



Gannett Fleming

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October 5, 2017
GF Project No. 057524

Ms. Carolyn Daniels, P.G.
Georgia Department of Natural Resources / Environmental Protection Division
Land Protection Branch / Response and Remediation Program
2 Martin Luther King Jr. Drive, SE
Suite 1462, East Town
Atlanta, Georgia 30334-9000

Re: VRP Progress Report #8
Rice Iron & Metals Inc. (Former)
2000 West Savannah Avenue
Valdosta, Lowndes County, Georgia 31603
HSI No. 10923
VRP No. 1348601340

Dear Ms. Daniels:

Gannett Fleming Inc., on behalf of Trademark Metals Recycling, has prepared this Voluntary Remediation Program (VRP) Progress Report #8 pursuant to the Georgia Department of Natural Resources, Environmental Protection Division (EPD) VRP for the above-referenced VRP Property. As recommended by EPD in a July 19, 2017 email, the purpose of this submittal is to present the Risk Reduction Standards/Cleanup Standards and Constituent of Concern/Delineation Standards tables to EPD to review. The tables are attached.

We appreciate the opportunity to work with EPD in moving contamination issues at this VRP Property toward closure. Should you have any questions or need additional information, please contact us at (813) 882-4366.

Sincerely,

GANNETT FLEMING, INC.

Aaron Getchell, CPG, P.G.
Senior Geologist



Anthony Hoffman, P.E.
Senior Engineer

cc: Mr. Joseph Stalker (Trademark Metals Recycling)
Mr. Eric Logsdon (The David J. Joseph Company)
Ms. Shanna Alexander, MS, MPH, DABT (Environmental Protection Division)

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TABLES

Table 1A:
Cumulative Soil Analytical Data
Rice Iron and Metals, Inc. (Former)
2000 West Savannah, Valdosta, Lowndes County, Georgia

Detected Regulated Substance	CAS Number	Units	Type I RRS (mg/Kg)	Area 3-CSS-1	Area 4-CSS-2	Area 5-CSS-4	Area 6-CSS-3	B-5	B-5R	B-5R*	B-6	B-7	B-8	B-9
				3 ft BLS	4 ft BLS	2 ft BLS	12 ft BLS	6-8 ft BLS	0-2 ft BLS	6-8 ft BLS	6-8 ft BLS	6-8 ft BLS	6-8 ft BLS	6-8 ft BLS
				10/6/11	10/6/11	10/6/11	10/6/11	9/17/14	2/16/2017	2/16/2017	9/17/14	9/17/14	9/17/14	9/17/14
VOCs by EPA Method 8260B														
Acetone	67-64-1	mg/Kg	400	NA	NA	NA	NA	NA	ND (0.0074)	ND (0.48)	NA	NA	NA	NA
Benzene	71-43-2	mg/Kg	0.5	NA	NA	NA	ND (0.001)	NA	ND (0.0090)	ND (0.059)	NA	NA	NA	NA
2-Butanone (MEK)	78-93-3	mg/Kg	200	NA	NA	NA	NA	NA	ND (0.0054)	ND (0.35)	NA	NA	NA	NA
Carbon Disulfide	75-15-0	mg/Kg	400	NA	NA	NA	NA	NA	ND (0.0074)	ND (0.049)	NA	NA	NA	NA
cis-1,2-dichloroethene	156-59-2	mg/Kg	400	NA	NA	NA	0.006	ND (0.0007)	ND (0.0010)	ND (0.066)	ND (0.00079)	ND (0.00073)	ND (0.00088)	ND (0.00072)
Ethylbenzene	108-90-7	mg/Kg	70	NA	NA	NA	0.0012 I	NA	ND (0.00074)	ND (0.048)	NA	NA	NA	NA
Isopropylbenzene	98-82-8	mg/Kg	21.88	NA	NA	NA	0.0010 U	NA	ND (0.00074)	ND (0.048)	NA	NA	NA	NA
p-Isopropyltoluene	99-87-6	mg/Kg	NC	NA	NA	NA	ND 0.001)	NA	ND (0.00074)	ND (0.048)	NA	NA	NA	NA
Methylene Chloride	75-09-2	mg/Kg	0.5	NA	NA	NA	ND (0.025)	ND (0.0028)	ND (0.0074)	ND (0.048)	ND (0.0032)	ND (0.0029)	ND (0.0035)	ND (0.0029)
Naphthalene	91-20-3	mg/Kg	60.4	NA	NA	NA	0.0050 U	NA	ND (0.0015)	ND (0.096)	NA	NA	NA	NA
n-Propylbenzene	103-65-1	mg/Kg	NC	NA	NA	NA	ND (0.0010)	NA	ND (0.00074)	ND (0.048)	NA	NA	NA	NA
Styrene	100-42-5	mg/Kg	14	NA	NA	NA	0.0010 U	NA	ND (0.00074)	ND (0.048)	NA	NA	NA	NA
Tetrachloroethylene	127-18-4	mg/Kg	0.5	NA	NA	NA	0.0010 U	0.0175	0.146	2.11	ND (0.001)	0.0026 J	0.0039 J	ND (0.00091)
Toluene	108-88-3	mg/Kg	100	NA	NA	NA	0.0010 U	NA	ND (0.00074)	ND (0.048)	NA	NA	NA	NA
Trichloroethylene	79-01-6	mg/Kg	0.5	NA	NA	NA	0.001 I	ND (0.00072)	0.0051	ND (0.048)	ND (0.00081)	ND (0.00074)	ND (0.00089)	ND (0.00073)
1,2,4-Trimethylbenzene	95-63-6	mg/Kg	NC	NA	NA	NA	0.0010 U	NA	ND (0.00074)	ND (0.048)	NA	NA	NA	NA
1,3,5-Trimethylbenzene	108-67-8	mg/Kg	NC	NA	NA	NA	0.0010 U	NA	ND (0.00074)	ND (0.048)	NA	NA	NA	NA
m,p-Xylene	108-38-3/106-42-3	mg/Kg	1000	NA	NA	NA	0.0020 U	NA	ND (0.00081)	ND (0.053)	NA	NA	NA	NA
o-Xylene	95-47-6	mg/Kg	1000	NA	NA	NA	0.0010 I	NA	ND (0.00074)	ND (0.048)	NA	NA	NA	NA
Acrolein	107-02-8	mg/Kg	0.0628	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	107-31-1	mg/Kg	1.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloroethyl Vinyl Ether	110-75-8	mg/Kg	NC	NA	NA	NA	NA	ND (0.00070)	NA	NA	ND (0.0079)	ND (0.0073)	ND (0.0088)	ND (0.0072)
o-Chlorotoluene	95-49-8	mg/Kg	NC	NA	NA	NA	NA	NA	ND (0.00074)	ND (0.048)	NA	NA	NA	NA
p-Chlorotoluene	106-43-4	mg/Kg	NC	NA	NA	NA	NA	NA	ND (0.00074)	ND (0.048)	NA	NA	NA	NA
Dichlorodifluoromethane	75-71-8	mg/Kg	0.0803	NA	NA	NA	ND (0.0010)	ND (0.00089)	ND (0.0015)	ND (0.096)	ND (0.0010)	ND (0.00092)	ND (0.0011)	ND (0.00091)
Vinyl Chloride	75-01-4	mg/Kg	0.2	NA	NA	NA	ND (0.0010)	ND (0.00072)	ND (0.00074)	ND (0.048)	ND (0.00081)	ND (0.00074)	ND (0.00089)	ND (0.00073)
Vinyl Acetate	108-05-4	mg/Kg	0.51	NA	NA	NA	NA	NA	ND (0.012)	ND (0.79)	NA	NA	NA	NA
Chloroethane	75-00-3	mg/Kg	0.17	NA	NA	NA	ND (0.0050)	ND (0.0016)	ND (0.0015)	ND (0.096)	ND (0.0018)	ND (0.0016)	ND (0.0020)	ND (0.0016)
Trichlorofluoromethane	75-69-4	mg/Kg	200	NA	NA	NA	ND (0.0010)	ND (0.00070)	ND (0.0015)	ND (0.096)	ND (0.00079)	ND (0.00073)	ND (0.00088)	ND (0.00072)
1,1-Dichloroethene	75-35-4	mg/Kg	0.7	NA	NA	NA	ND (0.0010)	ND (0.00070)	ND (0.0074)	ND (0.048)	ND (0.00079)	ND (0.00073)	ND (0.00088)	ND (0.00072)
Methyl Bromide (Bromomethane)	74-83-9	mg/Kg	0.8	NA	NA	NA	ND (0.0010)	ND (0.0013)	ND (0.0015)	ND (0.096)	ND (0.0015)	ND (0.0014)	ND (0.0016)	ND (0.0013)
Methyl Chloride (Chloromethane)	74-87-3	mg/Kg	0.04	NA	NA	NA	ND (0.0050)	ND (0.0014)	ND (0.0015)	ND (0.096)	ND (0.0016)	ND (0.0015)	ND (0.0018)	ND (0.0014)
Methylene Bromide (Dibromomethane)	74-95-3	mg/Kg	1000	NA	NA	NA	ND (0.0010)	NA	ND (0.00074)	ND (0.048)	NA	NA	NA	NA
Methylene Chloride (Dichloromethane)	75-09-2	mg/Kg	0.08	NA	NA	NA	ND (0.0250)	ND (0.0028)	0.0032 J	0.286 J	ND (0.0032)	ND (0.0029)	ND (0.0035)	ND (0.0029)
4-Methyl-2-pentanone (MIBK)	108-10-1	mg/Kg	3.3	NA	NA	NA	NA	NA	ND (0.0055)	ND (0.36)	NA	NA	NA	NA
Trans-1,2-Dichloroethene	156-60-5	mg/Kg	10	NA	NA	NA	ND (0.0010)	ND (0.00094)	ND (0.00074)	ND (0.048)	ND (0.0011)	ND (0.00097)	ND (0.0012)	ND (0.00097)
Methyl tert-Butyl Ether	1634-04-4	mg/Kg	NC	NA	NA	NA	ND (0.0010)	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	75-34-3	mg/Kg	240	NA	NA	NA	ND (0.0010)	ND (0.00070)	ND (0.0013)	ND (0.085)	ND (0.00079)	ND (0.00073)	ND (0.00088)	ND (0.00072)
Cis-1,2-Dichloroethane	156-59-2	mg/Kg	7	NA	NA	NA	0.0060	ND (0.00070)	ND (0.0010)	ND (0.066)	ND (0.00079)	ND (0.00073)	ND (0.00088)	ND (0.00072)
2,2-Dichloropropane	594-20-7	mg/Kg	NC	NA	NA	NA	ND (0.0010)	NA	NA	NA	NA	NA	NA	NA
Bromochloromethane	74-97-5	mg/Kg	NC	NA	NA	NA	ND (0.0010)	NA	ND (0.0011)	ND (0.071)	NA	NA	NA	NA
Chloroform	67-66-3	mg/Kg	3.85	NA	NA	NA	ND (0.0010)	ND (0.00079)	ND (0.00098)	ND (0.064)	ND (0.00090)	ND (0.00082)	ND (0.00099)	ND (0.00081)
Carbon Tetrachloride	56-23-5	mg/Kg	0.5	NA	NA	NA	ND (0.0010)	ND (0.00098)	ND (0.00075)	ND (0.049)	ND (0.0011)	ND (0.0010)	ND (0.0012)	ND (0.0010)
1,1,1-Trichloroethane	71-55-6	mg/Kg	20	NA	NA	NA	ND (0.0010)	ND (0.00070)	ND (0.00074)	ND (0.048)	ND (0.00079)	ND (0.00073)	ND (0.00088)	ND (0.00072)
1,1-Dichloropropene	563-58-6	mg/Kg	NC	NA	NA	NA	ND (0.0010)	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	107-06-2	mg/Kg	0.5	NA	NA	NA	ND (0.0010)	ND (0.00070)	ND (0.00074)	ND (0.048)	ND (0.00079)	ND (0.00073)	ND (0.00088)	ND (0.00072)
1,2-Dichloropropane	78-87-5	mg/Kg	0.5	NA	NA	NA	ND (0.0010)	ND (0.00070)	ND (0.00074)	ND (0.048)	ND (0.00079)	ND (0.00073)	ND (0.00088)	ND (0.00072)
Bromodichloromethane	75-27-4	mg/Kg	1.18	NA	NA	NA	ND (0.0010)	ND (0.00070)	ND (0.00074)	ND (0.048)	ND (0.00079)	ND (0.00073)	ND (0.00088)	ND (0.00072)
Cis-1,3-Dichloropropene	10061-01-5	mg/Kg	NC	NA	NA	NA	ND (0.0010)	ND (0.00070)	ND (0.00074)	ND (0.048)	ND (0.00079)	ND (0.00073)	ND (0.00088)	ND (0.00072)
Trans-1,3-Dichloropropene	547-75-6	mg/Kg	NC	NA	NA	NA	ND (0.0010)	ND (0.00070)	ND (0.00074)	ND (0.048)	ND (0.00079)	ND (0.00073)	ND (0.00088)	ND (0.00072)
1,1,2-Trichloroethane	79-00-5	mg/Kg	0.5	NA	NA	NA	ND (0.0010)	ND (0.0011)	ND (0.00074)	ND (0.048)	ND (0.0013)	ND (0.0012)	ND (0.0014)	ND (0.0012)
Dibromochloromethane	124-48-1	mg/Kg	1.63	NA	NA	NA	ND (0.0010)	ND (0.00070)	ND (0.00074)	ND (0.048)	ND (0.00079)	ND (0.00073)	ND (0.00088)	ND (0.00072)
1,3-Dichloropropane	142-28-9	mg/Kg	1000	NA	NA	NA	ND (0.0010)	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromomethane (EDB)	106-93-4	mg/Kg	0.01	NA	NA	NA	ND (0.0010)	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	108-90-7	mg/Kg	4.18	NA	NA	NA	ND (0.0010)	ND (0.00070)	ND (0.00074)	ND (0.048)	ND (0.00079)	ND (0.00073)	ND (0.00088)	ND (0.00072)
1,1,1,2-Tetrachloroethane	630-20-6	mg/Kg	7	NA	NA	NA	ND (0.0010)	NA	NA	NA	NA	NA	NA	NA
Bromoform	75-25-2	mg/Kg	80	NA	NA	NA	ND (0.0010)	ND (0.00076)	ND (0.00074)	ND (0.048)	ND (0.00086)	ND (0.00079)	ND (0.00095)	ND (0.00078)
Bromobenzene	108-86-1	mg/Kg	NC	NA	NA	NA	ND (0.0010)	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	79-34-5	mg/Kg	0.13	NA	NA	NA	ND (0.0010)	ND (0.00099)	ND (0.00074)	ND (0.048)	ND (0.0011)	ND (0.0010)	ND (0.0012)	ND (0.0010)
2-Chlorotoluene	95-49-8	mg/Kg	NC	NA	NA	NA	ND (0.0010)	NA	NA	NA	NA	NA	NA	NA
1,2,3-Trichloropropane	96-18-4	mg/Kg	0.478	NA	NA	NA	ND (0.0010)	NA	NA	NA	NA	NA	NA	NA
4-Chlorotoluene	106-43-4-													

Table 1A:
Cumulative Soil Analytical Data
Rice Iron and Metals, Inc. (Former)
2000 West Savannah, Valdosta, Lowndes County, Georgia

