Appendix C.6

Dermal Appendix

Dermal Worksheet
Intermediate Variables for Calculating DA(event)

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Trichloroethane, 1,1,2-	Ground Water -Construction RME Aberjona	--	1	6.44E-03	cm/hr	8	hr	5.96E-01	hr	1.43E+00	hr	2.86E-02
Dichloroethane, 1,1-	Ground Water -Construction RME Aberjona	--	1	6.74E-03	cm/hr	8	hr	3.82E-01	hr	9.18E-01	hr	2.58E-02
Dichloroethylene, 1,1-	Ground Water -Construction RME Aberjona	--	1	1.17E-02	cm/hr	8	hr	3.72E-01	hr	8.93E-01	hr	4.41E-02
Trichlorobenzene, 1,2,4-	Ground Water -Construction RME Aberjona	--	1	6.63E-02	cm/hr	8	hr	1.11E+00	hr	2.66E+00	hr	3.43E-01
Dichlorobenzene, 1,3-	Ground Water -Construction RME Aberjona	--	1	5.79E-02	cm/hr	8	hr	7.11E-01	hr	1.71E+00	hr	2.70E-01
Dichlorobenzene, 1,4-	Ground Water -Construction RME Aberjona	--	1	4.20E-02	cm/hr	8	hr	7.11E-01	hr	1.71E+00	hr	1.96E-01
Benzene	Ground Water -Construction RME Aberjona	--	1	1.49E-02	cm/hr	8	hr	2.92E-01	hr	7.00E-01	hr	5.05E-02
Bromomethane	Ground Water -Construction RME Aberjona	--	1	2.84E-03	cm/hr	8	hr	3.63E-01	hr	8.71E-01	hr	1.06E-02
Chlorobenzene	Ground Water -Construction RME Aberjona	--	1	2.82E-02	cm/hr	8	hr	4.56E-01	hr	1.09E+00	hr	1.15E-01
Chlorodibromomethane	Ground Water -Construction RME Aberjona	--	1	3.22E-03	cm/hr	8	hr	1.57E+00	hr	3.77E+00	hr	1.79E-02
Chloroethane	Ground Water -Construction RME Aberjona	--	1	6.07E-03	cm/hr	8	hr	2.45E-01	hr	5.88E-01	hr	1.88E-02
cis-1,2-Dichloroethene	Ground Water -Construction RME Aberjona	--	1	1.10E-02	cm/hr	8	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Ethylbenzene	Ground Water -Construction RME Aberjona	--	1	4.93E-02	cm/hr	8	hr	4.20E-01	hr	1.01E+00	hr	1.95E-01
Methyl tert-butyl ether	Ground Water -Construction RME Aberjona	--	1	2.11E-03	cm/hr	8	hr	3.32E-01	hr	7.98E-01	hr	7.63E-03
Methylene chloride	Ground Water -Construction RME Aberjona	--	1	3.54E-03	cm/hr	8	hr	3.19E-01	hr	7.65E-01	hr	1.26E-02
Tetrachlorethylene	Ground Water -Construction RME Aberjona	--	1	3.34E-02	cm/hr	8	hr	9.06E-01	hr	2.18E+00	hr	1.66E-01
Toluene	Ground Water -Construction RME Aberjona	--	1	3.11E-02	cm/hr	8	hr	3.50E-01	hr	8.39E-01	hr	1.15E-01
trans-1,2-Dichloroethene	Ground Water -Construction RME Aberjona	--	1	1.10E-02	cm/hr	8	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Trichloroethylene	Ground Water -Construction RME Aberjona	--	1	1.16E-02	cm/hr	8	hr	5.81E-01	hr	1.39E+00	hr	5.13E-02
Vinyl chloride	Ground Water -Construction RME Aberjona	--	1	5.60E-03	cm/hr	8	hr	2.39E-01	hr	5.73E-01	hr	1.70E-02
Xylenes (total)	Ground Water -Construction RME Aberjona	--	1	4.71E-02	cm/hr	8	hr	4.19E-01	hr	1.01E+00	hr	1.86E-01
p-Cresol	Ground Water -Construction RME Aberjona	--	1	7.66E-03	cm/hr	8	hr	4.30E-01	hr	1.03E+00	hr	3.06E-02
Naphthalene	Ground Water -Construction RME Aberjona	--	1	4.66E-02	cm/hr	8	hr	5.58E-01	hr	1.34E+00	hr	2.03E-01
2-Methylnaphthalene	Ground Water -Construction RME Aberjona	--	1	9.17E-02	cm/hr	8	hr	6.68E-01	hr	1.60E+00	hr	4.20E-01
Acenaphthylene	Ground Water -Construction RME Aberjona	--	1	9.11E-02	cm/hr	8	hr	7.60E-01	hr	1.82E+00	hr	4.32E-01
Phenanthrene	Ground Water -Construction RME Aberjona	--	1	1.44E-01	cm/hr	8	hr	1.06E+00	hr	4.11E+00	hr	7.40E-01
Benzo-a-pyrene	Ground Water -Construction RME Aberjona	--	1	7.01E-01	cm/hr	8	hr	2.69E+00	hr	1.17E+01	hr	4.27E+00
Dibenzo(a,h)anthracene	Ground Water -Construction RME Aberjona	--	0.6	1.51E+00	cm/hr	8	hr	3.88E+00	hr	1.76E+01	hr	9.68E+00
TCDD	Ground Water -Construction RME Aberjona	--	0.5	8.07E-01	cm/hr	8	hr	6.82E+00	hr	3.01E+01	hr	5.57E+00
Dieldrin	Ground Water -Construction RME Aberjona	--	0.8	1.22E-02	cm/hr	8	hr	1.46E+01	hr	3.51E+01	hr	9.18E-02
DDD	Ground Water -Construction RME Aberjona	--	0.8	1.79E-01	cm/hr	8	hr	6.65E+00	hr	2.60E+01	hr	1.23E+00
Acetophenone	Ground Water -Construction RME Aberjona	--	1	3.72E-03	cm/hr	8	hr	5.03E-01	hr	1.21E+00	hr	1.57E-02
Arsenic	Ground Water -Construction RME Aberjona	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data
Chromium	Ground Water -Construction RME Aberjona		No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data
Manganese	Ground Water -Construction RME Aberjona		No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data
Trichloroethane, 1,1,2-	Ground Water -Construction CT Aberjona	--	1	6.44E-03	cm/hr	8	hr	5.96E-01	hr	1.43E+00	hr	2.86E-02
Dichloroethane, 1,1-	Ground Water -Construction CT Aberjona	--	1	6.74E-03	cm/hr	8	hr	3.82E-01	hr	9.18E-01	hr	2.58E-02
Dichloroethylene, 1,1-	Ground Water -Construction CT Aberjona	--	1	1.17E-02	cm/hr	8	hr	3.72E-01	hr	8.93E-01	hr	4.41E-02

Dermal Worksheet
Intermediate Variables for Calculating DA(event)

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Trichlorobenzene, 1,2,4-	Ground Water -Construction CT Aberjona	--	1	6.63E-02	cm/hr	8	hr	1.11E+00	hr	2.66E+00	hr	3.43E-01
Dichlorobenzene, 1,3-	Ground Water -Construction CT Aberjona	--	1	5.79E-02	cm/hr	8	hr	7.11E-01	hr	1.71E+00	hr	2.70E-01
Dichlorobenzene, 1,4-	Ground Water -Construction CT Aberjona	--	1	4.20E-02	cm/hr	8	hr	7.11E-01	hr	1.71E+00	hr	1.96E-01
Benzene	Ground Water -Construction CT Aberjona	--	1	1.49E-02	cm/hr	8	hr	2.92E-01	hr	7.00E-01	hr	5.05E-02
Bromomethane	Ground Water -Construction CT Aberjona	--	1	2.84E-03	cm/hr	8	hr	3.63E-01	hr	8.71E-01	hr	1.06E-02
Chlorobenzene	Ground Water -Construction CT Aberjona	--	1	2.82E-02	cm/hr	8	hr	4.56E-01	hr	1.09E+00	hr	1.15E-01
Chlorodibromomethane	Ground Water -Construction CT Aberjona	--	1	3.22E-03	cm/hr	8	hr	1.57E+00	hr	3.77E+00	hr	1.79E-02
Chloroethane	Ground Water -Construction CT Aberjona	--	1	6.07E-03	cm/hr	8	hr	2.45E-01	hr	5.88E-01	hr	1.88E-02
cis-1,2-Dichloroethene	Ground Water -Construction CT Aberjona	--	1	1.10E-02	cm/hr	8	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Ethylbenzene	Ground Water -Construction CT Aberjona	--	1	4.93E-02	cm/hr	8	hr	4.20E-01	hr	1.01E+00	hr	1.95E-01
Methyl tert-butyl ether	Ground Water -Construction CT Aberjona	--	1	2.11E-03	cm/hr	8	hr	3.32E-01	hr	7.98E-01	hr	7.63E-03
Methylene chloride	Ground Water -Construction CT Aberjona	--	1	3.54E-03	cm/hr	8	hr	3.19E-01	hr	7.65E-01	hr	1.26E-02
Tetrachloroethylene	Ground Water -Construction CT Aberjona	--	1	3.34E-02	cm/hr	8	hr	9.06E-01	hr	2.18E+00	hr	1.66E-01
Toluene	Ground Water -Construction CT Aberjona	--	1	3.11E-02	cm/hr	8	hr	3.50E-01	hr	8.39E-01	hr	1.15E-01
trans-1,2-Dichloroethene	Ground Water -Construction CT Aberjona	--	1	1.10E-02	cm/hr	8	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Trichloroethylene	Ground Water -Construction CT Aberjona	--	1	1.16E-02	cm/hr	8	hr	5.81E-01	hr	1.39E+00	hr	5.13E-02
Vinyl chloride	Ground Water -Construction CT Aberjona	--	1	5.60E-03	cm/hr	8	hr	2.39E-01	hr	5.73E-01	hr	1.70E-02
Xylenes (total)	Ground Water -Construction CT Aberjona	--	1	4.71E-02	cm/hr	8	hr	4.19E-01	hr	1.01E+00	hr	1.86E-01
p-Cresol	Ground Water -Construction CT Aberjona	--	1	7.66E-03	cm/hr	8	hr	4.30E-01	hr	1.03E+00	hr	3.06E-02
Naphthalene	Ground Water -Construction CT Aberjona	--	1	4.66E-02	cm/hr	8	hr	5.58E-01	hr	1.34E+00	hr	2.03E-01
2-Methylnaphthalene	Ground Water -Construction CT Aberjona	--	1	9.17E-02	cm/hr	8	hr	6.68E-01	hr	1.60E+00	hr	4.20E-01
Acenaphthylene	Ground Water -Construction CT Aberjona	--	1	9.11E-02	cm/hr	8	hr	7.60E-01	hr	1.82E+00	hr	4.32E-01
Phenanthrene	Ground Water -Construction CT Aberjona	--	1	1.44E-01	cm/hr	8	hr	1.06E+00	hr	4.11E+00	hr	7.40E-01
Benzo-a-pyrene	Ground Water -Construction CT Aberjona	--	1	7.01E-01	cm/hr	8	hr	2.69E+00	hr	1.17E+01	hr	4.27E+00
Dibenzo(a,h)anthracene	Ground Water -Construction CT Aberjona	--	0.6	1.51E+00	cm/hr	8	hr	3.88E+00	hr	1.76E+01	hr	9.68E+00
TCDD	Ground Water -Construction CT Aberjona	--	0.5	8.07E-01	cm/hr	8	hr	6.82E+00	hr	3.01E+01	hr	5.57E+00
Dieldrin	Ground Water -Construction CT Aberjona	--	0.8	1.22E-02	cm/hr	8	hr	1.46E+01	hr	3.51E+01	hr	9.18E-02
DDD	Ground Water -Construction CT Aberjona	--	0.8	1.79E-01	cm/hr	8	hr	6.65E+00	hr	2.60E+01	hr	1.23E+00
Acetophenone	Ground Water -Construction CT Aberjona	--	1	3.72E-03	cm/hr	8	hr	5.03E-01	hr	1.21E+00	hr	1.57E-02
Arsenic	Ground Water -Construction CT Aberjona	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data
Chromium	Ground Water -Construction CT Aberjona	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data
Manganese	Ground Water -Construction CT Aberjona	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data

Dermal Worksheet
Intermediate Variables for Calculating DA(event)

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Trichloroethane, 1,1,2-	Ground Water -Construction RME Whitney	--	1	5.44E-03	cm/hr	8	hr	5.95E-01	hr	1.43E+00	hr	2.86E-02
Dichloroethane, 1,1-	Ground Water -Construction RME Whitney	--	1	6.74E-03	cm/hr	8	hr	3.82E-01	hr	9.18E-01	hr	2.58E-02
Dichloroethylene, 1,1-	Ground Water -Construction RME Whitney	--	1	1.17E-02	cm/hr	8	hr	3.72E-01	hr	8.93E-01	hr	4.41E-02
Trichlorobenzene, 1,2,4-	Ground Water -Construction RME Whitney	--	1	6.63E-02	cm/hr	8	hr	1.11E+00	hr	2.66E+00	hr	3.43E-01
Dichlorobenzene, 1,3-	Ground Water -Construction RME Whitney	--	1	5.79E-02	cm/hr	8	hr	7.11E-01	hr	1.71E+00	hr	2.70E-01
Dichlorobenzene, 1,4-	Ground Water -Construction RME Whitney	--	1	4.20E-02	cm/hr	8	hr	7.11E-01	hr	1.71E+00	hr	1.96E-01
Benzene	Ground Water -Construction RME Whitney	--	1	1.49E-02	cm/hr	8	hr	2.92E-01	hr	7.00E-01	hr	5.05E-02
Bromomethane	Ground Water -Construction RME Whitney	--	1	2.84E-03	cm/hr	8	hr	3.63E-01	hr	8.71E-01	hr	1.06E-02
Chlorobenzene	Ground Water -Construction RME Whitney	--	1	2.82E-02	cm/hr	8	hr	4.56E-01	hr	1.09E+00	hr	1.15E-01
Chlorodibromomethane	Ground Water -Construction RME Whitney	--	1	3.22E-03	cm/hr	8	hr	1.57E+00	hr	3.77E+00	hr	1.79E-02
Chloroethane	Ground Water -Construction RME Whitney	--	1	6.07E-03	cm/hr	8	hr	2.45E-01	hr	5.88E-01	hr	1.88E-02
cis-1,2-Dichloroethene	Ground Water -Construction RME Whitney	--	1	1.10E-02	cm/hr	8	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Ethylbenzene	Ground Water -Construction RME Whitney	--	1	4.93E-02	cm/hr	8	hr	4.20E-01	hr	1.01E+00	hr	1.95E-01
Methyl tert-butyl ether	Ground Water -Construction RME Whitney	--	1	2.11E-03	cm/hr	8	hr	3.32E-01	hr	7.98E-01	hr	7.63E-03
Methylene chloride	Ground Water -Construction RME Whitney	--	1	3.54E-03	cm/hr	8	hr	3.19E-01	hr	7.65E-01	hr	1.26E-02
Tetrachloroethylene	Ground Water -Construction RME Whitney	--	1	3.34E-02	cm/hr	8	hr	9.06E-01	hr	2.18E+00	hr	1.66E-01
Toluene	Ground Water -Construction RME Whitney	--	1	3.11E-02	cm/hr	8	hr	3.50E-01	hr	8.39E-01	hr	1.15E-01
trans-1,2-Dichloroethene	Ground Water -Construction RME Whitney	--	1	1.10E-02	cm/hr	8	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Trichloroethylene	Ground Water -Construction RME Whitney	--	1	1.16E-02	cm/hr	8	hr	5.81E-01	hr	1.39E+00	hr	5.13E-02
Vinyl chloride	Ground Water -Construction RME Whitney	--	1	5.60E-03	cm/hr	8	hr	2.39E-01	hr	5.73E-01	hr	1.70E-02
Xylenes (total)	Ground Water -Construction RME Whitney	--	1	4.71E-02	cm/hr	8	hr	4.19E-01	hr	1.01E+00	hr	1.86E-01
p-Cresol	Ground Water -Construction RME Whitney	--	1	7.66E-03	cm/hr	8	hr	4.30E-01	hr	1.03E+00	hr	3.06E-02
Naphthalene	Ground Water -Construction RME Whitney	--	1	4.66E-02	cm/hr	8	hr	5.58E-01	hr	1.34E+00	hr	2.03E-01
2-Methylnaphthalene	Ground Water -Construction RME Whitney	--	1	9.17E-02	cm/hr	8	hr	6.66E-01	hr	1.60E+00	hr	4.20E-01
Acenaphthylene	Ground Water -Construction RME Whitney	--	1	9.11E-02	cm/hr	8	hr	7.60E-01	hr	1.82E+00	hr	4.32E-01
Phenanthrene	Ground Water -Construction RME Whitney	--	1	1.44E-01	cm/hr	8	hr	1.06E+00	hr	4.11E+00	hr	7.40E-01
Benzo-a-pyrene	Ground Water -Construction RME Whitney	--	1	7.01E-01	cm/hr	8	hr	2.69E+00	hr	1.17E+01	hr	4.27E+00
Dibenzo(a,h)anthracene	Ground Water -Construction RME Whitney	--	0.6	1.51E+00	cm/hr	8	hr	3.88E+00	hr	1.76E+01	hr	9.68E+00
TCDD	Ground Water -Construction RME Whitney	--	0.5	8.07E-01	cm/hr	8	hr	6.82E+00	hr	3.01E+01	hr	5.57E+00
Dieldrin	Ground Water -Construction RME Whitney	--	0.8	1.22E-02	cm/hr	8	hr	1.46E+01	hr	3.51E+01	hr	9.18E-02
DDD	Ground Water -Construction RME Whitney	--	0.8	1.79E-01	cm/hr	8	hr	6.65E+00	hr	2.60E+01	hr	1.23E+00
Acetophenone	Ground Water -Construction RME Whitney	--	1	3.72E-03	cm/hr	8	hr	5.03E-01	hr	1.21E+00	hr	1.57E-02
Arsenic	Ground Water -Construction RME Whitney	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data
Chromium	Ground Water -Construction RME Whitney	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data
Manganese	Ground Water -Construction RME Whitney	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data

Dermal Worksheet
Intermediate Variables for Calculating DA(event)

