E-05			97%	
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	1.6E-07	4.1E-06	1.1E-04	5.7E-06	1.5E-04	3.9E-03	7%	181%	4766%
Benzo-a-pyrene	0.470139236	0.214980766	Y		2.4E-02	7.0E-01	2.0E+01	1.6E-09	4.8E-08	1.4E-06	5.9E-08	1.7E-06	5.0E-05	48%	1399%	40681%
Dibenzo(a,h)anthracene	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	2.1E-09	6.4E-08	2.0E-06	7.5E-08	2.3E-06	7.2E-05	70%	2168%	67007%
TCDD	0.546192220	0.217548111	Y		2.7E-02	8.1E-01	2.5E+01	2.8E-13	8.5E-12	2.6E-10	1.0E-11	3.1E-10	9.3E-09	42%	1282%	39075%
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01	5.6E-11	1.4E-09	3.7E-08	2.0E-09	5.2E-08	1.4E-06	2%	45%	1178%
DDD	0.489014209	0.162411367	N		6.4E-03	1.8E-01	5.0E+00	2.0E-08	5.7E-07	1.6E-05	7.4E-07	2.1E-05	5.8E-04	16%	450%	12587%
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA		8.8E-09			3.2E-07			3%	

C.6-10 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE CHILD RESIDENT CANCER RISK

FOR ORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Organic Chemicals from Aqueous Media (latest version 04/01)

Enter the Following Exposure Conditions: for site specific conditions, change values in Cells I8-I18
The default exposure conditions used in this spreadsheet assume exposure duration for carcinogenic effects of chemicals in water through showering

Concentration (mg/L*L/1000 cm3):			
Input site specific concentrations in Column marked *Conc*			
Area exposed (cm2):	SA =	6600	cm2
Event time (hr/event):	t_event =	0.33	hr/event
Event frequency (events/day):	EV =	1	event/day
Exposure frequency (days/year):	EF =	350	days/yr
Exposure duration (years):	ED =	2	years
for carcinogenic effects, ED = 30 years (used in this spreadsheet)			
for noncarcinogenic effects, ED = 9 years			
Body weight (kg):	BW =	15	kg
Averaging time (days):	AT =	25550	days
for carcinogenic effects, AT=70 years (25,550 days)			
for noncarcinogenic effects, AT=ED (in days)			
Skin thickness (assumed to be 10 um):	lsc =	1.00E-03	cm

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV	IR =	870	(cm3/day = L/day * 1000 cm3/L)
Drinking (mg/day) = Conc * IR * ABSIG	ABSGI =	1.0	(assumed 100% GI absorption)

IR: Ingestion rate of drinking water
ABSIG: Absorption fraction in GI tract

Refer to Appendix A for equations to evaluate DA_event and DAD

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/min) Q = 1135500.0 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

(*): outside of the Effective Prediction Domain (EPD) determined by the Flynn's measured Kp data
as evaluated using MLAB (Civilized Software, Bethesda, MD)
95% LCI and UCI are evaluated using STATA

(**): halogenated chemicals.
Note:

CHEMICAL	CAS No.	MWT	logKow	Kp 95% LCI	Kp (cm/hr) predicted	Kp (cm/hr) measured	Kp 95% UCI	Special Chemicals (*) or (**)	Derm/ Drink	Chem Assess	Derm/ Total Dose	B	tau (hr)	t_star (hr)	FA	Mean Conc (mg/cm3)	Kp used in DA_event	DA_event (mg/cm2-evt)	DAD (mg/kg-day)	log(Ds/lsc)	Dsc/lsc	Dsc	b	c	t_star1 B>0.6	t_star3 B<=0.6
Trichloroethane, 1,1,2-	79005	1.33E+02	2.05E+00	2.61E-04	6.4E-03		1.58E-01	**	6%	N	0%	0.0	0.60	1.43	1.0	5.64E-06	6.4E-03	4.5E-08	5.4E-07	-3.6E+00	2.79E-04	2.79E-07	3.2E-01	3.5E-01		1.43
Dichloroethane, 1,1-	75343	9.90E+01	1.79E+00	2.72E-04	6.7E-03		1.67E-01	**	5%	N	0%	0.0	0.38	0.92	1.0	1.96E-05	6.7E-03	1.3E-07	1.6E-06	-3.4E+00	4.36E-04	4.36E-07	3.2E-01	3.5E-01		0.92
Dichloroethylene, 1,1-	75354	9.69E+01	2.13E+00	4.69E-04	1.2E-02		2.90E-01	**	9%	N	0%	0.0	0.37	0.89	1.0	4.75E-06	1.2E-02	5.4E-08	6.5E-07	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Trichlorobenzene, 1,2,4-	120821	1.82E+02	3.98E+00	2.58E-03	6.6E-02		1.70E+00		84%	Y	0%	0.3	1.11	2.66	1.0	6.63E-06	6.6E-02	7.4E-07	8.9E-06	-3.8E+00	1.50E-04	1.50E-07	5.6E-01	5.9E-01		2.66
Dichlorobenzene, 1,3-	541731	1.47E+02	3.60E+00	2.27E-03	5.8E-02		1.47E+00		59%	Y	0%	0.3	0.71	1.71	1.0	6.17E-06	5.8E-02	4.8E-07	5.8E-06	-3.6E+00	2.34E-04	2.34E-07	4.9E-01	5.3E-01		1.71
Dichlorobenzene, 1,4-	106467	1.47E+02	3.39E+00	1.66E-03	4.2E-02		1.06E+00		43%	Y	0%	0.2	0.71	1.71	1.0	9.67E-06	4.2E-02	5.4E-07	6.5E-06	-3.6E+00	2.34E-04	2.34E-07	4.4E-01	4.7E-01		1.71
Benzene	71432	7.81E+01	2.13E+00	5.95E-04	1.5E-02		3.72E-01		10%	N	0%	0.1	0.29	0.70	1.0	3.94E-06	1.5E-02	5.0E-08	6.1E-07	-3.2E+00	5.71E-04	5.71E-07	3.3E-01	3.7E-01		0.70
Bromomethane	74839	9.50E+01	1.19E+00	1.14E-04	2.8E-03		7.04E-02	**	2%	N	0%	0.0	0.36	0.87	1.0	5.55E-06	2.8E-03	1.5E-08	1.8E-07	-3.3E+00	4.59E-04	4.59E-07	3.1E-01	3.4E-01		0.87
Chlorobenzene	108907	1.13E+02	2.84E+00	1.12E-03	2.8E-02		7.08E-01		23%	Y	0%	0.1	0.46	1.09	1.0	6.45E-06	2.8E-02	2.0E-07	2.4E-06	-3.4E+00	3.66E-04	3.66E-07	3.8E-01	4.1E-01		1.09
Chlorodibromomethane	124481	2.08E+02	2.23E+00	1.32E-04	3.2E-03		7.86E-02	**	5%	N	0%	0.0	1.57	3.77	1.0	5.73E-06	3.2E-03	3.7E-08	4.4E-07	-4.0E+00	1.06E-04	1.06E-07	3.1E-01	3.5E-01		3.77
Chloroethane	75003	6.45E+01	1.43E+00	2.43E-04	6.1E-03		1.52E-01	**	4%	N	0%	0.0	0.24	0.59	1.0	6.88E-06	6.1E-03	3.3E-08	4.0E-07	-3.2E+00	6.81E-04	6.81E-07	3.1E-01	3.5E-01		0.59
cis-1,2-Dichloroethene	156592	9.69E+01	2.09E+00	NA	1.1E-02		NA	**	8%	N	0%	0.0	0.37	0.89	1.0	1.10E-04	1.1E-02	1.2E-06	1.4E-05	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Ethylbenzene	100414	1.06E+02	3.15E+00	1.94E-03	4.9E-02		1.25E+00		38%	Y	0%	0.2	0.42	1.01	1.0	3.02E-06	4.9E-02	1.5E-07	1.8E-06	-3.4E+00	3.97E-04	3.97E-07	4.4E-01	4.7E-01		1.01
Methyl tert-butyl ether	1634044	8.82E+01	9.40E-01	NA	2.1E-03		NA		1%	N	0%	0.0	0.33	0.80	1.0	1.65E-05	2.1E-03	3.2E-08	3.8E-07	-3.3E+00	5.01E-04	5.01E-07	3.1E-01	3.4E-01		0.80
Methylene chloride	75092	8.49E+01	1.25E+00	1.42E-04	3.5E-03		8.81E-02	**	2%	N	0%	0.0	0.32	0.76	1.0	3.89E-06	3.5E-03	1.2E-08	1.5E-07	-3.3E+00	5.23E-04	5.23E-07	3.1E-01	3.4E-01		0.76
Tetrachlorethylene	127184	1.66E+02	3.40E+00	1.33E-03	3.3E-02		8.41E-01	**	38%	Y	0%	0.2	0.91	2.18	1.0	7.35E-06	3.3E-02	3.7E-07	4.5E-06	-3.7E+00	1.84E-04	1.84E-07	4.1E-01	4.5E-01		2.18
Toluene	108883	9.21E+01	2.73E+00	1.23E-03	3.1E-02		7.82E-01		22%	Y	0%	0.1	0.35	0.84	1.0	2.88E-05	3.1E-02	8.4E-07	1.0E-05	-3.3E+00	4.77E-04	4.77E-07	3.8E-01	4.1E-01		0.84
trans-1,2-Dichloroethene	156605	9.69E+01	2.09E+00	NA	1.1E-02		NA		8%	N	0%	0.0	0.37	0.89	1.0	4.80E-06	1.1E-02	5.1E-08	6.1E-07	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Trichloroethylene	79016	1.31E+02	2.42E+00	4.70E-04	1.2E-02		2.88E-01	**	11%	Y	0%	0.1	0.58	1.39	1.0	1.18E-05	1.2E-02	1.7E-07	2.0E-06	-3.5E+00	2.87E-04	2.87E-07	3.4E-01	3.7E-01		1.39
Vinyl chloride	75014	6.25E+01	1.36E+00	2.24E-04	5.6E-03		1.40E-01	**	3%	N	0%	0.0	0.24	0.57	1.0	3.38E-05	5.6E-03	1.5E-07	1.8E-06	-3.2E+00	6.99E-04	6.99E-07	3.1E-01	3.4E-01		0.57
Xylenes (total)	1330207	1.06E+02	3.12E+00	NA	4.7E-02		NA		37%	Y	0%	0.2	0.42	1.01	1.0	6.81E-06	4.7E-02	3.3E-07	4.0E-06	-3.4E+00	3.97E-04	3.97E-07	4.3E-01	4.7E-01		1.01
p-Cresol	106445	1.08E+02	1.95E+00	4.84E-03	7.7E-03		1.21E-02		6%	N	0%	0.0	0.43	1.03	1.0	5.63E-06	7.7E-03	4.5E-08	5.4E-07	-3.4E+00	3.87E-04	3.87E-07	3.2E-01	3.5E-01		1.03
Naphthalene	91203	1.28E+02	3.30E+00	1.84E-03	4.7E-02		1.18E+00		42%	Y	0%	0.2	0.56	1.34	1.0	4.64E-06	4.7E-02	2.6E-07	3.1E-06	-3.5E+00	2.99E-04	2.99E-07	4.4E-01	4.8E-01		1.34
2-Methylnaphthalene	91576	1.42E+02	3.86E+00	NA	9.2E-02		NA		90%	Y	0%	0.4	0.67	1.60	1.0	4.82E-06	9.2E-02	5.7E-07	6.9E-06	-3.6E+00	2.49E-04	2.49E-07	6.3E-01	6.6E-01		1.60
Acenaphthylene	208968	1.52E+02	3.94E+00	NA	9.1E-02		NA		96%	Y	0%	0.4	0.76	1.82	1.0	4.63E-06	9.1E-02	5.8E-07	7.0E-06	-3.7E+00	2.19E-04	2.19E-07	6.4E-01	6.6E-01		1.82
Phenanthrene	85018	1.78E+02	4.46E+00	5.47E-03	1.4E-01		3.80E+00	*	179%	Y	0%	0.7	1.06	4.11	1.0	4.74E-06	1.4E-01	1.1E-06	1.3E-05	-3.8E+00	1.57E-04	1.57E-07	1.0E+00	9.3E-01	4.11	2.55
Benzo-a-pyrene	50328	2.50E+02	6.10E+00	2.41E-02	7.0E-01		2.04E+01	*	1386%	Y	3%	4.3	2.69	11.67	1.0	3.87E-06	7.0E-01	7.1E-06	8.5E-05	-4.2E+00	6.19E-05	6.19E-08	1.3E+01	4.3E+00	11.67	6.46
Dibenzo(a,h)anthracene	53703	2.78E+02	6.84E+00	4.88E-02	1.5E+00		4.66E+01	*	2148%	Y	5%	9.7	3.88	17.57	0.6	3.87E-06	1.5E+00	1.1E-05	1.3E-04	-4.4E+00	4.29E-05	4.29E-08	6.3E+01	9.7E+00	17.57	9.32
TEQ (no 170/193/180) Hurr	1746016	3.22E+02	6.80E+00	2.65E-02	8.1E-01		2.46E+01	*	1270%	Y	3%	5.6	6.82	30.09	0.5	1.35E-12	8.1E-01	2.3E-12	2.7E-11	-4.6E+00	2.44E-05	2.44E-08	2.2E+01	5.6E+00	30.09	16.37
Dieldrin	60571	3.81E+02	4.56E+00	4.72E-04	1.2E-02		3.17E-01		45%	Y	0%	0.1	14.62	35.09	0.8	1.40E-08	1.2E-02	8.3E-10	1.0E-08	-4.9E+00	1.14E-05	1.14E-08	3.6E-01	4.0E-01		35.09
DDD	72548	3.20E+02	5.80E+00	6.41E-03	1.8E-01		5.02E+00	*	446%	Y	1%	1.2	6.65	25.99	0.8	1.89E-07	1.8E-01	1.1E-07	1.3E-06	-4.6E+00	2.51E-05	2.51E-08	1.8E+00	1.4E+00	25.99	15.96
Acetophenone	98862.0	1.20E+02	1.58E+00	NA	3.7E-03		NA		3%	N	0%	0.0	0.50	1.21	1.0	5.07E-06	3.7E-03	2.1E-08	2.6E-07	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01		1.21