Detected Regulated Substance	CAS Number	Units	Type I RRS (mg/Kg)	B-10	B-11	SB-1	SB-1	SB-1	SB-1	SB-2	SB-2	SB-2	SB-2	SB-3	SB-3
				6-8 ft BLS 2/16/2017	6-8 ft BLS 2/16/2017	0-2 ft BLS 4/14/15	0-2 ft BLS 10/21/15	2-4 ft BLS 10/21/15	4-6 ft BLS 7/26/2016	0-2 ft BLS 4/14/15	0-2 ft BLS 10/21/15	2-4 ft BLS 10/21/15	0-2 ft BLS 7/26/2016	0-2 ft BLS 4/14/15	0-2 ft BLS 10/21/15
VOCs by EPA Method 8260B															
Acetone	67-64-1	mg/Kg	400	NA	NA	NA	ND (0.012)	ND (0.0095)	0.0175 J	NA	ND (0.011)	ND (0.011)	ND (0.0081)	NA	ND (0.013)
Benzene	71-43-2	mg/Kg	0.5	NA	NA	NA	ND (0.00077)	ND (0.00063)	0.0098	NA	ND (0.00074)	ND (0.00067)	ND (0.0010)	NA	ND (0.00084)
2-Butanone (MEK)	78-93-3	mg/Kg	200	NA	NA	NA	ND (0.00065)	ND (0.0054)	ND (0.0064)	NA	ND (0.00063)	ND (0.0057)	ND (0.0072)	NA	ND (0.0071)
Carbon Disulfide	75-15-0	mg/Kg	400	NA	NA	NA	ND (0.0011)	ND (0.00093)	ND (0.00071)	NA	ND (0.0011)	ND (0.00098)	ND (0.00080)	NA	ND (0.0012)
cis-1,2-dichloroethene	156-59-2	mg/Kg	400	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00085)	NA	ND (0.00074)	ND (0.00067)	ND (0.00095)	NA	ND (0.00084)
Ethylbenzene	106-90-7	mg/Kg	70	NA	NA	NA	ND (0.00077)	ND (0.00063)	0.0034 J	NA	ND (0.00074)	ND (0.00067)	ND (0.00087)	NA	ND (0.00084)
Isopropylbenzene	98-82-8	mg/Kg	21.88	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.0010)	NA	ND (0.00074)	ND (0.00067)	ND (0.0011)	NA	ND (0.00084)
p-Isopropyltoluene	99-87-6	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
Methylene Chloride	75-09-2	mg/Kg	0.5	NA	NA	NA	ND (0.0031)	ND (0.0025)	ND (0.0028)	NA	ND (0.003)	ND (0.0027)	ND (0.0032)	NA	ND (0.0034)
Naphthalene	91-20-3	mg/Kg	60.4	NA	NA	NA	ND (0.0015)	ND (0.0013)	ND (0.0014)	NA	ND (0.0015)	ND (0.0013)	ND (0.0016)	NA	ND (0.0017)
n-Propylbenzene	123-65-1	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00088)	NA	ND (0.00074)	ND (0.00067)	ND (0.00099)	NA	ND (0.00084)
Styrene	100-42-5	mg/Kg	14	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
Tetrachloroethylene	127-18-4	mg/Kg	0.5	NA	NA	NA	ND (0.0013)	ND (0.0011)	ND (0.00093)	NA	ND (0.0012)	ND (0.0011)	ND (0.0010)	NA	ND (0.0014)
Toluene	108-88-3	mg/Kg	100	NA	NA	NA	ND (0.00077)	ND (0.00063)	0.046	NA	ND (0.00074)	ND (0.00067)	ND (0.00090)	NA	ND (0.00084)
Trichloroethylene	79-01-6	mg/Kg	0.5	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00083)	NA	ND (0.00074)	ND (0.00067)	ND (0.00093)	NA	ND (0.00084)
1,2,4-Trimethylbenzene	95-63-6	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	0.0017 J	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
1,3,5-Trimethylbenzene	108-67-8	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
m,p-Xylene	108-38-3/106-42-3	mg/Kg	1000	NA	NA	NA	ND (0.00082)	ND (0.00086)	0.0178	NA	ND (0.00079)	ND (0.00072)	ND (0.0014)	NA	ND (0.0009)
p-Xylene	95-47-6	mg/Kg	1000	NA	NA	NA	ND (0.00077)	ND (0.00063)	0.0136	NA	ND (0.00074)	ND (0.00067)	ND (0.00087)	NA	ND (0.00084)
Acrolein	107-02-8	mg/Kg	0.0628	NA	NA	NA	ND (0.0010)	ND (0.0085)	NA	NA	ND (0.0009)	ND (0.0090)	NA	NA	ND (0.011)
Acrylonitrile	107-31-1	mg/Kg	1.37	NA	NA	NA	ND (0.0054)	ND (0.0044)	NA	NA	ND (0.0052)	ND (0.0047)	NA	NA	ND (0.0059)
2-Chloroethyl Vinyl Ether	110-75-8	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	NA	NA	ND (0.00074)	ND (0.00067)	NA	NA	ND (0.0084)
o-Chlorotoluene	95-49-8	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
p-Chlorotoluene	106-43-4	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
Dichlorodifluoromethane	75-71-8	mg/Kg	0.0803	NA	NA	NA	ND (0.0011)	ND (0.00086)	ND (0.0018)	NA	ND (0.0010)	ND (0.00092)	ND (0.0020)	NA	ND (0.0012)
Vinyl Chloride	75-01-4	mg/Kg	0.2	NA	NA	NA	ND (0.0012)	ND (0.0010)	ND (0.0012)	NA	ND (0.0012)	ND (0.0011)	ND (0.0013)	NA	ND (0.0014)
Vinyl Acetate	108-95-4	mg/Kg	0.51	NA	NA	NA	ND (0.0091)	ND (0.0015)	ND (0.0086)	NA	ND (0.0089)	ND (0.0080)	ND (0.0074)	NA	ND (0.010)
Chloroethane	75-00-3	mg/Kg	0.17	NA	NA	NA	ND (0.0015)	ND (0.0013)	ND (0.0014)	NA	ND (0.00074)	ND (0.0013)	ND (0.0016)	NA	ND (0.0017)
Trichlorofluoromethane	75-69-4	mg/Kg	200	NA	NA	NA	ND (0.0013)	ND (0.0011)	ND (0.0013)	NA	ND (0.0013)	ND (0.0012)	ND (0.0015)	NA	ND (0.0015)
1,1-Dichloroethene	75-35-4	mg/Kg	0.7	NA	NA	NA	ND (0.0010)	ND (0.00083)	ND (0.0012)	NA	ND (0.00097)	ND (0.00088)	ND (0.00080)	NA	ND (0.00084)
Methyl Bromide (Bromomethane)	74-83-9	mg/Kg	0.8	NA	NA	NA	ND (0.0017)	ND (0.0014)	ND (0.0016)	NA	ND (0.0016)	ND (0.0015)	ND (0.0018)	NA	ND (0.0018)
Methyl Chloride (Chloromethane)	74-87-3	mg/Kg	0.04	NA	NA	NA	ND (0.0015)	ND (0.0013)	ND (0.0017)	NA	ND (0.0015)	ND (0.0013)	ND (0.0019)	NA	ND (0.0017)
Methylene Bromide (Dibromomethane)	74-95-3	mg/Kg	1000	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.0013)	NA	ND (0.00074)	ND (0.00067)	ND (0.0014)	NA	ND (0.00084)
Methylene Chloride (Dichloromethane)	75-09-2	mg/Kg	0.08	NA	NA	NA	ND (0.0031)	ND (0.0025)	ND (0.0028)	NA	ND (0.0030)	ND (0.0027)	ND (0.0032)	NA	ND (0.0034)
4-Methyl-2-pentanone (MIBK)	108-10-1	mg/Kg	3.3	NA	NA	NA	ND (0.0041)	ND (0.0034)	ND (0.0076)	NA	ND (0.0039)	ND (0.0036)	ND (0.0085)	NA	ND (0.0045)
Trans-1,2-Dichloroethene	156-60-5	mg/Kg	10	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.0011)	NA	ND (0.00074)	ND (0.00067)	ND (0.0012)	NA	ND (0.00084)
Methyl tert-Butyl Ether	1634-04-4	mg/Kg	NC	NA	NA	NA	ND (0.00092)	ND (0.00076)	ND (0.00079)	NA	ND (0.00089)	ND (0.00080)	ND (0.0085)	NA	ND (0.0010)
1,1-Dichloroethane	75-34-3	mg/Kg	240	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.0012)	NA	ND (0.00074)	ND (0.00067)	ND (0.0013)	NA	ND (0.00084)
Cis-1,2-Dichloroethene	156-59-2	mg/Kg	7	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00085)	NA	ND (0.00074)	ND (0.00067)	ND (0.00095)	NA	ND (0.00084)
2,2-Dichloropropane	594-20-7	mg/Kg	NC	NA	NA	NA	ND (0.00085)	ND (0.00070)	ND (0.00071)	NA	ND (0.00082)	ND (0.00074)	ND (0.00080)	NA	ND (0.00093)
Bromochloromethane	74-97-5	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00079)	NA	ND (0.00074)	ND (0.00067)	ND (0.00088)	NA	ND (0.00084)
Chloroform	67-66-3	mg/Kg	3.85	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00086)	NA	ND (0.00074)	ND (0.00067)	ND (0.00097)	NA	ND (0.00084)
Carbon Tetrachloride	56-23-5	mg/Kg	0.5	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.0013)	NA	ND (0.00074)	ND (0.00067)	ND (0.0014)	NA	ND (0.00084)
1,1,1-Trichloroethane	71-55-6	mg/Kg	20	NA	NA	NA	ND (0.0010)	ND (0.00083)	ND (0.00071)	NA	ND (0.00097)	ND (0.00088)	ND (0.00080)	NA	ND (0.0011)
1,1-Dichloropropene	563-58-6	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00091)	NA	ND (0.00074)	ND (0.00067)	ND (0.0010)	NA	ND (0.00084)
1,2-Dichloroethane	107-06-2	mg/Kg	0.5	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
1,2-Dichloropropane	78-87-5	mg/Kg	0.5	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.0011)	NA	ND (0.00074)	ND (0.00067)	ND (0.0013)	NA	ND (0.00084)
Bromodichloromethane	75-27-4	mg/Kg	1.18	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
Cis-1,3-Dichloropropene	10061-01-5	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.0013)	NA	ND (0.00074)	ND (0.00067)	ND (0.0015)	NA	ND (0.00084)
Trans-1,3-Dichloropropene	547-75-6	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
1,1,2-Trichloroethane	79-00-5	mg/Kg	0.5	NA	NA	NA	ND (0.00097)	ND (0.00080)	ND (0.0013)	NA	ND (0.00093)	ND (0.00084)	ND (0.0014)	NA	ND (0.0014)
Dibromochloromethane	124-48-1	mg/Kg	1.63	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
1,3-Dichloropropane	142-28-9	mg/Kg	1000	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
1,2-Dibromomethane (EDB)	106-93-4	mg/Kg	0.01	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
Chlorobenzene	108-90-7	mg/Kg	4.18	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
1,1,1,2-Tetrachloroethane	630-20-6	mg/Kg	7	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00079)	NA	ND (0.00074)	ND (0.00067)	ND (0.00085)	NA	ND (0.00084)
Bromoform	75-25-2	mg/Kg	80	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
Bromobenzene	108-86-1	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00086)	NA	ND (0.00074)	ND (0.00067)	ND (0.00097)	NA	ND (0.00084)
1,1,2,2-Tetrachloroethane	79-34-5	mg/Kg	0.13	NA	NA	NA	ND (0.00085)	ND (0.00070)	ND (0.0016)	NA	ND (0.00082)	ND (0.00074)	ND (0.0018)	NA	ND (0.00093)
2-Chlorotoluene	95-49-8	mg/Kg	NC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3-Trichloropropane	96-18-4	mg/Kg	0.478	NA	NA	NA	ND (0.0011)	ND (0.00086)	ND (0.0012)	NA	ND (0.0010)	ND (0.00092)	ND (0.0013)	NA	ND (0.0012)
4-Chlorotoluene	106-43-4	mg/Kg	NC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	98-06-6	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
1,2,4-Trimethylbenzene	95-63-6	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	0.00071 J	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
sec-Butylbenzene	135-98-8	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
1,3-Dichlorobenzene	541-73-1	mg/Kg	60	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
1,4-Dichlorobenzene	106-46-7	mg/Kg	7.5	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00072)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
n-Butylbenzene	104-51-8	mg/Kg	NC	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
1,2-Dichlorobenzene	95-50-1	mg/Kg	60	NA	NA	NA	ND (0.00077)	ND (0.00063)	ND (0.00071)	NA	ND (0.00074)	ND (0.00067)	ND (0.00080)	NA	ND (0.00084)
1,2-Dibromo-3-Chloropropane	96-12-8	mg/Kg	NC	NA	NA	NA	ND (0.0011)	ND (0.00088)							

Table 1A:
Cumulative Soil Analytical Data
Rice Iron and Metals, Inc. (Former)
2000 West Savannah, Valdosta, Lowndes County, Georgia

Detected Regulated Substance	CAS Number	Units	Type I RRS (mg/Kg)	SB-3	SB-3	SB-4	SB-4	SB-4	SB-4	SB-5	SB-5	SB-5	SBFP-1	SBFP-2	SBFP-3
				2-4 ft BLS 10/21/15	0-2 ft BLS 7/26/2016	0-2 ft BLS 4/14/15	0-2 ft BLS 10/21/15	2-4 ft BLS 10/21/15	2-4 ft BLS 7/26/2016	0-2 ft BLS 4/14/15	0-2 ft BLS 10/21/15	0-2 ft BLS 7/26/2016	0-2 ft BLS 7/28/2017	0-2 ft BLS 7/28/2017	0-2 ft BLS 7/28/2017
VOCs by EPA Method 8260B															
Acetone	67-64-1	mg/Kg	400	ND (0.01)	0.18	NA	ND (0.011)	ND (0.011)	0.119	NA	NA	ND (0.0082)	NA	NA	NA
Benzene	71-43-2	mg/Kg	0.5	ND (0.0068)	ND (0.0016)	NA	ND (0.00071)	ND (0.00073)	ND (0.0011)	NA	NA	0.0102	NA	NA	NA
2-Butanone (MEK)	78-93-3	mg/Kg	200	ND (0.0058)	0.0267 J	NA	ND (0.006)	ND (0.0062)	0.0141 J	NA	NA	ND (0.0073)	NA	NA	NA
Carbon Disulfide	75-15-0	mg/Kg	400	ND (0.001)	0.0227	NA	ND (0.001)	ND (0.0011)	0.0013 J	NA	NA	ND (0.0080)	NA	NA	NA
cis-1,2-dichloroethene	156-59-2	mg/Kg	400	ND (0.0068)	ND (0.0075)	NA	ND (0.00071)	ND (0.00073)	ND (0.0011)	NA	NA	ND (0.0096)	NA	NA	NA
Ethylbenzene	106-60-7	mg/Kg	70	ND (0.0068)	0.0169	NA	ND (0.00071)	ND (0.00073)	0.0023 J	NA	NA	0.133 J	NA	NA	NA
Isopropylbenzene	98-82-8	mg/Kg	21.88	ND (0.0068)	0.0058 J	NA	ND (0.00071)	ND (0.00073)	ND (0.0013)	NA	NA	ND (0.0011)	NA	NA	NA
p-Isopropyltoluene	99-87-6	mg/Kg	NC	ND (0.0068)	0.0194	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
Methylene Chloride	75-09-2	mg/Kg	0.5	ND (0.0027)	0.0197 B a	NA	ND (0.0029)	ND (0.0029)	0.0054 JB a	NA	NA	ND (0.0032)	NA	NA	NA
Naphthalene	91-20-3	mg/Kg	60.4	ND (0.0014)	0.0065	NA	ND (0.0014)	ND (0.0015)	0.0026 J	NA	NA	ND (0.0016)	NA	NA	NA
n-Propylbenzene	123-65-1	mg/Kg	NC	ND (0.0068)	0.0026 J	NA	ND (0.00071)	ND (0.00073)	ND (0.0011)	NA	NA	ND (0.0099)	NA	NA	NA
Styrene	100-42-5	mg/Kg	14	ND (0.0068)	0.0106	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
Tetrachloroethylene	127-18-4	mg/Kg	0.5	ND (0.0011)	ND (0.0017)	NA	ND (0.0012)	ND (0.0012)	ND (0.0012)	NA	NA	ND (0.0010)	NA	NA	NA
Toluene	108-88-3	mg/Kg	100	ND (0.0068)	0.0053 J	NA	ND (0.00071)	ND (0.00073)	0.0011 J	NA	NA	0.0049	NA	NA	NA
Trichloroethylene	79-01-6	mg/Kg	0.5	ND (0.0068)	ND (0.0015)	NA	ND (0.00071)	ND (0.00073)	ND (0.0011)	NA	NA	ND (0.0094)	NA	NA	NA
1,2,4-Trimethylbenzene	95-63-6	mg/Kg	NC	ND (0.0068)	0.0176	NA	ND (0.00071)	ND (0.00073)	0.0043 J	NA	NA	ND (0.0080)	NA	NA	NA
1,3,5-Trimethylbenzene	108-67-8	mg/Kg	NC	ND (0.0068)	0.0062 J	NA	ND (0.00071)	ND (0.00073)	0.0012 J	NA	NA	0.0014 J	NA	NA	NA
m,p-Xylene	108-38-3/106-42-3	mg/Kg	1000	ND (0.00073)	0.0099 J	NA	ND (0.00078)	ND (0.00078)	0.0019 J	NA	NA	0.699	NA	NA	NA
p-Xylene	95-47-6	mg/Kg	1000	ND (0.0068)	0.0078	NA	ND (0.00071)	ND (0.00073)	0.0015 J	NA	NA	0.425	NA	NA	NA
Acrolein	107-02-8	mg/Kg	0.0628	ND (0.0092)	NA	NA	ND (0.0095)	ND (0.0098)	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	107-31-1	mg/Kg	1.37	ND (0.0048)	NA	NA	ND (0.0050)	ND (0.0051)	NA	NA	NA	NA	NA	NA	NA
2-Chloroethyl Vinyl Ether	110-75-8	mg/Kg	NC	ND (0.0068)	NA	NA	ND (0.0071)	ND (0.0073)	NA	NA	NA	NA	NA	NA	NA
o-Chlorotoluene	95-49-8	mg/Kg	NC	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
p-Chlorotoluene	106-43-4	mg/Kg	NC	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
Dichlorodifluoromethane	75-71-8	mg/Kg	0.0803	ND (0.0094)	ND (0.0031)	NA	ND (0.0098)	ND (0.0010)	ND (0.0023)	NA	NA	ND (0.0020)	NA	NA	NA
Vinyl Chloride	75-01-4	mg/Kg	0.2	ND (0.0011)	ND (0.0021)	NA	ND (0.0011)	ND (0.0012)	ND (0.0015)	NA	NA	ND (0.00130)	NA	NA	NA
Vinyl Acetate	108-95-4	mg/Kg	0.51	ND (0.0081)	ND (0.012)	NA	ND (0.0085)	ND (0.0087)	ND (0.0088)	NA	NA	ND (0.0075)	NA	NA	NA
Chloroethane	75-00-3	mg/Kg	0.17	ND (0.0014)	ND (0.0025)	NA	ND (0.0014)	ND (0.0015)	ND (0.0018)	NA	NA	ND (0.0016)	NA	NA	NA
Trichlorofluoromethane	75-69-4	mg/Kg	200	ND (0.0012)	ND (0.0024)	NA	ND (0.0012)	ND (0.0013)	ND (0.0017)	NA	NA	ND (0.0015)	NA	NA	NA
1,1-Dichloroethene	75-35-4	mg/Kg	0.7	ND (0.0090)	ND (0.0013)	NA	ND (0.00094)	ND (0.00096)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
Methyl Bromide (Bromomethane)	74-83-9	mg/Kg	0.8	ND (0.0015)	ND (0.0033)	NA	ND (0.0015)	ND (0.0016)	ND (0.0023)	NA	NA	ND (0.0021)	NA	NA	NA
Methyl Chloride (Chloromethane)	74-87-3	mg/Kg	0.04	ND (0.0014)	ND (0.0030)	NA	ND (0.0014)	ND (0.0015)	ND (0.0022)	NA	NA	ND (0.0019)	NA	NA	NA
Methylene Bromide (Dibromomethane)	74-95-3	mg/Kg	1000	ND (0.0068)	ND (0.0023)	NA	ND (0.00071)	ND (0.00073)	ND (0.0017)	NA	NA	ND (0.0015)	NA	NA	NA
Methylene Chloride (Dichloromethane)	75-09-2	mg/Kg	0.08	ND (0.0027)	0.0197 B	NA	ND (0.0029)	ND (0.0029)	0.0054	NA	NA	ND (0.0032)	NA	NA	NA
4-Methyl-2-pentanone (MIBK)	108-10-1	mg/Kg	3.3	ND (0.0037)	ND (0.0014)	NA	ND (0.0038)	ND (0.0039)	ND (0.0097)	NA	NA	ND (0.0086)	NA	NA	NA
Trans-1,2-Dichloroethene	156-60-5	mg/Kg	10	ND (0.0068)	ND (0.0019)	NA	ND (0.00071)	ND (0.00073)	ND (0.0014)	NA	NA	ND (0.0012)	NA	NA	NA
Methyl tert-Butyl Ether	1634-04-4	mg/Kg	NC	ND (0.0082)	ND (0.0014)	NA	ND (0.00086)	ND (0.00088)	ND (0.0010)	NA	NA	ND (0.0089)	NA	NA	NA
1,1-Dichloroethane	75-34-3	mg/Kg	240	ND (0.0068)	ND (0.0021)	NA	ND (0.00071)	ND (0.00073)	ND (0.0015)	NA	NA	ND (0.0013)	NA	NA	NA
Cis-1,2-Dichloroethene	156-59-2	mg/Kg	7	ND (0.0068)	ND (0.0015)	NA	ND (0.00071)	ND (0.00073)	ND (0.0011)	NA	NA	ND (0.0096)	NA	NA	NA
2,2-Dichloropropane	594-20-7	mg/Kg	NC	ND (0.0076)	ND (0.0013)	NA	ND (0.00079)	ND (0.00081)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
Bromochloromethane	74-97-5	mg/Kg	NC	ND (0.0068)	ND (0.0014)	NA	ND (0.00071)	ND (0.00073)	ND (0.0010)	NA	NA	ND (0.0089)	NA	NA	NA
Chloroform	67-66-3	mg/Kg	3.85	ND (0.0068)	ND (0.0015)	NA	ND (0.00071)	ND (0.00073)	ND (0.0011)	NA	NA	ND (0.0098)	NA	NA	NA
Carbon Tetrachloride	56-23-5	mg/Kg	0.5	ND (0.0068)	ND (0.0023)	NA	ND (0.00071)	ND (0.00073)	ND (0.0016)	NA	NA	ND (0.0014)	NA	NA	NA
1,1,1-Trichloroethane	71-55-6	mg/Kg	20	ND (0.0090)	ND (0.0013)	NA	ND (0.00093)	ND (0.00096)	ND (0.00091)	NA	NA	ND (1.00080)	NA	NA	NA
1,1-Dichloropropene	563-58-6	mg/Kg	NC	ND (0.0068)	ND (0.0016)	NA	ND (0.00071)	ND (0.00073)	ND (0.0012)	NA	NA	ND (0.0010)	NA	NA	NA
1,2-Dichloroethane	107-06-2	mg/Kg	0.5	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
1,2-Dichloropropane	78-87-5	mg/Kg	0.5	ND (0.0068)	ND (0.0020)	NA	ND (0.00071)	ND (0.00073)	ND (0.0014)	NA	NA	ND (0.0013)	NA	NA	NA
Bromodichloromethane	75-27-4	mg/Kg	1.18	ND (0.0068)	ND (0.0063)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
Cis-1,3-Dichloropropene	10061-01-5	mg/Kg	NC	ND (0.0068)	ND (0.0024)	NA	ND (0.00071)	ND (0.00073)	ND (0.0017)	NA	NA	ND (0.0015)	NA	NA	NA
Trans-1,3-Dichloropropene	547-75-6	mg/Kg	NC	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
1,1,2-Trichloroethane	79-00-5	mg/Kg	0.5	ND (0.0086)	ND (0.0023)	NA	ND (0.00090)	ND (0.00092)	ND (0.0016)	NA	NA	ND (0.0015)	NA	NA	NA
Dibromochloromethane	124-48-1	mg/Kg	1.63	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
1,3-Dichloropropane	142-28-9	mg/Kg	1000	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
1,2-Dibromomethane (EDB)	106-93-4	mg/Kg	0.01	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
Chlorobenzene	108-90-7	mg/Kg	4.18	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
1,1,1,2-Tetrachloroethane	630-20-6	mg/Kg	NC	ND (0.0068)	ND (0.0014)	NA	ND (0.00071)	ND (0.00073)	ND (0.0010)	NA	NA	ND (0.0080)	NA	NA	NA
Bromoform	75-25-2	mg/Kg	80	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
Bromobenzene	108-86-1	mg/Kg	NC	ND (0.0068)	ND (0.0015)	NA	ND (0.00071)	ND (0.00073)	ND (0.0011)	NA	NA	ND (0.0098)	NA	NA	NA
1,1,2,2-Tetrachloroethane	79-34-5	mg/Kg	0.13	ND (0.0076)	ND (0.0028)	NA	ND (0.00079)	ND (0.00081)	ND (0.0020)	NA	NA	ND (0.0018)	NA	NA	NA
2-Chlorotoluene	95-49-8	mg/Kg	NC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3-Trichloropropane	96-18-4	mg/Kg	0.478	ND (0.0094)	ND (0.0021)	NA	ND (0.0098)	ND (0.0010)	ND (0.0015)	NA	NA	ND (0.0013)	NA	NA	NA
4-Chlorotoluene	106-43-4	mg/Kg	NC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	98-06-6	mg/Kg	NC	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
1,2,4-Trimethylbenzene	95-63-6	mg/Kg	NC	ND (0.0068)	0.0176	NA	ND (0.00071)	ND (0.00073)	0.0043 J	NA	NA	ND (0.0080)	NA	NA	NA
sec-Butylbenzene	135-98-8	mg/Kg	NC	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
1,3-Dichlorobenzene	541-73-1	mg/Kg	60	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	N (0.00080)	NA	NA	NA
1,4-Dichlorobenzene	106-46-7	mg/Kg	7.5	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00093)	NA	NA	N (0.00082)	NA	NA	NA
n-Butylbenzene	104-51-8	mg/Kg	NC	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
1,2-Dichlorobenzene	95-50-1	mg/Kg	60	ND (0.0068)	ND (0.0013)	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	N (0.00080)	NA	NA	NA
1,2-Dibromo-3-Chloropropane	96-12-8	mg/Kg	NC	ND (0.0096)	ND (0.0028)	NA	ND (0.0010)	ND (0.0010)	ND (0.0020)	NA	NA	ND (0.0018)	NA	NA	NA
1,2,4-Trichlorobenzene	120-82-1	mg/Kg	NC	ND (0.0068)	0.0176	NA	ND (0.00071)	ND (0.00073)	ND (0.0013)	NA	NA	ND (0.0012)	NA	NA	NA
Hexachlorobutadiene	87-68-3	mg/Kg	17.5	ND (0.0094)	ND (0.0028)	NA	ND (0.00098)	ND (0.0010)	ND (0.0020)	NA	NA	ND (0.0017)	NA	NA	NA
2-Hexanone	591-78-6	mg/Kg	NC	ND (0.0056)	ND (0.011)	NA	ND (0.0058)	ND (0.0060)	ND (0.0079)	NA	NA	ND (0.0070)	NA	NA	NA
p-Isopropyltoluene	99-87-6	mg/Kg	NC	ND (0.0068)	0.0176	NA	ND (0.00071)	ND (0.00073)	ND (0.00091)	NA	NA	ND (0.0080)	NA	NA	NA
Naphthalene	91-20-3														