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Trichloroethane, 1,1,2-	Ground Water -Construction CT Whitney	--	1	6.44E-03	cm/hr	8	hr	5.96E-01	hr	1.43E+00	hr	2.86E-02
Dichloroethane, 1,1-	Ground Water -Construction CT Whitney	--	1	6.74E-03	cm/hr	8	hr	3.82E-01	hr	9.18E-01	hr	2.58E-02
Dichloroethylene, 1,1-	Ground Water -Construction CT Whitney	--	1	1.17E-02	cm/hr	8	hr	3.72E-01	hr	8.93E-01	hr	4.41E-02
Trichlorobenzene, 1,2,4-	Ground Water -Construction CT Whitney	--	1	6.63E-02	cm/hr	8	hr	1.11E+00	hr	2.66E+00	hr	3.43E-01
Dichlorobenzene, 1,3-	Ground Water -Construction CT Whitney	--	1	5.79E-02	cm/hr	8	hr	7.11E-01	hr	1.71E+00	hr	2.70E-01
Dichlorobenzene, 1,4-	Ground Water -Construction CT Whitney	--	1	4.20E-02	cm/hr	8	hr	7.11E-01	hr	1.71E+00	hr	1.96E-01
Benzene	Ground Water -Construction CT Whitney	--	1	1.49E-02	cm/hr	8	hr	2.92E-01	hr	7.00E-01	hr	5.05E-02
Bromomethane	Ground Water -Construction CT Whitney	--	1	2.84E-03	cm/hr	8	hr	3.63E-01	hr	8.71E-01	hr	1.06E-02
Chlorobenzene	Ground Water -Construction CT Whitney	--	1	2.82E-02	cm/hr	8	hr	4.56E-01	hr	1.09E+00	hr	1.15E-01
Chlorodibromomethane	Ground Water -Construction CT Whitney	--	1	3.22E-03	cm/hr	8	hr	1.57E+00	hr	3.77E+00	hr	1.79E-02
Chloroethane	Ground Water -Construction CT Whitney	--	1	6.07E-03	cm/hr	8	hr	2.45E-01	hr	5.88E-01	hr	1.88E-02
cis-1,2-Dichloroethene	Ground Water -Construction CT Whitney	--	1	1.10E-02	cm/hr	8	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Ethylbenzene	Ground Water -Construction CT Whitney	--	1	4.93E-02	cm/hr	8	hr	4.20E-01	hr	1.01E+00	hr	1.95E-01
Methyl tert-butyl ether	Ground Water -Construction CT Whitney	--	1	2.11E-03	cm/hr	8	hr	3.32E-01	hr	7.98E-01	hr	7.63E-03
Methylene chloride	Ground Water -Construction CT Whitney	--	1	3.54E-03	cm/hr	8	hr	3.19E-01	hr	7.65E-01	hr	1.26E-02
Tetrachloroethylene	Ground Water -Construction CT Whitney	--	1	3.34E-02	cm/hr	8	hr	9.06E-01	hr	2.18E+00	hr	1.66E-01
Toluene	Ground Water -Construction CT Whitney	--	1	3.11E-02	cm/hr	8	hr	3.50E-01	hr	8.39E-01	hr	1.15E-01
trans-1,2-Dichloroethene	Ground Water -Construction CT Whitney	--	1	1.10E-02	cm/hr	8	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Trichloroethylene	Ground Water -Construction CT Whitney	--	1	1.16E-02	cm/hr	8	hr	5.81E-01	hr	1.39E+00	hr	5.13E-02
Vinyl chloride	Ground Water -Construction CT Whitney	--	1	5.60E-03	cm/hr	8	hr	2.39E-01	hr	5.73E-01	hr	1.70E-02
Xylenes (total)	Ground Water -Construction CT Whitney	--	1	4.71E-02	cm/hr	8	hr	4.19E-01	hr	1.01E+00	hr	1.86E-01
p-Cresol	Ground Water -Construction CT Whitney	--	1	7.66E-03	cm/hr	8	hr	4.30E-01	hr	1.03E+00	hr	3.06E-02
Naphthalene	Ground Water -Construction CT Whitney	--	1	4.66E-02	cm/hr	8	hr	5.58E-01	hr	1.34E+00	hr	2.03E-01
2-Methylnaphthalene	Ground Water -Construction CT Whitney	--	1	9.17E-02	cm/hr	8	hr	6.68E-01	hr	1.60E+00	hr	4.20E-01
Acenaphthylene	Ground Water -Construction CT Whitney	--	1	9.11E-02	cm/hr	8	hr	7.60E-01	hr	1.82E+00	hr	4.32E-01
Phenanthrene	Ground Water -Construction CT Whitney	--	1	1.44E-01	cm/hr	8	hr	1.06E+00	hr	4.11E+00	hr	7.40E-01
Benzo-a-pyrene	Ground Water -Construction CT Whitney	--	1	7.01E-01	cm/hr	8	hr	2.69E+00	hr	1.17E+01	hr	4.27E+00
Dibenzo(a,h)anthracene	Ground Water -Construction CT Whitney	--	0.6	1.51E+00	cm/hr	8	hr	3.88E+00	hr	1.76E+01	hr	9.68E+00
TCDD	Ground Water -Construction CT Whitney	--	0.5	8.07E-01	cm/hr	8	hr	6.82E+00	hr	3.01E+01	hr	5.57E+00
Dieldrin	Ground Water -Construction CT Whitney	--	0.8	1.22E-02	cm/hr	8	hr	1.46E+01	hr	3.51E+01	hr	9.18E-02
DDD	Ground Water -Construction CT Whitney	--	0.8	1.79E-01	cm/hr	8	hr	6.65E+00	hr	2.60E+01	hr	1.23E+00
Acetophenone	Ground Water -Construction CT Whitney	--	1	3.72E-03	cm/hr	8	hr	5.03E-01	hr	1.21E+00	hr	1.57E-02
Arsenic	Ground Water -Construction CT Whitney	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data
Chromium	Ground Water -Construction CT Whitney	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data
Manganese	Ground Water -Construction CT Whitney	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data

Dermal Worksheet
Intermediate Variables for Calculating DA(event)

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Trichloroethane, 1,1,2-	Ground Water -Construction RME Murphy	--	1	6.44E-03	cm/hr	8	hr	5.96E-01	hr	1.43E+00	hr	2.86E-02
Dichloroethane, 1,1-	Ground Water -Construction RME Murphy	--	1	6.74E-03	cm/hr	8	hr	3.82E-01	hr	9.18E-01	hr	2.58E-02
Dichloroethylene, 1,1-	Ground Water -Construction RME Murphy	--	1	1.17E-02	cm/hr	8	hr	3.72E-01	hr	8.93E-01	hr	4.41E-02
Trichlorobenzene, 1,2,4-	Ground Water -Construction RME Murphy	--	1	6.63E-02	cm/hr	8	hr	1.11E+00	hr	2.66E+00	hr	3.43E-01
Dichlorobenzene, 1,3-	Ground Water -Construction RME Murphy	--	1	5.79E-02	cm/hr	8	hr	7.11E-01	hr	1.71E+00	hr	2.70E-01
Dichlorobenzene, 1,4-	Ground Water -Construction RME Murphy	--	1	4.20E-02	cm/hr	8	hr	7.11E-01	hr	1.71E+00	hr	1.96E-01
Benzene	Ground Water -Construction RME Murphy	--	1	1.49E-02	cm/hr	8	hr	2.92E-01	hr	7.00E-01	hr	5.05E-02
Bromomethane	Ground Water -Construction RME Murphy	--	1	2.84E-03	cm/hr	8	hr	3.63E-01	hr	8.71E-01	hr	1.06E-02
Chlorobenzene	Ground Water -Construction RME Murphy	--	1	2.82E-02	cm/hr	8	hr	4.56E-01	hr	1.09E+00	hr	1.15E-01
Chlorodibromomethane	Ground Water -Construction RME Murphy	--	1	3.22E-03	cm/hr	8	hr	1.57E+00	hr	3.77E+00	hr	1.79E-02
Chloroethane	Ground Water -Construction RME Murphy	--	1	6.07E-03	cm/hr	8	hr	2.45E-01	hr	5.88E-01	hr	1.88E-02
cis-1,2-Dichloroethene	Ground Water -Construction RME Murphy	--	1	1.10E-02	cm/hr	8	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Ethylbenzene	Ground Water -Construction RME Murphy	--	1	4.93E-02	cm/hr	8	hr	4.20E-01	hr	1.01E+00	hr	1.95E-01
Methyl tert-butyl ether	Ground Water -Construction RME Murphy	--	1	2.11E-03	cm/hr	8	hr	3.32E-01	hr	7.98E-01	hr	7.63E-03
Methylene chloride	Ground Water -Construction RME Murphy	--	1	3.54E-03	cm/hr	8	hr	3.19E-01	hr	7.65E-01	hr	1.26E-02
Tetrachlorethylene	Ground Water -Construction RME Murphy	--	1	3.34E-02	cm/hr	8	hr	9.06E-01	hr	2.18E+00	hr	1.66E-01
Toluene	Ground Water -Construction RME Murphy	--	1	3.11E-02	cm/hr	8	hr	3.50E-01	hr	8.39E-01	hr	1.15E-01
trans-1,2-Dichloroethene	Ground Water -Construction RME Murphy	--	1	1.10E-02	cm/hr	8	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Trichloroethylene	Ground Water -Construction RME Murphy	--	1	1.16E-02	cm/hr	8	hr	5.81E-01	hr	1.39E+00	hr	5.13E-02
Vinyl chloride	Ground Water -Construction RME Murphy	--	1	5.60E-03	cm/hr	8	hr	2.39E-01	hr	5.73E-01	hr	1.70E-02
Xylenes (total)	Ground Water -Construction RME Murphy	--	1	4.71E-02	cm/hr	8	hr	4.19E-01	hr	1.01E+00	hr	1.86E-01
p-Cresol	Ground Water -Construction RME Murphy	--	1	7.66E-03	cm/hr	8	hr	4.30E-01	hr	1.03E+00	hr	3.06E-02
Naphthalene	Ground Water -Construction RME Murphy	--	1	4.66E-02	cm/hr	8	hr	5.58E-01	hr	1.34E+00	hr	2.03E-01
2-Methylnaphthalene	Ground Water -Construction RME Murphy	--	1	9.17E-02	cm/hr	8	hr	6.68E-01	hr	1.60E+00	hr	4.20E-01
Acenaphthylene	Ground Water -Construction RME Murphy	--	1	9.11E-02	cm/hr	8	hr	7.60E-01	hr	1.82E+00	hr	4.32E-01
Phenanthrene	Ground Water -Construction RME Murphy	--	1	1.44E-01	cm/hr	8	hr	1.06E+00	hr	4.11E+00	hr	7.40E-01
Benzo-a-pyrene	Ground Water -Construction RME Murphy	--	1	7.01E-01	cm/hr	8	hr	2.69E+00	hr	1.17E+01	hr	4.27E+00
Dibenzo(a,h)anthracene	Ground Water -Construction RME Murphy	--	0.6	1.51E+00	cm/hr	8	hr	3.88E+00	hr	1.76E+01	hr	9.68E+00
Acetophenone	Ground Water -Construction RME Murphy	--	1	3.72E-03	cm/hr	8	hr	5.03E-01	hr	1.21E+00	hr	1.57E-02
TCDD	Ground Water -Construction RME Murphy	--	0.5	8.07E-01	cm/hr	8	hr	6.82E+00	hr	3.01E+01	hr	5.57E+00
Dieldrin	Ground Water -Construction RME Murphy	--	0.8	1.22E-02	cm/hr	8	hr	1.46E+01	hr	3.51E+01	hr	9.18E-02
Arsenic	Ground Water -Construction RME Murphy	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data
Chromium	Ground Water -Construction RME Murphy	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data
Manganese	Ground Water -Construction RME Murphy	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data

Dermal Worksheet
Intermediate Variables for Calculating DA(event)

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Trichloroethane, 1,1,2-	Ground Water -Construction CT Murphy	--	1	6.44E-03	cm/hr	8	hr	5.96E-01	hr	1.43E+00	hr	2.86E-02
Dichloroethane, 1,1-	Ground Water -Construction CT Murphy	--	1	5.74E-03	cm/hr	8	hr	3.82E-01	hr	9.18E-01	hr	2.58E-02
Dichloroethylene, 1,1-	Ground Water -Construction CT Murphy	--	1	1.17E-02	cm/hr	8	hr	3.72E-01	hr	8.93E-01	hr	4.41E-02
Trichlorobenzene, 1,2,4-	Ground Water -Construction CT Murphy	--	1	6.63E-02	cm/hr	8	hr	1.11E+00	hr	2.66E+00	hr	3.43E-01
Dichlorobenzene, 1,3-	Ground Water -Construction CT Murphy	--	1	5.79E-02	cm/hr	8	hr	7.11E-01	hr	1.71E+00	hr	2.70E-01
Dichlorobenzene, 1,4-	Ground Water -Construction CT Murphy	--	1	4.20E-02	cm/hr	8	hr	7.11E-01	hr	1.71E+00	hr	1.96E-01
Benzene	Ground Water -Construction CT Murphy	--	1	1.49E-02	cm/hr	8	hr	2.92E-01	hr	7.00E-01	hr	5.05E-02
Bromomethane	Ground Water -Construction CT Murphy	--	1	2.84E-03	cm/hr	8	hr	3.63E-01	hr	8.71E-01	hr	1.06E-02
Chlorobenzene	Ground Water -Construction CT Murphy	--	1	2.82E-02	cm/hr	8	hr	4.56E-01	hr	1.09E+00	hr	1.15E-01
Chlorodibromomethane	Ground Water -Construction CT Murphy	--	1	3.22E-03	cm/hr	8	hr	1.57E+00	hr	3.77E+00	hr	1.79E-02
Chloroethane	Ground Water -Construction CT Murphy	--	1	6.07E-03	cm/hr	8	hr	2.45E-01	hr	5.88E-01	hr	1.88E-02
cis-1,2-Dichloroethene	Ground Water -Construction CT Murphy	--	1	1.10E-02	cm/hr	8	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Ethylbenzene	Ground Water -Construction CT Murphy	--	1	4.93E-02	cm/hr	8	hr	4.20E-01	hr	1.01E+00	hr	1.95E-01
Methyl tert-butyl ether	Ground Water -Construction CT Murphy	--	1	2.11E-03	cm/hr	8	hr	3.32E-01	hr	7.98E-01	hr	7.63E-03
Methylene chloride	Ground Water -Construction CT Murphy	--	1	3.54E-03	cm/hr	8	hr	3.19E-01	hr	7.65E-01	hr	1.26E-02
Tetrachloroethylene	Ground Water -Construction CT Murphy	--	1	3.34E-02	cm/hr	8	hr	9.06E-01	hr	2.18E+00	hr	1.66E-01
Toluene	Ground Water -Construction CT Murphy	--	1	3.11E-02	cm/hr	8	hr	3.50E-01	hr	8.39E-01	hr	1.15E-01
trans-1,2-Dichloroethene	Ground Water -Construction CT Murphy	--	1	1.10E-02	cm/hr	8	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Trichloroethylene	Ground Water -Construction CT Murphy	--	1	1.16E-02	cm/hr	8	hr	5.81E-01	hr	1.39E+00	hr	5.13E-02
Vinyl chloride	Ground Water -Construction CT Murphy	--	1	5.60E-03	cm/hr	8	hr	2.39E-01	hr	5.73E-01	hr	1.70E-02
Xylenes (total)	Ground Water -Construction CT Murphy	--	1	4.71E-02	cm/hr	8	hr	4.19E-01	hr	1.01E+00	hr	1.86E-01
p-Cresol	Ground Water -Construction CT Murphy	--	1	7.66E-03	cm/hr	8	hr	4.30E-01	hr	1.03E+00	hr	3.06E-02
Naphthalene	Ground Water -Construction CT Murphy	--	1	4.66E-02	cm/hr	8	hr	5.58E-01	hr	1.34E+00	hr	2.03E-01
2-Methylnaphthalene	Ground Water -Construction CT Murphy	--	1	9.17E-02	cm/hr	8	hr	6.68E-01	hr	1.60E+00	hr	4.20E-01
Acenaphthylene	Ground Water -Construction CT Murphy	--	1	9.11E-02	cm/hr	8	hr	7.60E-01	hr	1.82E+00	hr	4.32E-01
Phenanthrene	Ground Water -Construction CT Murphy	--	1	1.44E-01	cm/hr	8	hr	1.06E+00	hr	4.11E+00	hr	7.40E-01
Benzo-a-pyrene	Ground Water -Construction CT Murphy	--	1	7.01E-01	cm/hr	8	hr	2.69E+00	hr	1.17E+01	hr	4.27E+00
Dibenzo(a,h)anthracene	Ground Water -Construction CT Murphy	--	0.6	1.51E+00	cm/hr	8	hr	3.88E+00	hr	1.76E+01	hr	9.68E+00
TCDD	Ground Water -Construction CT Murphy	--	0.5	8.07E-01	cm/hr	8	hr	6.82E+00	hr	3.01E+01	hr	5.57E+00
Dieldrin	Ground Water -Construction CT Murphy	--	0.8	1.22E-02	cm/hr	8	hr	1.46E+01	hr	3.51E+01	hr	9.18E-02
DDD	Ground Water -Construction CT Murphy	--	0.8	1.79E-01	cm/hr	8	hr	6.65E+00	hr	2.60E+01	hr	1.23E+00
Acetophenone	Ground Water -Construction CT Murphy	--	1	3.72E-03	cm/hr	8	hr	5.03E-01	hr	1.21E+00	hr	1.57E-02
Arsenic	Ground Water -Construction CT Murphy	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data
Chromium	Ground Water -Construction CT Murphy	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data
Manganese	Ground Water -Construction CT Murphy	--	No data	1.00E-03	cm/hr	8	hr	No data	No data	No data	No data	No data

Dermal(heet
Intermediate Variables fo. Calculating DA(event)