C.6-10 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE CHILD RESIDENT CANCER RISK

EPDR2 =	1.39E+03	EPD1MW =	0.00051032
EPDR3 =	1.26E+01	EPD1KOW=	0.05615738
EPDC2 =	2.41E+02	EPDMIN1=	-0.06831355
EPDC3 =	2.10E+00	EPDMAX1=	0.55769245
MINW1 =	-3.09E-01	EPD3MW =	-0.00051032
MAXW1 =	3.17E-01	EPD3KOW=	0.05615738
MINW3 =	-2.96E-01	EPDMIN3=	-0.30104241
MAXW3 =	1.81E-01	EPDMAX3=	0.17585639

Comparison of DAD using 95% L-UCI and Average value

CHEMICAL	EPD1-c Eq (3.9)	EPD2-c Eq (3.10)	outside EPD?	Chemicals outside EPD (*)	Kp 95% LCI	Kp (cm/hr) predicted	Kp 95% UCI	DA_event (mg/cm2-evt) 95% LCI Kp	DA_event (mg/cm2-evt) Average Kp	DA_event (mg/cm2-evt) 95% UCI Kp	DAD (mg/kg-day) 95% LCI Kp	DAD (mg/kg-day) Average Kp	DAD (mg/kg-day) 95% UCI Kp	Derm/ Drink 95% LCI Kp	Derm/ Drink Average Kp	Derm/ Drink 95% UCI Kp
Trichloroethane, 1,1,2-	0.183198903	0.047046344	N		2.6E-04	6.4E-03	1.6E-01	1.8E-09	4.5E-08	1.1E-06	2.2E-08	5.4E-07	1.3E-05	0%	6%	147%
Dichloroethane, 1,1-	0.151043082	0.050000328	N		2.7E-04	6.7E-03	1.7E-01	5.2E-09	1.3E-07	3.2E-06	6.3E-08	1.6E-06	3.9E-05	0%	5%	124%
Dichloroethylene, 1,1-	0.169064925	0.070165502	N		4.7E-04	1.2E-02	2.9E-01	2.2E-09	5.4E-08	1.3E-06	2.6E-08	6.5E-07	1.6E-05	0%	9%	213%
Trichlorobenzene, 1,2,4-	0.316128886	0.130883837	N		2.6E-03	6.6E-02	1.7E+00	2.9E-08	7.4E-07	1.9E-05	3.5E-07	8.9E-06	2.3E-04	3%	84%	2160%
Dichlorobenzene, 1,3-	0.277183148	0.127149968	N		2.3E-03	5.8E-02	1.5E+00	1.9E-08	4.8E-07	1.2E-05	2.3E-07	5.8E-06	1.5E-04	2%	59%	1498%
Dichlorobenzene, 1,4-	0.265390099	0.115356919	N		1.7E-03	4.2E-02	1.1E+00	2.1E-08	5.4E-07	1.4E-05	2.6E-07	6.5E-06	1.7E-04	2%	43%	1077%
Benzene	0.159470967	0.079759461	N		5.9E-04	1.5E-02	3.7E-01	2.0E-09	5.0E-08	1.3E-06	2.4E-08	6.1E-07	1.5E-05	0%	10%	242%
Bromomethane	0.115307388	0.018347170	N		1.1E-04	2.8E-03	7.0E-02	6.1E-10	1.5E-08	3.7E-07	7.3E-09	1.8E-07	4.5E-06	0%	2%	51%
Chlorobenzene	0.216948639	0.102025264	N		1.1E-03	2.8E-02	7.1E-01	7.8E-09	2.0E-07	4.9E-06	9.4E-08	2.4E-06	5.9E-05	1%	23%	575%
Chlorodibromomethane	0.231529970	0.018931933	N		1.3E-04	3.2E-03	7.9E-02	1.5E-09	3.7E-08	9.0E-07	1.8E-08	4.4E-07	1.1E-05	0%	5%	119%
Chloroethane	0.113220492	0.047389607	N		2.4E-04	6.1E-03	1.5E-01	1.3E-09	3.3E-08	8.2E-07	1.6E-08	4.0E-07	9.9E-06	0%	4%	90%
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		1.2E-06			1.4E-05			8%	
Ethylbenzene	0.231091397	0.122700079	N		1.9E-03	4.9E-02	1.2E+00	6.0E-09	1.5E-07	3.9E-06	7.3E-08	1.8E-06	4.7E-05	2%	38%	975%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		3.2E-08			3.8E-07			1%	
Methylene chloride	0.113522630	0.026870813	N		1.4E-04	3.5E-03	8.8E-02	5.0E-10	1.2E-08	3.1E-07	6.0E-09	1.5E-07	3.7E-06	0%	2%	60%
Tetrachlorethylene	0.275545631	0.106324534	N		1.3E-03	3.3E-02	8.4E-01	1.5E-08	3.7E-07	9.3E-06	1.8E-07	4.5E-06	1.1E-04	2%	38%	964%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01	3.3E-08	8.4E-07	2.1E-05	4.0E-07	1.0E-05	2.5E-04	1%	22%	557%
trans-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		5.1E-08			6.1E-07			8%	
Trichloroethylene	0.202956499	0.068845207	N		4.7E-04	1.2E-02	2.9E-01	6.7E-09	1.7E-07	4.1E-06	8.1E-08	2.0E-06	5.0E-05	0%	11%	264%
Vinyl chloride	0.108268842	0.044479224	N		2.2E-04	5.6E-03	1.4E-01	5.9E-09	1.5E-07	3.7E-06	7.1E-08	1.8E-06	4.4E-05	0%	3%	82%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		3.3E-07			4.0E-06			37%	
p-Cresol	0.164692560	0.054321212	N		4.8E-03	7.7E-03	1.2E-02	2.8E-08	4.5E-08	7.1E-08	3.4E-07	5.4E-07	8.6E-07	4%	6%	10%
Naphthalene	0.250741977	0.119896713	N		1.8E-03	4.7E-02	1.2E+00	1.0E-08	2.6E-07	6.5E-06	1.2E-07	3.1E-06	7.8E-05	2%	42%	1062%
Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA		5.7E-07			6.9E-06			90%	
cenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA		5.8E-07			7.0E-06			96%	
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	4.2E-08	1.1E-06	2.9E-05	5.1E-07	1.3E-05	3.6E-04	7%	179%	4721%
Benzo-a-pyrene	0.470139236	0.214980766	Y		2.4E-02	7.0E-01	2.0E+01	2.4E-07	7.1E-06	2.1E-04	2.9E-06	8.5E-05	2.5E-03	48%	1386%	40292%
Dibenzo(a,h)anthracene	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	3.5E-07	1.1E-05	3.4E-04	4.3E-06	1.3E-04	4.1E-03	70%	2148%	66366%
TEQ (no 170/193/180) Humans	0.546192220	0.217548111	Y		2.7E-02	8.1E-01	2.5E+01	7.4E-14	2.3E-12	6.9E-11	9.0E-13	2.7E-11	8.3E-10	42%	1270%	38701%
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01	3.2E-11	8.3E-10	2.2E-08	3.9E-10	1.0E-08	2.6E-07	2%	45%	1167%
DDD	0.489014209	0.162411367	N		6.4E-03	1.8E-01	5.0E+00	4.0E-09	1.1E-07	3.1E-06	4.8E-08	1.3E-06	3.8E-05	16%	446%	12467%
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA		2.1E-08			2.6E-07			3%	

C.6-11 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE CHILD RESIDENT NONCANCER RISK

FOR ORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Organic Chemicals from Aqueous Media (latest version 04/01)

Enter the Following Exposure Conditions: for site specific conditions, change values in Cells I8-I18
The default exposure conditions used in this spreadsheet assume exposure duration for carcinogenic effects of chemicals in water through showering

Concentration (mg/L*L/1000 cm3):			
Input site specific concentrations in Column marked "Conc"			
Area exposed (cm2):	SA =	6600	cm2
Event time (hr/event):	t_event =	1	hr/event
Event frequency (events/day):	EV =	1	event/day
Exposure frequency (days/year):	EF =	350	days/yr
Exposure duration (years):	ED =	6	years
for carcinogenic effects, ED = 30 years (used in this spreadsheet)			
for noncarcinogenic effects, ED = 9 years			
Body weight (kg):	BW =	15	kg
Averaging time (days):	AT =	2190	days
for carcinogenic effects, AT=70 years (25,550 days)			
for noncarcinogenic effects, AT=ED (in days)			
Skin thickness (assumed to be 10 um):	Isc =	1.00E-03	cm

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV	IR =	1500	(cm3/day = L/day * 1000 cm3/L)
Drinking (mg/day) = Conc * IR * ABSIG	ABSGI =	1.0	(assumed 100% GI absorption)