Table 1B:
Cumulative Groundwater Analytical Data
Rice Iron and Metals, Inc. (Former)
2000 West Savannah, Valdosta, Lowndes County, Georgia

Compound	Units	CAS Number	Default Residential Type 1 RRS (mg/L)	MW-1D						MW-1DD						MW-1/MW-1R						MW-2/MW-2R						MW-3											
				35-40 ft BLS						70-75 ft BLS						10-20 ft bls						10-20 ft BLS						10-20 ft BLS											
				9/22/2014	4/15/2015	10/19/2015	4/6/2016	10/17/2016	2/16/2017	11/11/2014	4/15/2015	10/19/2015	4/6/2016	10/17/2016	2/16/2017	10/7/2011	8/12/2014	4/15/2015	10/20/2015	4/6/2016	7/27/2016	10/17/2016	2/16/2017	10/7/2011	8/12/2014	4/15/2015	10/20/2015	4/6/2016	10/18/2016	2/16/2017	10/6/2011	7/22/2014	4/15/2015	10/20/2015	4/6/2016	10/18/2016	2/15/2017		
VOCs by EPA Method 8260B																																							
Acetone	µg/L	67-64-1	4	NA	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	NA	ND (10)	ND (10)	ND (10)	ND (10)	NA	ND (11)	ND (10)	ND (250)	ND (250)	ND (200)	ND (200)	ND (500)	NA	ND (11)	ND (10)	ND (10)	ND (10)	ND (10)	NA	ND (11)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	
Acrolein	µg/L	107-02-8	0.7	NA	ND (5.0)	ND (5.0)	NA	NA	NA	NA	ND (5.0)	ND (5.0)	NA	NA	NA	ND (6.4)	ND (5.0)	ND (130)	NA	NA	NA	NA	NA	NA	ND (6.4)	ND (5.0)	ND (5.0)	NA	NA	NA	NA	ND (6.4)	ND (5.0)	ND (5.0)	NA	NA	NA	NA	
Acrylonitrile	µg/L	107-31-1	0.0020 (a)	NA	ND (2.0)	ND (2.0)	NA	NA	NA	NA	ND (2.0)	ND (2.0)	NA	NA	NA	ND (2.0)	ND (2.0)	ND (2.0)	NA	NA	NA	NA	NA	NA	ND (2.0)	ND (2.0)	ND (2.0)	NA	NA	NA	NA	ND (2.0)	ND (2.0)	ND (2.0)	NA	NA	NA	NA	
Benzene	µg/L	71-43-2	0.005	NA	ND (20)	ND (20)	ND (20)	ND (20)	ND (20)	ND (0.31)	NA	ND (20)	ND (20)	ND (0.20)	ND (0.20)	ND (0.31)	5.2	0.91 J	0.71 J	ND (5.0)	ND (250)	ND (4.1)	ND (4.1)	ND (6.2)	NA	ND (0.34)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.31)	NA	ND (0.24)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.31)	
Bromobenzene	µg/L	108-96-1	NC	NA	ND (27)	ND (27)	ND (42)	ND (42)	ND (37)	NA	ND (27)	ND (27)	ND (42)	ND (42)	ND (37)	NA	ND (31)	ND (27)	ND (6.7)	ND (11)	ND (8.4)	ND (8.4)	ND (7.3)	NA	ND (31)	ND (27)	ND (27)	ND (42)	ND (42)	ND (37)	NA	ND (31)	ND (27)	ND (27)	ND (42)	ND (42)	ND (37)	NA	
Bromochloromethane	µg/L	74-97-5	NC	NA	ND (34)	ND (34)	ND (42)	ND (42)	ND (45)	NA	ND (34)	ND (34)	ND (42)	ND (42)	ND (45)	NA	ND (38)	ND (34)	ND (8.4)	ND (11)	ND (8.5)	ND (8.5)	ND (9.0)	NA	ND (38)	ND (34)	ND (34)	ND (42)	ND (42)	ND (45)	NA	ND (38)	ND (34)	ND (34)	ND (42)	ND (42)	ND (45)	NA	
Bromodichloromethane	µg/L	75-27-4	Trihalomethane*	ND (0.26)	ND (0.22)	ND (0.22)	ND (0.24)	ND (0.24)	ND (0.24)	2.3	ND (0.22)	ND (0.22)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.26)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.24)	NA	ND (0.26)	ND (0.22)	ND (0.22)	ND (0.24)	ND (0.24)	ND (0.24)	NA	ND (0.26)	ND (0.22)	ND (0.22)	ND (0.24)	ND (0.24)	ND (0.24)	NA		
Bromofom	µg/L	75-25-2	NC	NA	ND (38)	ND (32)	ND (32)	ND (46)	ND (41)	ND (0.38)	ND (32)	ND (32)	ND (46)	ND (46)	ND (41)	ND (0.38)	ND (32)	ND (32)	ND (32)	ND (32)	ND (32)	ND (8.1)	NA	ND (0.38)	ND (32)	ND (32)	ND (32)	ND (46)	ND (46)	ND (41)	NA	ND (0.38)	ND (32)	ND (32)	ND (46)	ND (46)	ND (41)	NA	
2-Butanone (MEK)	µg/L	78-93-3	NC	NA	ND (1.2)	ND (1.2)	ND (2.6)	ND (2.6)	ND (2.0)	NA	ND (1.2)	ND (1.2)	ND (2.6)	ND (2.6)	ND (2.0)	NA	ND (1.5)	ND (1.2)	ND (29)	ND (64)	ND (51)	ND (51)	ND (40)	NA	ND (1.5)	ND (1.2)	ND (1.2)	ND (2.6)	ND (2.6)	ND (2.0)	NA	ND (1.5)	ND (1.2)	ND (1.2)	ND (2.6)	ND (2.6)	ND (2.0)	NA	
n-Butylbenzene	µg/L	104-51-8	NC	NA	ND (22)	ND (22)	ND (0.43)	ND (0.43)	ND (23)	NA	ND (22)	ND (22)	ND (0.43)	ND (0.43)	ND (23)	NA	ND (30)	ND (22)	ND (5.6)	ND (11)	ND (8.7)	ND (8.7)	ND (4.6)	NA	ND (30)	ND (22)	ND (22)	ND (0.43)	ND (0.43)	ND (23)	NA	ND (30)	ND (22)	ND (22)	ND (0.43)	ND (0.43)	ND (23)	NA	
sec-Butylbenzene	µg/L	135-98-8	NC	NA	ND (20)	ND (20)	ND (25)	ND (25)	ND (24)	NA	ND (20)	ND (20)	ND (25)	ND (25)	ND (24)	NA	ND (20)	ND (20)	ND (20)	ND (20)	ND (20)	ND (15)	ND (49)	NA	ND (27)	ND (20)	ND (20)	ND (25)	ND (25)	ND (24)	NA	ND (27)	ND (20)	ND (20)	ND (25)	ND (25)	ND (24)	NA	
tert-Butylbenzene	µg/L	98-06-6	NC	NA	ND (20)	ND (20)	ND (40)	ND (40)	ND (31)	NA	ND (20)	ND (20)	ND (40)	ND (40)	ND (31)	NA	ND (20)	ND (20)	ND (5.0)	ND (10)	ND (8.0)	ND (6.3)	NA	ND (29)	ND (20)	ND (20)	ND (40)	ND (40)	ND (31)	NA	ND (29)	ND (20)	ND (20)	ND (40)	ND (40)	ND (31)	NA		
Carbon Disulfide	µg/L	75-15-0	4	NA	ND (29)	ND (29)	ND (23)	ND (23)	ND (53)	NA	ND (29)	ND (29)	ND (23)	ND (23)	ND (53)	NA	ND (20)	ND (29)	ND (7.4)	ND (5.8)	ND (4.6)	ND (11)	NA	ND (20)	ND (29)	ND (29)	ND (29)	ND (23)	ND (23)	ND (53)	NA	ND (20)	ND (29)	ND (29)	ND (23)	ND (23)	ND (53)	NA	
Carbon Tetrachloride	µg/L	56-23-5	0.005	ND (0.40)	ND (0.28)	ND (0.28)	ND (0.30)	ND (0.30)	ND (0.36)	ND (0.40)	ND (0.28)	ND (0.28)	ND (0.30)	ND (0.30)	ND (0.36)	ND (0.40)	ND (0.28)	ND (0.28)	ND (7.1)	ND (7.5)	ND (6.0)	ND (6.0)	ND (7.1)	NA	ND (0.40)	ND (0.28)	ND (0.28)	ND (0.30)	ND (0.30)	ND (0.36)	NA	ND (0.40)	ND (0.28)	ND (0.28)	ND (0.30)	ND (0.30)	ND (0.36)	NA	
Chlorobenzene	µg/L	108-90-7	0.1	ND (0.24)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.24)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.24)	ND (0.24)	0.71	ND (5.0)	ND (5.0)	ND (4.0)	ND (4.0)	ND (7.1)	NA	ND (0.24)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	NA	ND (0.24)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	
Chloroethane	µg/L	75-00-3	NC	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.63)	ND (0.63)	ND (0.67)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.63)	ND (0.63)	ND (0.67)	ND (0.50)	ND (0.50)	ND (13)	ND (16)	ND (13)	ND (13)	ND (13)	NA	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.63)	ND (0.63)	ND (0.67)	NA	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.63)	ND (0.63)	ND (0.67)	NA
Chloromethane	µg/L	74-87-3	NC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
2-Chloroethyl Vinyl Ether	µg/L	110-75-8	NC	ND (1.0) a	ND (1.0) a	ND (1.0)	NA	NA	NA	ND (1.0)	ND (1.0) a	ND (1.0)	NA	NA	NA	ND (1.0)	ND (1.0)	ND (25)	NA	NA	NA	NA	NA	NA	ND (1.0)	ND (1.0)	ND (1.0)	NA	NA	NA	NA	NA	ND (1.0)	ND (1.0)	NA	NA	NA	NA	
Chloroform	µg/L	67-66-3	Trihalomethane*	ND (0.31)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	26.7	3.9	1.1	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.2)	0.41 J	0.79 J	ND (7.5)	ND (7.5)	ND (6.0)	ND (6.0)	ND (6.0)	NA	ND (0.31)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	NA	ND (0.31)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	
o-Chlorotoluene	µg/L	95-49-8	NC	NA	ND (20)	ND (20)	ND (24)	ND (24)	ND (22)	NA	ND (20)	ND (20)	ND (24)	ND (24)	ND (22)	ND (20)	ND (20)	ND (5.0)	ND (6.1)	ND (4.9)	ND (4.9)	ND (4.4)	NA	ND (0.23)	ND (20)	ND (20)	ND (20)	ND (24)	ND (24)	ND (22)	NA	ND (0.23)	ND (20)	ND (20)	ND (24)	ND (24)	ND (22)	NA	
p-Chlorotoluene	µg/L	106-43-4	NC	NA	ND (20)	ND (20)	ND (36)	ND (36)	ND (31)	NA	ND (20)	ND (20)	ND (36)	ND (36)	ND (31)	ND (29)	ND (20)	ND (5.0)	ND (8.9)	ND (7.1)	ND (7.1)	ND (6.1)	NA	ND (0.29)	ND (20)	ND (20)	ND (36)	ND (36)	ND (31)	NA	ND (0.29)	ND (20)	ND (20)	ND (36)	ND (36)	ND (31)	NA		
Dibromochloromethane	µg/L	124-48-1	Trihalomethane*	ND (0.36)	ND (0.20)	ND (0.20)	ND (0.26)	ND (0.26)	ND (0.28)	ND (0.36)	ND (0.20)	ND (0.20)	ND (0.26)	ND (0.26)	ND (0.28)	ND (0.36)	ND (1.20)	ND (0.20)	ND (5.0)	ND (6.5)	ND (5.2)	ND (5.2)	ND (6.5)	NA	ND (0.36)	ND (0.20)	ND (0.20)	ND (0.26)	ND (0.26)	ND (0.28)	NA	ND (0.36)	ND (0.20)	ND (0.20)	ND (0.26)	ND (0.26)	ND (0.28)	NA	
1,2-Dibromo-3-chloropropane	µg/L	96-12-8	NC	NA	ND (61)	ND (61)	ND (81)	ND (81)	ND (1.0)	NA	ND (61)	ND (61)	ND (81)	ND (81)	ND (1.0)	NA	ND (0.78)	ND (0.61)	ND (15)	ND (20)	ND (16)	ND (16)	ND (21)	NA	ND (0.78)	ND (0.61)	ND (0.61)	ND (81)	ND (81)	ND (1.0)	NA	ND (0.78)	ND (0.61)	ND (0.61)	ND (81)	ND (81)	ND (1.0)	NA	
1,2-Dibromomethane (EDB)	µg/L	106-93-4	NC	NA	ND (42)	ND (42)	ND (33)	ND (33)	ND (28)	NA	ND (42)	ND (42)	ND (33)	ND (33)	ND (28)	NA	ND (0.42)	ND (0.42)	ND (10)	ND (8.3)	ND (6.6)	ND (6.6)	ND (5.5)	NA	ND (0.42)	ND (0.42)	ND (0.42)	ND (33)	ND (33)	ND (28)	NA	ND (0.42)	ND (0.42)	ND (0.42)	ND (33)	ND (33)	ND (28)	NA	
Dichlorodifluoromethane	µg/L	75-71-8	1	ND (0.33)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.33)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.33)	ND (0.50)	ND (13)	ND (13)	ND (10)	ND (10)	ND (10)	ND (10)	NA	ND (0.33)	ND (0.50)	ND (0.50)													