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Trichloroethane, 1,1,2-	Groundwater - Resident Adult Shower RME	--	1	6.44E-03	cm/hr	0.58	hr	5.96E-01	hr	1.43E+00	hr	2.86E-02
Dichloroethane, 1,1-	Groundwater - Resident Adult Shower RME	--	1	6.74E-03	cm/hr	0.58	hr	3.82E-01	hr	9.18E-01	hr	2.58E-02
Dichloroethylene, 1,1-	Groundwater - Resident Adult Shower RME	--	1	1.17E-02	cm/hr	0.58	hr	3.72E-01	hr	8.93E-01	hr	4.41E-02
Trichlorobenzene, 1,2,4-	Groundwater - Resident Adult Shower RME	--	1	6.63E-02	cm/hr	0.58	hr	1.11E+00	hr	2.66E+00	hr	3.43E-01
Dichlorobenzene, 1,3-	Groundwater - Resident Adult Shower RME	--	1	5.79E-02	cm/hr	0.58	hr	7.11E-01	hr	1.71E+00	hr	2.70E-01
Dichlorobenzene, 1,4-	Groundwater - Resident Adult Shower RME	--	1	4.20E-02	cm/hr	0.58	hr	7.11E-01	hr	1.71E+00	hr	1.96E-01
Benzene	Groundwater - Resident Adult Shower RME	--	1	1.49E-02	cm/hr	0.58	hr	2.92E-01	hr	7.00E-01	hr	5.05E-02
Bromomethane	Groundwater - Resident Adult Shower RME	--	1	2.84E-03	cm/hr	0.58	hr	3.63E-01	hr	8.71E-01	hr	1.06E-02
Chlorobenzene	Groundwater - Resident Adult Shower RME	--	1	2.82E-02	cm/hr	0.58	hr	4.56E-01	hr	1.09E+00	hr	1.15E-01
Chlorodibromomethane	Groundwater - Resident Adult Shower RME	--	1	3.22E-03	cm/hr	0.58	hr	1.57E+00	hr	3.77E+00	hr	1.79E-02
Chloroethane	Groundwater - Resident Adult Shower RME	--	1	6.07E-03	cm/hr	0.58	hr	2.45E-01	hr	5.88E-01	hr	1.88E-02
cis-1,2-Dichloroethene	Groundwater - Resident Adult Shower RME	--	1	1.10E-02	cm/hr	0.58	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Ethylbenzene	Groundwater - Resident Adult Shower RME	--	1	4.93E-02	cm/hr	0.58	hr	4.20E-01	hr	1.01E+00	hr	1.95E-01
Methyl tert-butyl ether	Groundwater - Resident Adult Shower RME	--	1	2.11E-03	cm/hr	0.58	hr	3.32E-01	hr	7.98E-01	hr	7.63E-03
Methylene chloride	Groundwater - Resident Adult Shower RME	--	1	3.54E-03	cm/hr	0.58	hr	3.19E-01	hr	7.65E-01	hr	1.26E-02
Tetrachlorethylene	Groundwater - Resident Adult Shower RME	--	1	3.34E-02	cm/hr	0.58	hr	9.06E-01	hr	2.18E+00	hr	1.66E-01
Toluene	Groundwater - Resident Adult Shower RME	--	1	3.11E-02	cm/hr	0.58	hr	3.50E-01	hr	8.39E-01	hr	1.15E-01
trans-1,2-Dichloroethene	Groundwater - Resident Adult Shower RME	--	1	1.10E-02	cm/hr	0.58	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Trichloroethylene	Groundwater - Resident Adult Shower RME	--	1	1.16E-02	cm/hr	0.58	hr	5.81E-01	hr	1.39E+00	hr	5.13E-02
Vinyl chloride	Groundwater - Resident Adult Shower RME	--	1	5.60E-03	cm/hr	0.58	hr	2.39E-01	hr	5.73E-01	hr	1.70E-02
Xylenes (total)	Groundwater - Resident Adult Shower RME	--	1	4.71E-02	cm/hr	0.58	hr	4.19E-01	hr	1.01E+00	hr	1.86E-01
p-Cresol	Groundwater - Resident Adult Shower RME	--	1	7.66E-03	cm/hr	0.58	hr	4.30E-01	hr	1.03E+00	hr	3.06E-02
Naphthalene	Groundwater - Resident Adult Shower RME	--	1	4.66E-02	cm/hr	0.58	hr	5.58E-01	hr	1.34E+00	hr	2.03E-01
2-Methylnaphthalene	Groundwater - Resident Adult Shower RME	--	1	9.17E-02	cm/hr	0.58	hr	6.68E-01	hr	1.60E+00	hr	4.20E-01
Acenaphthylene	Groundwater - Resident Adult Shower RME	--	1	9.11E-02	cm/hr	0.58	hr	7.60E-01	hr	1.82E+00	hr	4.32E-01
Phenanthrene	Groundwater - Resident Adult Shower RME	--	1	1.44E-01	cm/hr	0.58	hr	1.06E+00	hr	4.11E+00	hr	7.40E-01
Benzo-a-pyrene	Groundwater - Resident Adult Shower RME	--	1	7.01E-01	cm/hr	0.58	hr	2.69E+00	hr	1.17E+01	hr	4.27E+00
Dibenzo(a,h)anthracene	Groundwater - Resident Adult Shower RME	--	0.5	1.51E+00	cm/hr	0.58	hr	3.88E+00	hr	1.76E+01	hr	9.68E+00
TCDD	Groundwater - Resident Adult Shower RME	--	0.5	8.07E-01	cm/hr	0.58	hr	6.82E+00	hr	3.01E+01	hr	5.57E+00
Dieldrin	Groundwater - Resident Adult Shower RME	--	0.8	1.22E-02	cm/hr	0.58	hr	1.46E+01	hr	3.51E+01	hr	9.18E-02
DDD	Groundwater - Resident Adult Shower RME	--	0.8	1.79E-01	cm/hr	0.58	hr	6.65E+00	hr	2.60E+01	hr	1.23E+00
Acetophenone	Groundwater - Resident Adult Shower RME	--	1.0	3.72E-03	cm/hr	0.58	hr	5.03E-01	hr	1.21E+00	hr	1.57E-02
Arsenic	Groundwater - Resident Adult Shower RME	--	No data	1.00E-03	cm/hr	0.58	hr	No data	No data	No data	No data	No data
Chromium	Groundwater - Resident Adult Shower RME	--	No data	1.00E-03	cm/hr	0.58	hr	No data	No data	No data	No data	No data
Lead	Groundwater - Resident Adult Shower RME	--	No data	NA	cm/hr	0.58	hr	No data	No data	No data	No data	No data
Manganese	Groundwater - Resident Adult Shower RME	--	No data	1.00E-03	cm/hr	0.58	hr	No data	No data	No data	No data	No data
Nickel	Groundwater - Resident Adult Shower RME	--	No data	2.00E-04	cm/hr	0.58	hr	No data	No data	No data	No data	No data
Trichloroethane, 1,1,2-	Groundwater - Resident Adult Shower CT	--	1	6.44E-03	cm/hr	0.25	hr	5.96E-01	hr	1.43E+00	hr	2.86E-02

Dermal Worksheet
Intermediate Variables for Calculating DA(event)

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Dichloroethane, 1,1-	Groundwater - Resident Adult Shower CT	--	1	6.74E-03	cm/hr	0.25	hr	3.82E-01	hr	9.18E-01	hr	2.58E-02
Dichloroethylene, 1,1-	Groundwater - Resident Adult Shower CT	--	1	1.17E-02	cm/hr	0.25	hr	3.72E-01	hr	8.93E-01	hr	4.41E-02
Trichlorobenzene, 1,2,4-	Groundwater - Resident Adult Shower CT	--	1	6.63E-02	cm/hr	0.25	hr	1.11E+00	hr	2.66E+00	hr	3.43E-01
Dichlorobenzene, 1,3-	Groundwater - Resident Adult Shower CT	--	1	5.79E-02	cm/hr	0.25	hr	7.11E-01	hr	1.71E+00	hr	2.70E-01
Dichlorobenzene, 1,4-	Groundwater - Resident Adult Shower CT	--	1	4.20E-02	cm/hr	0.25	hr	7.11E-01	hr	1.71E+00	hr	1.96E-01
Benzene	Groundwater - Resident Adult Shower CT	--	1	1.49E-02	cm/hr	0.25	hr	2.92E-01	hr	7.00E-01	hr	5.05E-02
Bromomethane	Groundwater - Resident Adult Shower CT	--	1	2.84E-03	cm/hr	0.25	hr	3.63E-01	hr	8.71E-01	hr	1.06E-02
Chlorobenzene	Groundwater - Resident Adult Shower CT	--	1	2.82E-02	cm/hr	0.25	hr	4.56E-01	hr	1.09E+00	hr	1.15E-01
Chlorodibromomethane	Groundwater - Resident Adult Shower CT	--	1	3.22E-03	cm/hr	0.25	hr	1.57E+00	hr	3.77E+00	hr	1.79E-02
Chloroethane	Groundwater - Resident Adult Shower CT	--	1	6.07E-03	cm/hr	0.25	hr	2.45E-01	hr	5.88E-01	hr	1.88E-02
cis-1,2-Dichloroethene	Groundwater - Resident Adult Shower CT	--	1	1.10E-02	cm/hr	0.25	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Ethylbenzene	Groundwater - Resident Adult Shower CT	--	1	4.93E-02	cm/hr	0.25	hr	4.20E-01	hr	1.01E+00	hr	1.95E-01
Methyl tert-butyl ether	Groundwater - Resident Adult Shower CT	--	1	2.11E-03	cm/hr	0.25	hr	3.32E-01	hr	7.98E-01	hr	7.63E-03
Methylene chloride	Groundwater - Resident Adult Shower CT	--	1	3.54E-03	cm/hr	0.25	hr	3.19E-01	hr	7.65E-01	hr	1.26E-02
Tetrachloroethylene	Groundwater - Resident Adult Shower CT	--	1	3.34E-02	cm/hr	0.25	hr	9.06E-01	hr	2.18E+00	hr	1.66E-01
Toluene	Groundwater - Resident Adult Shower CT	--	1	3.11E-02	cm/hr	0.25	hr	3.50E-01	hr	8.39E-01	hr	1.15E-01
trans-1,2-Dichloroethene	Groundwater - Resident Adult Shower CT	--	1	1.10E-02	cm/hr	0.25	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Trichloroethylene	Groundwater - Resident Adult Shower CT	--	1	1.16E-02	cm/hr	0.25	hr	5.81E-01	hr	1.39E+00	hr	5.13E-02
Vinyl chloride	Groundwater - Resident Adult Shower CT	--	1	5.60E-03	cm/hr	0.25	hr	2.39E-01	hr	5.73E-01	hr	1.70E-02
Xylenes (total)	Groundwater - Resident Adult Shower CT	--	1	4.71E-02	cm/hr	0.25	hr	4.19E-01	hr	1.01E+00	hr	1.86E-01
p-Cresol	Groundwater - Resident Adult Shower CT	--	1	7.66E-03	cm/hr	0.25	hr	4.30E-01	hr	1.03E+00	hr	3.06E-02
Naphthalene	Groundwater - Resident Adult Shower CT	--	1	4.66E-02	cm/hr	0.25	hr	5.58E-01	hr	1.34E+00	hr	2.03E-01
2-Methylnaphthalene	Groundwater - Resident Adult Shower CT	--	1	9.17E-02	cm/hr	0.25	hr	6.68E-01	hr	1.60E+00	hr	4.20E-01
Acenaphthylene	Groundwater - Resident Adult Shower CT	--	1	9.11E-02	cm/hr	0.25	hr	7.60E-01	hr	1.82E+00	hr	4.32E-01
Phenanthrene	Groundwater - Resident Adult Shower CT	--	1	1.44E-01	cm/hr	0.25	hr	1.06E+00	hr	4.11E+00	hr	7.40E-01
Benzo-a-pyrene	Groundwater - Resident Adult Shower CT	--	1	7.01E-01	cm/hr	0.25	hr	2.69E+00	hr	1.17E+01	hr	4.27E+00
Dibenzo(a,h)anthracene	Groundwater - Resident Adult Shower CT	--	0.6	1.51E+00	cm/hr	0.25	hr	3.88E+00	hr	1.76E+01	hr	9.68E+00
TCDD	Groundwater - Resident Adult Shower CT	--	0.5	8.07E-01	cm/hr	0.25	hr	6.82E+00	hr	3.01E+01	hr	5.57E+00
Dieldrin	Groundwater - Resident Adult Shower CT	--	0.8	1.22E-02	cm/hr	0.25	hr	1.46E+01	hr	3.51E+01	hr	9.18E-02
DDD	Groundwater - Resident Adult Shower CT	--	0.8	1.79E-01	cm/hr	0.25	hr	6.65E+00	hr	2.60E+01	hr	1.23E+00
Acetophenone	Groundwater - Resident Adult Shower CT	--	1	3.72E-03	cm/hr	0.25	hr	5.03E-01	hr	1.21E+00	hr	1.57E-02
Arsenic	Groundwater - Resident Adult Shower CT	--	No data	1.00E-03	cm/hr	0.25	hr	No data	No data	No data	No data	No data
Chromium	Groundwater - Resident Adult Shower CT	--	No data	1.00E-03	cm/hr	0.25	hr	No data	No data	No data	No data	No data
Lead	Groundwater - Resident Adult Shower CT	--	No data	NA	cm/hr	0.25	hr	No data	No data	No data	No data	No data
Manganese	Groundwater - Resident Adult Shower CT	--	No data	1.00E-03	cm/hr	0.25	hr	No data	No data	No data	No data	No data
Nickel	Groundwater - Resident Adult Shower CT	--	No data	2.00E-04	cm/hr	0.25	hr	No data	No data	No data	No data	No data

Intermediate Variables for Calculating DA(event)

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Trichloroethane, 1,1,2-	Groundwater - Resident Child Shower RME	--	1	6.44E-03	cm/hr	1	hr	5.96E-01	hr	1.43E+00	hr	2.66E-02
Dichloroethane, 1,1-	Groundwater - Resident Child Shower RME	--	1	6.74E-03	cm/hr	1	hr	3.82E-01	hr	9.18E-01	hr	2.58E-02
Dichloroethylene, 1,1-	Groundwater - Resident Child Shower RME	--	1	1.17E-02	cm/hr	1	hr	3.72E-01	hr	8.93E-01	hr	4.41E-02
Trichlorobenzene, 1,2,4-	Groundwater - Resident Child Shower RME	--	1	6.63E-02	cm/hr	1	hr	1.11E+00	hr	2.66E+00	hr	3.43E-01
Dichlorobenzene, 1,3-	Groundwater - Resident Child Shower RME	--	1	5.79E-02	cm/hr	1	hr	7.11E-01	hr	1.71E+00	hr	2.70E-01
Dichlorobenzene, 1,4-	Groundwater - Resident Child Shower RME	--	1	4.20E-02	cm/hr	1	hr	7.11E-01	hr	1.71E+00	hr	1.96E-01
Benzene	Groundwater - Resident Child Shower RME	--	1	1.49E-02	cm/hr	1	hr	2.92E-01	hr	7.00E-01	hr	5.05E-02
Bromomethane	Groundwater - Resident Child Shower RME	--	1	2.84E-03	cm/hr	1	hr	3.63E-01	hr	8.71E-01	hr	1.06E-02
Chlorobenzene	Groundwater - Resident Child Shower RME	--	1	2.82E-02	cm/hr	1	hr	4.56E-01	hr	1.09E+00	hr	1.15E-01
Chlorodibromomethane	Groundwater - Resident Child Shower RME	--	1	3.22E-03	cm/hr	1	hr	1.57E+00	hr	3.77E+00	hr	1.79E-02
Chloroethane	Groundwater - Resident Child Shower RME	--	1	6.07E-03	cm/hr	1	hr	2.45E-01	hr	5.88E-01	hr	1.88E-02
cis-1,2-Dichloroethene	Groundwater - Resident Child Shower RME	--	1	1.10E-02	cm/hr	1	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Ethylbenzene	Groundwater - Resident Child Shower RME	--	1	4.93E-02	cm/hr	1	hr	4.20E-01	hr	1.01E+00	hr	1.95E-01
Methyl tert-bulyl ether	Groundwater - Resident Child Shower RME	--	1	2.11E-03	cm/hr	1	hr	3.32E-01	hr	7.98E-01	hr	7.63E-03
Methylene chloride	Groundwater - Resident Child Shower RME	--	1	3.54E-03	cm/hr	1	hr	3.19E-01	hr	7.65E-01	hr	1.26E-02
Tetrachlorethylene	Groundwater - Resident Child Shower RME	--	1	3.34E-02	cm/hr	1	hr	9.06E-01	hr	2.16E+00	hr	1.66E-01
Toluene	Groundwater - Resident Child Shower RME	--	1	3.11E-02	cm/hr	1	hr	3.50E-01	hr	8.39E-01	hr	1.15E-01
trans-1,2-Dichloroethene	Groundwater - Resident Child Shower RME	--	1	1.10E-02	cm/hr	1	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Trichloroethylene	Groundwater - Resident Child Shower RME	--	1	1.16E-02	cm/hr	1	hr	5.81E-01	hr	1.39E+00	hr	5.13E-02
Vinyl chloride	Groundwater - Resident Child Shower RME	--	1	5.60E-03	cm/hr	1	hr	2.39E-01	hr	5.73E-01	hr	1.70E-02
Xylenes (total)	Groundwater - Resident Child Shower RME	--	1	4.71E-02	cm/hr	1	hr	4.19E-01	hr	1.01E+00	hr	1.86E-01
p-Cresol	Groundwater - Resident Child Shower RME	--	1	7.66E-03	cm/hr	1	hr	4.30E-01	hr	1.03E+00	hr	3.06E-02
Naphthalene	Groundwater - Resident Child Shower RME	--	1	4.66E-02	cm/hr	1	hr	5.58E-01	hr	1.34E+00	hr	2.03E-01
2-Methylnaphthalene	Groundwater - Resident Child Shower RME	--	1	9.17E-02	cm/hr	1	hr	6.68E-01	hr	1.60E+00	hr	4.20E-01
Acenaphthylene	Groundwater - Resident Child Shower RME	--	1	9.11E-02	cm/hr	1	hr	7.60E-01	hr	1.82E+00	hr	4.32E-01
Phenanthrene	Groundwater - Resident Child Shower RME	--	1	1.44E-01	cm/hr	1	hr	1.06E+00	hr	4.11E+00	hr	7.40E-01
Benzo-a-pyrene	Groundwater - Resident Child Shower RME	--	1	7.01E-01	cm/hr	1	hr	2.69E+00	hr	1.17E+01	hr	4.27E+00
Dibenzo(a,h)anthracene	Groundwater - Resident Child Shower RME	--	0.6	1.51E+00	cm/hr	1	hr	3.88E+00	hr	1.76E+01	hr	9.68E+00
TCDD	Groundwater - Resident Child Shower RME	--	0.5	8.07E-01	cm/hr	1	hr	6.82E+00	hr	3.01E+01	hr	5.57E+00
Dieldrin	Groundwater - Resident Child Shower RME	--	0.8	1.22E-02	cm/hr	1	hr	1.46E+01	hr	3.51E+01	hr	9.18E-02
DDD	Groundwater - Resident Child Shower RME	--	0.8	1.79E-01	cm/hr	1	hr	6.65E+00	hr	2.60E+01	hr	1.23E+00
Acetophenone	Groundwater - Resident Child Shower RME	--	1	3.72E-03	cm/hr	1	hr	5.03E-01	hr	1.21E+00	hr	1.57E-02
Arsenic	Groundwater - Resident Child Shower RME	--	No data	1.00E-03	cm/hr	1	hr	No data	No data	No data	No data	No data
Chromium	Groundwater - Resident Child Shower RME	--	No data	1.00E-03	cm/hr	1	hr	No data	No data	No data	No data	No data
Lead	Groundwater - Resident Child Shower RME	--	No data	NA	cm/hr	1	hr	No data	No data	No data	No data	No data
Manganese	Groundwater - Resident Child Shower RME	--	No data	1.00E-03	cm/hr	1	hr	No data	No data	No data	No data	No data
Nickel	Groundwater - Resident Child Shower RME	--	No data	2.00E-04	cm/hr	1	hr	No data	No data	No data	No data	No data

Derma. .rksheet
Intermediate Variables for Calculating DA(event)