IR: Ingestion rate of drinking water
ABSIG: Absorption fraction in GI tract

Refer to Appendix A for equations to evaluate DA_event and DAD

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/min) — Q = 1135500.0 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

(*): outside of the Effective Prediction Domain (EPD) determined by the Flynn's measured Kp data as evaluated using MLAB (Civilized Software, Bethesda, MD)
95% LCI and UCI are evaluated using STATA

(**): halogenated chemicals.
Note:

CHEMICAL	CAS No.	MWT	logKow	Kp 95% LCI	Kp (cm/hr) predicted	Kp (cm/hr) measured	Kp 95% UCI	Special Chemicals (*) or (**)	Derm/ Drink	Chem Assess	Derm/ Total Dose	B	tau (hr)	t_star (hr)	FA	Max Conc (mg/cm3)	Kp used in DA_event	DA_event (mg/cm2-evt)	DAD (mg/kg-day)	log(Ds/Isc)	Dsc/Isc	Dsc	b	c	t_star1 B>0.6	t_star3 B<=0.6
Trichloroethane, 1,1,2-	79005	1.33E+02	2.05E+00	2.61E-04	6.44E-03		1.58E-01	**	6%	N	0%	0.0	0.60	1.43	1.0	4.00E-07	6.4E-03	5.5E-09	2.3E-06	-3.6E+00	2.79E-04	2.79E-07	3.2E-01	3.5E-01		1.43
Dichloroethane, 1,1-	75343	9.90E+01	1.79E+00	2.72E-04	6.74E-03		1.67E-01	**	5%	N	0%	0.0	0.38	0.92	1.0	2.20E-04	6.7E-03	2.6E-06	1.1E-03	-3.4E+00	4.36E-04	4.36E-07	3.2E-01	3.5E-01		0.92
Dichloroethylene, 1,1-	75354	9.69E+01	2.13E+00	4.69E-04	1.17E-02		2.90E-01	**	9%	N	0%	0.0	0.37	0.89	1.0	9.00E-06	1.2E-02	1.8E-07	7.7E-05	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Trichlorobenzene, 1,2,4-	120821	1.82E+02	3.98E+00	2.58E-03	6.63E-02		1.70E+00		85%	Y	0%	0.3	1.11	2.66	1.0	2.30E-05	6.6E-02	4.4E-06	1.9E-03	-3.8E+00	1.50E-04	1.50E-07	5.6E-01	5.9E-01		2.66
Dichlorobenzene, 1,3-	541731	1.47E+02	3.60E+00	2.27E-03	5.79E-02		1.47E+00		59%	Y	0%	0.3	0.71	1.71	1.0	1.90E-05	5.8E-02	2.6E-06	1.1E-03	-3.6E+00	2.34E-04	2.34E-07	4.9E-01	5.3E-01		1.71
Dichlorobenzene, 1,4-	106467	1.47E+02	3.39E+00	1.66E-03	4.20E-02		1.06E+00		43%	Y	0%	0.2	0.71	1.71	1.0	1.97E-04	4.2E-02	1.9E-05	8.1E-03	-3.6E+00	2.34E-04	2.34E-07	4.4E-01	4.7E-01		1.71
Benzene	71432	7.81E+01	2.13E+00	5.95E-04	1.49E-02		3.72E-01		10%	Y	0%	0.1	0.29	0.70	1.0	8.60E-05	1.5E-02	2.0E-06	8.4E-04	-3.2E+00	5.71E-04	5.71E-07	3.3E-01	3.7E-01		0.70
Bromomethane	74839	9.50E+01	1.19E+00	1.14E-04	2.84E-03		7.04E-02		2%	N	0%	0.0	0.36	0.87	1.0	1.00E-06	2.8E-03	4.9E-09	2.1E-06	-3.3E+00	4.59E-04	4.59E-07	3.1E-01	3.4E-01		0.87
Chlorobenzene	108907	1.13E+02	2.84E+00	1.12E-03	2.82E-02		7.08E-01		23%	Y	0%	0.1	0.46	1.09	1.0	1.80E-05	2.8E-02	9.5E-07	4.0E-04	-3.4E+00	3.66E-04	3.66E-07	3.8E-01	4.1E-01		1.09
Chlorodibromomethane	124481	2.08E+02	2.23E+00	1.32E-04	3.22E-03		7.86E-02		5%	N	0%	0.0	1.57	3.77	1.0	1.51E-06	3.2E-03	1.7E-08	7.1E-06	-4.0E+00	1.06E-04	1.06E-07	3.1E-01	3.5E-01		3.77
Chloroethane	75003	6.45E+01	1.43E+00	2.43E-04	6.07E-03		1.52E-01		4%	N	0%	0.0	0.24	0.59	1.0	5.00E-05	6.1E-03	4.5E-07	1.9E-04	-3.2E+00	6.81E-04	6.81E-07	3.1E-01	3.5E-01		0.59
cis-1,2-Dichloroethene	156592	9.69E+01	2.09E+00	NA	1.10E-02	1.49E-02	NA		8%	N	0%	0.0	0.37	0.89	1.0	1.90E-03	1.1E-02	3.6E-05	1.5E-02	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Ethylbenzene	100414	1.06E+02	3.15E+00	1.94E-03	4.93E-02		1.25E+00		39%	Y	0%	0.2	0.42	1.01	1.0	4.00E-05	4.9E-02	3.5E-06	1.5E-03	-3.4E+00	3.97E-04	3.97E-07	4.4E-01	4.7E-01		1.01
Methyl tert-butyl ether	1634044	8.82E+01	9.40E-01	NA	2.11E-03	2.57E-03	NA		2%	N	0%	0.0	0.33	0.80	1.0	5.40E-04	2.1E-03	1.9E-06	8.0E-04	-3.3E+00	5.01E-04	5.01E-07	3.1E-01	3.4E-01		0.80
Methylene chloride	75092	8.49E+01	1.25E+00	1.42E-04	3.54E-03		8.81E-02		3%	N	0%	0.0	0.32	0.76	1.0	9.00E-05	3.5E-03	5.2E-07	2.2E-04	-3.3E+00	5.23E-04	5.23E-07	3.1E-01	3.4E-01		0.76
Tetrachlorethylene	127184	1.66E+02	3.40E+00	1.33E-03	3.34E-02		8.41E-01	**	39%	Y	0%	0.2	0.91	2.18	1.0	3.60E-05	3.3E-02	3.2E-06	1.3E-03	-3.7E+00	1.84E-04	1.84E-07	4.1E-01	4.5E-01		2.18
Toluene	108883	9.21E+01	2.73E+00	1.23E-03	3.11E-02		7.82E-01		23%	Y	0%	0.1	0.35	0.84	1.0	1.20E-03	3.1E-02	6.2E-05	2.6E-02	-3.3E+00	4.77E-04	4.77E-07	3.8E-01	4.1E-01		0.84
trans-1,2-Dichloroethene	156605	9.69E+01	2.09E+00	NA	1.10E-02	1.49E-02	NA		8%	N	0%	0.0	0.37	0.89	1.0	2.80E-05	1.1E-02	5.3E-07	2.2E-04	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Trichloroethylene	79016	1.31E+02	2.42E+00	4.70E-04	1.16E-02		2.88E-01		11%	Y	0%	0.1	0.58	1.39	1.0	1.60E-04	1.2E-02	3.9E-06	1.7E-03	-3.5E+00	2.87E-04	2.87E-07	3.4E-01	3.7E-01		1.39
Vinyl chloride	75014	6.25E+01	1.36E+00	2.24E-04	5.60E-03		1.40E-01		4%	N	0%	0.0	0.24	0.57	1.0	6.00E-04	5.6E-03	4.9E-06	2.1E-03	-3.2E+00	6.99E-04	6.99E-07	3.1E-01	3.4E-01		0.57
Xylenes (total)	1330207	1.06E+02	3.12E+00	NA	4.71E-02	7.04E-02	NA		37%	Y	0%	0.2	0.42	1.01	1.0	1.10E-04	4.7E-02	9.3E-06	3.9E-03	-3.4E+00	3.97E-04	3.97E-07	4.3E-01	4.7E-01		1.01
p-Cresol	106445	1.08E+02	1.95E+00	4.84E-03	7.66E-03	1.80E-02	1.21E-02		6%	N	0%	0.0	0.43	1.03	1.0	2.50E-05	7.7E-03	3.5E-07	1.5E-04	-3.4E+00	3.87E-04	3.87E-07	3.2E-01	3.5E-01		1.03
Naphthalene	91203	1.28E+02	3.30E+00	1.84E-03	4.66E-02		1.18E+00		42%	Y	0%	0.2	0.56	1.34	1.0	2.50E-05	4.7E-02	2.4E-06	1.0E-03	-3.5E+00	2.99E-04	2.99E-07	4.4E-01	4.8E-01		1.34
2-Methylnaphthalene	91576	1.42E+02	3.86E+00	NA	9.17E-02	1.42E-01	NA		91%	Y	0%	0.4	0.67	1.60	1.0	1.10E-05	9.2E-02	2.3E-06	9.6E-04	-3.6E+00	2.49E-04	2.49E-07	6.3E-01	6.6E-01		1.60
Acenaphthylene	208968	1.52E+02	3.94E+00	NA	9.11E-02	1.41E-01	NA		97%	Y	0%	0.4	0.76	1.82	1.0	3.20E-06	9.1E-02	7.0E-07	3.0E-04	-3.7E+00	2.19E-04	2.19E-07	6.4E-01	6.6E-01		1.82
Phenanthrene	85018	1.78E+02	4.46E+00	5.47E-03	1.44E-01		3.80E+00		181%	Y	0%	0.7	1.06	4.11	1.0	1.00E-05	1.4E-01	4.1E-06	1.7E-03	-3.8E+00	1.57E-04	1.57E-07	1.0E+00	9.3E-01	4.11	2.55
Benzo-a-pyrene	50328	2.50E+02	6.10E+00	2.41E-02	7.01E-01		2.04E+01		1399%	Y	2%	4.3	2.69	11.67	1.0	1.50E-08	7.0E-01	4.8E-08	2.0E-05	-4.2E+00	6.19E-05	6.19E-08	1.3E+01	4.3E+00	11.67	6.46
Dibenzo(a,h)anthracene	53703	2.78E+02	6.84E+00	4.88E-02	1.51E+00		4.66E+01	*	2168%	Y	3%	9.7	3.88	17.57	0.6	1.30E-08	1.5E+00	6.4E-08	2.7E-05	-4.4E+00	4.29E-05	4.29E-08	6.3E+01	9.7E+00	17.57	9.32
TCDD	1746016	3.22E+02	6.80E+00	2.65E-02	8.07E-01		2.46E+01	*	1282%	Y	2%	5.6	6.82	30.09	0.5	2.90E-12	8.1E-01	8.5E-12	3.6E-09	-4.6E+00	2.44E-05	2.44E-08	2.2E+01	5.6E+00	30.09	16.37
Dieldrin	60571	3.81E+02	4.56E+00	4.72E-04	1.22E-02		3.17E-01		45%	Y	0%	0.1	14.62	35.09	0.8	1.40E-08	1.2E-02	1.4E-09	6.1E-07	-4.9E+00	1.14E-05	1.14E-08	3.6E-01	4.0E-01		35.09
DDD	72548	3.20E+02	5.80E+00	6.41E-03	1.79E-01		5.02E+00	*	450%	Y	1%	1.2	6.65	25.99	0.8	5.58E-07	1.8E-01	5.7E-07	2.4E-04	-4.6E+00	2.51E-05	2.51E-08	1.8E+00	1.4E+00	25.99	15.96
Acetophenone	98862	1.20E+02	1.58E+00	NA	3.72E-03		NA		3%	N	0%	0.0	0.50	1.21	1.0	1.20E-06	3.7E-03	8.8E-09	3.7E-06	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01		1.21