Table 1B:
Cumulative Groundwater Analytical Data
Rice Iron and Metals, Inc. (Former)
2000 West Savannah, Valdosta, Lowndes County, Georgia

Compound	Units	CAS Number	Default Residential Type 1 RRS (mg/L)	MW-4																				MW-5																				MW-5D																				MW-6																				MW-7																				MW-8/MW-8R																				MW-9																				MW-10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
				10-20 ft BLS										10-20 ft BLS										35-40 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 ft BLS										10-20 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Table 1B:
Cumulative Groundwater Analytical Data
Rice Iron and Metals, Inc. (Former)
2000 West Savannah, Valdosta, Lowndes County, Georgia

Compound	Units	CAS Number	Default Residential Type 1 RRS (mg/L)	MW-11								MW-12				MW-13				MW-14						MW-15						MW-16				WATER WELL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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				10/7/2011	7/22/2014	4/15/2015	10/20/2015	4/6/2016	10/18/2016	2/16/2017	7/27/2017	8/11/2014	4/14/2015	10/20/2015	4/7/2016	8/11/2014	4/14/2015	10/20/2015	4/7/2016	9/22/2014	4/15/2015	10/20/2015	4/6/2016	10/18/2016	2/16/2017	7/27/2016	10/18/2016	2/17/2017	7/28/2017	4/15/2015	10/20/2015	4/6/2016																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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Acetone	µg/L	67-64-1	4	NA	ND (11)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (11)	ND (10)	ND (10)	ND (10)	ND (10)	NA	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	NA	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	NA	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)</

Table 2A:
Delineation Criteria For Soil
Rice Iron and Metals, Inc. (Former)
2000 West Savannah, Valdosta, Lowndes County, Georgia

Detected Regulated Substance	CAS No.	Date	Maximum Concentration Detected (mg/kg)	Location (ID) & Depth (ft BLS) of Maximum Detection	Residential Type 1 Soil RRS (mg/Kg)	Criteria for Delineation Standard [(A),(B), (C), (D), (E), or (F)]	Extent Delineated (laterally and vertically)? (yes or no)	Notes/Comments/Justification
Acetone	67-64-1	7/26/2016	0.18	SB-3 0-2 ft BLS	400	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Benzene	71-43-2	7/26/2016	0.0102	SB-5 2-4 ft BLS	0.5	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
2-Butanone (MEK)	78-93-3	7/26/2016	0.27	SB-3 0-2 ft BLS	200	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Carbon disulfide	75-15-0	7/26/2016	0.0227	SB-3 0-2 ft BLS	400	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
cis-1,2-Dichloroethene	156-59-2	10/16/2011	0.006	Area 6-CSS-3 12 ft BLS	7	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Ethylbenzene	108-90-7	7/26/2016	0.13	SB-5 2-4 ft BLS	70	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Isopropylbenzene	98-82-8	7/26/2016	0.01	SB-3 0-2 ft BLS	21.88	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Methylene Chloride	75-09-2	2/16/2017	0.2860	B-5R 6-8 ft BLS	0.5	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Naphthalene	91-20-3	7/26/2016	0.0065	SB-3 0-2 ft BLS	60.4	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Styrene	100-42-5	7/26/2016	0.0106	SB-3 0-2 ft BLS	14	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Tetrachloroethylene	127-18-4	2/16/2017	2.11	B-5R 6-8 ft BLS	0.5	E	No	The maximum concentration detected at the Site is above the Type 1 RRS.
Toluene	108-88-3	7/26/2016	0.046	SB-1 4-6 ft BLS	100	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Trichloroethylene	79-01-6	2/16/2017	0.0051	B-5R 0-2 ft BLS	0.5	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,2,4-Trichlorobenzene	120-82-1	7/26/2016	0.0176	SB-3 0-2 ft BLS	10.83	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
xylene, total	1330-20-7	7/26/2016	1.124	SB-5 2-4 ft BLS	1000	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Acrolein	107-02-8	10/21/2015	ND (0.0094)	SB-4 0-2 ft BLS	0.0628	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Acrylonitrile	107-31-1	10/21/2015	ND (0.0050)	SB-4 0-2 ft BLS	1.37	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Dichlorodifluoromethane	75-71-8	10/21/2015	ND (0.0010)	SB-4 0-2 ft BLS	0.0803	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Vinyl Acetate	108-05-4	10/21/2015	ND (0.0085)	SB-4 0-2 ft BLS	0.51	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Vinyl Chloride	75-01-4	10/21/2015	ND (0.0011)	SB-4 0-2 ft BLS	0.2	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Chloroethane	75-00-3	10/21/2015	ND (0.0014)	SB-4 0-2 ft BLS	0.17	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Trichlorofluoromethane	75-69-4	10/21/2015	ND (0.0012)	SB-4 0-2 ft BLS	200	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,1-Dichloroethene	75-35-4	10/21/2015	ND (0.000094)	SB-4 0-2 ft BLS	0.7	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Methyl Bromide (Bromomethane)	74-83-9	10/21/2015	ND (0.0015)	SB-4 0-2 ft BLS	0.8	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Methyl Chloride (Chloromethane)	74-87-3	10/21/2015	ND (0.0014)	SB-4 0-2 ft BLS	0.04	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Methylene Bromide (Dibromomethane)	74-95-3	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	1000	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Methylene Chloride (Dichloromethane)	75-09-2	10/21/2015	ND (0.0029)	SB-4 0-2 ft BLS	0.08	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
4-Methyl-2-pentanone (MIBK)	108-10-1	10/21/2015	ND (0.0038)	SB-4 0-2 ft BLS	3.3	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Trans-1,2-Dichloroethene	156-60-5	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	10	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,1-Dichloroethane	75-34-3	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	240	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Cis-1,2-Dichloroethene	156-59-2	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	7	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Chloroform	67-66-3	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	3.85	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Carbon Tetrachloride	56-23-5	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	0.5	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,1,1-Trichloethane	71-55-6	10/21/2015	ND (0.00093)	SB-4 0-2 ft BLS	20	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,2-Dichloroethane	107-06-2	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	0.5	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,2-Dichloropropane	78-87-5	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	0.5	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Bromodichloromethane	75-27-4	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	1.18	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,1,2-Trichloroethane	79-00-5	10/21/2015	ND (0.00090)	SB-4 0-2 ft BLS	0.5	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Dibromochloromethane	124-48-1	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	1.63	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,3-Dichloropropane	142-28-9	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	1000	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,2-Dibromoethane (EDB)	106-93-4	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	0.01	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Chlorobenzene	108-90-7	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	4.18	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,1,1,2-Tetrachloroehtane	630-20-6	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	7	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Bromoform	75-25-2	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	80	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,1,2,2-Tetrachloroethane	79-34-5	10/21/2015	ND (0.00079)	SB-4 0-2 ft BLS	0.13	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,2,3-Trichloropropane	96-18-4	10/21/2015	ND (0.00098)	SB-4 0-2 ft BLS	0.478	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,3-Dichlorobenzene	541-73-1	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	60	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,4-Dichlorobenzene	106-46-7	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	7.5	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,2-Dichlorobenzene	95-50-1	10/21/2015	ND (0.00071)	SB-4 0-2 ft BLS	60	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Hexachlorobutadiene	87-68-3	10/21/2015	ND (0.00098)	SB-4 0-2 ft BLS	17.5	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Napthalene	91-20-3	10/21/2015	ND (0.0014)	SB-4 0-2 ft BLS	60.4	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Arsenic	7440-38-2	2/16/2017	540	B-5R 6-8 ft BLS	20	E	No	The maximum concentration detected at the Site is above the Type 1 RRS.
Cadmium	7440-43-9	10/6/2011	1.01	Area 3-CSS-1 3 ft BLS	2	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Chromium	7440-47-3	10/6/2011	1.44	Area 5-CSS-4	100	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Lead	7439-92-1	10/6/2011	3.10	SBFP-2 0-2 ft BLS	75	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard

Table 2A:
Delineation Criteria For Soil
Rice Iron and Metals, Inc. (Former)
2000 West Savannah, Valdosta, Lowndes County, Georgia

Detected Regulated Substance	CAS No.	Date	Maximum Concentration Detected (mg/kg)	Location (ID) & Depth (ft BLS) of Maximum Detection	Residential Type 1 Soil RRS (mg/Kg)	Criteria for Delineation Standard [(A),(B), (C), (D), (E), or (F)]	Extent Delineated (laterally and vertically)? (yes or no)	Notes/Comments/Justification
Aroclor 1016	12674-11-2	4/14/2015	ND (0.0077)	SB-4 0-2 ft BLS	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Aroclor 1221	11104-28-2	4/14/2015	ND (0.0096)	SB-4 0-2 ft BLS	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Aroclor 1232	11141-16-5	4/14/2015	ND (0.0096)	SB-4 0-2 ft BLS	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Aroclor 1242	53469-21-9	4/14/2015	ND (0.0077)	SB-4 0-2 ft BLS	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Aroclor 1248	12672-29-6	4/14/2015	0.0628	SB-4 0-2 ft BLS	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Aroclor 1254	11097-69-1	4/14/2015	0.0677	SB-4 0-2 ft BLS	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
Aroclor 1260	11096-82-5	4/14/2015	0.0269	SB-3 0-2 ft BLS	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	4/14/2015	ND 0.00000984	SB-5 (0-2 ft bls)	8.00E-05	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	25822-46-9	4/14/2015	0.0000215	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	3268-87-9	4/14/2015	0.000229	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	4/14/2015	ND 0.000000984	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	39001-02-0	4/14/2015	ND 0.00000984	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
Total Tetrachlorodibenzo-p-dioxin	41903-57-5	4/14/2015	ND 0.000000984	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
Total Pentachlorodibenzo-p-dioxin	36088-22-9	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
Total Hexachlorodibenzo-p-dioxin	3465-46-8	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
Total Heptachlorodibenzo-p-dioxin	37871-00-4	4/14/2015	0.0000503	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
Total Tetrachlorodibenzofuran	30402-14-3	4/14/2015	ND 0.000000984	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
Total Pentachlorodibenzofuran	30402-15-4	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
Total Hexachlorodibenzofuran	55684-94-1	4/14/2015	ND 0.00000492	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
Total Heptachlorodibenzofuran	38998-75-3	4/14/2015	0.00000642	SB-5 (0-2 ft bls)	-	-	-	see Total PCDD and PCDFs
Total PCDDs and PCDFs (TEQ WHO2005 ND=0.5)	3333-30-1	4/14/2015	0.00000629	SB-5 (0-2 ft bls)	8.00E-05	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
3,3',4,4'-Tetrachlorobiphenyl (77)	32598-13-3	4/14/2015	0.000104	SB-5 (0-2 ft bls)	1.11	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
3,4,4',5-Tetrachlorobiphenyl (81)	70362-50-4	4/14/2015	0.00000432	SB-5 (0-2 ft bls)	0.32	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
2,3,3',4,4'-Pentachlorobiphenyl (105)	32598-14-4	4/14/2015	0.000942	SB-5 (0-2 ft bls)	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
2,3,4,4',5-Pentachlorobiphenyl (114)	74472-37-0	4/14/2015	0.0000521	SB-5 (0-2 ft bls)	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
2,3',4,4',5-Pentachlorobiphenyl (118)	31508-00-6	4/14/2015	0.00208	SB-5 (0-2 ft bls)	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
2',3,4,4',5-Pentachlorobiphenyl (123)	65510-44-3	4/14/2015	0.0000352	SB-5 (0-2 ft bls)	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
3,3',4,4',5-Pentachlorobiphenyl (126)	57465-28-8	4/14/2015	0.00000699	SB-5 (0-2 ft bls)	0.00	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
2,3,3',4,4',5-Hexachlorobiphenyl (156)	38380-08-4	4/14/2015	0.000342	SB-5 (0-2 ft bls)	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
2,3,3',4,4',5'-Hexachlorobiphenyl (157)	69782-90-7	4/14/2015	0.00000388	SB-5 (0-2 ft bls)	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
2,3',4,4',5,5'-Hexachlorobiphenyl (167)	52663-72-6	4/14/2015	0.000109	SB-5 (0-2 ft bls)	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
3,3',4,4',5,5'-Hexachlorobiphenyl (169)	32774-16-6	4/14/2015	ND 0.00000194	SB-5 (0-2 ft bls)	0.0036	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)	39635-31-9	4/14/2015	0.0000289	SB-5 (0-2 ft bls)	1.55	E	Yes	The maximum concentration detected at the Site is below the Type 1 Risk Reduction Standard

Delineation Criteria Options:

Pursuant to the Georgia Voluntary Remediation Act [§12-8-108.(1)]

(A): Concentrations from appropriate number of samples representative of local ambient or anthropogenic background conditions not affected by the subject site release.

(B): For Soil Only, Notification Concentrations (NCs)

(C): 2X Laboratory Lower Detection Limit (Standard PQL for EPA Analytical Method used) if less than all cleanup standards - Cannot exceed (E).

(D): For metals in soil, concentrations reported for GA undisturbed native soil samples as reported in USGS Open File Report 8 1-197 (Boerngen and Shacklette, 1981) or such later version as may be adopted by rule or regulation of the board.

(E): Default Residential Standards/Type 1 RRS:

Pursuant to the Georgia Hazardous Site Response Rules [§391-3-19-.06(3)(b)]

(F): For soil only: Highest value between Type 1 or Type 2 RRS

Notes:

B a = value confirmed by dual column analysis

CAS = Chemical Abstract Service

COC = Constituent of Concern

ft BLS = feet below land surface

I = result between the method detection limit and peak quantitation limit

J = estimated value

mg/Kg = milligrams per Kilogram (parts per million)

V = surrogate recovery not within criteria

RRS indicates Risk Reduction Standard

Values highlighted yellow exceeded the Type 1 RRS

PCDDs = polychlorinated dibenzodioxins

PCDFs = polychlorinated dibenzofurans

ND indicates the analyte was non-detect and as such was below the method detection limit

Table 2B:
Delineation Criteria For Groundwater
Rice Iron and Metals, Inc. (Former)
2000 West Savannah, Valdosta, Lowndes County, Georgia