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Trichloroethane, 1,1,2-	Groundwater - Resident Child Shower CT	--	1	6.44E-03	cm/hr	0.33	hr	5.96E-01	hr	1.43E+00	hr	2.66E-02
Dichloroethane, 1,1-	Groundwater - Resident Child Shower CT	--	1	6.74E-03	cm/hr	0.33	hr	3.82E-01	hr	9.18E-01	hr	2.58E-02
Dichloroethylene, 1,1-	Groundwater - Resident Child Shower CT	--	1	1.17E-02	cm/hr	0.33	hr	3.72E-01	hr	8.93E-01	hr	4.41E-02
Trichlorobenzene, 1,2,4-	Groundwater - Resident Child Shower CT	--	1	6.63E-02	cm/hr	0.33	hr	1.11E+00	hr	2.66E+00	hr	3.43E-01
Dichlorobenzene, 1,3-	Groundwater - Resident Child Shower CT	--	1	5.79E-02	cm/hr	0.33	hr	7.11E-01	hr	1.71E+00	hr	2.70E-01
Dichlorobenzene, 1,4-	Groundwater - Resident Child Shower CT	--	1	4.20E-02	cm/hr	0.33	hr	7.11E-01	hr	1.71E+00	hr	1.96E-01
Benzene	Groundwater - Resident Child Shower CT	--	1	1.49E-02	cm/hr	0.33	hr	2.92E-01	hr	7.00E-01	hr	5.05E-02
Bromomethane	Groundwater - Resident Child Shower CT	--	1	2.84E-03	cm/hr	0.33	hr	3.63E-01	hr	8.71E-01	hr	1.06E-02
Chlorobenzene	Groundwater - Resident Child Shower CT	--	1	2.82E-02	cm/hr	0.33	hr	4.56E-01	hr	1.09E+00	hr	1.15E-01
Chlorodibromomethane	Groundwater - Resident Child Shower CT	--	1	3.22E-03	cm/hr	0.33	hr	1.57E+00	hr	3.77E+00	hr	1.79E-02
Chloroethane	Groundwater - Resident Child Shower CT	--	1	6.07E-03	cm/hr	0.33	hr	2.45E-01	hr	5.88E-01	hr	1.88E-02
cis-1,2-Dichloroethene	Groundwater - Resident Child Shower CT	--	1	1.10E-02	cm/hr	0.33	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Ethylbenzene	Groundwater - Resident Child Shower CT	--	1	4.93E-02	cm/hr	0.33	hr	4.20E-01	hr	1.01E+00	hr	1.95E-01
Methyl tert-butyl ether	Groundwater - Resident Child Shower CT	--	1	2.11E-03	cm/hr	0.33	hr	3.32E-01	hr	7.98E-01	hr	7.63E-03
Methylene chloride	Groundwater - Resident Child Shower CT	--	1	3.54E-03	cm/hr	0.33	hr	3.19E-01	hr	7.65E-01	hr	1.26E-02
Tetrachlorethylene	Groundwater - Resident Child Shower CT	--	1	3.34E-02	cm/hr	0.33	hr	9.06E-01	hr	2.18E+00	hr	1.66E-01
Toluene	Groundwater - Resident Child Shower CT	--	1	3.11E-02	cm/hr	0.33	hr	3.50E-01	hr	8.39E-01	hr	1.15E-01
trans-1,2-Dichloroethene	Groundwater - Resident Child Shower CT	--	1	1.10E-02	cm/hr	0.33	hr	3.72E-01	hr	8.94E-01	hr	4.15E-02
Trichloroethylene	Groundwater - Resident Child Shower CT	--	1	1.16E-02	cm/hr	0.33	hr	5.81E-01	hr	1.39E+00	hr	5.13E-02
Vinyl chloride	Groundwater - Resident Child Shower CT	--	1	5.60E-03	cm/hr	0.33	hr	2.39E-01	hr	5.73E-01	hr	1.70E-02
Xylenes (total)	Groundwater - Resident Child Shower CT	--	1	4.71E-02	cm/hr	0.33	hr	4.19E-01	hr	1.01E+00	hr	1.86E-01
p-Cresol	Groundwater - Resident Child Shower CT	--	1	7.66E-03	cm/hr	0.33	hr	4.30E-01	hr	1.03E+00	hr	3.06E-02
Naphthalene	Groundwater - Resident Child Shower CT	--	1	4.66E-02	cm/hr	0.33	hr	5.58E-01	hr	1.34E+00	hr	2.03E-01
2-Methylnaphthalene	Groundwater - Resident Child Shower CT	--	1	9.17E-02	cm/hr	0.33	hr	6.68E-01	hr	1.60E+00	hr	4.20E-01
Acenaphthylene	Groundwater - Resident Child Shower CT	--	1	9.11E-02	cm/hr	0.33	hr	7.60E-01	hr	1.82E+00	hr	4.32E-01
Phenanthrene	Groundwater - Resident Child Shower CT	--	1	1.44E-01	cm/hr	0.33	hr	1.06E+00	hr	4.11E+00	hr	7.40E-01
Benzo-a-pyrene	Groundwater - Resident Child Shower CT	--	1	7.01E-01	cm/hr	0.33	hr	2.69E+00	hr	1.17E+01	hr	4.27E+00
Dibenzo(a,h)anthracene	Groundwater - Resident Child Shower CT	--	0.6	1.51E+00	cm/hr	0.33	hr	3.88E+00	hr	1.76E+01	hr	9.68E+00
TEQ (no 170/193/180) Humans*	Groundwater - Resident Child Shower CT	--	0.5	8.07E-01	cm/hr	0.33	hr	6.82E+00	hr	3.01E+01	hr	5.57E+00
Dieldrin	Groundwater - Resident Child Shower CT	--	0.8	1.22E-02	cm/hr	0.33	hr	1.46E+01	hr	3.51E+01	hr	9.18E-02
DDD	Groundwater - Resident Child Shower CT	--	0.8	1.79E-01	cm/hr	0.33	hr	6.65E+00	hr	2.60E+01	hr	1.23E+00
Acetophenone	Groundwater - Resident Child Shower CT	--	1	3.72E-03	cm/hr	0.33	hr	5.03E-01	hr	1.21E+00	hr	1.57E-02
Arsenic	Groundwater - Resident Child Shower CT	--	No data	1.00E-03	cm/hr	0.33	hr	No data	No data	No data	No data	No data
Chromium	Groundwater - Resident Child Shower CT	--	No data	1.00E-03	cm/hr	0.33	hr	No data	No data	No data	No data	No data
Lead	Groundwater - Resident Child Shower CT	--	No data	NA	cm/hr	0.33	hr	No data	No data	No data	No data	No data
Manganese	Groundwater - Resident Child Shower CT	--	No data	1.00E-03	cm/hr	0.33	hr	No data	No data	No data	No data	No data
Nickel	Groundwater - Resident Child Shower CT	--	No data	2.00E-04	cm/hr	0.33	hr	No data	No data	No data	No data	No data

Dermal Worksheet
Intermediate Variables for Calculating DA(event)

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
2-Methylnaphthalene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
4,4'-DDT	Sediment/Soil	0.03	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Acenaphthylene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
alpha-Chlordane	Sediment/Soil	0.04	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Aroclor 1242	Sediment/Soil	0.14	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Aroclor 1248	Sediment/Soil	0.14	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Aroclor 1254	Sediment/Soil	0.14	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Aroclor 1260	Sediment/Soil	0.14	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Arsenic	Sediment/Soil	0.03	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Benzo(a)Anthracene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Benzo(a)Pyrene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Benzo(b)Fluoranthene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Benzo(g,h,i)perylene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Benzo(k)Fluoranthene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Cadmium	Sediment/Soil	0.001	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Dibenz(a,h) anthracene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
gamma-Chlordane	Sediment/Soil	0.04	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Indeno(1,2,3-cd)pyrene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Naphthalene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Phenanthrene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
TEQ (no 170/193/180) Humans*	Sediment/Soil	0.14	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data

FA = Fraction Absorbed Water
Kp = Dermal Permeability Coefficient of Compound in Water

T(event) = Event Duration
Tau = Lag Time

T* = Time to Reach Steady-State
B = Dimensionless Ratio of the Permeability Coefficient of a Compound Through the Stratum Corneum Relative to its Permeability Coefficient Across the Viable Epidermis

C.6-1 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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 =	125.0	days/yr
Exposure duration (years): for carcinogenic effects, ED = 30 years (used in this spreadsheet) for noncarcinogenic effects, ED = 9 years	ED =	1.0	years
Body weight (kg):	BW =	70.0	kg
Averaging time (days): for carcinogenic effects, AT=70 years (25,550 days) for noncarcinogenic effects, AT=ED (in days)	AT =	25550	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 =	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/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	**	383%	Y	0%	0.0	0.60	1.43	########	4.00E-07	6.4E-03	2.3E-08	5.3E-09	-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	########	2.20E-04	6.7E-03	1.3E-05	2.9E-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	**	649%	Y	0%	0.0	0.37	0.89	########	9.00E-06	1.2E-02	8.9E-07	2.0E-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		3889%	Y	0%	0.3	1.11	2.66	########	2.30E-05	6.6E-02	1.4E-05	3.1E-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		3090%	Y	0%	0.3	0.71	1.71	########	1.90E-05	5.8E-02	8.9E-06	2.1E-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		2322%	Y	0%	0.2	0.71	1.71	########	1.97E-04	4.2E-02	6.9E-05	1.6E-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		807%	Y	0%	0.1	0.29	0.70	########	8.60E-05	1.5E-02	1.1E-05	2.4E-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	**	162%	Y	0%	0.0	0.36	0.87	########	1.00E-06	2.8E-03	2.5E-08	5.7E-09	-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	########	1.80E-05	2.8E-02	4.2E-06	9.6E-07	-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	**	235%	Y	0%	0.0	1.57	3.77	########	1.05E-06	3.2E-03	3.7E-08	8.6E-09	-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	########	5.00E-05	6.1E-03	2.5E-06	5.8E-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	**	612%	Y	0%	0.0	0.37	0.89	########	1.90E-03	1.1E-02	1.8E-04	4.1E-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		2500%	Y	0%	0.2	0.42	1.01	########	4.00E-05	4.9E-02	1.5E-05	3.5E-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		120%	Y	0%	0.0	0.33	0.80	########	5.40E-04	2.1E-03	9.8E-06	2.3E-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	**	200%	Y	0%	0.0	0.32	0.76	########	9.00E-05	3.5E-03	2.7E-06	6.3E-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	**	1979%	Y	0%	0.2	0.91	2.18	########	7.00E-06	3.3E-02	2.1E-06	4.8E-07	-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	########	1.20E-03	3.1E-02	3.0E-04	6.8E-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		612%	Y	0%	0.0	0.37	0.89	########	2.80E-05	1.1E-02	2.6E-06	6.0E-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	**	678%	Y	0%	0.1	0.58	1.39	########	4.20E-05	1.2E-02	4.3E-06	1.0E-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	**	309%	Y	0%	0.0	0.24	0.57	########	6.00E-04	5.6E-03	2.8E-05	6.5E-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		2402%	Y	0%	0.2	0.42	1.01	########	1.10E-04	4.7E-02	4.0E-05	9.2E-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		437%	Y	0%	0.0	0.43	1.03	########	2.50E-05	7.7E-03	1.7E-06	3.8E-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		2457%	Y	0%	0.2	0.56	1.34	########	2.50E-05	4.7E-02	9.3E-06	2.1E-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		4526%	Y	0%	0.4	0.67	1.60	########	1.10E-05	9.2E-02	7.5E-06	1.7E-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		4630%	Y	0%	0.4	0.76	1.82	########	3.20E-06	9.1E-02	2.2E-06	5.2E-07	-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	########	1.00E-05	1.4E-01	1.2E-05	2.7E-06	-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	*	59363%	Y	0%	4.3	2.69	11.67	########	1.50E-08	7.0E-01	1.3E-07	3.1E-08	-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	*	91997%	Y	1%	9.7	3.88	17.57	6.00E-01	1.30E-08	1.5E+00	1.8E-07	4.2E-08	-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	5.00E-01	1.40E-12	8.1E-01	1.2E-11	2.7E-12	-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		1930%	Y	0%	0.1	14.62	35.09	8.00E-01	1.40E-08	1.2E-02	4.1E-09	9.4E-10	-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	*	19090%	Y	0%	1.2	6.65	25.99	8.00E-01	5.58E-07	1.8E-01	1.6E-06	3.7E-07	-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		219%	Y	0%	0.0	0.50	1.21	########	1.20E-06	3.7E-03	4.0E-08	9.2E-09	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01		1.21

C.6-1 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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	2.2E-10	5.3E-09	1.3E-07	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	1.2E-07	2.9E-06	7.3E-05	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	8.2E-09	2.0E-07	5.1E-06	26%	649%	16140%
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	1.2E-07	3.1E-06	8.0E-05	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	8.1E-08	2.1E-06	5.2E-05	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	6.3E-07	1.6E-05	4.0E-04	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	9.7E-08	2.4E-06	6.1E-05	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	2.3E-10	5.7E-09	1.4E-07	7%	162%	4021%
Chlorobenzene	0.216948639	0.102025264	N		1.1E-03	2.8E-02	7.1E-01	1.7E-07	4.2E-06	1.0E-04	3.8E-08	9.6E-07	2.4E-05	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	3.5E-10	8.6E-09	2.1E-07	10%	235%	5734%
Chloroethane	0.113220492	0.047389607	N		2.4E-04	6.1E-03	1.5E-01	1.0E-07	2.5E-06	6.3E-05	2.3E-08	5.8E-07	1.5E-05	13%	335%	8364%
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		1.8E-04			4.1E-05			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	1.4E-07	3.5E-06	8.9E-05	99%	2500%	63436%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		9.8E-06			2.3E-06			120%	
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	2.5E-08	6.3E-07	1.6E-05	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	1.9E-08	4.8E-07	1.2E-05	79%	1979%	49791%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01	1.2E-05	3.0E-04	7.5E-03	2.7E-06	6.8E-05	1.7E-03	65%	1632%	41070%
trans-1,2-Dichloroethen	0.166839043	0.067898794	N		NA	1.1E-02	NA		2.6E-06			6.0E-07			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	4.0E-08	1.0E-06	2.5E-05	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	2.6E-07	6.5E-06	1.6E-04	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		4.0E-05			9.2E-06			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	2.4E-07	3.8E-07	6.0E-07	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	8.5E-08	2.1E-06	5.4E-05	97%	2457%	62236%
2-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA		7.5E-06			1.7E-06			4526%	
Acenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA		2.2E-06			5.2E-07			4630%	
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	4.4E-07	1.2E-05	3.0E-04	1.0E-07	2.7E-06	7.0E-05	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	1.1E-09	3.1E-08	9.0E-07	2042%	59363%	1725935%
Dibenzo(a,h)anthracene	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	5.9E-09	1.8E-07	5.6E-06	1.4E-09	4.2E-08	1.3E-06	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	8.8E-14	2.7E-12	8.1E-11	1786%	54409%	1657801%
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01	1.6E-10	4.1E-09	1.1E-07	3.6E-11	9.4E-10	2.4E-08	75%	1930%	49991%
DDD	0.489014209	0.162411367	N		6.4E-03	1.8E-01	5.0E+00	5.8E-08	1.6E-06	4.5E-05	1.3E-08	3.7E-07	1.0E-05	682%	19090%	534024%
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA		4.0E-08			9.2E-09			219%	

C.6-1.1 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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 =	125.0	days/yr
Exposure duration (years): for carcinogenic effects, ED = 30 years (used in this spreadsheet); for noncarcinogenic effects, ED = 9 years	ED =	1.0	years
Body weight (kg): .	BW =	70.0	kg
Averaging time (days): for carcinogenic effects, AT=70 years (25,550 days); for noncarcinogenic effects, AT=ED (in days)	AT =	25550	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	**				0.0	0.60	1.43	########	ND	6.4E-03		N/A	-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	**				0.0	0.38	0.92	########	ND	6.7E-03		N/A	-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	########	1.94E-07	1.2E-02	1.9E-08	4.4E-09	-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	########	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	########	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		2322%	Y	0%	0.2	0.71	1.71	########	4.84E-07	4.2E-02	1.7E-07	3.9E-08	-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	########	3.20E-07	1.5E-02	3.9E-08	9.0E-09	-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	**				0.0	0.36	0.87	########	ND	2.8E-03		N/A	-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					0.1	0.46	1.09	########	ND	2.8E-02		N/A	-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	**	235%	Y	0%	0.0	1.57	3.77	########	1.03E-06	3.2E-03	3.7E-08	8.5E-09	-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	**				0.0	0.24	0.59	########	ND	6.1E-03		N/A	-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	########	2.90E-05	1.1E-02	2.7E-06	6.2E-07	-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					0.2	0.42	1.01	########	ND	4.9E-02		N/A	-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		120%	Y	0%	0.0	0.33	0.80	########	1.40E-05	2.1E-03	2.5E-07	5.9E-08	-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	**				0.0	0.32	0.76	########	ND	3.5E-03		N/A	-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	########	4.18E-07	3.3E-02	1.3E-07	2.9E-08	-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					0.1	0.35	0.84	########	ND	3.1E-02		N/A	-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					0.0	0.37	0.89	########	ND	1.1E-02		N/A	-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	########	2.50E-05	1.2E-02	2.6E-06	5.9E-07	-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	########	2.40E-07	5.6E-03	1.1E-08	2.6E-09	-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					0.2	0.42	1.01	########	ND	4.7E-02		N/A	-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					0.0	0.43	1.03	########	ND	7.7E-03		N/A	-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	########	2.70E-06	4.7E-02	1.0E-06	2.3E-07	-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					0.4	0.67	1.60	########	ND	9.2E-02		N/A	-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	########	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	########	2.10E-06	1.4E-01	2.4E-06	5.6E-07	-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	*	59363%	Y	0%	4.3	2.69	11.67	########	1.10E-08	7.0E-01	9.9E-08	2.3E-08	-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	*	91997%	Y	1%	9.7	3.88	17.57	6.00E-01	1.30E-08	1.5E+00	1.8E-07	4.2E-08	-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	*				5.6	6.82	30.09	5.00E-01	ND	8.1E-01		N/A	-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		1930%	Y	0%	0.1	14.62	35.09	8.00E-01	1.40E-08	1.2E-02	4.1E-09	9.4E-10	-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	8.00E-01	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	1.20E+02	1.58E+00	NA	3.7E-03		NA					0.0	0.50	1.21	########	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.6-1.1 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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									
Dichloroethylene, 1,1-	0.169064925	0.070165502	N		4.7E-04	1.2E-02	2.9E-01	7.7E-10	1.9E-08	4.7E-07	1.8E-10	4.4E-09	1.1E-07	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	6.7E-09	1.7E-07	4.3E-06	1.6E-09	3.9E-08	9.9E-07	92%	2322%	58688%
Benzene	0.159470967	0.079759461	N		5.9E-04	1.5E-02	3.7E-01	1.6E-09	3.9E-08	9.8E-07	3.6E-10	9.0E-09	2.3E-07	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									
Chlorodibromomethane	0.231529970	0.018931933	N		1.3E-04	3.2E-03	7.9E-02	1.5E-09	3.7E-08	8.9E-07	3.5E-10	8.5E-09	2.1E-07	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		2.7E-06			6.2E-07			612%	
Ethylbenzene	0.231091397	0.122700079	N		1.9E-03	4.9E-02	1.2E+00									
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		2.5E-07			5.9E-08			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	5.0E-09	1.3E-07	3.2E-06	1.1E-09	2.9E-08	7.3E-07	79%	1979%	49791%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01									
trans-1,2-Dichloroethen	0.166839043	0.067898794	N		NA	1.1E-02	NA									
Trichloroethylene	0.202956499	0.068845207	N		4.7E-04	1.2E-02	2.9E-01	1.0E-07	2.6E-06	6.4E-05	2.4E-08	5.9E-07	1.5E-05	27%	678%	16777%
Vinyl chloride	0.108268842	0.044479224	N		2.2E-04	5.6E-03	1.4E-01	4.5E-10	1.1E-08	2.8E-07	1.0E-10	2.6E-09	6.5E-08	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA									
p-Cresol	0.164692560	0.054321212	N		4.8E-03	7.7E-03	1.2E-02									
Naphthalene	0.250741977	0.119896713	N		1.8E-03	4.7E-02	1.2E+00	4.0E-08	1.0E-06	2.5E-05	9.2E-09	2.3E-07	5.9E-06	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									
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	9.2E-08	2.4E-06	6.4E-05	2.1E-08	5.6E-07	1.5E-05	290%	7628%	200991%
Benzo-a-pyrene	0.470139236	0.214980766	Y		2.4E-02	7.0E-01	2.0E+01	3.4E-09	9.9E-08	2.9E-06	7.8E-10	2.3E-08	6.6E-07	2042%	59363%	1725935%
Dibenzo(a,h)anthracen	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	5.9E-09	1.8E-07	5.6E-06	1.4E-09	4.2E-08	1.3E-06	2977%	91997%	2842859%
TCDD	0.546192220	0.217548111	Y		2.7E-02	8.1E-01	2.5E+01									
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01	1.6E-10	4.1E-09	1.1E-07	3.6E-11	9.4E-10	2.4E-08	75%	1930%	49991%
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.6-1.2 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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 =	125.0	days/yr
Exposure duration (years): for carcinogenic effects, ED = 30 years (used in this spreadsheet) for noncarcinogenic effects, ED = 9 years	ED =	1.0	years
Body weight (kg):	BW =	70.0	kg
Averaging time (days): for carcinogenic effects, AT=70 years (25,550 days) for noncarcinogenic effects, AT=ED (in days)	AT =	25550	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
Drinking (mg/day) = Conc * IR * ABSIG