C.6-11 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE CHILD RESIDENT NONCANCER RISK

EPDR2 =	1.39E+03	EPD1MW =	0.00051032
EPDR3 =	1.26E+01	EPD1KOW=	0.05615738
EPDC2 =	2.41E+02	EPDMIN1=	-0.06831355
EPDC3 =	2.10E+00	EPDMAX1=	0.55769245
MINW1 =	-3.09E-01	EPD3MW =	-0.00051032
MAXW1 =	3.17E-01	EPD3KOW=	0.05615738
MINW3 =	-2.96E-01	EPDMIN3=	-0.30104241
MAXW3 =	1.81E-01	EPDMAX3=	0.17585639

Comparison of DAD using 95% L-UCI and Average value

CHEMICAL	EPD1-c Eq (3.9)	EPD2-c Eq (3.10)	outside EPD?	Chemicals outside EPD (*)	Kp 95% LCI	Kp (cm/hr) predicted	Kp 95% UCI	DA_event (mg/cm2-evt) 95% LCI Kp	DA_event (mg/cm2-evt) Average Kp	DA_event (mg/cm2-evt) 95% UCI Kp	DAD (mg/kg-day) 95% LCI Kp	DAD (mg/kg-day) Average Kp	DAD (mg/kg-day) 95% UCI Kp	Derm/ Drink 95% LCI Kp	Derm/ Drink Average Kp	Derm/ Drink 95% UCI Kp
Trichloroethane, 1,1,2-	0.183198903	0.047046344	N		2.6E-04	6.4E-03	1.6E-01	2.2E-10	5.5E-09	1.4E-07	9.4E-08	2.3E-06	5.7E-05	0%	6%	149%
Dichloroethane, 1,1-	0.151043082	0.050000328	N		2.7E-04	6.7E-03	1.7E-01	1.1E-07	2.6E-06	6.5E-05	4.4E-05	1.1E-03	2.7E-02	0%	5%	129%
Dichloroethylene, 1,1-	0.169064925	0.070165502	N		4.7E-04	1.2E-02	2.9E-01	7.3E-09	1.8E-07	4.5E-06	3.1E-06	7.7E-05	1.9E-03	0%	9%	221%
Trichlorobenzene, 1,2,4	0.316128886	0.130883837	N		2.6E-03	6.6E-02	1.7E+00	1.7E-07	4.4E-06	1.1E-04	7.3E-05	1.9E-03	4.8E-02	3%	85%	2181%
Dichlorobenzene, 1,3-	0.277183148	0.127149968	N		2.3E-03	5.8E-02	1.5E+00	1.0E-07	2.6E-06	6.5E-05	4.2E-05	1.1E-03	2.8E-02	2%	59%	1512%
Dichlorobenzene, 1,4-	0.265390099	0.115356919	N		1.7E-03	4.2E-02	1.1E+00	7.6E-07	1.9E-05	4.9E-04	3.2E-04	8.1E-03	2.1E-01	2%	43%	1088%
Benzene	0.159470967	0.079759461	N		5.9E-04	1.5E-02	3.7E-01	8.0E-08	2.0E-06	5.0E-05	3.4E-05	8.4E-04	2.1E-02	0%	10%	256%
Bromomethane	0.115307388	0.018347170	N		1.1E-04	2.8E-03	7.0E-02	2.0E-10	4.9E-09	1.2E-07	8.3E-08	2.1E-06	5.1E-05	0%	2%	53%
Chlorobenzene	0.216948639	0.102025264	N		1.1E-03	2.8E-02	7.1E-01	3.8E-08	9.5E-07	2.4E-05	1.6E-05	4.0E-04	1.0E-02	1%	23%	581%
Chlorodibromomethane	0.231529970	0.018931933	N		1.3E-04	3.2E-03	7.9E-02	6.9E-10	1.7E-08	4.1E-07	2.9E-07	7.1E-06	1.7E-04	0%	5%	120%
Chloroethane	0.113220492	0.047389607	N		2.4E-04	6.1E-03	1.5E-01	1.8E-08	4.5E-07	1.1E-05	7.6E-06	1.9E-04	4.7E-03	0%	4%	99%
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA	NA	3.6E-05	NA	NA	1.5E-02	NA	NA	8%	NA
Ethylbenzene	0.231091397	0.122700079	N		1.9E-03	4.9E-02	1.2E+00	1.4E-07	3.5E-06	8.9E-05	5.9E-05	1.5E-03	3.8E-02	2%	39%	984%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA	NA	1.9E-06	NA	NA	8.0E-04	NA	NA	2%	NA
Methylene chloride	0.113522630	0.026870813	N		1.4E-04	3.5E-03	8.8E-02	2.1E-08	5.2E-07	1.3E-05	8.8E-06	2.2E-04	5.5E-03	0%	3%	63%
Tetrachlorethylene	0.275545631	0.106324534	N		1.3E-03	3.3E-02	8.4E-01	1.3E-07	3.2E-06	8.0E-05	5.3E-05	1.3E-03	3.4E-02	2%	39%	974%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01	2.5E-06	6.2E-05	1.6E-03	1.0E-03	2.6E-02	6.6E-01	1%	23%	577%
trans-1,2-Dichloroethen	0.166839043	0.067898794	N		NA	1.1E-02	NA	NA	5.3E-07	NA	NA	2.2E-04	NA	NA	8%	NA
Trichloroethylene	0.202956499	0.068845207	N		4.7E-04	1.2E-02	2.9E-01	1.6E-07	3.9E-06	9.7E-05	6.7E-05	1.7E-03	4.1E-02	0%	11%	267%
Vinyl chloride	0.108268842	0.044479224	N		2.2E-04	5.6E-03	1.4E-01	2.0E-07	4.9E-06	1.2E-04	8.3E-05	2.1E-03	5.2E-02	0%	4%	90%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA	NA	9.3E-06	NA	NA	3.9E-03	NA	NA	37%	NA
p-Cresol	0.164692560	0.054321212	N		4.8E-03	7.7E-03	1.2E-02	2.2E-07	3.5E-07	5.5E-07	9.2E-05	1.5E-04	2.3E-04	4%	6%	10%
Naphthalene	0.250741977	0.119896713	N		1.8E-03	4.7E-02	1.2E+00	9.5E-08	2.4E-06	6.1E-05	4.0E-05	1.0E-03	2.6E-02	2%	42%	1072%
2-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA	NA	2.3E-06	NA	NA	9.6E-04	NA	NA	91%	NA
Acenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA	NA	7.0E-07	NA	NA	3.0E-04	NA	NA	97%	NA
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	1.6E-07	4.1E-06	1.1E-04	6.6E-05	1.7E-03	4.6E-02	7%	181%	4766%
Benzo-a-pyrene	0.470139236	0.214980766	Y		2.4E-02	7.0E-01	2.0E+01	1.6E-09	4.8E-08	1.4E-06	6.9E-07	2.0E-05	5.9E-04	48%	1399%	40681%
Dibenzo(a,h)anthracene	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	2.1E-09	6.4E-08	2.0E-06	8.7E-07	2.7E-05	8.4E-04	70%	2168%	67007%
TCDD	0.546192220	0.217548111	Y		2.7E-02	8.1E-01	2.5E+01	2.8E-13	8.5E-12	2.6E-10	1.2E-10	3.6E-09	1.1E-07	42%	1282%	39075%
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01	5.6E-11	1.4E-09	3.7E-08	2.4E-08	6.1E-07	1.6E-05	2%	45%	1178%
DDD	0.489014209	0.162411367	N		6.4E-03	1.8E-01	5.0E+00	2.0E-08	5.7E-07	1.6E-05	8.6E-06	2.4E-04	6.7E-03	16%	450%	12587%
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA		8.8E-09			3.7E-06			3%	

C.6-12 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE CHILD RESIDENT NONCANCER RISK

FOR ORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Organic Chemicals from Aqueous Media (latest version 04/01)

Enter the Following Exposure Conditions: for site specific conditions, change values in Cells I8-I18
The default exposure conditions used in this spreadsheet assume exposure duration for carcinogenic effects of chemicals in water through showering

Concentration (mg/L*L/1000 cm3):			
Input site specific concentrations in Column marked "Conc"			
Area exposed (cm2):	SA =	6600	cm2
Event time (hr/event):	t_event =	0.33	hr/event
Event frequency (events/day):	EV =	1.0	event/day
Exposure frequency (days/year):	EF =	350.0	days/yr
Exposure duration (years):	ED =	2.0	years
for carcinogenic effects, ED = 30 years (used in this spreadsheet)			
for noncarcinogenic effects, ED = 9 years			
Body weight (kg):	BW =	15.0	kg
Averaging time (days):	AT =	730	days
for carcinogenic effects, AT=70 years (25,550 days)			
for noncarcinogenic effects, AT=ED (in days)			
Skin thickness (assumed to be 10 um):	Isc =	1.00E-03	cm

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV	IR =	870	(cm3/day = L/day * 1000 cm3/L)
Drinking (mg/day) = Conc * IR * ABSIG	ABSGI =	1.0	(assumed 100% GI absorption)

IR: Ingestion rate of drinking water
ABSIG: Absorption fraction in GI tract

Refer to Appendix A for equations to evaluate DA_event and DAD

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/min)	Q =	1135500.0	(cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

(*): outside of the Effective Prediction Domain (EPD) determined by the Flynn's measured Kp data as evaluated using MLAB (Civilized Software, Bethesda, MD)
95% LCI and UCI are evaluated using STATA

(**): halogenated chemicals.
Note:

CHEMICAL	CAS No.	MWT	logKow	Kp 95% LCI	Kp (cm/hr) predicted	Kp (cm/hr) measured	Kp 95% UCI	Special Chemicals (*) or (**)	Derm/ Drink	Chem Assess	Derm/ Total Dose	B	tau (hr)	t_star (hr)	FA	Mean Conc (mg/cm3)	Kp used in DA_event	DA_event (mg/cm2-evt)	DAD (mg/kg-day)	log(Ds/Isc)	Dsc/Isc	Dsc	b	c	t_star1 B>0.6	t_star3 B<=0.6
Trichloroethane, 1,1,2-	79005	1.33E+02	2.05E+00	2.61E-04	6.4E-03		1.58E-01	**	6%	N	0%	0.0	0.60	1.43	1.0	5.64E-06	6.4E-03	4.5E-08	1.9E-05	-3.6E+00	2.79E-04	2.79E-07	3.2E-01	3.5E-01		1.43
Dichloroethane, 1,1-	75343	9.90E+01	1.79E+00	2.72E-04	6.7E-03		1.67E-01	**	5%	N	0%	0.0	0.38	0.92	1.0	1.96E-05	6.7E-03	1.3E-07	5.5E-05	-3.4E+00	4.36E-04	4.36E-07	3.2E-01	3.5E-01		0.92
Dichloroethylene, 1,1-	75354	9.69E+01	2.13E+00	4.69E-04	1.2E-02		2.90E-01	**	9%	N	0%	0.0	0.37	0.89	1.0	4.75E-06	1.2E-02	5.4E-08	2.3E-05	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Trichlorobenzene, 1,2,4-	120821	1.82E+02	3.98E+00	2.58E-03	6.6E-02		1.70E+00		84%	Y	0%	0.3	1.11	2.66	1.0	6.63E-06	6.6E-02	7.4E-07	3.1E-04	-3.8E+00	1.50E-04	1.50E-07	5.6E-01	5.9E-01		2.66
Dichlorobenzene, 1,3-	541731	1.47E+02	3.60E+00	2.27E-03	5.8E-02		1.47E+00		59%	Y	0%	0.3	0.71	1.71	1.0	6.17E-06	5.8E-02	4.8E-07	2.0E-04	-3.6E+00	2.34E-04	2.34E-07	4.9E-01	5.3E-01		1.71
Dichlorobenzene, 1,4-	106467	1.47E+02	3.39E+00	1.66E-03	4.2E-02		1.06E+00		43%	Y	0%	0.2	0.71	1.71	1.0	9.67E-06	4.2E-02	5.4E-07	2.3E-04	-3.6E+00	2.34E-04	2.34E-07	4.4E-01	4.7E-01		1.71
Benzene	71432	7.81E+01	2.13E+00	5.95E-04	1.5E-02		3.72E-01		10%	N	0%	0.1	0.29	0.70	1.0	3.94E-06	1.5E-02	5.0E-08	2.1E-05	-3.2E+00	5.71E-04	5.71E-07	3.3E-01	3.7E-01		0.70
Bromomethane	74839	9.50E+01	1.19E+00	1.14E-04	2.8E-03		7.04E-02	**	2%	N	0%	0.0	0.36	0.87	1.0	5.55E-06	2.8E-03	1.5E-08	6.4E-06	-3.3E+00	4.59E-04	4.59E-07	3.1E-01	3.4E-01		0.87
Chlorobenzene	108907	1.13E+02	2.84E+00	1.12E-03	2.8E-02		7.08E-01		23%	Y	0%	0.1	0.46	1.09	1.0	6.45E-06	2.8E-02	2.0E-07	8.2E-05	-3.4E+00	3.66E-04	3.66E-07	3.8E-01	4.1E-01		1.09
Chlorodibromomethane	124481	2.08E+02	2.23E+00	1.32E-04	3.2E-03		7.86E-02	**	5%	N	0%	0.0	1.57	3.77	1.0	5.73E-06	3.2E-03	3.7E-08	1.6E-05	-4.0E+00	1.06E-04	1.06E-07	3.1E-01	3.5E-01		3.77
Chloroethane	75003	6.45E+01	1.43E+00	2.43E-04	6.1E-03		1.52E-01	**	4%	N	0%	0.0	0.24	0.59	1.0	6.88E-06	6.1E-03	3.3E-08	1.4E-05	-3.2E+00	6.81E-04	6.81E-07	3.1E-01	3.5E-01		0.59
cis-1,2-Dichloroethene	156592	9.69E+01	2.09E+00	NA	1.1E-02		NA	**	8%	N	0%	0.0	0.37	0.89	1.0	1.10E-04	1.1E-02	1.2E-06	4.9E-04	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Ethylbenzene	100414	1.06E+02	3.15E+00	1.94E-03	4.9E-02		1.25E+00		38%	Y	0%	0.2	0.42	1.01	1.0	3.02E-06	4.9E-02	1.5E-07	6.5E-05	-3.4E+00	3.97E-04	3.97E-07	4.4E-01	4.7E-01		1.01
Methyl tert-butyl ether	1634044	8.82E+01	9.40E-01	NA	2.1E-03		NA		1%	N	0%	0.0	0.33	0.80	1.0	1.65E-05	2.1E-03	3.2E-08	1.3E-05	-3.3E+00	5.01E-04	5.01E-07	3.1E-01	3.4E-01		0.80
Methylene chloride	75092	8.49E+01	1.25E+00	1.42E-04	3.5E-03		8.81E-02	**	2%	N	0%	0.0	0.32	0.76	1.0	3.89E-06	3.5E-03	1.2E-08	5.2E-06	-3.3E+00	5.23E-04	5.23E-07	3.1E-01	3.4E-01		0.76
Tetrachlorethylene	127184	1.66E+02	3.40E+00	1.33E-03	3.3E-02		8.41E-01	**	38%	Y	0%	0.2	0.91	2.18	1.0	7.35E-06	3.3E-02	3.7E-07	1.6E-04	-3.7E+00	1.84E-04	1.84E-07	4.1E-01	4.5E-01		2.18
Toluene	108883	9.21E+01	2.73E+00	1.23E-03	3.1E-02		7.82E-01		22%	Y	0%	0.1	0.35	0.84	1.0	2.88E-05	3.1E-02	8.4E-07	3.5E-04	-3.3E+00	4.77E-04	4.77E-07	3.8E-01	4.1E-01		0.84
trans-1,2-Dichloroethene	156605	9.69E+01	2.09E+00	NA	1.1E-02		NA		8%	N	0%	0.0	0.37	0.89	1.0	4.80E-06	1.1E-02	5.1E-08	2.1E-05	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Trichloroethylene	79016	1.31E+02	2.42E+00	4.70E-04	1.2E-02		2.88E-01	**	11%	Y	0%	0.1	0.58	1.39	1.0	1.18E-05	1.2E-02	1.7E-07	7.0E-05	-3.5E+00	2.87E-04	2.87E-07	3.4E-01	3.7E-01		1.39
Vinyl chloride	75014	6.25E+01	1.36E+00	2.24E-04	5.6E-03		1.40E-01	**	3%	N	0%	0.0	0.24	0.57	1.0	3.38E-05	5.6E-03	1.5E-07	6.2E-05	-3.2E+00	6.99E-04	6.99E-07	3.1E-01	3.4E-01		0.57
Xylenes (total)	1330207	1.06E+02	3.12E+00	NA	4.7E-02		NA		37%	Y	0%	0.2	0.42	1.01	1.0	6.81E-06	4.7E-02	3.3E-07	1.4E-04	-3.4E+00	3.97E-04	3.97E-07	4.3E-01	4.7E-01		1.01
p-Cresol	106445	1.08E+02	1.95E+00	4.84E-03	7.7E-03		1.21E-02		6%	N	0%	0.0	0.43	1.03	1.0	5.63E-06	7.7E-03	4.5E-08	1.9E-05	-3.4E+00	3.87E-04	3.87E-07	3.2E-01	3.5E-01		1.03
Naphthalene	91203	1.28E+02	3.30E+00	1.84E-03	4.7E-02		1.18E+00		42%	Y	0%	0.2	0.56	1.34	1.0	4.64E-06	4.7E-02	2.6E-07	1.1E-04	-3.5E+00	2.99E-04	2.99E-07	4.4E-01	4.8E-01		1.34
2-Methylnaphthalene	91576	1.42E+02	3.86E+00	NA	9.2E-02		NA		90%	Y	0%	0.4	0.67	1.60	1.0	4.82E-06	9.2E-02	5.7E-07	2.4E-04	-3.6E+00	2.49E-04	2.49E-07	6.3E-01	6.6E-01		1.60
Acenaphthylene	208968	1.52E+02	3.94E+00	NA	9.1E-02		NA		96%	Y	0%	0.4	0.76	1.82	1.0	4.63E-06	9.1E-02	5.8E-07	2.5E-04	-3.7E+00	2.19E-04	2.19E-07	6.4E-01	6.6E-01		1.82
Phenanthrene	85018	1.78E+02	4.46E+00	5.47E-03	1.4E-01		3.80E+00	*	179%	Y	0%	0.7	1.06	4.11	1.0	4.74E-06	1.4E-01	1.1E-06	4.7E-04	-3.8E+00	1.57E-04	1.57E-07	1.0E+00	9.3E-01	4.11	2.55
Benzo-a-pyrene	50328	2.50E+02	6.10E+00	2.41E-02	7.0E-01		2.04E+01	*	1386%	Y	3%	4.3	2.69	11.67	1.0	3.87E-06	7.0E-01	7.1E-06	3.0E-03	-4.2E+00	6.19E-05	6.19E-08	1.3E+01	4.3E+00	11.67	6.46
Dibenzo(a,h)anthracene	53703	2.78E+02	6.84E+00	4.88E-02	1.5E+00		4.66E+01	*	2148%	Y	5%	9.7	3.88	17.57	0.6	3.87E-06	1.5E+00	1.1E-05	4.6E-03	-4.4E+00	4.29E-05	4.29E-08	6.3E+01	9.7E+00	17.57	9.32
TEQ (no 170/193/180) Humans*	1746016	3.22E+02	6.80E+00	2.65E-02	8.1E-01		2.46E+01	*	1270%	Y	3%	5.6	6.82	30.09	0.5	1.35E-12	8.1E-01	2.3E-12	9.6E-10	-4.6E+00	2.44E-05	2.44E-08	2.2E+01	5.6E+00	30.09	16.37
Dieldrin	60571	3.81E+02	4.56E+00	4.72E-04	1.2E-02		3.17E-01		45%	Y	0%	0.1	14.62	35.09	0.8	1.40E-08	1.2E-02	8.3E-10	3.5E-07	-4.9E+00	1.14E-05	1.14E-08	3.6E-01	4.0E-01		35.09
DDD	72548	3.20E+02	5.80E+00	6.41E-03	1.8E-01		5.02E+00	*	446%	Y	1%	1.2	6.65	25.99	0.8	1.89E-07	1.8E-01	1.1E-07	4.7E-05	-4.6E+00	2.51E-05	2.51E-08	1.8E+00	1.4E+00	25.99	15.96
Acetophenone	98862	1.20E+02	1.58E+00	NA	3.7E-03		NA		3%	N	0%	0.0	0.50	1.21	1.0	5.07E-06	3.7E-03	2.1E-08	9.0E-06	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01		1.21

C.6-12 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE CHILD RESIDENT NONCANCER RISK

EPDR2 =	1.39E+03	EPD1MW =	0.00051032
EPDR3 =	1.26E+01	EPD1KOW=	0.05615738
EPDC2 =	2.41E+02	EPDMIN1=	-0.06831355
EPDC3 =	2.10E+00	EPDMAX1=	0.55769245
MINW1 =	-3.09E-01	EPD3MW =	-0.00051032
MAXW1 =	3.17E-01	EPD3KOW=	0.05615738
MINW3 =	-2.96E-01	EPDMIN3=	-0.30104241
MAXW3 =	1.81E-01	EPDMAX3=	0.17585639