Detected Regulated Substance	CAS Number	Date	Maximum Concentration Detected (mg/L)	Location (ID) & Depth (well screen interval in ft BLS) of Maximum Detection	Type 1 RRS For Groundwater (mg/L)	Criteria for Delineation Standard [(A),(B), (C), (D), (E), or (F)]	Extent Delineated (laterally and vertically)? (yes or no)	Notes/Comments/Justification
Acetone	67-64-1	10/20/2015	ND (0.010)	MW-2/MW-2R screened 10-20 ft BLS	4	E	Yes	The maximum detection was below the Type 1 RRS.
Acrolein	107-02-8	10/20/2015	ND (0.0050)	MW-2/MW-2R screened 10-20 ft BLS	0.7	E	Yes	The maximum detection was below the Type 1 RRS.
Acrylonitrile	107-31-1	10/20/2015	ND (0.0020)	MW-2/MW-2R screened 10-20 ft BLS	0.0020 (a)	E	Yes	The maximum detection was below the Type 1 RRS.
Benzene	71-43-2	4/2/2016	1.6	MW-8/MW-8R screened 10-20 ft BLS	0.005	E	No	The maximum concentration detected was above the Type 1 RRS.
Dichlorobromomethane	75-27-4	11/11/2014	0.0023	MW-1DD screened 70-75 ft BLS	Trihalomethane*	E	Yes	The maximum detection was below the Type 1 RRS.
Bromoform	75-25-2	11/11/2014	ND (0.00038)	MW-1DD screened 70-75 ft BLS	Trihalomethane*	E	Yes	The maximum detection was below the Type 1 RRS.
Carbon Disulfide	75-15-0	7/28/2017	ND (0.00053)	MW-8/MW-8R screened 10-20 ft BLS	4	E	Yes	The maximum detection was below the Type 1 RRS.
Carbon Tetrachloride	56-23-5	7/28/2017	ND (0.00036)	MW-8/MW-8R screened 10-20 ft BLS	0.005	E	Yes	The maximum detection was below the Type 1 RRS.
Chlorobenzene	108-90-7	10/7/2011	0.0007	MW-1/MW-1R screened 10-20 ft BLS	0.1	E	Yes	The maximum detection was below the Type 1 RRS.
Chloroform	67-66-3	11/11/2014	0.0267	MW-1DD screened 70-75 ft BLS	Trihalomethane*	E	Yes	The maximum detection was below the Type 1 RRS.
Dibromochloromethane	124-48-1	11/11/2014	ND (0.00036)	MW-1DD screened 70-75 ft BLS	Trihalomethane*	E	Yes	The maximum detection was below the Type 1 RRS.
Dichlorodiflouromethane	75-71-8	7/28/2017	ND (0.00050)	MW-8/MW-8R screened 10-20 ft BLS	1	E	Yes	The maximum detection was below the Type 1 RRS.
1,2-Dichlorobenzene	95-50-1	10/7/2011	0.0009	MW-1/MW-1R screened 10-20 ft BLS	0.6	E	Yes	The maximum detection was below the Type 1 RRS.
1,3-Dichlorobenzene	541-73-1	10/20/2015	0.00023	MW-5D screened 35-40 ft BLS	0.6	E	Yes	The maximum detection was below the Type 1 RRS.
1,4-Dichlorobenzene	106-46-7	10/7/2011	0.0005	MW-1/MW-1R screened 10-20 ft BLS	0.075	E	Yes	The maximum detection was below the Type 1 RRS.
1,1-Dichloroethane	75-34-3	10/17/2016	0.0051	MW-1DD screened 70-75 ft BLS	4	E	Yes	The maximum detection was below the Type 1 RRS.
1,1-Dichloroethene	75-35-4	8/12/2014	0.0248	MW-1/MW-1R screened 10-20 ft BLS	0.007	E	No	The maximum concentration detected was above the Type 1 RRS.
1,2-Dichloroethane	107-06-2	7/28/2017	ND (0.00031)	MW-8/MW-8R screened 10-20 ft BLS	0.005	E	Yes	The maximum detection was below the Type 1 RRS.
cis-1,2-Dichloroethene	156-59-2	8/12/2014	1.77	MW-1/MW-1R screened 10-20 ft BLS	0.07	E	No	The maximum concentration detected was above the Type 1 RRS.
trans-1,2-Dichloroethene	156-60-5	8/12/2014	0.0201	MW-1/MW-1R screened 10-20 ft BLS	0.1	E	Yes	The maximum detection was below the Type 1 RRS.
Ethylbenzene	100-41-4	7/27/2016	0.205	MW-8/MW-8R screened 10-20 ft BLS	0.7	E	Yes	The maximum detection was below the Type 1 RRS.
Hexachlorobutadiene	87-68-3	7/28/2017	ND (0.00030)	MW-8/MW-8R screened 10-20 ft BLS	0.00030 (a)	E	Yes	The maximum detection was below the Type 1 RRS.
1,2-Dichloropropane	78-87-5	10/7/2011	0.0014	MW-1/MW-1R screened 10-20 ft BLS	0.005	E	Yes	The maximum detection was below the Type 1 RRS.
1,3-Dichloropropane	142-28-9	7/28/2017	ND (0.00031)	MW-8/MW-8R screened 10-20 ft BLS	0.002	E	Yes	The maximum detection was below the Type 1 RRS.
Methyl Bromide	74-83-9	7/28/2017	ND (0.00059)	MW-8/MW-8R screened 10-20 ft BLS	0.01	E	Yes	The maximum detection was below the Type 1 RRS.
Methyl Chloride	74-87-3	7/28/2017	ND (0.00050)	MW-8/MW-8R screened 10-20 ft BLS	0.003	E	Yes	The maximum detection was below the Type 1 RRS.
Methylene Bromide	74-95-3	7/28/2017	ND (0.00037)	MW-8/MW-8R screened 10-20 ft BLS	0.4	E	Yes	The maximum detection was below the Type 1 RRS.
Methylene Chloride	75-09-2	7/28/2017	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.005	E	Yes	The maximum detection was below the Type 1 RRS.
Naphthalene	91-20-3	4/15/2015	0.0126	MW-1/MW-1R screened 10-20 ft BLS	0.02	E	Yes	The maximum detection was below the Type 1 RRS.
Styrene	100-42-5	7/28/2017	ND (0.00022)	MW-8/MW-8R screened 10-20 ft BLS	0.1	E	Yes	The maximum detection was below the Type 1 RRS.
Tetrachloroethene	127-18-4	10/20/2015	0.464	MW-1/MW-1R screened 10-20 ft BLS	0.005	E	No	The maximum concentration detected was above the Type 1 RRS.
1,1,1,2-Tetrachloroethane	630-20-6	7/28/2017	ND (0.00028)	MW-8/MW-8R screened 10-20 ft BLS	0.07	E	Yes	The maximum detection was below the Type 1 RRS.
1,1,2,2-Tetrachloroethane	79-34-5	7/28/2017	ND (0.00030)	MW-8/MW-8R screened 10-20 ft BLS	0.0002 (a)	E	Yes	The maximum detection was below the Type 1 RRS.
Toluene	108-88-3	4/2/2016	3.83	MW-8/MW-8R screened 10-20 ft BLS	1	E	No	The maximum concentration detected was above the Type 1 RRS.
1,1,1-Trichloroethane	71-55-6	7/28/2017	ND (0.00025)	MW-8/MW-8R screened 10-20 ft BLS	0.2	E	Yes	The maximum detection was below the Type 1 RRS.
1,1,2-Trichloroethane	79-00-5	7/28/2017	ND (0.00047)	MW-8/MW-8R screened 10-20 ft BLS	0.005	E	Yes	The maximum detection was below the Type 1 RRS.

Table 2B:
Delineation Criteria For Groundwater
Rice Iron and Metals, Inc. (Former)
2000 West Savannah, Valdosta, Lowndes County, Georgia

Detected Regulated Substance	CAS Number	Date	Maximum Concentration Detected (mg/L)	Location (ID) & Depth (well screen interval in ft BLS) of Maximum Detection	Type 1 RRS For Groundwater (mg/L)	Criteria for Delineation Standard [(A),(B), (C), (D), (E), or (F)]	Extent Delineated (laterally and vertically)? (yes or no)	Notes/Comments/Justification
Trichloroethene	79-01-6	8/12/2014	3.06	MW-1/MW-1R screened 10-20 ft BLS	0.005	E	No	The maximum concentration detected was above the Type 1 RRS.
Trichloroflouromethane	75-69-4	7/28/2017	ND (0.00050)	MW-8/MW-8R screened 10-20 ft BLS	2	E	Yes	The maximum detection was below the Type 1 RRS.
1,2,3-Trichloropropane	96-18-4	7/28/2017	ND (0.00063)	MW-8/MW-8R screened 10-20 ft BLS	0.04	E	Yes	The maximum detection was below the Type 1 RRS.
Trihalomethane, Total *	-	11/11/2014	0.03	MW-1DD screened 70-75 ft BLS	0.08	E	Yes	The maximum detection was below the Type 1 RRS.
Vinyl chloride	75-01-4	2/16/2017	0.0111	MW-1/MW-1R screened 10-20 ft BLS	0.002	E	No	The maximum concentration detected was above the Type 1 RRS.
Xylenes, total	1330-20-7	7/27/2016	1.266	MW-8/MW-8R screened 10-20 ft BLS	10	E	Yes	The maximum detection was below the Type 1 RRS.
Arsenic	7440-38-2	2/16/2017	0.366	MW-1/MW-1R screened 10-20 ft BLS	0.01	E	No	The maximum concentration detected was above the Type 1 RRS.
Chromium	7440-47-3	10/6/2011	0.00472	MW-5 screened 10-20 ft BLS	0.1	E	Yes	The maximum detection was below the Type 1 RRS.
Lead	7439-92-1	10/7/2011	0.00318	MW-10 screened 10-20 ft BLS	0.015	E	Yes	The maximum detection was below the Type 1 RRS.
Aroclor 1016	12674-11-2	10/6/2011	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.0005	E	Yes	The maximum detection was below the Type 1 RRS.
Aroclor 1221	11104-28-2	10/6/2011	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.0005	E	Yes	The maximum detection was below the Type 1 RRS.
Aroclor 1232	11141-16-5	10/6/2011	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.0005	E	Yes	The maximum detection was below the Type 1 RRS.
Aroclor 1242	53469-21-9	10/6/2011	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.0005	E	Yes	The maximum detection was below the Type 1 RRS.
Aroclor 1248	12672-29-6	10/6/2011	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.0005	E	Yes	The maximum detection was below the Type 1 RRS.
Aroclor 1254	11097-69-1	10/6/2011	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.0005	E	Yes	The maximum detection was below the Type 1 RRS.
Aroclor 1260	11096-82-5	10/6/2011	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.0005	E	Yes	The maximum detection was below the Type 1 RRS.

Delineation Criteria Options:
Pursuant to the Georgia Voluntary Remediation Act [§12-8-108.(1)]
(A): Concentrations from appropriate number of samples representative of local ambient or anthropogenic background conditions not affected by the subject site release.
(B): For Soil Only, Notification Concentrations (NCs) - Cannot exceed (E).
(C): 2X Laboratory Lower Detection Limit (Standard PQL for EPA Analytical Method used) if less than all cleanup standards - Cannot exceed (E).
(D): For metals in soil, concentrations reported for GA undisturbed native soil samples as reported in USGS Open File Report 8 1-197 (Boerngen and Shacklette, 1981) or such later version as may be adopted by rule or regulation of the board.
(E): Default Residential Standards/Type 1 RRS:
Pursuant to the Georgia Hazardous Site Response Rules [§391-3-19-.06(3)(b)]
(F): For soil only: Highest value between Type 1 or Type 2 RRS

Notes:
mg/L = miligramss per Liter (parts per million)
CAS = Chemical Abstract Service
ft BLS = feet below land surface
*Trihalomethanes, Total includes the summarized concentrations for dichlorobromomethane, dibromochloromethane, bromoform, and chloroform.
(a) indicates the current health-based drinking waster criterion for this substance is lower then the current method detection limit. According to Rule 391-3-19-.07(4)€, the detection limit or background will be the Type 1 groundwater concentration criterion for this substance/analyte.
RRS = Risk Reduction Standard
Yellow highlighted values exceed the Type 1 RRS
ND indicates the analyte was non-detect and as such was below the method detection limit

Table 3A:
Type 1 Risk Reduction Standards for Constituents of Concern In Soil
Former Rice Iron and Metals, Inc. (Former)
2000 West Savannah, Valdosta, Lowndes County, Georgia

Detected Regulated Substances Retained as Constituents of Concern	CAS Number	Maximum Concentration Detected in Soil (mg/Kg)	TEF	Adjusted Maximum Concentration Using TEF (mg/Kg)	Location (ID) & Depth (ft BLS) of Maximum Detection	Table 2 of Appendix III from GA R&R 391-3-19 (mg/Kg)	Regulated Substance Trigger Notification Requirements (GA R&R 391-3-19) (mg/Kg)	Type 1 Groundwater Values multiplied by 100 (mg/Kg)	Equation 6 (mg/kg)	Equation 7 (mg/kg)	Residential Type 1 Soil Risk Reduction Standard (mg/Kg)
VOCs by EPA Method 8260B											
Acetone	67-64-1	0.18	-	-	SB-3 0-2 ft BLS	-	2.74	400	-	191,000	400
Benzene	71-43-2	0.0102	-	-	SB-5 2-4 ft BLS	-	0.02	0.5	17.7	177	0.5
2-Butanone (MEK)	78-93-3	0.267	-	-	SB-3 0-2 ft BLS	-	0.79	200	-	47600	200
Carbon disulfide	75-15-0	0.0227	-	-	SB-3 0-2 ft BLS	-	0.0008***	400	-	857	400
cis-1,2-Dichloroethylene	156-59-2	0.006	-	-	Area 6-CSS-3 12 ft BLS	-	0.53	7	-	-	7
Ethylbenzene	108-90-7	0.133	-	-	SB-5 2-4 ft BLS	-	20.00	70	92.7	9130	70
Isopropylbenzene	98-82-8	0.0058	-	-	SB-3 0-2 ft BLS	-	21.88	-	-	4280	21.88
Methylene Chloride	75-09-2	0.2860	-	-	B-5R 6-8 ft BLS	-	0.08	0.5	3570	1210	0.5
Naphthalene	91-20-3	0.0065	-	-	SB-3 0-2 ft BLS	-	100.00	2	60.4	259	60.4
Styrene	100-42-5	0.0106	-	-	SB-3 0-2 ft BLS	-	14.00	10	-	15400	14.00
Tetrachloroethylene	127-18-4	2.11	-	-	B-5R 6-8 ft BLS	-	0.18	0.5	314	141	0.5
Toluene	108-88-3	0.046	-	-	SB-1 4-6 ft BLS	-	14.40	100	-	22,100	100
Trichloroethylene	79-01-6	0.0051	-	-	B-5R 0-2 ft BLS	-	0.13	0.5	18.2	6.62	0.5
1,2,4-Trichlorobenzene	120-82-1	0.0176	-	-	SB-3 0-2 ft BLS	-	10.83	7	515	115	10.83
xylene (total)	1330-20-7	1.124	-	-	SB-5 2-4 ft BLS	-	20	1000	-	1050	1000
Acrolein	107-02-8	ND (0.0094)	-	-	SB-4 0-2 ft BLS	-	0.0094	70	-	6.28E+02	0.0628
Acrylonitrile	107-31-1	ND (0.0050)	-	-	SB-4 0-2 ft BLS	-	1.37	0.6	2.68	17.3	1.37
Dichlorodifluoromethane	75-71-8	ND (0.0010)	-	-	SB-4 0-2 ft BLS	-	1.49	100	8.03E-02	-	0.0803
Vinyl Acetate	108-05-4	ND (0.0085)	-	-	SB-4 0-2 ft BLS	-	0.51	-	-	823	0.51
Vinyl Chloride	75-01-4	ND (0.0011)	-	-	SB-4 0-2 ft BLS	-	0.04	0.2	3.52	76.6	0.2
Chloroethane	75-00-3	ND (0.0014)	-	-	SB-4 0-2 ft BLS	-	0.17	-	-	-	0.17
Trichlorofluoromethane	75-69-4	ND (0.0012)	-	-	SB-4 0-2 ft BLS	-	0.7	200	-	-	200
1,1-Dichloroethene	75-35-4	ND (0.000094)	-	-	SB-4 0-2 ft BLS	-	0.36	0.7	-	240	0.7
Methyl Bromide (Bromomethane)	74-83-9	ND (0.0015)	-	-	SB-4 0-2 ft BLS	-	0.80	-	-	6.96	0.8
Methyl Chloride (Chloromethane)	74-87-3	ND (0.0014)	-	-	SB-4 0-2 ft BLS	-	0.04	-	-	-	0.04
Methylene Bromide (Dibromomethane)	74-95-3	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	[1000]	-	-	-	1000
Methylene Chloride (Dichloromethane)	75-09-2	ND (0.0029)	-	-	SB-4 0-2 ft BLS	-	0.08	-	3570	1210	0.08
4-Methyl-2-pentanone (MIBK)	108-10-1	ND (0.0038)	-	-	SB-4 0-2 ft BLS	-	3.3	0	-	-	3.3
Trans-1,2-Dichloroethene	156-60-5	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	0.53	10	-	-	10
1,1-Dichloroethane	75-34-3	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	0.03	400	-	240	240
Cis-1,2-Dichloroethene	156-59-2	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	0.53	7	-	-	7
Chloroform	67-66-3	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	0.68	80	3.85	354	3.85
Carbon Tetrachloride	56-23-5	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	0.17	0.5	6.5	162	0.5
1,1,1-Trichloroethane	71-55-6	ND (0.0093)	-	-	SB-4 0-2 ft BLS	-	5.44	20	-	10700	20
1,2-Dichloroethane	107-06-2	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	0.02	0.5	6.24	49.9	0.5
1,2-Dichloropropane	78-87-5	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	0.02	0.5	14.2	25.3	0.5
Bromodichloromethane	75-27-4	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	1.18	-	3.73	-	1.18
1,1,2-Trichloroethane	79-00-5	ND (0.0090)	-	-	SB-4 0-2 ft BLS	-	0.5	0.5	16.8	2.45	0.5
Dibromochloromethane	124-48-1	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	1.63	-	178	-	1.63
1,3-Dichloropropane	142-28-9	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	[1000]	-	-	-	1000
1,2-Dibromoethane (EDB)	106-93-4	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	0.01	0	5.05E-01	1.23E+02	0.01
Chlorobenzene	108-90-7	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	4.18	-	-	565	4.18
1,1,1,2-Tetrachloroethane	630-20-6	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	1.03	7	29.4	-	7
Bromoform	75-25-2	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	1.000	80	271	-	80
1,1,2,2-Tetrachloroethane	79-34-5	ND (0.00079)	-	-	SB-4 0-2 ft BLS	-	0.13	0.02	9.4	-	0.13
1,2,3-Trichloropropane	96-18-4	ND (0.00098)	-	-	SB-4 0-2 ft BLS	-	0.54	4	4.98E-01	8.69	0.478
1,3-Dichlorobenzene	541-73-1	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	2.22	60	-	-	60
1,4-Dichlorobenzene	106-46-7	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	6.84	7.5	41.4	1.17E+04	7.5
1,2-Dichlorobenzene	95-50-1	ND (0.00071)	-	-	SB-4 0-2 ft BLS	-	25	60	-	4.10E+03	60
Hexachlorobutadiene	87-68-3	ND (0.00098)	-	-	SB-4 0-2 ft BLS	-	17.5	0.1	19.7	-	17.5
Napthalene	91-20-3	ND (0.0014)	-	-	SB-4 0-2 ft BLS	-	100	2	60.4	2.59E+02	60.4
Metals by EPA Method 6010B											
Arsenic	7440-38-2	540	-	-	B-5 6-8 ft BLS	20	41	1	9.96	192	20
Cadmium	7440-43-9	1.01	-	-	Area 3-CSS-1 3 ft BLS	2	39.00	0.5	83500	634	2
Chromium	7440-47-3	1.44	-	-	Area 5-CSS-4	100	1200.00	10	-	-	100
Lead	7439-92-1	3.10	-	-	SBFP-2 0-2 ft BLS	75	400.00	1.5	-	-	75
PCBs by EPA Method 8082A											
Aroclor 1016	12674-11-2	ND (0.0077)	-	-	SB-4 0-2 ft BLS	-	1.55	0.05	189	-	1.55
Aroclor 1221	11104-28-2	ND (0.0096)	-	-	SB-4 0-2 ft BLS	-	1.55	0.05	5.11	-	1.55
Aroclor 1232	11141-16-5	ND (0.0096)	-	-	SB-4 0-2 ft BLS	-	1.55	0.05	4.06	-	1.55
Aroclor 1242	53469-21-9	ND (0.0077)	-	-	SB-4 0-2 ft BLS	-	1.55	0.05	6.44	-	1.55
Aroclor 1248	12672-29-6	0.06	-	-	SB-4 0-2 ft BLS	-	1.55	0.05	6.5	-	1.55
Aroclor 1254	11097-69-1	0.0677	-	-	SB-4 0-2 ft BLS	-	1.55	0.05	6.72	-	1.55
Aroclor 1260	11096-82-5	0.0269	-	-	SB-3 0-2 ft BLS	-	1.55	0.05	6.97	-	1.55
Polychlorinated dibenzo-p-dioxins (PCDDs)											
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	< 0.000000984	1.0000	0.0000010	SB-5 (0-2 ft BLS)	-	8.00E-05	3.00E-06	1.10E-04	4.47E-04	8.00E-05
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	< 0.000004920	1.0000	0.0000049	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	< 0.000004920	0.1000	0.0000005	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	< 0.000004920	0.1000	0.0000005	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	< 0.000004920	0.1000	0.0000005	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	25822-46-9	0.0000215	0.0100	0.0000002	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	3268-87-9	0.000229	0.0003	0.0000001	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
Polychlorinated dibenzofurans (PCDFs)											
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	< 0.00000098	0.1000	0.00000010	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6	< 0.00000492	0.0300	0.00000015	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	< 0.00000492	0.3000	0.00000148	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	< 0.00000492	0.1000	0.00000049	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	< 0.00000492	0.1000	0.00000049	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	< 0.00000492	0.1000	0.00000049	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	< 0.00000492	0.1000	0.00000049	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	< 0.00000492	0.1000	0.00000049	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	< 0.00000492	0.0100	0.00000005	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	39001-02-0	< 0.00000984	0.0003	0.00000000	SB-5 (0-2 ft BLS)	-	-	-	-	-	see TEQ WHO2005
Total PCDDs and PCDFs											
Total Tetrachlorodibenzo-p-dioxin	41903-57-5	< 9.84E-07	-	9.84E-07	SB-5 (0-2 ft BLS)	-	8.00E-05	-	-	-	see TEQ WHO2005
Total Pentachlorodibenzo-p-dioxin	36088-22-9	< 4.92E-06	-	4.92E-06	SB-5 (0-2 ft BLS)	-	1.60E-04	-	-	-	see TEQ WHO2005
Total Hexachlorodibenzo-p-dioxin	3465-46-8	< 4.92E-06	-	1.48E-06	SB-5 (0-2 ft BLS)	-	1.90E-03	-	-	-	see TEQ WHO2005
Total Heptachlorodibenzo-p-dioxin	37871-00-4	< 5.03E-05	-	2.15E-07	SB-5 (0-2 ft BLS)	-	8.00E-04	-	-	-	see TEQ WHO2005
Total Tetrachlorodibenzofuran	30402-14-3	< 9.84E-07	-	9.84E-08	SB-5 (0-2 ft BLS)	-	8.00E-04	-	-	-	see TEQ WHO2005
Total Pentachlorodibenzofuran	30402-15-4	< 4.92E-06	-	1.62E-06	SB-5 (0-2 ft BLS)	-	1.60E-04	-	-	-	see TEQ WHO2005
Total Hexachlorodibenzofuran	55684-94-1	< 4.92E-06	-	1.97E-06	SB-5 (0-2 ft BLS)	-	8.00E-04	-	-	-	see TEQ WHO2005
Total Heptachlorodibenzofuran	38998-75-3	< 6.42E-06	-	5.41E-07	SB-5 (0-2 ft BLS)	-	8.00E-04	-	-	-	see TEQ WHO2005
Total PCDDs & PCDFs (TEQ WHO2005 ND=0.5)	3333-30-1	-	-	6.29E-06	SB-5 (0-2 ft BLS)	-	8.00E-05	3.00E-06	1.10E-04	4.47E-04	8.00E-05
Polychlorinated biphenyls (PCB congener number)											
3,3',4,4'-Tetrachlorobiphenyl (77)	32598-13-3	0.000104	0.0001	1.04E-08	SB-5 (0-2 ft BLS)	-	1.55	0.05	1.11	4.47	1.11
3,4,4',5'-Tetrachlorobiphenyl (81)	70362-50-4	0.00000432	0.0003	1.30E-09	SB-5 (0-2 ft BLS)	-	1.55	0.05	3.24E-01	1.46	3.24E-01
2,3,3',4,4'-Pentachlorobiphenyl (105)	32598-14-4	0.000942	0.00003	2.83E-08	SB-5 (0-2 ft BLS)	-	1.55	0.05	3.32	14.6	1.55
2,3,4,4',5'-Pentachlorobiphenyl (114)	74472-37-0	0.0000521	0.00003	1.56E-09	SB-5 (0-2 ft BLS)	-	1.55	0.05	3.52	14.6	1.55
2,3',4,4',5'-Pentachlorobiphenyl (118)	31508-00-6	0.00208	0.00003	6.24E-08	SB-5 (0-2 ft BLS)	-	1.55	0.05	3.31	14.6	1.55