IR =	50	(cm3/day = L/day * 1000 cm3/L)
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	**				0.0	0.60	1.43	#######	ND	6.4E-03		N/A	-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	#######	1.20E-04	6.7E-03	6.9E-06	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	**				0.0	0.37	0.89	#######	ND	1.2E-02		N/A	-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		3889%	Y	0%	0.3	1.11	2.66	#######	2.30E-05	6.6E-02	1.4E-05	3.1E-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		3090%	Y	0%	0.3	0.71	1.71	#######	1.90E-05	5.8E-02	8.9E-06	2.1E-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		2322%	Y	0%	0.2	0.71	1.71	#######	1.97E-04	4.2E-02	6.9E-05	1.6E-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		807%	Y	0%	0.1	0.29	0.70	#######	8.60E-05	1.5E-02	1.1E-05	2.4E-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	**				0.0	0.36	0.87	#######	ND	2.8E-03		N/A	-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	#######	1.80E-05	2.8E-02	4.2E-06	9.6E-07	-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	**	235%	Y	0%	0.0	1.57	3.77	#######	1.05E-06	3.2E-03	3.7E-08	8.6E-09	-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	**				0.0	0.24	0.59	#######	ND	6.1E-03		N/A	-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	#######	4.80E-04	1.1E-02	4.4E-05	1.0E-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		2500%	Y	0%	0.2	0.42	1.01	#######	4.00E-05	4.9E-02	1.5E-05	3.5E-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		120%	Y	0%	0.0	0.33	0.80	#######	5.40E-04	2.1E-03	9.8E-06	2.3E-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	**				0.0	0.32	0.76	#######	ND	3.5E-03		N/A	-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	**				0.2	0.91	2.18	#######	ND	3.3E-02		N/A	-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	#######	1.20E-03	3.1E-02	3.0E-04	6.8E-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		612%	Y	0%	0.0	0.37	0.89	#######	1.50E-05	1.1E-02	1.4E-06	3.2E-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	**	678%	Y	0%	0.1	0.58	1.39	#######	2.00E-06	1.2E-02	2.1E-07	4.7E-08	-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	#######	4.20E-04	5.6E-03	2.0E-05	4.5E-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		2402%	Y	0%	0.2	0.42	1.01	#######	4.25E-05	4.7E-02	1.5E-05	3.6E-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		437%	Y	0%	0.0	0.43	1.03	#######	1.80E-06	7.7E-03	1.2E-07	2.7E-08	-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	#######	1.36E-05	4.7E-02	5.1E-06	1.2E-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					0.4	0.67	1.60	#######	ND	9.2E-02		N/A	-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		4630%	Y	0%	0.4	0.76	1.82	#######	3.20E-06	9.1E-02	2.2E-06	5.2E-07	-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	#######	3.10E-06	1.4E-01	3.6E-06	8.3E-07	-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	*	59363%	Y	0%	4.3	2.69	11.67	#######	1.50E-08	7.0E-01	1.3E-07	3.1E-08	-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	*	91997%	Y	1%	9.7	3.88	17.57	6.00E-01	5.80E-09	1.5E+00	8.1E-08	1.9E-08	-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	5.00E-01	1.40E-12	8.1E-01	1.2E-11	2.7E-12	-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	8.00E-01	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	*	19090%	Y	0%	1.2	6.65	25.99	8.00E-01	5.58E-07	1.8E-01	1.6E-06	3.7E-07	-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		219%	Y	0%	0.0	0.50	1.21	#######	1.20E-06	3.7E-03	4.0E-08	9.2E-09	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01		1.21

C.6-1.2 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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-UCl and Average value

CHEMICAL	EPD1-c Eq (3.9)	EPD2-c Eq (3.10)	outside EPD?	Chemicals outside EPD (*)	Kp 95% LCl	Kp (cm/hr) predicted	Kp 95% UCl	DA_event (mg/cm2-evt) 95% LCl Kp	DA_event (mg/cm2-evt) Average Kp	DA_event (mg/cm2-evt) 95% UCl Kp	DAD (mg/kg-day) 95% LCl Kp	DAD (mg/kg-day) Average Kp	DAD (mg/kg-day) 95% UCl Kp	Derm/ Drink 95% LCl Kp	Derm/ Drink Average Kp	Derm/ Drink 95% UCl 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	6.5E-08	1.6E-06	4.0E-05	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	1.2E-07	3.1E-06	8.0E-05	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	8.1E-08	2.1E-06	5.2E-05	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	6.3E-07	1.6E-05	4.0E-04	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	9.7E-08	2.4E-06	6.1E-05	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	3.8E-08	9.6E-07	2.4E-05	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	3.5E-10	8.6E-09	2.1E-07	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			1.0E-05			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	1.4E-07	3.5E-06	8.9E-05	99%	2500%	63436%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		9.8E-06			2.3E-06			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	2.7E-06	6.8E-05	1.7E-03	65%	1632%	41070%
trans-1,2-Dichloroethen	0.166839043	0.067898794	N		NA	1.1E-02	NA		1.4E-06			3.2E-07			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	1.9E-09	4.7E-08	1.2E-06	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	1.8E-07	4.5E-06	1.1E-04	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		1.5E-05			3.6E-06			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	1.7E-08	2.7E-08	4.4E-08	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	4.6E-08	1.2E-06	3.0E-05	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			5.2E-07			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	3.1E-08	8.3E-07	2.2E-05	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	1.1E-09	3.1E-08	9.0E-07	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	6.0E-10	1.9E-08	5.8E-07	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	8.8E-14	2.7E-12	8.1E-11	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	1.3E-08	3.7E-07	1.0E-05	682%	19090%	534024%
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA		4.0E-08			9.2E-09			219%	

C-6.1.3 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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	event/day
Exposure frequency (days/year):	EF =	125	days/yr
Exposure duration (years): for carcinogenic effects, ED = 30 years (used in this spreadsheet); for noncarcinogenic effects, ED = 9 years	ED =	1	years
Body weight (kg):	BW =	70	kg
Averaging time (days): for carcinogenic effects, AT=70 years (25,550 days); for noncarcinogenic effects, AT=ED (in days)	AT =	25550	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			
Drinking (mg/day) = Conc * IR * ABSIG	IR =	50	(cm3/day = L/day * 1000 cm3/L)
	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	#######	4.00E-07	6.4E-03	2.3E-08	5.3E-09	-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	#######	2.20E-04	6.7E-03	1.3E-05	2.9E-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	**	649%	Y	0%	0.0	0.37	0.89	#######	9.00E-06	1.2E-02	8.9E-07	2.0E-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					0.3	1.11	2.66	#######	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	#######	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	#######	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	#######	1.60E-05	1.5E-02	2.0E-06	4.5E-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	**	162%	Y	0%	0.0	0.36	0.87	#######	1.00E-06	2.8E-03	2.5E-08	5.7E-09	-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	#######	1.00E-06	2.8E-02	2.3E-07	5.3E-08	-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	#######	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	#######	5.00E-05	6.1E-03	2.5E-06	5.8E-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	**	612%	Y	0%	0.0	0.37	0.89	#######	1.90E-03	1.1E-02	1.8E-04	4.1E-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		2500%	Y	0%	0.2	0.42	1.01	#######	2.30E-05	4.9E-02	8.7E-06	2.0E-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					0.0	0.33	0.80	#######	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	#######	9.00E-05	3.5E-03	2.7E-06	6.3E-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	**	1979%	Y	0%	0.2	0.91	2.18	#######	7.00E-06	3.3E-02	2.1E-06	4.8E-07	-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	#######	5.20E-05	3.1E-02	1.3E-05	3.0E-06	-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	#######	2.80E-05	1.1E-02	2.6E-06	6.0E-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	**	678%	Y	0%	0.1	0.58	1.39	#######	4.20E-05	1.2E-02	4.3E-06	1.0E-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	**	309%	Y	0%	0.0	0.24	0.57	#######	6.00E-04	5.6E-03	2.8E-05	6.5E-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		2402%	Y	0%	0.2	0.42	1.01	#######	1.10E-04	4.7E-02	4.0E-05	9.2E-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		437%	Y	0%	0.0	0.43	1.03	#######	2.50E-05	7.7E-03	1.7E-06	3.8E-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		2457%	Y	0%	0.2	0.56	1.34	#######	2.50E-05	4.7E-02	9.3E-06	2.1E-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		4526%	Y	0%	0.4	0.67	1.60	#######	1.10E-05	9.2E-02	7.5E-06	1.7E-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					0.4	0.76	1.82	#######	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	#######	1.00E-05	1.4E-01	1.2E-05	2.7E-06	-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	#######	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	6.00E-01	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	5.00E-01	1.20E-12	8.1E-01	9.9E-12	2.3E-12	-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	8.00E-01	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	8.00E-01	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	1.20E+02	1.58E+00	NA	3.7E-03		NA					0.0	0.50	1.21	#######	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-6.1.3 DERMAL ABSORPTION CALCULATION FOR RME EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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	2.2E-10	5.3E-09	1.3E-07	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	1.2E-07	2.9E-06	7.3E-05	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	8.2E-09	2.0E-07	5.1E-06	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	1.8E-08	4.5E-07	1.1E-05	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	2.3E-10	5.7E-09	1.4E-07	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	2.1E-09	5.3E-08	1.3E-06	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	2.3E-08	5.8E-07	1.5E-05	13%	335%	8364%
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		1.8E-04			4.1E-05			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	7.9E-08	2.0E-06	5.1E-05	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	2.5E-08	6.3E-07	1.6E-05	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	1.9E-08	4.8E-07	1.2E-05	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	1.2E-07	3.0E-06	7.5E-05	65%	1632%	41070%
trans-1,2-Dichloroethen	0.166839043	0.067898794	N		NA	1.1E-02	NA		2.6E-06			6.0E-07			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	4.0E-08	1.0E-06	2.5E-05	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	2.6E-07	6.5E-06	1.6E-04	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		4.0E-05			9.2E-06			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	2.4E-07	3.8E-07	6.0E-07	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	8.5E-08	2.1E-06	5.4E-05	97%	2457%	62236%
2-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA		7.5E-06			1.7E-06			4526%	
Acenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA									
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	4.4E-07	1.2E-05	3.0E-04	1.0E-07	2.7E-06	7.0E-05	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	7.5E-14	2.3E-12	7.0E-11	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.6-2 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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): for carcinogenic effects, ED = 30 years (used in this spreadsheet) for noncarcinogenic effects, ED = 9 years	ED =	1.0	years
Body weight (kg):	BW =	70.0	kg
Averaging time (days): for carcinogenic effects, AT=70 years (25,550 days) for noncarcinogenic effects, AT=ED (in days)	AT =	25550	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 =	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/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	**	383%	Y	0%	0.0	0.60	1.43	1.0E+00	4.00E-07	6.4E-03	2.3E-08	1.7E-09	-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	1.0E+00	2.20E-04	6.7E-03	1.3E-05	9.4E-07	-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	1.0E+00	9.00E-06	1.2E-02	8.9E-07	6.5E-08	-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		3889%	Y	0%	0.3	1.11	2.66	1.0E+00	2.30E-05	6.6E-02	1.4E-05	1.0E-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		3090%	Y	0%	0.3	0.71	1.71	1.0E+00	1.90E-05	5.8E-02	8.9E-06	6.6E-07	-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		2322%	Y	0%	0.2	0.71	1.71	1.0E+00	1.97E-04	4.2E-02	6.9E-05	5.1E-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		807%	Y	0%	0.1	0.29	0.70	1.0E+00	8.60E-05	1.5E-02	1.1E-05	7.8E-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	**	162%	Y	0%	0.0	0.36	0.87	1.0E+00	1.00E-06	2.8E-03	2.5E-08	1.8E-09	-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	1.0E+00	1.80E-05	2.8E-02	4.2E-06	3.1E-07	-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	**	235%	Y	0%	0.0	1.57	3.77	1.0E+00	1.05E-06	3.2E-03	3.7E-08	2.8E-09	-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	1.0E+00	5.00E-05	6.1E-03	2.5E-06	1.9E-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	**	612%	Y	0%	0.0	0.37	0.89	1.0E+00	1.90E-03	1.1E-02	1.8E-04	1.3E-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		2500%	Y	0%	0.2	0.42	1.01	1.0E+00	4.00E-05	4.9E-02	1.5E-05	1.1E-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		120%	Y	0%	0.0	0.33	0.80	1.0E+00	5.40E-04	2.1E-03	9.8E-06	7.3E-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	**	200%	Y	0%	0.0	0.32	0.76	1.0E+00	9.00E-05	3.5E-03	2.7E-06	2.0E-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	**	1979%	Y	0%	0.2	0.91	2.18	1.0E+00	7.00E-06	3.3E-02	2.1E-06	1.5E-07	-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	1.0E+00	1.20E-03	3.1E-02	3.0E-04	2.2E-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	1.0E+00	2.80E-05	1.1E-02	2.6E-06	1.9E-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	**	678%	Y	0%	0.1	0.58	1.39	1.0E+00	4.20E-05	1.2E-02	4.3E-06	3.2E-07	-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	1.0E+00	6.00E-04	5.6E-03	2.8E-05	2.1E-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		2402%	Y	0%	0.2	0.42	1.01	1.0E+00	1.10E-04	4.7E-02	4.0E-05	3.0E-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		437%	Y	0%	0.0	0.43	1.03	1.0E+00	2.50E-05	7.7E-03	1.7E-06	1.2E-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		2457%	Y	0%	0.2	0.56	1.34	1.0E+00	2.50E-05	4.7E-02	9.3E-06	6.9E-07	-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	1.0E+00	1.10E-05	9.2E-02	7.5E-06	5.6E-07	-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		4630%	Y	0%	0.4	0.76	1.82	1.0E+00	3.20E-06	9.1E-02	2.2E-06	1.7E-07	-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	1.0E+00	1.00E-05	1.4E-01	1.2E-05	8.5E-07	-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	*	59363%	Y	0%	4.3	2.69	11.67	1.0E+00	1.50E-08	7.0E-01	1.3E-07	1.0E-08	-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	*	91997%	Y	1%	9.7	3.88	17.57	6.0E-01	1.30E-08	1.5E+00	1.8E-07	1.3E-08	-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	5.0E-01	1.40E-12	8.1E-01	1.2E-11	8.5E-13	-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		1930%	Y	0%	0.1	14.62	35.09	8.0E-01	1.40E-08	1.2E-02	4.1E-09	3.0E-10	-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	*	19090%	Y	0%	1.2	6.65	25.99	8.0E-01	5.58E-07	1.8E-01	1.6E-06	1.2E-07	-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		219%	Y	0%	0.0	0.50	1.21	1.0E+00	1.20E-06	3.7E-03	4.0E-08	2.9E-09	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01		1.21

orp3_99

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	7.0E-11	1.7E-09	4.2E-08	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	3.8E-08	9.4E-07	2.3E-05	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	2.6E-09	6.5E-08	1.6E-06	26%	649%	16140%
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	3.9E-08	1.0E-06	2.6E-05	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	2.6E-08	6.6E-07	1.7E-05	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	2.0E-07	5.1E-06	1.3E-04	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	3.1E-08	7.8E-07	1.9E-05	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	7.3E-11	1.8E-09	4.5E-08	7%	162%	4021%
Chlorobenzene	0.216948639	0.102025264	N		1.1E-03	2.8E-02	7.1E-01	1.7E-07	4.2E-06	1.0E-04	1.2E-08	3.1E-07	7.7E-06	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	1.1E-10	2.8E-09	6.7E-08	10%	235%	5734%
Chloroethane	0.113220492	0.047389607	N		2.4E-04	6.1E-03	1.5E-01	1.0E-07	2.5E-06	6.3E-05	7.5E-09	1.9E-07	4.7E-06	13%	335%	8364%
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		1.8E-04			1.3E-05			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	4.4E-08	1.1E-06	2.8E-05	99%	2500%	63436%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		9.8E-06			7.3E-07			120%	
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	8.1E-09	2.0E-07	5.0E-06	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	6.2E-09	1.5E-07	3.9E-06	79%	1979%	49791%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01		3.0E-04	7.5E-03	8.7E-07	2.2E-05	5.5E-04	65%	1632%	41070%
trans-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA	#VALUE!	2.6E-06			1.9E-07			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	1.3E-08	3.2E-07	7.9E-06	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	8.3E-08	2.1E-06	5.2E-05	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		4.0E-05			3.0E-06			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	7.7E-08	1.2E-07	1.9E-07	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	2.7E-08	6.9E-07	1.7E-05	97%	2457%	62236%
2-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA		7.5E-06			5.6E-07			4526%	
Acenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA		2.2E-06			1.7E-07			4630%	
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	4.4E-07	1.2E-05	3.0E-04	3.2E-08	8.5E-07	2.2E-05	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	3.4E-10	1.0E-08	2.9E-07	2042%	59363%	1725935%
Dibenzo(a,h)anthracene	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	5.9E-09	1.8E-07	5.6E-06	4.3E-10	1.3E-08	4.1E-07	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	2.8E-14	8.5E-13	2.6E-11	1786%	54409%	1657801%
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01	1.6E-10	4.1E-09	1.1E-07	1.2E-11	3.0E-10	7.8E-09	75%	1930%	49991%
DDD	0.489014209	0.162411367	N		6.4E-03	1.8E-01	5.0E+00	5.8E-08	1.6E-06	4.5E-05	4.3E-09	1.2E-07	3.3E-06	682%	19090%	534024%
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA		4.0E-08			2.9E-09			219%	