Comparison of DAD using 95% L-UCI and Average value

CHEMICAL	EPD1-c Eq (3.9)	EPD2-c Eq (3.10)	outside EPD?	Chemicals outside EPD (*)	Kp 95% LCI	Kp (cm/hr) predicted	Kp 95% UCI	DA_event (mg/cm2-evt) 95% LCI Kp	DA_event (mg/cm2-evt) Average Kp	DA_event (mg/cm2-evt) 95% UCI Kp	DAD (mg/kg-day) 95% LCI Kp	DAD (mg/kg-day) Average Kp	DAD (mg/kg-day) 95% UCI Kp	Derm/ Drink 95% LCI Kp	Derm/ Drink Average Kp	Derm/ Drink 95% UCI Kp
Trichloroethane, 1,1,2-	0.183198903	0.047046344	N		2.6E-04	6.4E-03	1.6E-01	1.8E-09	4.5E-08	1.1E-06	7.6E-07	1.9E-05	4.6E-04	0%	6%	147%
Dichloroethane, 1,1-	0.151043082	0.050000328	N		2.7E-04	6.7E-03	1.7E-01	5.2E-09	1.3E-07	3.2E-06	2.2E-06	5.5E-05	1.4E-03	0%	5%	124%
Dichloroethylene, 1,1-	0.169064925	0.070165502	N		4.7E-04	1.2E-02	2.9E-01	2.2E-09	5.4E-08	1.3E-06	9.1E-07	2.3E-05	5.6E-04	0%	9%	213%
Trichlorobenzene, 1,2,4-	0.316128886	0.130883837	N		2.6E-03	6.6E-02	1.7E+00	2.9E-08	7.4E-07	1.9E-05	1.2E-05	3.1E-04	8.0E-03	3%	84%	2160%
Dichlorobenzene, 1,3-	0.277183148	0.127149968	N		2.3E-03	5.8E-02	1.5E+00	1.9E-08	4.8E-07	1.2E-05	7.9E-06	2.0E-04	5.1E-03	2%	59%	1498%
Dichlorobenzene, 1,4-	0.265390099	0.115356919	N		1.7E-03	4.2E-02	1.1E+00	2.1E-08	5.4E-07	1.4E-05	9.1E-06	2.3E-04	5.8E-03	2%	43%	1077%
Benzene	0.159470967	0.079759461	N		5.9E-04	1.5E-02	3.7E-01	2.0E-09	5.0E-08	1.3E-06	8.5E-07	2.1E-05	5.3E-04	0%	10%	242%
Bromomethane	0.115307388	0.018347170	N		1.1E-04	2.8E-03	7.0E-02	6.1E-10	1.5E-08	3.7E-07	2.6E-07	6.4E-06	1.6E-04	0%	2%	51%
Chlorobenzene	0.216948639	0.102025264	N		1.1E-03	2.8E-02	7.1E-01	7.8E-09	2.0E-07	4.9E-06	3.3E-06	8.2E-05	2.1E-03	1%	23%	575%
Chlorodibromomethane	0.231529970	0.018931933	N		1.3E-04	3.2E-03	7.9E-02	1.5E-09	3.7E-08	9.0E-07	6.4E-07	1.6E-05	3.8E-04	0%	5%	119%
Chloroethane	0.113220492	0.047389607	N		2.4E-04	6.1E-03	1.5E-01	1.3E-09	3.3E-08	8.2E-07	5.5E-07	1.4E-05	3.5E-04	0%	4%	90%
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		1.2E-06			4.9E-04			8%	
Ethylbenzene	0.231091397	0.122700079	N		1.9E-03	4.9E-02	1.2E+00	6.0E-09	1.5E-07	3.9E-06	2.5E-06	6.5E-05	1.6E-03	2%	38%	975%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		3.2E-08			1.3E-05			1%	
Methylene chloride	0.113522630	0.026870813	N		1.4E-04	3.5E-03	8.8E-02	5.0E-10	1.2E-08	3.1E-07	2.1E-07	5.2E-06	1.3E-04	0%	2%	60%
Tetrachlorethylene	0.275545631	0.106324534	N		1.3E-03	3.3E-02	8.4E-01	1.5E-08	3.7E-07	9.3E-06	6.2E-06	1.6E-04	3.9E-03	2%	38%	964%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01	3.3E-08	8.4E-07	2.1E-05	1.4E-05	3.5E-04	8.9E-03	1%	22%	557%
trans-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		5.1E-08			2.1E-05			8%	
Trichloroethylene	0.202956499	0.068845207	N		4.7E-04	1.2E-02	2.9E-01	6.7E-09	1.7E-07	4.1E-06	2.8E-06	7.0E-05	1.7E-03	0%	11%	264%
Vinyl chloride	0.108268842	0.044479224	N		2.2E-04	5.6E-03	1.4E-01	5.9E-09	1.5E-07	3.7E-06	2.5E-06	6.2E-05	1.5E-03	0%	3%	82%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		3.3E-07			1.4E-04			37%	
p-Cresol	0.164692560	0.054321212	N		4.8E-03	7.7E-03	1.2E-02	2.8E-08	4.5E-08	7.1E-08	1.2E-05	1.9E-05	3.0E-05	4%	6%	10%
Naphthalene	0.250741977	0.119896713	N		1.8E-03	4.7E-02	1.2E+00	1.0E-08	2.6E-07	6.5E-06	4.3E-06	1.1E-04	2.7E-03	2%	42%	1062%
2-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA		5.7E-07			2.4E-04			90%	
Acenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA		5.8E-07			2.5E-04			96%	
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	4.2E-08	1.1E-06	2.9E-05	1.8E-05	4.7E-04	1.2E-02	7%	179%	4721%
Benzo-a-pyrene	0.470139236	0.214980766	Y		2.4E-02	7.0E-01	2.0E+01	2.4E-07	7.1E-06	2.1E-04	1.0E-04	3.0E-03	8.7E-02	48%	1386%	40292%
Dibenzo(a,h)anthracene	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	3.5E-07	1.1E-05	3.4E-04	1.5E-04	4.6E-03	1.4E-01	70%	2148%	66366%
TEQ (no 170/193/180) Humans	0.546192220	0.217548111	Y		2.7E-02	8.1E-01	2.5E+01	7.4E-14	2.3E-12	6.9E-11	3.1E-11	9.6E-10	2.9E-08	42%	1270%	38701%
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01	3.2E-11	8.3E-10	2.2E-08	1.4E-08	3.5E-07	9.1E-06	2%	45%	1167%
DDD	0.489014209	0.162411367	N		6.4E-03	1.8E-01	5.0E+00	4.0E-09	1.1E-07	3.1E-06	1.7E-06	4.7E-05	1.3E-03	16%	446%	12467%
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA		2.1E-08			9.0E-06			3%	

C.6-13 DE . ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (C INED): FUTURE ADULT CONSTRUCTION WORKER CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2	Dose Absorbed	see Appen	mg/cm2-event
t_event =	8.00	hr/event (35 minutes/event)	Skin Surface Ar	3300	cm2
EV =	1	event/day	Event Frequenc	1	events/day
EF =	125	days/yr	Exposure Frequ	125	days/year
ED =	1	years	Exposure Dural	1	years
BW =	70	kg	Body Weight	70	kg
AT =	25550	days	Averaging Time	25550	days
			Averaging Time	3.7E+02	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 50 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	1.8E-04	1.4E-06	3.2E-07	95%	55.58%	Y	0.00%
7440473	Chromium	1.0E-03	experimental	1.1E-04	9.0E-07	2.1E-07	1.3%	4061.54%	Y	0.00%
7439965	Manganese	1.0E-03	default	2.6E-03	2.1E-05	4.9E-06	6%	880.00%	Y	0.00%

C.6-13.1 DL .L ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (.BINED): FUTURE ADULT CONSTRUCTION WORKER CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2
t_event =	8.00	hr/event (35 minutes/event)
EV =	1	event/day
EF =	125	days/yr
ED =	1	years
BW =	70	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	50	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		
Condition for screening: "Y" when Dermal is 10% of Drinking			

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	2.5E-06	2.0E-08	4.6E-09	95%	55.58%	Y	0.00%
7440473	Chromium	1.0E-03	experimental	1.3E-05	1.0E-07	2.4E-08	1.3%	4061.54%	Y	0.00%
7439965	Manganese	1.0E-03	default	8.2E-04	6.6E-06	1.5E-06	6%	880.00%	Y	0.00%

C.6-13.2 D(.L ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER(.BINED): FUTURE ADULT CONSTRUCTION WORKER CANCER RISK (

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2
t_event =	8.00	hr/event (35 minutes/event)
EV =	1	event/day
EF =	125	days/yr
ED =	1	years
BW =	70	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	50 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific	
Condition for screening: "Y" when Dermal is 10% of Drinking		

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	3.5E-06	2.8E-08	6.5E-09	95%	55.58%	Y	0.00%
7440473	Chromium	1.0E-03	experimental	2.3E-05	1.8E-07	4.2E-08	1.3%	4061.54%	Y	0.00%
7439965	Manganese	1.0E-03	default	2.6E-03	2.1E-05	4.9E-06	6%	880.00%	Y	0.00%

C.6-13.3 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE ADULT CONSTRUCTION WORKER CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2
t_event =	8	hr/event
EV =	1	event/day
EF =	125	days/yr
ED =	1	years
BW =	70	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 50 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	1.8E-04	1.4E-06	3.2E-07	95%	55.58%	Y	0.00%
7440473	Chromium	1.0E-03	experimental	1.1E-04	9.0E-07	2.1E-07	1.3%	4061.54%	Y	0.00%
7439965	Manganese	1.0E-03	default	4.7E-04	3.8E-06	8.7E-07	6%	880.00%	Y	0.00%

C.6-14 DERM. ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (CO. .NED): FUTURE ADULT CONSTRUCTION WORKER CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

			Dose Absorbed see Appen		mg/cm2-event
SA=	3300	cm2	Skin Surface Ar	3300	cm2
t_event =	8.00	hr/event (35 minutes/event)	Event Frequenc	1	events/day
EV =	1	event/day	Exposure Freqt	40	days/year
EF =	40	days/yr	Exposure Durat	1	years
ED =	1	years	Body Weight	70	kg
BW =	70	kg	Averaging Time	25550	days
AT =	25550	days	Averaging Time	365	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 50 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/n Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	1.8E-04	1.4E-06	1.0E-07	95%	55.58%	Y	0.00%
7440473	Chromium	1.0E-03	experimental	1.1E-04	9.0E-07	6.7E-08	1%	4061.54%	Y	0.00%
7439965	Manganese	1.0E-03	default	2.6E-03	2.1E-05	1.6E-06	6%	880.00%	Y	0.00%

C.6-14.1 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (PERJONA): FUTURE ADULT CONSTRUCTION WORKER CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2
t_event =	8.00	hr/event (35 minutes/event)
EV =	1	event/day
EF =	40	days/yr
ED =	1	years
BW =	70	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	50	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		
Condition for screening: "Y" when Dermal is 10% of Drinking			

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/n Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	2.5E-06	2.0E-08	1.5E-09	95%	55.58%	Y	0.00%
7440473	Chromium	1.0E-03	experimental	1.3E-05	1.0E-07	7.7E-09	1%	4061.54%	Y	0.00%
7439965	Manganese	1.0E-03	default	8.2E-04	6.6E-06	4.9E-07	6%	880.00%	Y	0.00%

C.6-14.2 DE...AL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (...NEY): FUTURE ADULT CONSTRUCTION WORKER CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2
t_event =	8.00	hr/event (35 minutes/event)
EV =	1	event/day
EF =	40	days/yr
ED =	1	years
BW =	70	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	50	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		

Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/n Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	3.5E-06	2.8E-08	2.1E-09	95%	55.58%	Y	0.00%
7440473	Chromium	1.0E-03	experimental	2.3E-05	1.8E-07	1.4E-08	1%	4061.54%	Y	0.00%
7439965	Manganese	1.0E-03	default	2.6E-03	2.1E-05	1.6E-06	6%	880.00%	Y	0.00%

C.6-14.3 DE. . .AL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (. . .PHY): FUTURE ADULT CONSTRUCTION WORKER CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2
t_event =	8	hr/event
EV =	1	event/day
EF =	40	days/yr
ED =	1	years
BW =	70	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	50	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		
Condition for screening: "Y" when Dermal is 10% of Drinking			