Table 3B:
Type 1 Risk Reduction Standards for Constituents of Concern in Groundwater

Rice Iron and Metals, Inc. (Former)
2000 West Savannah, Valdosta, Lowndes County, Georgia

Detected Regulated Substances Retained as Constituents of Concern	CAS Number	Maximum Concentration Detected in Groundwater (mg/L)	Location (ID) & Depth (well screen interval in ft BLS)	Table 1 of Appendix III (mg/L)	Residential Type 1 Groundwater Risk Reduction Standard (mg/L)
VOCs by EPA Method 8260B					
Acetone	67-64-1	ND (0.010)	MW-2/MW-2R screened 10-20 ft BLS	4	4
Acrolein	107-02-8	ND (0.0050)	MW-2/MW-2R screened 10-20 ft BLS	0.7	0.7
Acrylonitrile	107-31-1	ND (0.0020)	MW-2/MW-2R screened 10-20 ft BLS	0.0020 (a)	0.0020 (a)
Benzene	71-43-2	1.6	MW-8/MW-8R screened 10-20 ft BLS	0.005	0.005
Bromoform	75-25-2	ND (0.00038)	MW-1DD screened 70-75 ft BLS	Trihalomethane*	See Trihalomethane, Total
Carbon Disulfide	75-15-0	ND (0.00053)	MW-8/MW-8R screened 10-20 ft BLS	4	4
Carbon Tetrachloride	56-23-5	ND (0.00036)	MW-8/MW-8R screened 10-20 ft BLS	0.005	0.005
Dichlorobromomethane	75-27-4	0.0023	MW-1DD screened 70-75 ft BLS	Trihalomethane*	See Trihalomethane, Total
Chlorobenzene	108-90-7	0.0007	MW-1/MW-1R screened 10-20 ft BLS	0.1	0.1
Chloroform	67-66-3	0.0267	MW-1DD screened 70-75 ft BLS	Trihalomethane*	See Trihalomethane, Total
Dibromochloromethane	124-48-1	ND (0.00036)	MW-1DD screened 70-75 ft BLS	Trihalomethane*	See Trihalomethane, Total
Dichlorobromomethane	75-27-4	0.0023	MW-1DD screened 70-75 ft BLS	Trihalomethane*	See Trihalomethane, Total
Dichlorodifluoromethane	75-71-8	ND (0.00050)	MW-8/MW-8R screened 10-20 ft BLS	1	1
Trihalomethanes, total	-	0.050	MW-1DD screened 70-75 ft BLS	0.08	0.08
1,2-Dichlorobenzene	95-50-1	0.0009	MW-1/MW-1R screened 10-20 ft BLS	0.6	0.6
1,3-Dichlorobenzene	541-73-1	0.00023	MW-5D screened 35-40 ft BLS	0.6	0.6
1,4-Dichlorobenzene	106-46-7	0.0005	MW-1/MW-1R screened 10-20 ft BLS	0.075	0.075
1,1-Dichloroethane	75-34-3	0.0051	MW-1DD screened 70-75 ft BLS	4	4
1,1-Dichloroethene	75-35-4	0.0248	MW-1/MW-1R screened 10-20 ft BLS	0.007	0.007
1,2-Dichloroethane	107-06-2	ND (0.00031)	MW-8/MW-8R screened 10-20 ft BLS	0.005	0.005
cis-1,2-dichloroethene	156-59-2	1.77	MW-1/MW-1R screened 10-20 ft BLS	0.07	0.07
trans-1,2-dichloroethene	156-60-5	0.0201	MW-1/MW-1R screened 10-20 ft BLS	0.1	0.1
Ethylbenzene	100-41-4	0.205	MW-8/MW-8R screened 10-20 ft BLS	0.7	0.7
Hexachlorobutadiene	87-68-3	ND (0.00030)	MW-8/MW-8R screened 10-20 ft BLS	0.00030 (a)	0.00030 (a)
1,2-dichloropropane	78-87-5	0.0014	MW-1/MW-1R screened 10-20 ft BLS	0.005	0.005
Methyl Bromide	74-83-9	ND (0.00059)	MW-8/MW-8R screened 10-20 ft BLS	0.01	0.01
Methyl Chloride	74-87-3	ND (0.00050)	MW-8/MW-8R screened 10-20 ft BLS	0.003	0.003
Methylene Bromide	74-95-3	ND (0.00037)	MW-8/MW-8R screened 10-20 ft BLS	0.4	0.4
Methylene Chloride	75-09-2	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.005	0.005
Naphthalene	91-20-3	0.0126	MW-1/MW-1R screened 10-20 ft BLS	0.02	0.02
Styrene	100-42-5	ND (0.00022)	MW-8/MW-8R screened 10-20 ft BLS	0.1	0.1
Tetrachloroethylene	127-18-4	0.464	MW-1/MW-1R screened 10-20 ft BLS	0.005	0.005
1,1,1,2-Tetrachloroethane	630-20-6	ND (0.00028)	MW-8/MW-8R screened 10-20 ft BLS	0.07	0.07
1,1,2,2-Tetrachloroethane	79-34-5	ND (0.00030)	MW-8/MW-8R screened 10-20 ft BLS	0.0002 (a)	0.0002 (a)
1,1,1-Trichloroethane	71-55-6	ND (0.00025)	MW-8/MW-8R screened 10-20 ft BLS	0.2	0.2
1,1,2-Trichloroethane	79-00-5	ND (0.00047)	MW-8/MW-8R screened 10-20 ft BLS	0.005	0.005
Toluene	108-88-3	3.83	MW-8/MW-8R screened 10-20 ft BLS	1	1
1,2,4-Trichlorobenzene	120-82-1	0.0016	MW-5D screened 35-40 ft BLS	0.07	0.07
Trichloroethylene	79-01-6	3.06	MW-1/MW-1R screened 10-20 ft BLS	0.005	0.005
Trichlorofluoromethane	75-69-4	ND (0.00050)	MW-8/MW-8R screened 10-20 ft BLS	2	2
Trihalomethane, Total *	-	0.03	MW-1DD screened 70-75 ft BLS	0.08	0.08
1,2,3-Trichloropropane	96-18-4	ND (0.00063)	MW-8/MW-8R screened 10-20 ft BLS	0.04	0.04
Vinyl chloride	75-01-4	0.011	MW-1/MW-1R screened 10-20 ft BLS	0.002	0.002
xylene (total)	1330-20-7	1.266	MW-8/MW-8R screened 10-20 ft BLS	10	10
Metals by EPA Method 6010B					
Arsenic	7440-38-2	0.366	MW-1/MW-1R screened 10-20 ft BLS	0.01	0.01
Chromium	7440-47-3	0.00472	MW-5 screened 10-20 ft BLS	0.1	0.1
Lead	7439-92-1	0.00318	MW-10 screened 10-20 ft BLS	0.015	0.015
PCBs by EPA Method					
Aroclor 1016	12674-11-2	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.0005	0.0005
Aroclor 1221	11104-28-2	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.0005	0.0005
Aroclor 1232	11141-16-5	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.0005	0.0005
Aroclor 1242	53469-21-9	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.0005	0.0005
Aroclor 1248	12672-29-6	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.0005	0.0005
Aroclor 1254	11097-69-1	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.0005	0.0005
Aroclor 1260	11096-82-5	ND (0.0020)	MW-8/MW-8R screened 10-20 ft BLS	0.0005	0.0005

Notes:

EPA = Environmental Protection Agency

CAS = Chemical Abstracts Service

µg/l = micrograms per liter

mg/l = milligrams per liter

VOCs = volatile organic compounds

ft BLS = feet below land surface

Groundwater Default Residential Type 1 RRS's were obtained from Table 1 of Appendix III of Georgia's Rules and Regulations set in 391-3-19 of the Georgia Administrative Code.

Reference "Process Chart for the Development of RRS at HSRA, Brownfield, and VRP Sites (Rule 391-3-19-07)".

Values highlighted yellow exceed the Type 1 and Type 3 RRS in Groundwater

*Trihalomethanes, Total includes the summarized concentrations for dichlorobromomethane, dibromochloromethane, bromoform, and chloroform.

(a) indicates the current health-based drinking water criterion for this substance is lower than the current method detection limit. According to Rule 391-3-19-07(4)(e), the detection limit or background will be the Type 1 groundwater concentration criterion for this substance/analyte.

APPENDIX A

1,1-Dichloroethane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	4.22E+01 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	2115.82	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0.2	mg/kg-day
* Sfi	0.0056	(mg/kg-day)-1
* Sfo	0.0057	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.004	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	5.94E-02	cm2/s
* Di	0.08	cm2/s
* E	0.35	unitless
* Kas	0.36	g soil/cm3 air
* HLC	0.01	atm-m3/mol
* Kd	0.64	cm3/g
* Koc	32.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016) Chemical Specific Parameters. Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables. (<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,1-Dichloroethene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	2.40E+02	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{as} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	868.87	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.057142857	mg/kg-day
* RfDo	0.05	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.015	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	6.08E-02	cm2/s
* Di	0.09	cm2/s
* E	0.35	unitless
* Kas	1.67	g soil/cm3 air
* HLC	0.03	atm-m3/mol
* Kd	0.64	cm3/g
* Koc	32.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,1,1-Trichloroethane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.07E+04	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	1556.17	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	1.428571429	mg/kg-day
* RfDo	2	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.006	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	4.60E-02	cm2/s
* Di	0.07	cm2/s
* E	0.35	unitless
* Kas	0.79	g soil/cm3 air
* HLC	0.02	atm-m3/mol
* Kd	0.88	cm3/g
* Koc	44.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,1,1,2-Tetrachloroethane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	2.94E+01 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{as} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	7070.67	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0.03	mg/kg-day
* Sfi	0.0259	(mg/kg-day)-1
* Sfo	0.026	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.39E-02	cm2/s
* Di	0.05	cm2/s
* E	0.35	unitless
* Kas	0.06	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	1.72	cm3/g
* Koc	86.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.
(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,1,2,2-Tetrachloroethane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	9.40E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm·m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	19218.81	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0.022	mg/kg-day
* Sfi	0.203	(mg/kg-day) ⁻¹
* Sfo	0.2	(mg/kg-day) ⁻¹
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* ρ	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.47E-02	cm2/s
* Di	0.05	cm2/s
* E	0.35	unitless
* Kas	0.01	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	1.90	cm3/g
* Koc	95.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016) Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables. (<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,1,2-Trichloroethane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.68E+01 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	2.45E+00 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm·m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	8829.25	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	5.71429E-05	mg/kg-day
* RfDo	0.004	mg/kg-day
* Sfi	0.056	(mg/kg-day) ⁻¹
* Sfo	0.057	(mg/kg-day) ⁻¹
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm ² /s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	4.74E-02	cm2/s
* Di	0.07	cm2/s
* E	0.35	unitless
* Kas	0.03	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	1.22	cm3/g
* Koc	61.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,1-Dichloroethane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10\text{-}6 \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	4.22E+01 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10\text{-}6 \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	2115.82	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0.2	mg/kg-day
* Sfi	0.0056	(mg/kg-day)-1
* Sfo	0.0057	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.004	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	5.94E-02	cm2/s
* Di	0.08	cm2/s
* E	0.35	unitless
* Kas	0.36	g soil/cm3 air
* HLC	0.01	atm-m3/mol
* Kd	0.64	cm3/g
* Koc	32.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016) Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.
(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,1-Dichloroethene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10^{-5} (10^{-4} for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	2.40E+02	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m³/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m³/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m³/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m³)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{as} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	868.87	m ³ /kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m ³ /day
* RfDi	0.057142857	mg/kg-day
* RfDo	0.05	mg/kg-day
* Sfi	0	(mg/kg-day) ⁻¹
* Sfo	0	(mg/kg-day) ⁻¹
* PEF	4.63E+09	m ³ /kg
* Irw	2	L/day
* K	0.5	L/m ³