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C.6-2.1 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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): for carcinogenic effects, ED = 30 years (used in this spreadsheet) for noncarcinogenic effects, ED = 9 years	ED =	1.0	years
Body weight (kg):	BW =	70.0	kg
Averaging time (days): for carcinogenic effects, AT=70 years (25,550 days) for noncarcinogenic effects, AT=ED (in days)	AT =	25550	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	**				0.0	0.60	1.43	1.0E+00	ND	6.4E-03		N/A	-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	**				0.0	0.38	0.92	1.0E+00	ND	6.7E-03		N/A	-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	1.0E+00	1.94E-07	1.2E-02	1.9E-08	1.4E-09	-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	1.0E+00	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	1.0E+00	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		2322%	Y	0%	0.2	0.71	1.71	1.0E+00	4.84E-07	4.2E-02	1.7E-07	1.3E-08	-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	1.0E+00	3.20E-07	1.5E-02	3.9E-08	2.9E-09	-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	**				0.0	0.36	0.87	1.0E+00	ND	2.8E-03		N/A	-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					0.1	0.46	1.09	1.0E+00	ND	2.8E-02		N/A	-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	**	235%	Y	0%	0.0	1.57	3.77	1.0E+00	1.03E-06	3.2E-03	3.7E-08	2.7E-09	-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	**				0.0	0.24	0.59	1.0E+00	ND	6.1E-03		N/A	-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	1.0E+00	2.90E-05	1.1E-02	2.7E-06	2.0E-07	-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					0.2	0.42	1.01	1.0E+00	ND	4.9E-02		N/A	-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		120%	Y	0%	0.0	0.33	0.80	1.0E+00	1.40E-05	2.1E-03	2.5E-07	1.9E-08	-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	**				0.0	0.32	0.76	1.0E+00	ND	3.5E-03		N/A	-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	1.0E+00	4.18E-07	3.3E-02	1.3E-07	9.3E-09	-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					0.1	0.35	0.84	1.0E+00	ND	3.1E-02		N/A	-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					0.0	0.37	0.89	1.0E+00	ND	1.1E-02		N/A	-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	1.0E+00	2.50E-05	1.2E-02	2.6E-06	1.9E-07	-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	1.0E+00	2.40E-07	5.6E-03	1.1E-08	8.3E-10	-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					0.2	0.42	1.01	1.0E+00	ND	4.7E-02		N/A	-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					0.0	0.43	1.03	1.0E+00	ND	7.7E-03		N/A	-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	1.0E+00	2.70E-06	4.7E-02	1.0E-06	7.4E-08	-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					0.4	0.67	1.60	1.0E+00	ND	9.2E-02		N/A	-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	1.0E+00	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	1.0E+00	2.10E-06	1.4E-01	2.4E-06	1.8E-07	-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	*	59363%	Y	0%	4.3	2.69	11.67	1.0E+00	1.10E-08	7.0E-01	9.9E-08	7.3E-09	-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	*	91997%	Y	1%	9.7	3.88	17.57	6.0E-01	1.30E-08	1.5E+00	1.8E-07	1.3E-08	-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	*				5.6	6.82	30.09	5.0E-01	ND	8.1E-01		N/A	-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		1930%	Y	0%	0.1	14.62	35.09	8.0E-01	1.40E-08	1.2E-02	4.1E-09	3.0E-10	-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	8.0E-01	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	1.0E+00	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.6-2.1 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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									
Dichloroethylene, 1,1-	0.169064925	0.070165502	N		4.7E-04	1.2E-02	2.9E-01	7.7E-10	1.9E-08	4.7E-07	5.7E-11	1.4E-09	3.5E-08	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	6.7E-09	1.7E-07	4.3E-06	5.0E-10	1.3E-08	3.2E-07	92%	2322%	58688%
Benzene	0.159470967	0.079759461	N		5.9E-04	1.5E-02	3.7E-01	1.6E-09	3.9E-08	9.8E-07	1.2E-10	2.9E-09	7.2E-08	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									
Chlorodibromomethane	0.231529970	0.018931933	N		1.3E-04	3.2E-03	7.9E-02	1.5E-09	3.7E-08	8.9E-07	1.1E-10	2.7E-09	6.6E-08	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		2.7E-06			2.0E-07			612%	
Ethylbenzene	0.231091397	0.122700079	N		1.9E-03	4.9E-02	1.2E+00									
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		2.5E-07			1.9E-08			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	5.0E-09	1.3E-07	3.2E-06	3.7E-10	9.3E-09	2.3E-07	79%	1979%	49791%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01									
trans-1,2-Dichloroethen	0.166839043	0.067898794	N		NA	1.1E-02	NA									
Trichloroethylene	0.202956499	0.068845207	N		4.7E-04	1.2E-02	2.9E-01	1.0E-07	2.6E-06	6.4E-05	7.7E-09	1.9E-07	4.7E-06	27%	678%	16777%
Vinyl chloride	0.108268842	0.044479224	N		2.2E-04	5.6E-03	1.4E-01	4.5E-10	1.1E-08	2.8E-07	3.3E-11	8.3E-10	2.1E-08	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA									
p-Cresol	0.164692560	0.054321212	N		4.8E-03	7.7E-03	1.2E-02									
Naphthalene	0.250741977	0.119896713	N		1.8E-03	4.7E-02	1.2E+00	4.0E-08	1.0E-06	2.5E-05	2.9E-09	7.4E-08	1.9E-06	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									
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	9.2E-08	2.4E-06	6.4E-05	6.8E-09	1.8E-07	4.7E-06	290%	7628%	200991%
Benzo-a-pyrene	0.470139236	0.214980766	Y		2.4E-02	7.0E-01	2.0E+01	3.4E-09	9.9E-08	2.9E-06	2.5E-10	7.3E-09	2.1E-07	2042%	59363%	1725935%
Dibenzo(a,h)anthracene	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	5.9E-09	1.8E-07	5.6E-06	4.3E-10	1.3E-08	4.1E-07	2977%	91997%	2842859%
TCDD	0.546192220	0.217548111	Y		2.7E-02	8.1E-01	2.5E+01									
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01	1.6E-10	4.1E-09	1.1E-07	1.2E-11	3.0E-10	7.8E-09	75%	1930%	49991%
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.6-2.2 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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): for carcinogenic effects, ED = 30 years (used in this spreadsheet); for noncarcinogenic effects, ED = 9 years	ED =	1.0	years
Body weight (kg):	BW =	70.0	kg
Averaging time (days): for carcinogenic effects, AT=70 years (25,550 days); for noncarcinogenic effects, AT=ED (in days)	AT =	25550	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
Drinking (mg/day) = Conc * IR * ABSIG

IR =	50	(cm3/day = L/day * 1000 cm3/L)
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	**				0.0	0.60	1.43	1.0E+00	ND	6.4E-03									
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	1.0E+00	1.20E-04	6.7E-03	6.9E-06	N/A	-3.6E+00	2.79E-04	2.79E-07	3.2E-01	3.5E-01		1.43
Dichloroethylene, 1,1-	75354	9.69E+01	2.13E+00	4.69E-04	1.2E-02		2.90E-01	**				0.0	0.37	0.89	1.0E+00	ND	1.2E-02		5.1E-07	-3.4E+00	4.36E-04	4.36E-07	3.2E-01	3.5E-01		0.92
Trichlorobenzene, 1,2,4-	120821	1.82E+02	3.98E+00	2.58E-03	6.6E-02		1.70E+00		3889%	Y	0%	0.3	1.11	2.66	1.0E+00	2.30E-05	6.6E-02	1.4E-05	N/A	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Dichlorobenzene, 1,3-	541731	1.47E+02	3.60E+00	2.27E-03	5.8E-02		1.47E+00		3090%	Y	0%	0.3	0.71	1.71	1.0E+00	1.90E-05	5.8E-02	8.9E-06	1.0E-06	-3.8E+00	1.50E-04	1.50E-07	5.6E-01	5.9E-01		2.66
Dichlorobenzene, 1,4-	106467	1.47E+02	3.39E+00	1.66E-03	4.2E-02		1.06E+00		2322%	Y	0%	0.2	0.71	1.71	1.0E+00	1.97E-04	4.2E-02	6.9E-05	6.6E-07	-3.6E+00	2.34E-04	2.34E-07	4.9E-01	5.3E-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	1.0E+00	8.60E-05	1.5E-02	1.1E-05	5.1E-06	-3.6E+00	2.34E-04	2.34E-07	4.4E-01	4.7E-01		1.71
Bromomethane	74839	9.50E+01	1.19E+00	1.14E-04	2.8E-03		7.04E-02	**				0.0	0.36	0.87	1.0E+00	ND	2.8E-03		7.8E-07	-3.2E+00	5.71E-04	5.71E-07	3.3E-01	3.7E-01		0.70
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	1.0E+00	1.80E-05	2.8E-02	4.2E-06	N/A	-3.3E+00	4.59E-04	4.59E-07	3.1E-01	3.4E-01		0.87
Chlorodibromomethane	124481	2.08E+02	2.23E+00	1.32E-04	3.2E-03		7.86E-02	**	235%	Y	0%	0.0	1.57	3.77	1.0E+00	1.05E-06	3.2E-03	3.7E-08	3.1E-07	-3.4E+00	3.66E-04	3.66E-07	3.8E-01	4.1E-01		1.09
Chloroethane	75003	6.45E+01	1.43E+00	2.43E-04	6.1E-03		1.52E-01	**				0.0	0.24	0.59	1.0E+00	ND	6.1E-03		2.8E-09	-4.0E+00	1.06E-04	1.06E-07	3.1E-01	3.5E-01		3.77
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	1.0E+00	4.80E-04	1.1E-02	4.4E-05	N/A	-3.2E+00	6.81E-04	6.81E-07	3.1E-01	3.5E-01		0.59
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	1.0E+00	4.00E-05	4.9E-02	1.5E-05	3.3E-06	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Methyl tert-butyl ether	1634044	8.82E+01	9.40E-01	NA	2.1E-03		NA		120%	Y	0%	0.0	0.33	0.80	1.0E+00	5.40E-04	2.1E-03	9.8E-06	1.1E-06	-3.4E+00	3.97E-04	3.97E-07	4.4E-01	4.7E-01		1.01
Methylene chloride	75092	8.49E+01	1.25E+00	1.42E-04	3.5E-03		8.81E-02	**				0.0	0.32	0.76	1.0E+00	ND	3.5E-03		7.3E-07	-3.3E+00	5.01E-04	5.01E-07	3.1E-01	3.4E-01		0.80
Tetrachlorethylene	127184	1.66E+02	3.40E+00	1.33E-03	3.3E-02		8.41E-01	**				0.2	0.91	2.18	1.0E+00	ND	3.3E-02		N/A	-3.3E+00	5.23E-04	5.23E-07	3.1E-01	3.4E-01		0.76
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	1.0E+00	1.20E-03	3.1E-02	3.0E-04	N/A	-3.7E+00	1.84E-04	1.84E-07	4.1E-01	4.5E-01		2.18
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	1.0E+00	1.50E-05	1.1E-02	1.4E-06	2.2E-05	-3.3E+00	4.77E-04	4.77E-07	3.8E-01	4.1E-01		0.84
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	1.0E+00	2.00E-06	1.2E-02	2.1E-07	1.0E-07	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
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	1.0E+00	4.20E-04	5.6E-03	2.0E-05	1.5E-08	-3.5E+00	2.87E-04	2.87E-07	3.4E-01	3.7E-01		1.39
Xylenes (total)	1330207	1.06E+02	3.12E+00	NA	4.7E-02		NA		2402%	Y	0%	0.2	0.42	1.01	1.0E+00	4.25E-05	4.7E-02	1.5E-05	1.4E-06	-3.2E+00	6.99E-04	6.99E-07	3.1E-01	3.4E-01		0.57
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	1.0E+00	1.80E-06	7.7E-03	1.2E-07	1.1E-06	-3.4E+00	3.97E-04	3.97E-07	4.3E-01	4.7E-01		1.01
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	1.0E+00	1.36E-05	4.7E-02	5.1E-06	8.8E-09	-3.4E+00	3.87E-04	3.87E-07	3.2E-01	3.5E-01		1.03
2-Methylnaphthalene	91576	1.42E+02	3.86E+00	NA	9.2E-02		NA					0.4	0.67	1.60	1.0E+00	ND	9.2E-02		3.7E-07	-3.5E+00	2.99E-04	2.99E-07	4.4E-01	4.8E-01		1.34
Acenaphthylene	208968	1.52E+02	3.94E+00	NA	9.1E-02		NA		4630%	Y	0%	0.4	0.76	1.82	1.0E+00	3.20E-06	9.1E-02	2.2E-06	1.7E-07	-3.7E+00	2.19E-04	2.19E-07	6.3E-01	6.6E-01		1.60
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	1.0E+00	3.10E-06	1.4E-01	3.6E-06	2.6E-07	-3.8E+00	1.57E-04	1.57E-07	6.4E-01	6.6E-01		1.82
Benzo-a-pyrene	50328	2.50E+02	6.10E+00	2.41E-02	7.0E-01		2.04E+01	*	59363%	Y	0%	4.3	2.69	11.67	1.0E+00	1.50E-08	7.0E-01	1.3E-07	1.0E-08	-4.2E+00	6.19E-05	6.19E-08	1.0E+00	9.3E-01	4.11	2.55
Dibenzo(a,h)anthracene	53703	2.78E+02	6.84E+00	4.88E-02	1.5E+00		4.66E+01	*	91997%	Y	1%	9.7	3.88	17.57	6.0E-01	5.80E-09	1.5E+00	8.1E-08	6.0E-09	-4.4E+00	4.29E-05	4.29E-08	1.3E+01	4.3E+00	11.67	6.46
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	5.0E-01	1.40E-12	8.1E-01	1.2E-11	8.5E-13	-4.6E+00	2.44E-05	2.44E-08	6.3E+01	9.7E+00	17.57	9.32
Dieldrin	60571	3.81E+02	4.56E+00	4.72E-04	1.2E-02		3.17E-01					0.1	14.62	35.09	8.0E-01	ND	1.2E-02		N/A	-4.9E+00	1.14E-05	1.14E-08	2.2E+01	5.6E+00	30.09	16.37
DDD	72548	3.20E+02	5.80E+00	6.41E-03	1.8E-01		5.02E+00	*	19090%	Y	0%	1.2	6.65	25.99	8.0E-01	5.58E-07	1.8E-01	1.6E-06	1.2E-07	-4.6E+00	2.51E-05	2.51E-08	3.6E-01	4.0E-01		35.09
Acetophenone	98862.0	1.20E+02	1.58E+00	NA	3.7E-03		NA	0.00E+00	219%	Y	0%	0.0	0.50	1.21	1.0E+00	1.20E-06	3.7E-03	4.0E-08	2.9E-09	-3.5E+00	3.32E-04	3.32E-07	1.8E+00	1.4E+00	25.99	15.96
																							3.1E-01	3.4E-01	#NUM!	1.21

C.6-2.2 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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	2.1E-08	5.1E-07	1.3E-05	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	3.9E-08	1.0E-06	2.6E-05	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	2.6E-08	6.6E-07	1.7E-05	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	2.0E-07	5.1E-06	1.3E-04	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	3.1E-08	7.8E-07	1.9E-05	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	1.2E-08	3.1E-07	7.7E-06	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	1.1E-10	2.8E-09	6.7E-08	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								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	4.4E-08	1.1E-06	2.8E-05	99%	2500%	63436%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		9.8E-06			7.3E-07			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	8.7E-07	2.2E-05	5.5E-04	65%	1632%	41070%
trans-1,2-Dichloroethen	0.166839043	0.067898794	N		NA	1.1E-02	NA		1.4E-06			1.0E-07			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	6.1E-10	1.5E-08	3.8E-07	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	5.8E-08	1.4E-06	3.6E-05	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		1.5E-05			1.1E-06			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	5.6E-09	8.8E-09	1.4E-08	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	1.5E-08	3.7E-07	9.5E-06	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			1.7E-07			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	1.0E-08	2.6E-07	7.0E-06	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	3.4E-10	1.0E-08	2.9E-07	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	1.9E-10	6.0E-09	1.8E-07	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	2.8E-14	8.5E-13	2.6E-11	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	4.3E-09	1.2E-07	3.3E-06	682%	19090%	534024%
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA	#VALUE!	4.0E-08	#VALUE!	#VALUE!	2.9E-09	#VALUE!	#VALUE!	219%	#VALUE!

C.6-2.3 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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"

Parameter		Value	Unit
Area exposed (cm2):	SA =	3300	cm2
Event time (hr/event):	t_event =	8	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	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 = 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	1.0E+00	4.00E-07	6.4E-03	2.3E-08	1.7E-09	-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	1.0E+00	2.20E-04	6.7E-03	1.3E-05	9.4E-07	-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	1.0E+00	9.00E-06	1.2E-02	8.9E-07	6.5E-08	-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	1.0E+00	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	1.0E+00	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	1.0E+00	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	1.0E+00	1.60E-05	1.5E-02	2.0E-06	1.4E-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	**	162%	Y	0%	0.0	0.36	0.87	1.0E+00	1.00E-06	2.8E-03	2.5E-08	1.8E-09	-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	1.0E+00	1.00E-06	2.8E-02	2.3E-07	1.7E-08	-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	1.0E+00	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	1.0E+00	5.00E-05	6.1E-03	2.5E-06	1.9E-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	**	612%	Y	0%	0.0	0.37	0.89	1.0E+00	1.90E-03	1.1E-02	1.8E-04	1.3E-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		2500%	Y	0%	0.2	0.42	1.01	1.0E+00	2.30E-05	4.9E-02	8.7E-06	6.4E-07	-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	1.0E+00	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	1.0E+00	9.00E-05	3.5E-03	2.7E-06	2.0E-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	**	1979%	Y	0%	0.2	0.91	2.18	1.0E+00	7.00E-06	3.3E-02	2.1E-06	1.5E-07	-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	1.0E+00	5.20E-05	3.1E-02	1.3E-05	9.5E-07	-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	1.0E+00	2.80E-05	1.1E-02	2.6E-06	1.9E-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	**	678%	Y	0%	0.1	0.58	1.39	1.0E+00	4.20E-05	1.2E-02	4.3E-06	3.2E-07	-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	1.0E+00	6.00E-04	5.6E-03	2.8E-05	2.1E-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		2402%	Y	0%	0.2	0.42	1.01	1.0E+00	1.10E-04	4.7E-02	4.0E-05	3.0E-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		437%	Y	0%	0.0	0.43	1.03	1.0E+00	2.50E-05	7.7E-03	1.7E-06	1.2E-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		2457%	Y	0%	0.2	0.56	1.34	1.0E+00	2.50E-05	4.7E-02	9.3E-06	6.9E-07	-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	1.0E+00	1.10E-05	9.2E-02	7.5E-06	5.6E-07	-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	1.0E+00	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	1.0E+00	1.00E-05	1.4E-01	1.2E-05	8.5E-07	-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	1.0E+00	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	6.0E-01	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	5.0E-01	1.20E-12	8.1E-01	9.9E-12	7.3E-13	-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	8.0E-01	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	8.0E-01	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	0.00E+00				0.0	0.50	1.21	1.0E+00	ND	3.7E-03		N/A	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01	#NUM!	1.21