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/n Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	1.8E-04	1.4E-06	1.0E-07	95%	55.58%	Y	0.00%
7440473	Chromium	1.0E-03	experimental	1.1E-04	9.0E-07	6.7E-08	1%	4061.54%	Y	0.00%
7439965	Manganese	1.0E-03	default	4.7E-04	3.8E-06	2.8E-07	6%	880.00%	Y	0.00%

. OR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2	Dose Absorbed	see Appen	mg/cm2-event
t_event =	8.00	hr/event (35 minutes/event)	Skin Surface Ar	3300	cm2
EV =	1	event/day	Event Frequenc	1	events/day
EF =	125	days/yr	Exposure Frequ	125	days/year
ED =	1	years	Exposure Durat	1	years
BW =	70	kg	Body Weight	70	kg
AT =	365	days	Averaging Time	25550	days
			Averaging Time	365	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water — IR = 50 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract — Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/n Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	1.8E-04	1.4E-06	2.3E-05	95%	55.58%	Y	0.00%
7440473	Chromium	1.0E-03	experimental	1.1E-04	9.0E-07	1.5E-05	1.3%	4061.54%	Y	0.00%
7439965	Manganese	1.0E-03	default	2.6E-03	2.1E-05	3.4E-04	6%	880.00%	Y	0.00%

C.5-15.1 FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2
t_event =	8	hr/event
EV =	1	event/day
EF =	125	days/yr
ED =	1	years
BW =	70	kg
AT =	365	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 50 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/n Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	2.5E-06	2.0E-08	3.2E-07	95%	55.58%	Y	0.00%
7440473	Chromium	1.0E-03	experimental	1.3E-05	1.0E-07	1.7E-06	1.3%	4061.54%	Y	0.00%
7439965	Manganese	1.0E-03	default	8.2E-04	6.6E-06	1.1E-04	6%	880.00%	Y	0.00%

C.6-15.2 FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2
t_event =	8.00	hr/event (35 minutes/event)
EV =	1	event/day
EF =	125	days/yr
ED =	1	years
BW =	70	kg
AT =	365	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 50 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	3.5E-06	2.8E-08	4.5E-07	95%	55.58%	Y	0.00%
7440473	Chromium	1.0E-03	experimental	2.3E-05	1.8E-07	3.0E-06	1.3%	4061.54%	Y	0.00%
7439965	Manganese	1.0E-03	default	2.6E-03	2.1E-05	3.4E-04	6%	880.00%	Y	0.00%

C.6-15.3 **FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)**

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2
t_event =	8.00	hr/event (35 minutes/event)
EV =	1	event/day
EF =	125	days/yr
ED =	1	years
BW =	70	kg
AT =	365	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 50 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/n Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	1.8E-04	1.4E-06	2.3E-05	95%	55.58%	Y	0.00%
7440473	Chromium	1.0E-03	experimental	1.1E-04	9.0E-07	1.5E-05	1.3%	4061.54%	Y	0.00%
7439965	Manganese	1.0E-03	default	4.7E-04	3.8E-06	6.1E-05	6%	880.00%	Y	0.00%

C.6-16 DE... ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (C... INED): FUTURE ADULT CONSTRUCTION WORKER NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2	Dose Absorbed	see Appen	mg/cm2-event
t_event =	8.00	hr/event (35 minutes/event)	Skin Surface Ar	3300	cm2
EV =	1	event/day	Event Frequenc	1	events/day
EF =	40	days/yr	Exposure Freqt	40	days/year
ED =	1	years	Exposure Durat	1	years
BW =	70	kg	Body Weight	70	kg
AT =	365	days	Averaging Time	25550	days
			Averaging Time	365	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 50 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/n Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	1.8E-04	1.4E-06	7.2E-06	95%	55.58%	Y	0.00%
7440473	Chromium	1.0E-03	experimental	1.1E-04	9.0E-07	4.7E-06	1.3%	4061.54%	Y	0.00%
7439965	Manganese	1.0E-03	default	2.6E-03	2.1E-05	1.1E-04	6%	880.00%	Y	0.00%

C.6-16.1 DER... ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (CO... ED): FUTURE ADULT CONSTRUCTION WORKER NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2
t_event =	8.00	hr/event (35 minutes/event)
EV =	1	event/day
EF =	40	days/yr
ED =	1	years
BW =	70	kg
AT =	365	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 50 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	2.5E-06	2.0E-08	1.0E-07	#N/A	#N/A	#N/A	0.00%
7440473	Chromium	1.0E-03	experimental	1.3E-05	1.0E-07	5.4E-07	#N/A	#N/A	#N/A	0.00%
7439965	Manganese	1.0E-03	default	8.2E-04	6.6E-06	3.4E-05	#N/A	#N/A	#N/A	0.00%

C.6-16.2 DE. .AL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (CO .NED): FUTURE ADULT CONSTRUCTION WORKER NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2
t_event =	8.00	hr/event (35 minutes/event)
EV =	1	event/day
EF =	40	days/yr
ED =	1	years
BW =	70	kg
AT =	365	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	50	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		

Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	3.5E-06	2.8E-08	1.4E-07	#N/A	#N/A	#N/A	0.00%
7440473	Chromium	1.0E-03	experimental	2.3E-05	1.8E-07	9.5E-07	#N/A	#N/A	#N/A	0.00%
7439965	Manganese	1.0E-03	default	2.6E-03	2.1E-05	1.1E-04	#N/A	#N/A	#N/A	0.00%

C.6-16.3 D AL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (C NED): FUTURE ADULT CONSTRUCTION WORKER NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	3300	cm2
t_event =	8	hr/event
EV =	1	event/day
EF =	40	days/yr
ED =	1	years
BW =	70	kg
AT =	365	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	50	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		
Condition for screening: "Y" when Dermal is 10% of Drinking			

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7440382	Arsenic	1.0E-03	default	1.8E-04	1.4E-06	7.2E-06	95%	55.58%	Y	0.00%
7440473	Chromium	1.0E-03	experimental	1.1E-04	9.0E-07	4.7E-06	1.3%	4061.54%	Y	0.00%
7439965	Manganese	1.0E-03	default	4.7E-04	3.8E-06	1.9E-05	6%	880.00%	Y	0.00%

C.6-17 DE ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER MBINED): FUTURE CHILD RESIDENT CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	6600	cm2
t_event =	1	hr/event
EV =	1	event/day
EF =	350	days/yr
ED =	6	years
BW =	15	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 1500 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/n Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to Derm/ be assessed	Total Dose
57125	Arsenic	1.0E-03	default	1.8E-04	1.8E-07	6.3E-06	95%	0.46%	N	0.00%
7440382	Chromium	1.0E-03	experimental	1.3E-04	1.3E-07	4.8E-06	1%	33.85%	Y	0.00%
7440473	Lead	NA	NA	1.5E-04	NA	NA	NA	NA	NA	NA
7439965	Manganese	1.0E-03	default	2.6E-03	2.6E-06	9.5E-05	6%	7.33%	N	0.00%
7440020	Nickel	2.0E-04	experimental	9.3E-05	1.9E-08	6.7E-07	4%	2.20%	N	0.00%

C.6-18 DER . ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (C INED): FUTURE CHILD RESIDENT CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	6600	cm2
t_event =	0.33	hr/event
EV =	1	event/day
EF =	350	days/yr
ED =	2	years
BW =	15	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 870 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/n Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
57125	Arsenic	1.0E-03	default	6.9E-06	2.3E-09	2.7E-08	95%	0.26%	N	0.00%
7440382	Chromium	1.0E-03	experimental	1.0E-05	3.4E-09	4.1E-08	1%	19.26%	Y	0.00%
7440473	Lead	NA	NA	8.5E-06	NA	NA	NA	NA	NA	NA
7439965	Manganese	1.0E-03	default	4.6E-04	1.5E-07	1.8E-06	6%	4.17%	N	0.00%
7440020	Nickel	2.0E-04	experimental	7.1E-06	4.7E-10	5.6E-09	4%	1.25%	N	0.00%

C.6-19 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE CHILD NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	6600	cm2
t_event =	1	hr/event
EV =	1	event/day
EF =	350	days/yr
ED =	6	years
BW =	15	kg
AT =	2190	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	1500	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		
Condition for screening: "Y" when Dermal is 10% of Drinking			

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/n Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to Derm/ be assessed	Total Dose
57125	Arsenic	1.0E-03	default	1.8E-04	1.8E-07	7.4E-05	95%	0.46%	N	0.00%
7440382	Chromium	1.0E-03	experimental	1.3E-04	1.3E-07	5.6E-05	1%	33.85%	Y	0.00%
7440473	Lead	NA	NA	1.5E-04	NA	NA	NA	NA	NA	NA
7439965	Manganese	1.0E-03	default	2.6E-03	2.6E-06	1.1E-03	6%	7.33%	N	0.00%
7440020	Nickel	2.0E-04	experimental	9.3E-05	1.9E-08	7.9E-06	4%	2.20%	N	0.00%

C.6-20 DER... L ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (C... INED): FUTURE CHILD RESIDENT NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	6600	cm2
t_event =	0.33	hr/event
EV =	1	event/day
EF =	350	days/yr
ED =	2	years
BW =	15	kg
AT =	730	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	870	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		

Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/m Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
57125	Arsenic	1.0E-03	default	6.9E-06	2.3E-09	9.5E-07	95%	0.26%	N	0.00%
7440382	Chromium	1.0E-03	experimental	1.0E-05	3.4E-09	1.4E-06	1%	19.26%	Y	0.00%
7440473	Lead	NA	NA	8.5E-06	NA	NA	NA	NA	NA	NA
7439965	Manganese	1.0E-03	default	4.6E-04	1.5E-07	6.4E-05	6%	4.17%	N	0.00%
7440020	Nickel	2.0E-04	experimental	7.1E-06	4.7E-10	2.0E-07	4%	1.25%	N	0.00%

C.6-21 DE. .L ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER \ ,MBINED): FUTURE ADULT RESIDENT CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	18000	cm2
t_event =	0.58	hr/event
EV =	1	event/day
EF =	350	days/yr
ED =	24	years
BW =	70	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 1500 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/n Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
57125	Arsenic	1.0E-03	default	1.8E-04	1.0E-07	8.6E-06	95%	0.73%	N	0.00%
7440382	Chromium	1.0E-03	experimental	1.3E-04	7.7E-08	6.5E-06	1%	53.54%	Y	0.00%
7440473	Lead	NA	NA	1.5E-04	NA	NA	NA	NA	NA	NA
7439965	Manganese	1.0E-03	default	2.6E-03	1.5E-06	1.3E-04	6%	11.60%	Y	0.00%
7440020	Nickel	2.0E-04	experimental	9.3E-05	1.1E-08	9.1E-07	4%	3.48%	N	0.00%

C.6-22 DE AL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDW R (COMBINED): FUTURE ADULT RESIDENT CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	18000	cm2
t_event =	0.25	hr/event
EV =	1	event/day
EF =	350	days/yr
ED =	7	years
BW =	70	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinkir IR = 1400 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fractior Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/ Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
57125	Arsenic	1.0E-03	default	6.9E-06	1.7E-09	4.2E-08	95%	0.34%	N	0.00%
7440382	Chromium	1.0E-03	experimental	1.0E-05	2.6E-09	6.3E-08	1%	24.73%	Y	0.00%
7440473	Lead	NA	NA	8.5E-06	NA	NA	NA	NA	NA	NA
7439965	Manganese	1.0E-03	default	4.6E-04	1.1E-07	2.8E-06	6%	5.36%	N	0.00%
7440020	Nickel	2.0E-04	experimental	7.1E-06	3.5E-10	8.7E-09	4%	1.61%	N	0.00%