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm ²
* π	3.14	unitless

0.5 acres

* α	0.015	cm ² /s
* T	7.90E+08	s
* p	2.65	g/cm ³
* fOC	0.02	g/g
* Dei	6.08E-02	cm ² /s
* Di	0.09	cm ² /s
* E	0.35	unitless
* Kas	1.67	g soil/cm ³ air
* HLC	0.03	atm-m ³ /mol
* Kd	0.64	cm ³ /g
* Koc	32.00	cm ³ /g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,2 Dibromoethane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	5.05E-01 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.23E+02 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	10018.20	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.002571429	mg/kg-day
* RfDo	0.009	mg/kg-day
* Sfi	2.1	(mg/kg-day) ⁻¹
* Sfo	2	(mg/kg-day) ⁻¹
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm ² /s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.04E-02	cm2/s
* Di	0.04	cm2/s
* E	0.35	unitless
* Kas	0.03	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.80	cm3/g
* Koc	40.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.
(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,2- Dichlorobenzene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	4.10E+03	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	15862.98	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.057142857	mg/kg-day
* RfDo	0.09	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.96E-02	cm2/s
* Di	0.06	cm2/s
* E	0.35	unitless
* Kas	0.01	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	7.60	cm3/g
* Koc	380.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters. Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables. (<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,2 Dichloropropane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.42E+01 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	2.53E+01 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{as} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	4547.03	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.001142857	mg/kg-day
* RfDo	0.09	mg/kg-day
* Sfi	0.035	(mg/kg-day)-1
* Sfo	0.036	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.001	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	5.16E-02	cm2/s
* Di	0.07	cm2/s
* E	0.35	unitless
* Kas	0.09	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	1.22	cm3/g
* Koc	61.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,2,3-Trichloropropane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	4.98E-01 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	8.69E+00 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	20896.48	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	8.57143E-05	mg/kg-day
* RfDo	0.004	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	30	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	4.03E-02	cm2/s
* Di	0.06	cm2/s
* E	0.35	unitless
* Kas	0.01	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	2.40	cm3/g
* Koc	120.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters. Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables. (<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,2-Dichloroethane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SfO)(10^{-6} \text{ kg/mg})(IRs) + (SfI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	6.24E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	4.99E+01 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SfI – Inhalation cancer slope factor (mg/kg-day)-1

SfO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{as} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	5198.87	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.002	mg/kg-day
* RfDo	0.006	mg/kg-day
* Sfi	0.091	(mg/kg-day)-1
* Sfo	0.091	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.001	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	6.08E-02	cm2/s
* Di	0.09	cm2/s
* E	0.35	unitless
* Kas	0.06	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.80	cm3/g
* Koc	40.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,3- Dichlorobenzene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm·m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	#DIV/0!	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	#DIV/0!	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	0.00E+00	cm2/s
* Di	0.00	cm2/s
* E	0.35	unitless
* Kas	#DIV/0!	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.00	cm3/g
* Koc	0.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,3-Dichloropropane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10^{-5} (10^{-4} for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m³/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m³/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m³/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m³)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{as} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm·m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	8348.82	m ³ /kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m ³ /day
* RfDi	0	mg/kg-day
* RfDo	0.02	mg/kg-day
* Sfi	0	(mg/kg-day) ⁻¹
* Sfo	0	(mg/kg-day) ⁻¹
* PEF	4.63E+09	m ³ /kg
* Irw	2	L/day
* K	0.5	L/m ³

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm ²
* π	3.14	unitless

0.5 acres

* α	0.000	cm ² /s
* T	7.90E+08	s
* p	2.65	g/cm ³
* fOC	0.02	g/g
* Dei	5.23E-02	cm ² /s
* Di	0.07	cm ² /s
* E	0.35	unitless
* Kas	0.03	g soil/cm ³ air
* HLC	0.00	atm·m ³ /mol
* Kd	1.44	cm ³ /g
* Koc	72.00	cm ³ /g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016) Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.
(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,4- Dichlorobenzene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	4.14E+01 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.17E+04 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	14238.03	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.228571429	mg/kg-day
* RfDo	0.07	mg/kg-day
* Sfi	0.0385	(mg/kg-day) ⁻¹
* Sfo	0.0054	(mg/kg-day) ⁻¹
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.89E-02	cm2/s
* Di	0.06	cm2/s
* E	0.35	unitless
* Kas	0.01	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	7.60	cm3/g
* Koc	380.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters. Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables. (<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

1,2,4-Trichlorobenzene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	5.15E+02 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.15E+02 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{as} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	42004.43	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.000571429	mg/kg-day
* RfDo	0.01	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0.029	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	2.83E-02	cm2/s
* Di	0.04	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	28.00	cm3/g
* Koc	1400.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.10E-04 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	4.47E-04 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	2740637.67	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	1.14286E-08	mg/kg-day
* RfDo	7E-10	mg/kg-day
* Sfi	133000	(mg/kg-day)-1
* Sfo	130000	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* ρ	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.32E-02	cm2/s
* Di	0.05	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	5000.00	cm3/g
* Koc	250000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters. Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables. (<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

2-Butanone

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	4.76E+04	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	7805.86	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	1.428571429	mg/kg-day
* RfDo	0.6	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	6.44E-02	cm2/s
* Di	0.09	cm2/s
* E	0.35	unitless
* Kas	0.03	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.09	cm3/g
* Koc	4.50	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Acetone

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.91E+05	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{as} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	6614.18	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	8.857142857	mg/kg-day
* RfDo	0.9	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	7.78E-02	cm2/s
* Di	0.11	cm2/s
* E	0.35	unitless
* Kas	0.03	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.05	cm3/g
* Koc	2.40	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Acrolein

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SfO)(10^{-6} \text{ kg/mg})(IRs) + (SfI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	6.28E-02	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SfI – Inhalation cancer slope factor (mg/kg-day)-1

SfO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	2257.03	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	5.71429E-06	mg/kg-day
* RfDo	0.0005	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.004	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	7.78E-02	cm2/s
* Di	0.11	cm2/s
* E	0.35	unitless
* Kas	0.25	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.02	cm3/g
* Koc	1.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Acrylonitrile

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	2.68E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.73E+01 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{as} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	6221.28	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.000571429	mg/kg-day
* RfDo	0.04	mg/kg-day
* Sfi	0.238	(mg/kg-day)-1
* Sfo	0.54	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.001	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	7.78E-02	cm2/s
* Di	0.11	cm2/s
* E	0.35	unitless
* Kas	0.03	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.17	cm3/g
* Koc	8.50	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016) Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Aroclor 1016

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.89E+02 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	998381.10	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0.00007	mg/kg-day
* Sfi	0.07	(mg/kg-day)-1
* Sfo	0.07	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	1.20E-02	cm2/s
* Di	0.02	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	960.00	cm3/g
* Koc	48000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Aroclor 1221

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	5.11E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm·m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	283866.29	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0	mg/kg-day
* Sfi	1.995	(mg/kg-day)-1
* Sfo	2	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	2.26E-02	cm2/s
* Di	0.03	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	168.00	cm3/g
* Koc	8400.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016) Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Aroclor 1232

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	4.06E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	155838.38	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0	mg/kg-day
* Sfi	1.995	(mg/kg-day)-1
* Sfo	2	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	2.33E-02	cm2/s
* Di	0.03	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	168.00	cm3/g
* Koc	8400.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Aroclor 1242

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	6.44E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	821518.59	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0	mg/kg-day
* Sfi	1.995	(mg/kg-day)-1
* Sfo	2	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	1.70E-02	cm2/s
* Di	0.02	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	1560.00	cm3/g
* Koc	78000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016) Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Aroclor 1248

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SfO)(10^{-6} \text{ kg/mg})(IRs) + (SfI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	6.50E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SfI – Inhalation cancer slope factor (mg/kg-day)-1

SfO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	878767.70	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDI	0	mg/kg-day
* RfDo	0	mg/kg-day
* Sfi	1.995	(mg/kg-day)-1
* Sfo	2	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	1.13E-02	cm2/s
* Di	0.02	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	1540.00	cm3/g
* Koc	77000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016) Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Aroclor 1254

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	6.72E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	1168698.30	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0.00002	mg/kg-day
* Sfi	1.995	(mg/kg-day)-1
* Sfo	2	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	1.70E-02	cm2/s
* Di	0.02	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	2600.00	cm3/g
* Koc	130000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Aroclor 1260

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10^{-5} (10^{-4} for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	6.97E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	1817601.63	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0	mg/kg-day
* Sfi	1.995	(mg/kg-day)-1
* Sfo	2	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	1.56E-02	cm2/s
* Di	0.02	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	7000.00	cm3/g
* Koc	350000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016) Chemical Specific Parameters. Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables. (<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Arsenic

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10^{-5} (10^{-4} for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	9.96E+00 mg/kg	EQUATION 6 NON-VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.92E+02 mg/kg	EQUATION 7 NON-VOLATILE COMPOUNDS	
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	#VALUE!	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	4.28571E-06	mg/kg-day
* RfDo	0.0003	mg/kg-day
* Sfi	15.05	(mg/kg-day) ⁻¹
* Sfo	1.5	(mg/kg-day) ⁻¹
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	#VALUE!	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	#VALUE!	cm2/s
* Di	-	cm2/s
* E	0.35	unitless
* Kas	#VALUE!	g soil/cm3 air
* HLC	-	atm-m3/mol
* Kd	#VALUE!	cm3/g
* Koc	-	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters. Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables. (<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Benzene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.77E+01 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.77E+02 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	4548.78	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.008571429	mg/kg-day
* RfDo	0.004	mg/kg-day
* Sfi	0.0273	(mg/kg-day)-1
* Sfo	0.055	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.001	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	6.36E-02	cm2/s
* Di	0.09	cm2/s
* E	0.35	unitless
* Kas	0.08	g soil/cm3 air
* HLC	0.01	atm-m3/mol
* Kd	3.00	cm3/g
* Koc	150.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016) Chemical Specific Parameters. Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables. (<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Bromodichloromethane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SfO)(10^{-6} \text{ kg/mg})(IRs) + (SfI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.73E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SfI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SfO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm·m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	4324.45	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDI	0	mg/kg-day
* RfDo	0.02	mg/kg-day
* Sfi	0.1295	(mg/kg-day)-1
* Sfo	0.062	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.001	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.96E-02	cm2/s
* Di	0.06	cm2/s
* E	0.35	unitless
* Kas	0.13	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.64	cm3/g
* Koc	32.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Paramters Table:

· U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016) Chemical Specific Parameters.

Accessible online at:

[NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.](http://www.epa.gov/risk/risk-based-screening-table-generic-tables)

<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>.

A THQ of 1.0 was selected when using RSL tables.

Bromoform

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	2.71E+02 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	10742.90	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0.022	mg/kg-day
* Sfi	0.00385	(mg/kg-day)-1
* Sfo	0.0079	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	2.55E-02	cm2/s
* Di	0.04	cm2/s
* E	0.35	unitless
* Kas	0.03	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.64	cm3/g
* Koc	32.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016) Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Cadmium

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	8.35E+04 mg/kg	EQUATION 6 NON-VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	6.34E+02 mg/kg	EQUATION 7 NON-VOLATILE COMPOUNDS	
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm·m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	#VALUE!	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	2.85714E-06	mg/kg-day
* RfDo	0.001	mg/kg-day
* Sfi	6.3	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	#VALUE!	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	#VALUE!	cm2/s
* Di	-	cm2/s
* E	0.35	unitless
* Kas	#VALUE!	g soil/cm3 air
* HLC	-	atm-m3/mol
* Kd	#VALUE!	cm3/g
* Koc	-	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Carbon Disulfide

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	8.57E+02	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	892.91	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.2	mg/kg-day
* RfDo	0.1	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.016	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	7.78E-02	cm2/s
* Di	0.11	cm2/s
* E	0.35	unitless
* Kas	1.30	g soil/cm3 air
* HLC	0.01	atm-m3/mol
* Kd	0.44	cm3/g
* Koc	22.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Carbon Tetrachloride

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	6.50E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.62E+02 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

CALCULATED		
CHEMICAL SPECIFIC TABLE		
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	1240.42	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.028571429	mg/kg-day
* RfDo	0.004	mg/kg-day
* Sfi	0.021	(mg/kg-day)-1
* Sfo	0.07	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.008	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	4.03E-02	cm2/s
* Di	0.06	cm2/s
* E	0.35	unitless
* Kas	1.30	g soil/cm3 air
* HLC	0.03	atm-m3/mol
* Kd	0.88	cm3/g
* Koc	44.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Chlorobenzene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	5.65E+02	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	8505.83	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.014285714	mg/kg-day
* RfDo	0.02	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	5.09E-02	cm2/s
* Di	0.07	cm2/s
* E	0.35	unitless
* Kas	0.03	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	4.60	cm3/g
* Koc	230.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables. (<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Chloroethane (Ethyl Chloride)

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SfO)(10^{-6} \text{ kg/mg})(IRs) + (SfI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m³/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m³/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SfI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SfO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m³/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m³)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	1142.81	m ³ /kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m ³ /day
* RfDi	2.857142857	mg/kg-day
* RfDo	0	mg/kg-day
* Sfi	0	(mg/kg-day) ⁻¹
* Sfo	0	(mg/kg-day) ⁻¹
* PEF	4.63E+09	m ³ /kg
* Irw	2	L/day
* K	0.5	L/m ³

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm ²
* π	3.14	unitless

0.5 acres

* α	0.011	cm ² /s
* T	7.90E+08	s
* p	2.65	g/cm ³
* fOC	0.02	g/g
* Dei	7.07E-02	cm ² /s
* Di	0.10	cm ² /s
* E	0.35	unitless
* Kas	0.93	g soil/cm ³ air
* HLC	0.01	atm-m ³ /mol
* Kd	0.44	cm ³ /g
* Koc	22.00	cm ³ /g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Chloroform

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.85E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.54E+02 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{as} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	2750.62	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.028	mg/kg-day
* RfDo	0.01	mg/kg-day
* Sfi	0.0805	(mg/kg-day)-1
* Sfo	0.031	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.003	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	5.45E-02	cm2/s
* Di	0.08	cm2/s
* E	0.35	unitless
* Kas	0.24	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.64	cm3/g
* Koc	32.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Chromium, Total

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 NON-VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	#VALUE!	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

	α	#VALUE!	cm^2/s
* T	7.90E+08	s	
* p	2.65	g/cm3	
* fOC	0.02	g/g	
* Dei	#VALUE!	cm2/s	
* Di	-	cm2/s	
* E	0.35	unitless	
* Kas	#VALUE!	g soil/cm3 air	
* HLC	-	atm-m3/mol	
* Kd	#VALUE!	cm3/g	
* Koc	-	cm3/g	

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.
(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Cis 1,2-DCE

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#VALUE!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#VALUE!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	2739.89	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	#VALUE!	mg/kg-day
* RfDo	0.002	mg/kg-day
* Sfi	#VALUE!	(mg/kg-day)-1
* Sfo	-	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.003	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	6.22E-02	cm2/s
* Di	0.09	cm2/s
* E	0.35	unitless
* Kas	0.21	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.80	cm3/g
* Koc	40.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Dibromochloromethane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.78E+02 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm·m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	8803.37	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0.02	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0.084	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	2.62E-02	cm2/s
* Di	0.04	cm2/s
* E	0.35	unitless
* Kas	0.05	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.64	cm3/g
* Koc	32.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016) Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Dibromomethane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm·m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	5823.62	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.001142857	mg/kg-day
* RfDo	0	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.001	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.89E-02	cm2/s
* Di	0.06	cm2/s
* E	0.35	unitless
* Kas	0.08	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.44	cm3/g
* Koc	22.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Dichlordiflouromethane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	8.03E-02 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm·m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	168.81	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0	mg/kg-day
* Sfi	0.238	(mg/kg-day)-1
* Sfo	0.54	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.041	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	5.37E-02	cm2/s
* Di	0.08	cm2/s
* E	0.35	unitless
* Kas	15.84	g soil/cm3 air
* HLC	0.34	atm-m3/mol
* Kd	0.88	cm3/g
* Koc	44.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Paramters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Ethylbenzene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	9.27E+01 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	9.13E+03 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	7662.52	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.285714286	mg/kg-day
* RfDo	0.1	mg/kg-day
* Sfi	0.00875	(mg/kg-day)-1
* Sfo	0.011	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	4.81E-02	cm2/s
* Di	0.07	cm2/s
* E	0.35	unitless
* Kas	0.04	g soil/cm3 air
* HLC	0.01	atm-m3/mol
* Kd	9.00	cm3/g
* Koc	450.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Paramters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.
(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Hexachlorobutadiene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.97E+01 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm·m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	14872.42	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0.001	mg/kg-day
* Sfi	0.077	(mg/kg-day) ⁻¹
* Sfo	0.078	(mg/kg-day) ⁻¹
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	1.91E-02	cm2/s
* Di	0.03	cm2/s
* E	0.35	unitless
* Kas	0.02	g soil/cm3 air
* HLC	0.01	atm-m3/mol
* Kd	17.00	cm3/g
* Koc	850.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Paramters Table:

· U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

[NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.](http://www.epa.gov/risk/risk-based-screening-table-generic-tables)

<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>.

A THQ of 1.0 was selected when using RSL tables.