erg3_99

C.6-2.3 DERMAL ABSORPTION CALCULATION FOR CT EXPOSURE - GROUNDWATER (COMBINED): FUTURE CONSTRUCTION WORKER 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	7.0E-11	1.7E-09	4.2E-08	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	3.8E-08	9.4E-07	2.3E-05	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	2.6E-09	6.5E-08	1.6E-06	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	5.8E-09	1.4E-07	3.6E-06	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	7.3E-11	1.8E-09	4.5E-08	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	6.8E-10	1.7E-08	4.3E-07	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	7.5E-09	1.9E-07	4.7E-06	13%	335%	8364%
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		1.8E-04			1.3E-05			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	2.5E-08	6.4E-07	1.6E-05	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	8.1E-09	2.0E-07	5.0E-06	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	6.2E-09	1.5E-07	3.9E-06	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	3.8E-08	9.5E-07	2.4E-05	65%	1632%	41070%
trans-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		2.6E-06			1.9E-07			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	1.3E-08	3.2E-07	7.9E-06	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	8.3E-08	2.1E-06	5.2E-05	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		4.0E-05			3.0E-06			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	7.7E-08	1.2E-07	1.9E-07	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	2.7E-08	6.9E-07	1.7E-05	97%	2457%	62236%
2-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA		7.5E-06			5.6E-07			4526%	
Acenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA									
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	4.4E-07	1.2E-05	3.0E-04	3.2E-08	8.5E-07	2.2E-05	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	2.4E-14	7.3E-13	2.2E-11	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.6-3 DERMAL ABSORPTION CALCULATION FOR RME 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 =	125.0	days/yr
Exposure duration (years): for carcinogenic effects, ED = 30 years (used in this spreadsheet) for noncarcinogenic effects, ED = 9 years	ED =	1.0	years
Body weight (kg):	BW =	70.0	kg
Averaging time (days): for carcinogenic effects, AT=70 years (25,550 days) for noncarcinogenic effects, AT=ED (in days)	AT =	365	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 =	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/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	**	383%	Y	0%	0.0	0.60	1.43	1.0	4.00E-07	6.4E-03	2.3E-08	3.7E-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	2.1E-04	-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	1.4E-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		3889%	Y	0%	0.3	1.11	2.66	1.0	2.30E-05	6.6E-02	1.4E-05	2.2E-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		3090%	Y	0%	0.3	0.71	1.71	1.0	1.90E-05	5.8E-02	8.9E-06	1.4E-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		2322%	Y	0%	0.2	0.71	1.71	1.0	1.97E-04	4.2E-02	6.9E-05	1.1E-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	1.5E-02		3.72E-01		807%	Y	0%	0.1	0.29	0.70	1.0	8.60E-05	1.5E-02	1.1E-05	1.7E-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	2.8E-03		7.04E-02	**	162%	Y	0%	0.0	0.36	0.87	1.0	1.00E-06	2.8E-03	2.5E-08	4.0E-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	1.80E-05	2.8E-02	4.2E-06	6.7E-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	**	235%	Y	0%	0.0	1.57	3.77	1.0	1.05E-06	3.2E-03	3.7E-08	6.0E-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	**	335%	Y	0%	0.0	0.24	0.59	1.0	5.00E-05	6.1E-03	2.5E-06	4.1E-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	2.8E-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		2500%	Y	0%	0.2	0.42	1.01	1.0	4.00E-05	4.9E-02	1.5E-05	2.4E-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		120%	Y	0%	0.0	0.33	0.80	1.0	5.40E-04	2.1E-03	9.8E-06	1.6E-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	3.5E-03		8.81E-02	**	200%	Y	0%	0.0	0.32	0.76	1.0	9.00E-05	3.5E-03	2.7E-06	4.4E-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	3.4E-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	1.20E-03	3.1E-02	3.0E-04	4.8E-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		612%	Y	0%	0.0	0.37	0.89	1.0	2.80E-05	1.1E-02	2.6E-06	4.2E-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	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	**	309%	Y	0%	0.0	0.24	0.57	1.0	6.00E-04	5.6E-03	2.8E-05	4.5E-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	6.5E-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	2.7E-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		2457%	Y	0%	0.2	0.56	1.34	1.0	2.50E-05	4.7E-02	9.3E-06	1.5E-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		4526%	Y	0%	0.4	0.67	1.60	1.0	1.10E-05	9.2E-02	7.5E-06	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		4630%	Y	0%	0.4	0.76	1.82	1.0	3.20E-06	9.1E-02	2.2E-06	3.6E-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	*	7628%	Y	0%	0.7	1.06	4.11	1.0	1.00E-05	1.4E-01	1.2E-05	1.9E-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	*	59363%	Y	0%	4.3	2.69	11.67	1.0	1.50E-08	7.0E-01	1.3E-07	2.2E-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	*	91997%	Y	1%	9.7	3.88	17.57	0.6	1.30E-08	1.5E+00	1.8E-07	2.9E-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	*	54409%	Y	0%	5.6	6.82	30.09	0.5	1.40E-12	8.1E-01	1.2E-11	1.9E-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		1930%	Y	0%	0.1	14.62	35.09	0.8	1.40E-08	1.2E-02	4.1E-09	6.6E-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	*	19090%	Y	0%	1.2	6.65	25.99	0.8	5.58E-07	1.8E-01	1.6E-06	2.6E-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		219%	Y	0%	0.0	0.50	1.21	1.0	1.20E-06	3.7E-03	4.0E-08	6.4E-07	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01		1.21

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	1.5E-08	3.7E-07	9.2E-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	8.3E-06	2.1E-04	5.1E-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	5.8E-07	1.4E-05	3.6E-04	26%	649%	16140%
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	8.5E-06	2.2E-04	5.6E-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	5.6E-06	1.4E-04	3.7E-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	4.4E-05	1.1E-03	2.8E-02	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	6.8E-06	1.7E-04	4.2E-03	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	1.6E-08	4.0E-07	9.8E-06	7%	162%	4021%
Chlorobenzene	0.216948639	0.102025264	N		1.1E-03	2.8E-02	7.1E-01	1.7E-07	4.2E-06	1.0E-04	2.7E-06	6.7E-05	1.7E-03	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	2.5E-08	6.0E-07	1.5E-05	10%	235%	5734%
Chloroethane	0.113220492	0.047389607	N		2.4E-04	6.1E-03	1.5E-01	1.0E-07	2.5E-06	6.3E-05	1.6E-06	4.1E-05	1.0E-03	13%	335%	8364%
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		1.8E-04			2.8E-03			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	9.6E-06	2.4E-04	6.2E-03	99%	2500%	63436%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		9.8E-06			1.6E-04			120%	
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	1.8E-06	4.4E-05	1.1E-03	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	1.3E-06	3.4E-05	8.5E-04	79%	1979%	49791%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01	1.2E-05	3.0E-04	7.5E-03	1.9E-04	4.8E-03	1.2E-01	65%	1632%	41070%
trans-1,2-Dichloroethen	0.166839043	0.067898794	N		NA	1.1E-02	NA		2.6E-06			4.2E-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	2.8E-06	7.0E-05	1.7E-03	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	1.8E-05	4.5E-04	1.1E-02	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		4.0E-05			6.5E-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	1.7E-05	2.7E-05	4.2E-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	5.9E-06	1.5E-04	3.8E-03	97%	2457%	62236%
2-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA		7.5E-06			1.2E-04			4526%	
cenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA		2.2E-06			3.6E-05			4630%	
henanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	4.4E-07	1.2E-05	3.0E-04	7.1E-06	1.9E-04	4.9E-03	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	7.5E-08	2.2E-06	6.3E-05	2042%	59363%	1725935%
Dibenzo(a,h)anthracene	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	5.9E-09	1.8E-07	5.6E-06	9.5E-08	2.9E-06	9.0E-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	6.1E-12	1.9E-10	5.7E-09	1786%	54409%	1657801%
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01	1.6E-10	4.1E-09	1.1E-07	2.6E-09	6.6E-08	1.7E-06	75%	1930%	49991%
DDD	0.489014209	0.162411367	N		6.4E-03	1.8E-01	5.0E+00	5.8E-08	1.6E-06	4.5E-05	9.3E-07	2.6E-05	7.3E-04	682%	19090%	534024%
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA		4.0E-08			6.4E-07			219%	

C.6-3.1 DERMAL ABSORPTION CALCULATION FOR RME 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	hr/event
Event frequency (events/day):	EV =	1	event/day
Exposure frequency (days/year):	EF =	125	days/yr
Exposure duration (years): for carcinogenic effects, ED = 30 years (used in this spreadsheet); for noncarcinogenic effects, ED = 9 years	ED =	1	years
Body weight (kg):	BW =	70	kg
Averaging time (days): for carcinogenic effects, AT=70 years (25,550 days); for noncarcinogenic effects, AT=ED (in days)	AT =	365	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	**				0.0	0.60	1.43	1.0	ND	6.4E-03		N/A	-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	**				0.0	0.38	0.92	1.0	ND	6.7E-03		N/A	-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	1.94E-07	1.2E-02	1.9E-08	3.1E-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					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		2322%	Y	0%	0.2	0.71	1.71	1.0	4.84E-07	4.2E-02	1.7E-07	2.7E-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		807%	Y	0%	0.1	0.29	0.70	1.0	3.20E-07	1.5E-02	3.9E-08	6.3E-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	**				0.0	0.36	0.87	1.0	ND	2.8E-03		N/A	-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					0.1	0.46	1.09	1.0	ND	2.8E-02		N/A	-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	**	235%	Y	0%	0.0	1.57	3.77	1.0	1.03E-06	3.2E-03	3.7E-08	5.9E-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	**				0.0	0.24	0.59	1.0	ND	6.1E-03		N/A	-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	2.90E-05	1.1E-02	2.7E-06	4.3E-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					0.2	0.42	1.01	1.0	ND	4.9E-02		N/A	-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		120%	Y	0%	0.0	0.33	0.80	1.0	1.40E-05	2.1E-03	2.5E-07	4.1E-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	**				0.0	0.32	0.76	1.0	ND	3.5E-03		N/A	-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	4.18E-07	3.3E-02	1.3E-07	2.0E-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					0.1	0.35	0.84	1.0	ND	3.1E-02		N/A	-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					0.0	0.37	0.89	1.0	ND	1.1E-02		N/A	-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	2.50E-05	1.2E-02	2.6E-06	4.1E-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	2.40E-07	5.6E-03	1.1E-08	1.8E-07	-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					0.2	0.42	1.01	1.0	ND	4.7E-02		N/A	-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					0.0	0.43	1.03	1.0	ND	7.7E-03		N/A	-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	2.70E-06	4.7E-02	1.0E-06	1.6E-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					0.4	0.67	1.60	1.0	ND	9.2E-02		N/A	-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	2.10E-06	1.4E-01	2.4E-06	3.9E-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	*	59363%	Y	0%	4.3	2.69	11.67	1.0	1.10E-08	7.0E-01	9.9E-08	1.6E-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	*	91997%	Y	1%	9.7	3.88	17.57	0.6	1.30E-08	1.5E+00	1.8E-07	2.9E-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	*				5.6	6.82	30.09	0.5	ND	8.1E-01		N/A	-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		1930%	Y	0%	0.1	14.62	35.09	0.8	1.40E-08	1.2E-02	4.1E-09	6.6E-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	*				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		1.58E+00	NA	1.8E-02		NA					0.0	0.11	0.26	1.0	ND	1.8E-02		N/A	-2.8E+00	1.57E-03	1.57E-06	3.0E-01	3.3E-01		0.26

C.6-3.1 DERMAL ABSORPTION CALCULATION FOR RME 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									
Dichloroethylene, 1,1-	0.169064925	0.070165502	N		4.7E-04	1.2E-02	2.9E-01	7.7E-10	1.9E-08	4.7E-07	1.2E-08	3.1E-07	7.7E-06	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	6.7E-09	1.7E-07	4.3E-06	1.1E-07	2.7E-06	6.9E-05	92%	2322%	58688%
Benzene	0.159470967	0.079759461	N		5.9E-04	1.5E-02	3.7E-01	1.6E-09	3.9E-08	9.8E-07	2.5E-08	6.3E-07	1.6E-05	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									
Chlorodibromomethane	0.231529970	0.018931933	N		1.3E-04	3.2E-03	7.9E-02	1.5E-09	3.7E-08	8.9E-07	2.4E-08	5.9E-07	1.4E-05	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		2.7E-06			4.3E-05			612%	
Ethylbenzene	0.231091397	0.122700079	N		1.9E-03	4.9E-02	1.2E+00									
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		2.5E-07			4.1E-06			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	5.0E-09	1.3E-07	3.2E-06	8.0E-08	2.0E-06	5.1E-05	79%	1979%	49791%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01									
trans-1,2-Dichloroethen	0.166839043	0.067898794	N		NA	1.1E-02	NA									
Trichloroethylene	0.202956499	0.068845207	N		4.7E-04	1.2E-02	2.9E-01	1.0E-07	2.6E-06	6.4E-05	1.7E-06	4.1E-05	1.0E-03	27%	678%	16777%
Vinyl chloride	0.108268842	0.044479224	N		2.2E-04	5.6E-03	1.4E-01	4.5E-10	1.1E-08	2.8E-07	7.2E-09	1.8E-07	4.5E-06	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA									
p-Cresol	0.164692560	0.054321212	N		4.8E-03	7.7E-03	1.2E-02									
Naphthalene	0.250741977	0.119896713	N		1.8E-03	4.7E-02	1.2E+00	4.0E-08	1.0E-06	2.5E-05	6.4E-07	1.6E-05	4.1E-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									
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	9.2E-08	2.4E-06	6.4E-05	1.5E-06	3.9E-05	1.0E-03	290%	7628%	200991%
Benzo-a-pyrene	0.470139236	0.214980766	Y		2.4E-02	7.0E-01	2.0E+01	3.4E-09	9.9E-08	2.9E-06	5.5E-08	1.6E-06	4.6E-05	2042%	59363%	1725935%
Dibenzo(a,h)anthracene	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	5.9E-09	1.8E-07	5.6E-06	9.5E-08	2.9E-06	9.0E-05	2977%	91997%	2842859%
TCDD	0.546192220	0.217548111	Y		2.7E-02	8.1E-01	2.5E+01									
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01	1.6E-10	4.1E-09	1.1E-07	2.6E-09	6.6E-08	1.7E-06	75%	1930%	49991%
DDD	0.489014209	0.162411367	N		6.4E-03	1.8E-01	5.0E+00									
Acetophenone	0.088728656	0.088728656	N		NA	1.8E-02	NA									

C.6-3.2 DERMAL ABSORPTION CALCULATION FOR RME 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 =	125.0	days/yr
Exposure duration (years): for carcinogenic effects, ED = 30 years (used in this spreadsheet); for noncarcinogenic effects, ED = 9 years	ED =	1.0	years
Body weight (kg):	BW =	70.0	kg
Averaging time (days): for carcinogenic effects, AT=70 years (25,550 days); for noncarcinogenic effects, AT=ED (in days)	AT =	365	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	**				0.0	0.60	1.43	1.0	N/A	6.4E-03		N/A	-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	1.20E-04	6.7E-03	6.9E-06	1.1E-04	-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	**				0.0	0.37	0.89	1.0	N/A	1.2E-02		N/A	-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		3889%	Y	0%	0.3	1.11	2.66	1.0	2.30E-05	6.6E-02	1.4E-05	2.2E-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		3090%	Y	0%	0.3	0.71	1.71	1.0	1.90E-05	5.8E-02	8.9E-06	1.4E-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		2322%	Y	0%	0.2	0.71	1.71	1.0	1.97E-04	4.2E-02	6.9E-05	1.1E-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	1.5E-02		3.72E-01		807%	Y	0%	0.1	0.29	0.70	1.0	8.60E-05	1.5E-02	1.1E-05	1.7E-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	2.8E-03		7.04E-02	**				0.0	0.36	0.87	1.0	N/A	2.8E-03		N/A	-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	1.80E-05	2.8E-02	4.2E-06	6.7E-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	**	235%	Y	0%	0.0	1.57	3.77	1.0	1.05E-06	3.2E-03	3.7E-08	6.0E-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	**				0.0	0.24	0.59	1.0	N/A	6.1E-03		N/A	-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	4.80E-04	1.1E-02	4.4E-05	7.2E-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	4.00E-05	4.9E-02	1.5E-05	2.4E-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		120%	Y	0%	0.0	0.33	0.80	1.0	5.40E-04	2.1E-03	9.8E-06	1.6E-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	3.5E-03		8.81E-02	**				0.0	0.32	0.76	1.0	N/A	3.5E-03		N/A	-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	**				0.2	0.91	2.18	1.0	N/A	3.3E-02		N/A	-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	1.20E-03	3.1E-02	3.0E-04	4.8E-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		612%	Y	0%	0.0	0.37	0.89	1.0	1.50E-05	1.1E-02	1.4E-06	2.2E-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	2.00E-06	1.2E-02	2.1E-07	3.3E-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	**	309%	Y	0%	0.0	0.24	0.57	1.0	4.20E-04	5.6E-03	2.0E-05	3.2E-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	4.25E-05	4.7E-02	1.5E-05	2.5E-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	1.80E-06	7.7E-03	1.2E-07	1.9E-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	1.36E-05	4.7E-02	5.1E-06	8.2E-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					0.4	0.67	1.60	1.0	N/A	9.2E-02		N/A	-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		4630%	Y	0%	0.4	0.76	1.82	1.0	3.20E-06	9.1E-02	2.2E-06	3.6E-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	*	7628%	Y	0%	0.7	1.06	4.11	1.0	3.10E-06	1.4E-01	3.6E-06	5.8E-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	*	59363%	Y	0%	4.3	2.69	11.67	1.0	1.50E-08	7.0E-01	1.3E-07	2.2E-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	*	91997%	Y	1%	9.7	3.88	17.57	0.6	5.80E-09	1.5E+00	8.1E-08	1.3E-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	*	54409%	Y	0%	5.6	6.82	30.09	0.5	1.40E-12	8.1E-01	1.2E-11	1.9E-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					0.1	14.62	35.09	0.8	N/A	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	*	19090%	Y	0%	1.2	6.65	25.99	0.8	5.58E-07	1.8E-01	1.6E-06	2.6E-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		219%	Y	0%	0.0	0.50	1.21	1.0	1.20E-06	3.7E-03	4.0E-08	6.4E-07	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01		1.21

C.6-3.2 DERMAL ABSORPTION CALCULATION FOR RME 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	4.5E-06	1.1E-04	2.8E-03	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	8.5E-06	2.2E-04	5.6E-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	5.6E-06	1.4E-04	3.7E-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	4.4E-05	1.1E-03	2.8E-02	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	6.8E-06	1.7E-04	4.2E-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	2.7E-06	6.7E-05	1.7E-03	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	2.5E-08	6.0E-07	1.5E-05	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			7.2E-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	9.6E-06	2.4E-04	6.2E-03	99%	2500%	63436%
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		9.8E-06			1.6E-04			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	1.9E-04	4.8E-03	1.2E-01	65%	1632%	41070%
trans-1,2-Dichloroethen	0.166839043	0.067898794	N		NA	1.1E-02	NA		1.4E-06			2.2E-05			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	1.3E-07	3.3E-06	8.2E-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	1.3E-05	3.2E-04	7.9E-03	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		1.5E-05			2.5E-04			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	1.2E-06	1.9E-06	3.0E-06	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	3.2E-06	8.2E-05	2.1E-03	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			3.6E-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	2.2E-06	5.8E-05	1.5E-03	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	7.5E-08	2.2E-06	6.3E-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	4.2E-08	1.3E-06	4.0E-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	6.1E-12	1.9E-10	5.7E-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	9.3E-07	2.6E-05	7.3E-04	682%	19090%	534024%
Acetophenone	0.150043236	0.027414076	N		NA	3.7E-03	NA		4.0E-08			6.4E-07			219%	

C.6-3.3 DERMAL ABSORPTION CALCULATION FOR RME 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 =	125.0	days/yr
Exposure duration (years): for carcinogenic effects, ED = 30 years (used in this spreadsheet); for noncarcinogenic effects, ED = 9 years	ED =	1.0	years
Body weight (kg):	BW =	70.0	kg
Averaging time (days): for carcinogenic effects, AT=70 years (25,550 days); for noncarcinogenic effects, AT=ED (in days)	AT =	365	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	3.7E-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	2.1E-04	-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	1.4E-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					0.3	1.11	2.66	1.0	N/A	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	N/A	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	N/A	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	3.2E-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	4.0E-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	3.7E-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	N/A	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	4.1E-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	2.8E-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		2500%	Y	0%	0.2	0.42	1.01	1.0	2.30E-05	4.9E-02	8.7E-06	1.4E-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					0.0	0.33	0.80	1.0	N/A	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	4.4E-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	3.4E-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	2.1E-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		612%	Y	0%	0.0	0.37	0.89	1.0	2.80E-05	1.1E-02	2.6E-06	4.2E-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	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	**	309%	Y	0%	0.0	0.24	0.57	1.0	6.00E-04	5.6E-03	2.8E-05	4.5E-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	6.5E-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	2.7E-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		2457%	Y	0%	0.2	0.56	1.34	1.0	2.50E-05	4.7E-02	9.3E-06	1.5E-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		4526%	Y	0%	0.4	0.67	1.60	1.0	1.10E-05	9.2E-02	7.5E-06	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					0.4	0.76	1.82	1.0	N/A	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	1.9E-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	*				4.3	2.69	11.67	1.0	N/A	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	N/A	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	1.6E-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					0.1	14.62	35.09	0.8	N/A	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	N/A	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	1.20E+02	1.58E+00	NA	3.7E-03		NA					0.0	0.50	1.21	1.0	N/A	3.7E-03		N/A	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01		1.21