C.6-23 DE... ...L ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER ...MBINED): FUTURE ADULT RESIDENT NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	18000	cm2
t_event =	0.58	hr/event
EV =	1	event/day
EF =	350	days/yr
ED =	24	years
BW =	70	kg
AT =	8760	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2000 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/n Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
57125	Arsenic	1.0E-03	default	1.8E-04	1.0E-07	2.5E-05	95%	0.55%	N	0.00%
7440382	Chromium	1.0E-03	experimental	1.3E-04	7.7E-08	1.9E-05	1%	40.15%	Y	0.00%
7440473	Lead	NA	NA	1.5E-04	NA	NA	NA	NA	NA	NA
7439965	Manganese	1.0E-03	default	2.6E-03	1.5E-06	3.8E-04	6%	8.70%	N	0.00%
7440020	Nickel	2.0E-04	experimental	9.3E-05	1.1E-08	2.7E-06	4%	2.61%	N	0.00%

C.6-24 DE .L ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWAT (COMBINED): FUTURE ADULT RESIDENT NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	18000	cm2
t_event =	0.25	hr/event
EV =	1	event/day
EF =	350	days/yr
ED =	7	years
BW =	70	kg
AT =	2555	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinki IR = 1400 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fractio Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
57125	Arsenic	1.0E-03	default	6.9E-06	1.7E-09	4.2E-07	95%	0.34%	N	0.00%
7440382	Chromium	1.0E-03	experimental	1.0E-05	2.6E-09	6.3E-07	1%	24.73%	Y	0.00%
7440473	Lead	NA	NA	8.5E-06	NA	NA	NA	NA	NA	NA
7439965	Manganese	1.0E-03	default	4.6E-04	1.1E-07	2.8E-05	6%	5.36%	N	0.00%
7440020	Nickel	2.0E-04	experimental	7.1E-06	3.5E-10	8.7E-08	4%	1.61%	N	0.00%

C.6-25 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - SURFACE WATER: FUTURE OLDER CHILD TRESPASSER CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	4500	cm2
t_event =	1	hr/event
EV =	1	event/day
EF =	52	days/yr
ED =	6	years
BW =	57	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	1500	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		

Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	1.0E-03	experimental	2.3E-05	2.3E-08	2.2E-08	1.3%	23.08%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	5.5E-07	5.3E-07	6%	5.00%	N	0.00%

C.6-26 DE AL ABSORPTION CALCULATION FOR CT EXPOSURE - SURFACE WA .: FUTURE OLDER CHILD TRESPASSER CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	4500	cm2
t_event =	0.5	hr/event
EV =	1	event/day
EF =	26	days/yr
ED =	2	years
BW =	57	kg
AT =	730	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 1500 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	1.0E-03	experimental	2.3E-05	1.2E-08	6.5E-08	1.3%	11.54%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	2.7E-07	1.5E-06	6%	2.50%	N	0.00%

C.6-27 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - SURFACE WA... : FUTURE OLDER CHILD TRESPASSER NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	4500	cm2
t_event =	1	hr/event
EV =	1	event/day
EF =	52	days/yr
ED =	6	years
BW =	57	kg
AT =	2190	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 1500 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	1.0E-03	experimental	2.3E-05	2.3E-08	2.6E-07	1.3%	23.08%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	5.5E-07	6.1E-06	6%	5.00%	N	0.00%

C.6-28 DE AL ABSORPTION CALCULATION FOR CT EXPOSURE - SURFACE WA : FUTURE OLDER CHILD TRESPASSER NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	4500	cm2
t_event =	0.5	hr/event
EV =	1	event/day
EF =	26	days/yr
ED =	2	years
BW =	57	kg
AT =	730	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 1500 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	1.0E-03	experimental	2.3E-05	1.2E-08	6.5E-08	1.3%	11.54%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	2.7E-07	1.5E-06	6%	2.50%	N	0.00%

C.6-29 DE AL ABSORPTION CALCULATION FOR RME EXPOSURE - SURFACE W ER: CURRENT OLDER CHILD TRESPASSER CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	4500	cm2
t_event =	1	hr/event
EV =	1	event/day
EF =	26	days/yr
ED =	6	years
BW =	57	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 1500 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	1.0E-03	experimental	2.3E-05	2.3E-08	1.1E-08	1.3%	23.08%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	5.5E-07	2.6E-07	6%	5.00%	N	0.00%

C.6-30 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - SURFACE WATER - CURRENT OLDER CHILD TRESPASSER CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	4500	cm2
t_event =	0.5	hr/event
EV =	1	event/day
EF =	26	days/yr
ED =	2	years
BW =	57	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	1500	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		

Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	1.0E-03	experimental	2.3E-05	1.2E-08	1.8E-09	1.3%	11.54%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	2.7E-07	4.4E-08	6%	2.50%	N	0.00%

C.6-31 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - SURFACE WATER: CURRENT OLDER CHILD TRESPASSER NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	4500	cm2
t_event =	1	hr/event
EV =	1	event/day
EF =	26	days/yr
ED =	6	years
BW =	57	kg
AT =	2190	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water — IR = 1500 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract — Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/m Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	1.0E-03	experimental	2.3E-05	2.3E-08	1.3E-07	1.3%	23.08%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	5.5E-07	3.1E-06	6%	5.00%	N	0.00%

C.6-32 DER. . .L ABSORPTION CALCULATION FOR CT EXPOSURE - SURFACE WA . . FUTURE OLDER CHILD TRESPASSER NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	4500	cm2
t_event =	0.5	hr/event
EV =	1	event/day
EF =	26	days/yr
ED =	2	years
BW =	57	kg
AT =	730	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	1500	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		

Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	1.0E-03	experimental	2.3E-05	1.2E-08	6.5E-08	1.3%	11.54%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	2.7E-07	1.5E-06	6%	2.50%	N	0.00%

C.6-33 DER...L ABSORPTION CALCULATION FOR RME EXPOSURE - SURFACE W..R: FUTURE CHILD RECREATIONAL CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	2800	cm2
t_event =	1	hr/event
EV =	1	event/day
EF =	78	days/yr
ED =	6	years
BW =	15	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 1500 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	2.0E-03	experimental	2.3E-05	4.6E-08	1.6E-07	1.3%	28.72%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	5.5E-07	1.9E-06	6%	3.11%	N	0.00%

C.6-34 DE[illegible] [illegible]L ABSORPTION CALCULATION FOR CT EXPOSURE - SURFACE WATER: [illegible] URE CHILD RECREATIONAL CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	2800	cm2
t_event =	0.5	hr/event
EV =	1	event/day
EF =	26	days/yr
ED =	2	years
BW =	15	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	870	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		
Condition for screening: "Y" when Dermal is 10% of Drinking			

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/n Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	2.0E-03	experimental	2.3E-05	2.3E-08	8.7E-09	1.3%	24.76%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	2.7E-07	1.0E-07	6%	2.68%	N	0.00%

C.6-35 DER... L ABSORPTION CALCULATION FOR RME EXPOSURE - SURFACE W... R: FUTURE CHILD RECREATIONAL NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	2800	cm2
t_event =	1	hr/event
EV =	1	event/day
EF =	78	days/yr
ED =	6	years
BW =	15	kg
AT =	2190	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	1500	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		

Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	2.0E-03	experimental	2.3E-05	4.6E-08	1.8E-06	1.3%	28.72%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	5.5E-07	2.2E-05	6%	3.11%	N	0.00%

C.6-36 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - SURFACE WATER: FUTURE CHILD RECREATIONAL NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	2800	cm2
t_event =	0.5	hr/event
EV =	1	event/day
EF =	26	days/yr
ED =	2	years
BW =	15	kg
AT =	730	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	870	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		

Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	2.0E-03	experimental	2.3E-05	2.3E-08	3.1E-07	1.3%	24.76%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	2.7E-07	3.6E-06	6%	2.68%	N	0.00%

C.6-37 DE...AL ABSORPTION CALCULATION FOR RME EXPOSURE - SURFACE W... _R: FUTURE ADULT RECREATIONAL CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	5700	cm2
t_event =	1	hr/event
EV =	1	event/day
EF =	78	days/yr
ED =	24	years
BW =	70	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 2000 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	2.0E-03	experimental	2.3E-05	4.6E-08	2.7E-07	1.3%	43.85%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	5.5E-07	3.3E-06	6%	4.75%	N	0.00%

C.6-38 DE AL ABSORPTION CALCULATION FOR CT EXPOSURE - SURFACE WA : FUTURE ADULT RECREATIONAL CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	5700	cm2
t_event =	0.5	hr/event
EV =	1	event/day
EF =	26	days/yr
ED =	7	years
BW =	70	kg
AT =	25550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	1400	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		

Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	2.0E-03	experimental	2.3E+01	2.3E-02	1.3E-02	1.3%	31.32%	Y	0.00%
	Manganese	1.0E-03	default	5.5E+02	2.7E-01	1.6E-01	6%	3.39%	N	0.00%

C.6-39 DE[illegible]AL ABSORPTION CALCULATION FOR RME EXPOSURE - SURFACE W[illegible]R: FUTURE ADULT RECREATIONAL NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	5700	cm2
t_event =	1	hr/event
EV =	1	event/day
EF =	78	days/yr
ED =	24	years
BW =	70	kg
AT =	8760	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water	IR =	2000	(cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract	Chemical specific		

Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	2.0E-03	experimental	2.3E-05	4.6E-08	8.0E-07	1.3%	43.85%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	5.5E-07	9.5E-06	6%	4.75%	N	0.00%

C.6-40 DE .L ABSORPTION CALCULATION FOR CT EXPOSURE - SURFACE WAT FUTURE ADULT RECREATIONAL NON-CANCER RISK

FOR INORGANIC CHEMICALS IN WATER (latest version 04/01)

Worksheet to Calculate Dermal Absorption of Inorganic Chemicals from Aqueous Media

Enter the Following Exposure Conditions: for site specific conditions, change values for A through AT (Given are default values from Table 8-6)

SA=	5700	cm2
t_event =	0.5	hr/event
EV =	1	event/day
EF =	26	days/yr
ED =	7	years
BW =	70	kg
AT =	2550	days

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV
Drinking (mg/day) = Conc * IR * ABSIG

IR: Ingestion rate of drinking water IR = 1400 (cm3/day = L/day * 1000 cm3/L)
ABSIG: Absorption fraction in GI tract Chemical specific
Condition for screening: "Y" when Dermal is 10% of Drinking

Compare Dermal to Total dose exposed during adult showering assuming 5 gal/min of water flow rate

Total dose (mg/day) = Q * T_event * EV

Q: Shower flow rate (5-15 gal/min; here using 5 gal/r Q = 1135500 (cm3/hr = gal/min * 3.785 gal/l * 60 min/hr *1000 cm3/hr)

Refer to Appendix A for equations to evaluate DA_event and DAD

	CHEMICAL	Kp (cm/hr)	Source of Kp (exp or default)	Conc (mg/cm3)	DA_event (mg/cm2-event)	DAD (mg/kg-day)	ABSGI (chemical specific)	Screening	Chemicals to be assessed	Derm/ Total Dose
7.4E+06	Chromium	2.0E-03	experimental	2.3E-05	2.3E-08	1.3E-07	1.3%	31.32%	Y	0.00%
	Manganese	1.0E-03	default	5.5E-04	2.7E-07	1.6E-06	6%	3.39%	N	0.00%