Isopropylbenzene (Cumene)

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDi)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	4.28E+03	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	8255.69	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.114285714	mg/kg-day
* RfDo	0.1	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	4.24E-02	cm2/s
* Di	0.06	cm2/s
* E	0.35	unitless
* Kas	0.04	g soil/cm3 air
* HLC	0.01	atm-m3/mol
* Kd	14.00	cm3/g
* Koc	700.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Lead

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDi)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
----	---------	-------	-------------------------------

C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm·m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	#DIV/0!	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

	α	#DIV/0!	cm^2/s
* T	7.90E+08	s	
* p	2.65	g/cm3	
* fOC	0.02	g/g	
* Dei	0.00E+00	cm2/s	
* Di	0.00	cm2/s	
* E	0.35	unitless	
* Kas	#DIV/0!	g soil/cm3 air	
* HLC	0.00	atm-m3/mol	
* Kd	0.00	cm3/g	
* Koc	0.00	cm3/g	

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Methyl Bromide

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	6.96E+00	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{as} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	1009.45	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.001428571	mg/kg-day
* RfDo	0.0014	mg/kg-day
* Sfi	0	(mg/kg-day) ⁻¹
* Sfo	0	(mg/kg-day) ⁻¹
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.013	cm^2/s
* T	7.90E+08	s
* ρ	2.65	g/cm3
* fOC	0.02	g/g
* Dei	7.07E-02	cm2/s
* Di	0.10	cm2/s
* E	0.35	unitless
* Kas	1.15	g soil/cm3 air
* HLC	0.01	atm-m3/mol
* Kd	0.26	cm3/g
* Koc	13.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.
(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Methyl Chloride

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	823.41	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.025714286	mg/kg-day
* RfDo	0	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.019	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	8.49E-02	cm2/s
* Di	0.12	cm2/s
* E	0.35	unitless
* Kas	1.39	g soil/cm3 air
* HLC	0.01	atm-m3/mol
* Kd	0.26	cm3/g
* Koc	13.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Methylene Chloride

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SfO)(10^{-6} \text{ kg/mg})(IRs) + (SfI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.57E+03 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.21E+03 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SfI – Inhalation cancer slope factor (mg/kg-day)-1

SfO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	2104.79	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.171428571	mg/kg-day
* RfDo	0.006	mg/kg-day
* Sfi	0.000035	(mg/kg-day)-1
* Sfo	0.002	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.004	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	7.07E-02	cm2/s
* Di	0.10	cm2/s
* E	0.35	unitless
* Kas	0.31	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.44	cm3/g
* Koc	22.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.
(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

4-Methyl-2-pentanone

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	9656.11	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.857142857	mg/kg-day
* RfDo	0	mg/kg-day
* Sfi	0	(mg/kg-day) ⁻¹
* Sfo	0	(mg/kg-day) ⁻¹
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* ρ	2.65	g/cm3
* fOC	0.02	g/g
* Dei	4.95E-02	cm2/s
* Di	0.07	cm2/s
* E	0.35	unitless
* Kas	0.02	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.26	cm3/g
* Koc	13.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Naphthalene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	6.04E+01 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDi)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	2.59E+02 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{as} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	63333.39	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.000857143	mg/kg-day
* RfDo	0.02	mg/kg-day
* Sfi	0.119	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	4.24E-02	cm2/s
* Di	0.06	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	30.00	cm3/g
* Koc	1500.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Paramters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

PCB 77

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.11E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	4.472025281 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	3457808.14	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.000114286	mg/kg-day
* RfDo	0.000007	mg/kg-day
* Sfi	13.3	(mg/kg-day)-1
* Sfo	13	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.47E-02	cm2/s
* Di	0.05	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	1560.00	cm3/g
* Koc	78000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

PCB 81

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10^{-5} (10^{-4} for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.24E-01 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.456204456 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	714748.47	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	3.71429E-05	mg/kg-day
* RfDo	0.0000023	mg/kg-day
* Sfi	38.5	(mg/kg-day)-1
* Sfo	39	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.47E-02	cm2/s
* Di	0.05	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	1560.00	cm3/g
* Koc	78000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

PCB 105

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.32E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	14.58574336 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	835139.65	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.000371429	mg/kg-day
* RfDo	0.000023	mg/kg-day
* Sfi	3.85	(mg/kg-day)-1
* Sfo	3.9	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.32E-02	cm2/s
* Di	0.05	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	2600.00	cm3/g
* Koc	130000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

PCB 114

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.52E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	14.64613802 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	1456948.96	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.000371429	mg/kg-day
* RfDo	0.000023	mg/kg-day
* Sfi	3.85	(mg/kg-day)-1
* Sfo	3.9	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.32E-02	cm2/s
* Di	0.05	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	2600.00	cm3/g
* Koc	130000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

PCB 118

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.31E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	14.58324933 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	820614.36	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.000371429	mg/kg-day
* RfDo	0.000023	mg/kg-day
* Sfi	3.85	(mg/kg-day)-1
* Sfo	3.9	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.32E-02	cm2/s
* Di	0.05	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	2600.00	cm3/g
* Koc	130000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

PCB 123

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.40E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	14.61062332 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	1013821.23	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.000371429	mg/kg-day
* RfDo	0.000023	mg/kg-day
* Sfi	3.85	(mg/kg-day)-1
* Sfo	3.9	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.32E-02	cm2/s
* Di	0.05	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	2600.00	cm3/g
* Koc	130000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

PCB 126

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.01E-03 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	0.004447097 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{as} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	1013821.23	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	1.14286E-07	mg/kg-day
* RfDo	0.000000007	mg/kg-day
* Sfi	13300	(mg/kg-day)-1
* Sfo	13000	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.32E-02	cm2/s
* Di	0.05	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	2600.00	cm3/g
* Koc	130000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

PCB 156

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.54E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	14.65110046 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	1551439.34	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.000371429	mg/kg-day
* RfDo	0.000023	mg/kg-day
* Sfi	3.85	(mg/kg-day)-1
* Sfo	3.9	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.11E-02	cm2/s
* Di	0.04	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	4200.00	cm3/g
* Koc	210000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

PCB 157

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.52E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	14.64581754 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	1451238.59	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.000371429	mg/kg-day
* RfDo	0.000023	mg/kg-day
* Sfi	3.85	(mg/kg-day)-1
* Sfo	3.9	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.11E-02	cm2/s
* Di	0.04	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	4200.00	cm3/g
* Koc	210000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Paramters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

PCB 167

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.62E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	14.67394259 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	2209908.55	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.000371429	mg/kg-day
* RfDo	0.000023	mg/kg-day
* Sfi	3.85	(mg/kg-day) ⁻¹
* Sfo	3.9	(mg/kg-day) ⁻¹
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm ² /s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.11E-02	cm2/s
* Di	0.04	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	4200.00	cm3/g
* Koc	210000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

PCB 169

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.62E-03 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	0.014673943 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	2209908.55	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	3.71429E-07	mg/kg-day
* RfDo	0.000000023	mg/kg-day
* Sfi	3850	(mg/kg-day)-1
* Sfo	3900	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.11E-02	cm2/s
* Di	0.04	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	4200.00	cm3/g
* Koc	210000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

PCB 189

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.69E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	14.69279882 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	3396564.33	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.000371429	mg/kg-day
* RfDo	0.000023	mg/kg-day
* Sfi	3.85	(mg/kg-day)-1
* Sfo	3.9	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	2.97E-02	cm2/s
* Di	0.04	cm2/s
* E	0.35	unitless
* Kas	0.00	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	7000.00	cm3/g
* Koc	350000.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

p-Isopropyltoluene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SfO)(10^{-6} \text{ kg/mg})(IRs) + (SfI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
----	---------	-------	-------------------------------

C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SfI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SfO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm·m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	#DIV/0!	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	#DIV/0!	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	0.00E+00	cm2/s
* Di	0.00	cm2/s
* E	0.35	unitless
* Kas	#DIV/0!	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.00	cm3/g
* Koc	0.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Styrene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.54E+04	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	12625.59	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.285714286	mg/kg-day
* RfDo	0.2	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	5.02E-02	cm2/s
* Di	0.07	cm2/s
* E	0.35	unitless
* Kas	0.01	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	9.00	cm3/g
* Koc	450.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Tetrachloroethylene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.14E+02 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.41E+02 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)
 THI – Target Hazard Index
 TR– Target Excess Risk
 BW – Body Weight (kg)
 ED – Exposure Duration (years)
 AT – Averaging Time (years)
 VF – Soil to Air Volatilization Factor (m3/kg)
 EF – Exposure Frequency (days/year)
 IRs – Ingestion rate of soil (mg/day)
 IRa – Ingestion rate of air (m3/day)
 RfDi – Inhalation reference dose (mg/kg-day)
 RfDo – Oral reference dose (mg/kg-day)
 SFI – Inhalation cancer slope factor (mg/kg-day)-1
 SFO – Oral cancer slope factor (mg/kg-day)-1
 PEF – Particulate Emission Factor (m3/kg)
 Daily water ingestion rate (L/day)
 Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45
 V wind speed in mixing zone (m/s) = 2.25
 DH diffusion height (m) = 2
 A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)
 [PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)
 [RHO]s density of soil solids (g/cm³) = 2.65
 OC soil organic carbon content fraction (unitless) = 0.02
 D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}
 D_i molecular diffusivity (cm²/s) (chemical-specific)
 E total soil porosity (unitless) = 0.35
 K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41
 H Henry's law constant (atm-m³/mol) (chemical-specific)
 K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)
 K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	2628.21	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.011428571	mg/kg-day
* RfDo	0.006	mg/kg-day
* Sfi	0.00091	(mg/kg-day)-1
* Sfo	0.0021	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.003	cm^2/s
* T	7.90E+08	s
* ρ	2.65	g/cm3
* fOC	0.02	g/g
* Dei	3.54E-02	cm2/s
* Di	0.05	cm2/s
* E	0.35	unitless
* Kas	0.39	g soil/cm3 air
* HLC	0.02	atm-m3/mol
* Kd	1.90	cm3/g
* Koc	95.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Paramters Table:
 U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.
 Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.
<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>.

A THQ of 1.0 was selected when using RSL tables.

Toluene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	2.21E+04	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)
[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	5583.16	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	1.428571429	mg/kg-day
* RfDo	0.08	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.001	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	5.52E-02	cm2/s
* Di	0.08	cm2/s
* E	0.35	unitless
* Kas	0.06	g soil/cm3 air
* HLC	0.01	atm-m3/mol
* Kd	4.60	cm3/g
* Koc	230.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Paramters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters. Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables. (<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Trans-1,2-Dichloroethene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)
 THI – Target Hazard Index
 TR – Target Excess Risk
 BW – Body Weight (kg)
 ED – Exposure Duration (years)
 AT – Averaging Time (years)
 VF – Soil to Air Volatilization Factor (m³/kg)
 EF – Exposure Frequency (days/year)
 IRs – Ingestion rate of soil (mg/day)
 IRa – Ingestion rate of air (m³/day)
 RfDi – Inhalation reference dose (mg/kg-day)
 RfDo – Oral reference dose (mg/kg-day)
 SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹
 SFO – Oral cancer slope factor (mg/kg-day)⁻¹
 PEF – Particulate Emission Factor (m³/kg)
 Daily water ingestion rate (L/day)
 Water-to air volatilization factor (L/m³)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45
 V wind speed in mixing zone (m/s) = 2.25
 DH diffusion height (m) = 2
 A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)
 [PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)
 [RHO]s density of soil solids (g/cm³) = 2.65
 OC soil organic carbon content fraction (unitless) = 0.02
 D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}
 D_i molecular diffusivity (cm²/s) (chemical-specific)
 E total soil porosity (unitless) = 0.35
 K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41
 H Henry's law constant (atm-m³/mol) (chemical-specific)
 K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)
 K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	1763.44	m ³ /kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m ³ /day
* RfDi	0	mg/kg-day
* RfDo	0.02	mg/kg-day
* Sfi	0	(mg/kg-day) ⁻¹
* Sfo	0	(mg/kg-day) ⁻¹
* PEF	4.63E+09	m ³ /kg
* Irw	2	L/day
* K	0.5	L/m ³

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm ²
* π	3.14	unitless

0.5 acres

* α	0.006	cm ² /s
* T	7.90E+08	s
* ρ	2.65	g/cm ³
* fOC	0.02	g/g
* Dei	6.22E-02	cm ² /s
* Di	0.09	cm ² /s
* E	0.35	unitless
* Kas	0.48	g soil/cm ³ air
* HLC	0.01	atm-m ³ /mol
* Kd	0.80	cm ³ /g
* Koc	40.00	cm ³ /g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:
 U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016) Chemical Specific Parameters.
 Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.
<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>.

A THQ of 1.0 was selected when using RSL tables.

Trichloroethylene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.82E+01 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	6.62E+00 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	2430.15	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.000571429	mg/kg-day
* RfDo	0.0005	mg/kg-day
* Sfi	0.01435	(mg/kg-day)-1
* Sfo	0.046	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.003	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	4.88E-02	cm2/s
* Di	0.07	cm2/s
* E	0.35	unitless
* Kas	0.33	g soil/cm3 air
* HLC	0.01	atm-m3/mol
* Kd	1.22	cm3/g
* Koc	61.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Trichloroflouromethane

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)⁻¹

SFO – Oral cancer slope factor (mg/kg-day)⁻¹

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	105.50	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0	mg/kg-day
* RfDo	0.3	mg/kg-day
* Sfi	0	(mg/kg-day) ⁻¹
* Sfo	0	(mg/kg-day) ⁻¹
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.508	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	1.06E+00	cm2/s
* Di	1.50	cm2/s
* E	0.35	unitless
* Kas	4.52	g soil/cm3 air
* HLC	0.10	atm-m3/mol
* Kd	0.88	cm3/g
* Koc	44.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Paramters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Vinyl Acetate

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	8.23E+02	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	2964.35	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.057142857	mg/kg-day
* RfDo	1	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk (Eqtn 7)

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.002	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	6.01E-02	cm2/s
* Di	0.09	cm2/s
* E	0.35	unitless
* Kas	0.19	g soil/cm3 air
* HLC	0.00	atm-m3/mol
* Kd	0.11	cm3/g
* Koc	5.60	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Vinyl Chloride

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SfO)(10^{-6} \text{ kg/mg})(IRs) + (SfI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	3.52E+00 mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	7.66E+01 mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SfI – Inhalation cancer slope factor (mg/kg-day)-1

SfO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{EI} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	574.10	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.028571429	mg/kg-day
* RfDo	0.003	mg/kg-day
* Sfi	0.0154	(mg/kg-day)-1
* Sfo	0.72	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.027	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	7.78E-02	cm2/s
* Di	0.11	cm2/s
* E	0.35	unitless
* Kas	2.61	g soil/cm3 air
* HLC	0.03	atm-m3/mol
* Kd	0.44	cm3/g
* Koc	22.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.

Xylene

TYPE 1 RRS

Equation 6

This is the concentration for which the upper bound excess cancer risk is less than or equal to 10⁻⁵ (10⁻⁴ for class C carcinogens) from soil ingestion and inhalation of volatiles and particulates using EQ 6 of RAGS Part B and residential assumptions in Table 3 of Appendix II of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(TR)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(SFO)(10^{-6} \text{ kg/mg})(IRs) + (SFI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	#DIV/0!	mg/kg	EQUATION 6 VOLATILE COMPOUNDS
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Equation 7

This is the concentration unlikely to cause non-cancer toxic effects from soil ingestion and inhalation of volatiles and particulates using EQ 7 of RAGS Part B and non-residential assumptions in Table 3 of Appendix III of Georgia Administrative Code 391-3-19-.07

$$C \text{ (mg/kg)} = \frac{(THI)(BW)(AT)(365 \text{ days/year})}{(EF)(ED)[(1/RfDo)(10^{-6} \text{ kg/mg})(IRs) + (1/RfDI)(IRa)\{(1/VF) + (1/PEF)\}]}$$

C=	1.05E+03	mg/kg	EQUATION 7 VOLATILE COMPOUNDS
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C – Concentration in soil (mg/kg)

THI – Target Hazard Index

TR– Target Excess Risk

BW – Body Weight (kg)

ED – Exposure Duration (years)

AT – Averaging Time (years)

VF – Soil to Air Volatilization Factor (m3/kg)

EF – Exposure Frequency (days/year)

IRs – Ingestion rate of soil (mg/day)

IRa – Ingestion rate of air (m3/day)

RfDi – Inhalation reference dose (mg/kg-day)

RfDo – Oral reference dose (mg/kg-day)

SFI – Inhalation cancer slope factor (mg/kg-day)-1

SFO – Oral cancer slope factor (mg/kg-day)-1

PEF – Particulate Emission Factor (m3/kg)

Daily water ingestion rate (L/day)

Water-to air volatilization factor (L/m3)

$$VF = \frac{LS * V * DH}{A} * \frac{(\pi * \alpha * T)^{1/2}}{(2 * D_{EI} * E * K_{as} * 10^{-3} \text{ Kg/g})}$$

WHERE:

LS length of side of contaminated area (m) = 45

V wind speed in mixing zone (m/s) = 2.25

DH diffusion height (m) = 2

A area of contamination (cm²) = 2.03 x 10⁷ (=0.5 acre)

[PI] pi = 3.14

$$\alpha = \frac{(D_{ei} * E)}{E + (p)(1 - E)/K_{as}}$$

T exposure interval (s) = 7.9 x 10⁸ (=25 yr)

[RHO]s density of soil solids (g/cm³) = 2.65

OC soil organic carbon content fraction (unitless) = 0.02

D_{ae} effective diffusivity (cm²/s) = D_i x E^{0.33}

D_i molecular diffusivity (cm²/s) (chemical-specific)

E total soil porosity (unitless) = 0.35

K_{oc} soil/air partition coefficient (g soil/cm³ air) = (H/K_a) x 41

H Henry's law constant (atm-m³/mol) (chemical-specific)

K_a soil-water partition coefficient (cm³/g) = K_{oc} x OC (or chemical specific)

K_{oc} organic carbon partition coefficient (cm³/g) (chemical-specific)

	CALCULATED	
	CHEMICAL SPECIFIC TABLE	
* THI	1	unitless
* TR	1.00E-05	unitless
* BW	70	kg
* ED	30	years
* AT	7.00E+01	years
* VF	7647.96	m3/kg
* EF	350	days/year
* Irs	114	mg/day
* Ira	15	m3/day
* RfDi	0.028571429	mg/kg-day
* RfDo	0.2	mg/kg-day
* Sfi	0	(mg/kg-day)-1
* Sfo	0	(mg/kg-day)-1
* PEF	4.63E+09	m3/kg
* Irw	2	L/day
* K	0.5	L/m3

10⁻⁵ for Class A/B carcinogens; 10⁻⁴ for Class C carcinogens

25 for non-residential; 30 for residential

AT=ED, if non-cancer risk [Eqtn 7]

250 for non-residential; 350 for residential

* LS	45	m
* V	2.25	m/s
* DH	2	m
* A	2.03E+07	cm2
* π	3.14	unitless

0.5 acres

* α	0.000	cm^2/s
* T	7.90E+08	s
* p	2.65	g/cm3
* fOC	0.02	g/g
* Dei	4.88E-02	cm2/s
* Di	0.07	cm2/s
* E	0.35	unitless
* Kas	0.04	g soil/cm3 air
* HLC	0.01	atm-m3/mol
* Kd	7.60	cm3/g
* Koc	380.00	cm3/g

=25 years

*values were taken from Table I of Appendix III (GAC 391-3-19)

Collect chemical-specific parameter values from EPA's Chemical Specific Parameters Table:

U.S. EPA (May 2016) Regional Screening Levels (RSLs) - Generic Tables (May 2016): Chemical Specific Parameters.

Accessible online at:

NOTE: US EPA Region 4 has approved the use of the Regional Screening Level Tables.

(<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>).

A THQ of 1.0 was selected when using RSL tables.