C.6-3.3 DERMAL ABSORPTION CALCULATION FOR RME 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	1.5E-08	3.7E-07	9.2E-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	8.3E-06	2.1E-04	5.1E-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	5.8E-07	1.4E-05	3.6E-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	1.3E-06	3.2E-05	7.9E-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	1.6E-08	4.0E-07	9.8E-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	1.5E-07	3.7E-06	9.4E-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	1.6E-06	4.1E-05	1.0E-03	13%	335%	8364%
cis-1,2-Dichloroethene	0.166839043	0.067898794	N		NA	1.1E-02	NA		1.8E-04			2.8E-03			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	5.5E-06	1.4E-04	3.6E-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	1.8E-06	4.4E-05	1.1E-03	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	1.3E-06	3.4E-05	8.5E-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	8.2E-06	2.1E-04	5.2E-03	65%	1632%	41070%
trans-1,2-Dichloroethen	0.166839043	0.067898794	N		NA	1.1E-02	NA		2.6E-06			4.2E-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	2.8E-06	7.0E-05	1.7E-03	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	1.8E-05	4.5E-04	1.1E-02	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA		4.0E-05			6.5E-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	1.7E-05	2.7E-05	4.2E-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	5.9E-06	1.5E-04	3.8E-03	97%	2457%	62236%
2-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA		7.5E-06			1.2E-04			4526%	
Acenaphthylene	0.298930305	0.143589828	N		NA	9.1E-02	NA									
Phenanthrene	0.341400381	0.159523424	N		5.5E-03	1.4E-01	3.8E+00	4.4E-07	1.2E-05	3.0E-04	7.1E-06	1.9E-04	4.9E-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	5.2E-12	1.6E-10	4.9E-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.6-4 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	hr/event
Event frequency (events/day):	EV =	1	event/day
Exposure frequency (days/year):	EF =	40	days/yr
Exposure duration (years): for carcinogenic effects, ED = 30 years (used in this spreadsheet); for noncarcinogenic effects, ED = 9 years	ED =	1	years
Body weight (kg):	BW =	70	kg
Averaging time (days): for carcinogenic effects, AT=70 years (25,550 days); for noncarcinogenic effects, AT=ED (in days)	AT =	365	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		3889%	Y	0%	0.3	1.11	2.66	1.0	2.30E-05	6.6E-02	1.4E-05	7.0E-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		3090%	Y	0%	0.3	0.71	1.71	1.0	1.90E-05	5.8E-02	8.9E-06	4.6E-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		2322%	Y	0%	0.2	0.71	1.71	1.0	1.97E-04	4.2E-02	6.9E-05	3.6E-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		807%	Y	0%	0.1	0.29	0.70	1.0	8.60E-05	1.5E-02	1.1E-05	5.4E-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	1.80E-05	2.8E-02	4.2E-06	2.1E-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	**	235%	Y	0%	0.0	1.57	3.77	1.0	1.05E-06	3.2E-03	3.7E-08	1.9E-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	**	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	4.00E-05	4.9E-02	1.5E-05	7.8E-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		120%	Y	0%	0.0	0.33	0.80	1.0	5.40E-04	2.1E-03	9.8E-06	5.1E-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	**	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	1.20E-03	3.1E-02	3.0E-04	1.5E-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		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		4630%	Y	0%	0.4	0.76	1.82	1.0	3.20E-06	9.1E-02	2.2E-06	1.2E-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	*	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	*	59363%	Y	0%	4.3	2.69	11.67	1.0	1.50E-08	7.0E-01	1.3E-07	7.0E-07	-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	*	91997%	Y	1%	9.7	3.88	17.57	0.6	1.30E-08	1.5E+00	1.8E-07	9.4E-07	-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	1.40E-12	8.1E-01	1.2E-11	6.0E-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		1930%	Y	0%	0.1	14.62	35.09	0.8	1.40E-08	1.2E-02	4.1E-09	2.1E-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	*	19090%	Y	0%	1.2	6.65	25.99	0.8	5.58E-07	1.8E-01	1.6E-06	8.3E-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	0.00E+00	219%	Y	0%	0.0	0.50	1.21	1.0	1.20E-06	3.7E-03	4.0E-08	2.1E-07	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01		1.21

C.6-4 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	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	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	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	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	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	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	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		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%	
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	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	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	5.9E-09	1.8E-07	5.6E-06	3.0E-08	9.4E-07	2.9E-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	1.6E-10	4.1E-09	1.1E-07	8.2E-10	2.1E-08	5.5E-07	75%	1930%	49991%
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%	

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C.6-4.1 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): for carcinogenic effects, ED = 30 years (used in this spreadsheet) for noncarcinogenic effects, ED = 9 years	ED =	1.0	years
Body weight (kg):	BW =	70.0	kg
Averaging time (days): for carcinogenic effects, AT=70 years (25,550 days) for noncarcinogenic effects, AT=ED (in days)	AT =	365	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	**				0.0	0.60	1.43	1.0	ND	6.4E-03		N/A	-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	**				0.0	0.38	0.92	1.0	ND	6.7E-03		N/A	-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	1.94E-07	1.2E-02	1.9E-08	9.9E-08	-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		2322%	Y	0%	0.2	0.71	1.71	1.0	4.84E-07	4.2E-02	1.7E-07	8.8E-07	-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	3.20E-07	1.5E-02	3.9E-08	2.0E-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	**				0.0	0.36	0.87	1.0	ND	2.8E-03		N/A	-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					0.1	0.46	1.09	1.0	ND	2.8E-02		N/A	-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	**	235%	Y	0%	0.0	1.57	3.77	1.0	1.03E-06	3.2E-03	3.7E-08	1.9E-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	**				0.0	0.24	0.59	1.0	ND	6.1E-03		N/A	-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	2.90E-05	1.1E-02	2.7E-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					0.2	0.42	1.01	1.0	ND	4.9E-02		N/A	-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		120%	Y	0%	0.0	0.33	0.80	1.0	1.40E-05	2.1E-03	2.5E-07	1.3E-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	**				0.0	0.32	0.76	1.0	ND	3.5E-03		N/A	-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	4.18E-07	3.3E-02	1.3E-07	6.5E-07	-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					0.1	0.35	0.84	1.0	ND	3.1E-02		N/A	-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					0.0	0.37	0.89	1.0	ND	1.1E-02		N/A	-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	2.50E-05	1.2E-02	2.6E-06	1.3E-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	2.40E-07	5.6E-03	1.1E-08	5.8E-08	-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					0.2	0.42	1.01	1.0	ND	4.7E-02		N/A	-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					0.0	0.43	1.03	1.0	ND	7.7E-03		N/A	-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	2.70E-06	4.7E-02	1.0E-06	5.2E-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					0.4	0.67	1.60	1.0	ND	9.2E-02		N/A	-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	2.10E-06	1.4E-01	2.4E-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	*	59363%	Y	0%	4.3	2.69	11.67	1.0	1.10E-08	7.0E-01	9.9E-08	5.1E-07	-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	*	91997%	Y	1%	9.7	3.88	17.57	0.6	1.30E-08	1.5E+00	1.8E-07	9.4E-07	-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	*				5.6	6.82	30.09	0.5	ND	8.1E-01		N/A	-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		1930%	Y	0%	0.1	14.62	35.09	0.8	1.40E-08	1.2E-02	4.1E-09	2.1E-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	*				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	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		1.21

C.6-4.1 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									
Dichloroethylene, 1,1-	0.169064925	0.070165502	N		4.7E-04	1.2E-02	2.9E-01	7.7E-10	1.9E-08	4.7E-07	4.0E-09	9.9E-08	2.5E-06	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	6.7E-09	1.7E-07	4.3E-06	3.5E-08	8.8E-07	2.2E-05	92%	2322%	58688%
Benzene	0.159470967	0.079759461	N		5.9E-04	1.5E-02	3.7E-01	1.6E-09	3.9E-08	9.8E-07	8.1E-09	2.0E-07	5.1E-06	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									
Chlorodibromomethane	0.231529970	0.018931933	N		1.3E-04	3.2E-03	7.9E-02	1.5E-09	3.7E-08	8.9E-07	7.8E-09	1.9E-07	4.6E-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		2.7E-06			1.4E-05			612%	
Ethylbenzene	0.231091397	0.122700079	N		1.9E-03	4.9E-02	1.2E+00									
Methyl tert-butyl ether	0.097772373	0.007803496	N		NA	2.1E-03	NA		2.5E-07			1.3E-06			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	5.0E-09	1.3E-07	3.2E-06	2.6E-08	6.5E-07	1.6E-05	79%	1979%	49791%
Toluene	0.200309830	0.106309450	N		1.2E-03	3.1E-02	7.8E-01									
trans-1,2-Dichloroethen	0.166839043	0.067898794	N		NA	1.1E-02	NA									
Trichloroethylene	0.202956499	0.068845207	N		4.7E-04	1.2E-02	2.9E-01	1.0E-07	2.6E-06	6.4E-05	5.4E-07	1.3E-05	3.3E-04	27%	678%	16777%
Vinyl chloride	0.108268842	0.044479224	N		2.2E-04	5.6E-03	1.4E-01	4.5E-10	1.1E-08	2.8E-07	2.3E-09	5.8E-08	1.4E-06	12%	309%	7716%
Xylenes (total)	0.229391367	0.121030668	N		NA	4.7E-02	NA									
p-Cresol	0.164692560	0.054321212	N		4.8E-03	7.7E-03	1.2E-02									
Naphthalene	0.250741977	0.119896713	N		1.8E-03	4.7E-02	1.2E+00	4.0E-08	1.0E-06	2.5E-05	2.1E-07	5.2E-06	1.3E-04	97%	2457%	62236%
2-Methylnaphthalene	0.289334545	0.144200407	N		NA	9.2E-02	NA									
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	9.2E-08	2.4E-06	6.4E-05	4.8E-07	1.3E-05	3.3E-04	290%	7628%	200991%
Benzo-a-pyrene	0.470139236	0.214980766	Y		2.4E-02	7.0E-01	2.0E+01	3.4E-09	9.9E-08	2.9E-06	1.8E-08	5.1E-07	1.5E-05	2042%	59363%	1725935%
Dibenzo(a,h)anthracen	0.526188697	0.242044224	Y		4.9E-02	1.5E+00	4.7E+01	5.9E-09	1.8E-07	5.6E-06	3.0E-08	9.4E-07	2.9E-05	2977%	91997%	2842859%
TCDD	0.546192220	0.217548111	Y		2.7E-02	8.1E-01	2.5E+01									
Dieldrin	0.450508394	0.061646886	N		4.7E-04	1.2E-02	3.2E-01	1.6E-10	4.1E-09	1.1E-07	8.2E-10	2.1E-08	5.5E-07	75%	1930%	49991%
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.6-4.2 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): for carcinogenic effects, ED = 30 years (used in this spreadsheet) for noncarcinogenic effects, ED = 9 years	ED =	1.0	years
Body weight (kg):	BW =	70.0	kg
Averaging time (days): for carcinogenic effects, AT=70 years (25,550 days) for noncarcinogenic effects, AT=ED (in days)	AT =	365	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 =	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/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	**				0.0	0.60	1.43	1.0	ND	6.4E-03									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	1.20E-04	6.7E-03	6.9E-06	N/A	-3.6E+00	2.79E-04	2.79E-07	3.2E-01	3.5E-01		
Dichloroethylene, 1,1-	75354	9.69E+01	2.13E+00	4.69E-04	1.2E-02		2.90E-01	**				0.0	0.37	0.89	1.0	ND	1.2E-02			-3.4E+00	4.36E-04	4.36E-07	3.2E-01	3.5E-01		0.92
Trichlorobenzene, 1,2,4-	120821	1.82E+02	3.98E+00	2.58E-03	6.6E-02		1.70E+00		3889%	Y	0%	0.3	1.11	2.66	1.0	2.30E-05	6.6E-02	1.4E-05	N/A	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Dichlorobenzene, 1,3-	541731	1.47E+02	3.60E+00	2.27E-03	5.8E-02		1.47E+00		3090%	Y	0%	0.3	0.71	1.71	1.0	1.90E-05	5.8E-02	8.9E-06	7.0E-05	-3.8E+00	1.50E-04	1.50E-07	5.6E-01	5.9E-01		2.66
Dichlorobenzene, 1,4-	106467	1.47E+02	3.39E+00	1.66E-03	4.2E-02		1.06E+00		2322%	Y	0%	0.2	0.71	1.71	1.0	1.97E-04	4.2E-02	6.9E-05	4.6E-05	-3.6E+00	2.34E-04	2.34E-07	4.9E-01	5.3E-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	8.60E-05	1.5E-02	1.1E-05	3.6E-04	-3.6E+00	2.34E-04	2.34E-07	4.4E-01	4.7E-01		1.71
Bromomethane	74839	9.50E+01	1.19E+00	1.14E-04	2.8E-03		7.04E-02	**				0.0	0.36	0.87	1.0	ND	2.8E-03		5.4E-05	-3.2E+00	5.71E-04	5.71E-07	3.3E-01	3.7E-01		0.70
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	1.80E-05	2.8E-02	4.2E-06	N/A	-3.3E+00	4.59E-04	4.59E-07	3.1E-01	3.4E-01		0.87
Chlorodibromomethane	124481	2.08E+02	2.23E+00	1.32E-04	3.2E-03		7.86E-02	**	235%	Y	0%	0.0	1.57	3.77	1.0	1.05E-06	3.2E-03	3.7E-08	2.1E-05	-3.4E+00	3.66E-04	3.66E-07	3.8E-01	4.1E-01		1.09
Chloroethane	75003	6.45E+01	1.43E+00	2.43E-04	6.1E-03		1.52E-01	**				0.0	0.24	0.59	1.0	ND	6.1E-03		1.9E-07	-4.0E+00	1.06E-04	1.06E-07	3.1E-01	3.5E-01		3.77
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	4.80E-04	1.1E-02	4.4E-05	N/A	-3.2E+00	6.81E-04	6.81E-07	3.1E-01	3.5E-01		0.59
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	4.00E-05	4.9E-02	1.5E-05	2.3E-04	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
Methyl tert-butyl ether	1634044	8.82E+01	9.40E-01	NA	2.1E-03		NA		120%	Y	0%	0.0	0.33	0.80	1.0	5.40E-04	2.1E-03	9.8E-06	7.8E-05	-3.4E+00	3.97E-04	3.97E-07	4.4E-01	4.7E-01		1.01
Methylene chloride	75092	8.49E+01	1.25E+00	1.42E-04	3.5E-03		8.81E-02	**				0.0	0.32	0.76	1.0	ND	3.5E-03		5.1E-05	-3.3E+00	5.01E-04	5.01E-07	3.1E-01	3.4E-01		0.80
Tetrachlorethylene	127184	1.66E+02	3.40E+00	1.33E-03	3.3E-02		8.41E-01	**				0.2	0.91	2.18	1.0	ND	3.3E-02		N/A	-3.3E+00	5.23E-04	5.23E-07	3.1E-01	3.4E-01		0.76
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	1.20E-03	3.1E-02	3.0E-04	N/A	-3.7E+00	1.84E-04	1.84E-07	4.1E-01	4.5E-01		2.18
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	1.50E-05	1.1E-02	1.4E-06	1.5E-03	-3.3E+00	4.77E-04	4.77E-07	3.8E-01	4.1E-01		0.84
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	2.00E-06	1.2E-02	2.1E-07	7.2E-06	-3.3E+00	4.48E-04	4.48E-07	3.3E-01	3.6E-01		0.89
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	4.20E-04	5.6E-03	2.0E-05	1.1E-06	-3.5E+00	2.87E-04	2.87E-07	3.4E-01	3.7E-01		1.39
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	4.25E-05	4.7E-02	1.5E-05	1.0E-04	-3.2E+00	6.99E-04	6.99E-07	3.1E-01	3.4E-01		0.57
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	1.80E-06	7.7E-03	1.2E-07	8.0E-05	-3.4E+00	3.97E-04	3.97E-07	4.3E-01	4.7E-01		1.01
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	1.36E-05	4.7E-02	5.1E-06	6.2E-07	-3.4E+00	3.87E-04	3.87E-07	3.2E-01	3.5E-01		1.03
2-Methylnaphthalene	91576	1.42E+02	3.86E+00	NA	9.2E-02		NA					0.4	0.67	1.60	1.0	ND	9.2E-02		2.6E-05	-3.5E+00	2.99E-04	2.99E-07	4.4E-01	4.8E-01		1.34
Acenaphthylene	208968	1.52E+02	3.94E+00	NA	9.1E-02		NA		4630%	Y	0%	0.4	0.76	1.82	1.0	3.20E-06	9.1E-02	2.2E-06	N/A	-3.6E+00	2.49E-04	2.49E-07	6.3E-01	6.6E-01		1.60
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	3.10E-06	1.4E-01	3.6E-06	1.2E-05	-3.7E+00	2.19E-04	2.19E-07	6.4E-01	6.6E-01		1.82
Benzo-a-pyrene	50328	2.50E+02	6.10E+00	2.41E-02	7.0E-01		2.04E+01	*	59363%	Y	0%	4.3	2.69	11.67	1.0	1.50E-08	7.0E-01	1.3E-07	1.9E-05	-3.8E+00	1.57E-04	1.57E-07	1.0E+00	9.3E-01	4.11	2.55
Dibenzo(a,h)anthracene	53703	2.78E+02	6.84E+00	4.88E-02	1.5E+00		4.66E+01	*	91997%	Y	1%	9.7	3.88	17.57	0.6	5.80E-09	1.5E+00	8.1E-08	7.0E-07	-4.2E+00	6.19E-05	6.19E-08	1.3E+01	4.3E+00	11.67	6.46
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	1.40E-12	8.1E-01	1.2E-11	4.2E-07	-4.4E+00	4.29E-05	4.29E-08	6.3E+01	9.7E+00	17.57	9.32
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		6.0E-11	-4.6E+00	2.44E-05	2.44E-08	2.2E+01	5.6E+00	30.09	16.37
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	5.58E-07	1.8E-01	1.6E-06	N/A	-4.9E+00	1.14E-05	1.14E-08	3.6E-01	4.0E-01		35.09
Acetophenone	98862	1.20E+02	1.58E+00	NA	3.7E-03		NA		219%	Y	0%	0.0	0.50	1.21	1.0	1.20E-06	3.7E-03	4.0E-08	8.3E-06	-4.6E+00	2.51E-05	2.51E-08	1.8E+00	1.4E+00	25.99	15.96
																			2.1E-07	-3.5E+00	3.32E-04	3.32E-07	3.1E-01	3.4E-01		1.21