APPENDIX E

Fate and Transport Modeling Results

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LIST OF TABLES

Table E-1. Physical and Chemical Properties of Inorganic SRCs in Surface and Subsurface Soil and Sediment 1
Table E-2. Physical and Chemical Properties of Organic SRCs in Surface and Subsurface Soil and Sediment 2
Table E-3. HELP Model Parameters for Developing Water Balance Estimates 4
Table E-4. Initial CMCOPCs Based on Maximum Concentration of SRCs Compared to GSSL for Soil – Pond Bank Aggregate 5
Table E-5. DAF Calculation for Soil – Pond Bank Aggregate 7
Table E-6. Initial CMCOPCs Based on Comparison of the SRC's Maximum Concentration to SSSL with a DAF of 1.00 – Pond Bank Aggregate 8
Table E-7. Initial CMCOPCs Based on Arrival Time to Groundwater Table in Less Than or Equal to 1,000 Years – Pond Bank Aggregate 9
Table E-8. Results for SRCs in Sediment at Backwater Area Aggregate 10
Table E-9. Results for SRCs in Sediment at Upper Cobbs Pond Aggregate 12
Table E-10. Results for SRCs in Sediment at Lower Cobbs Pond Aggregate 14
Table E-11. Climatic Data from SESOIL for Upper and Lower Cobbs Ponds AOC 17
Table E-12. Physical and Chemical Properties of Initial CMCOPCs Selected for SESOIL Modeling – Pond Bank Aggregate 18
Table E-13. Load Application Data for SESOIL Model of Initial CMCOPCs – Pond Bank Aggregate 19
Table E-14. Physical and Chemical Properties of Final CMCOPCs Selected for AT123D Modeling – Pond Bank Aggregate 21

LIST OF FIGURES

Figure E-1. TNT Biotransformation Pathway 25
Figure E-2. 2,6-DNT Biotransformation Pathway 25
Figure E-3. HMX Biotransformation Pathway 26
Figure E-4. Predicted Contaminant Mass Loading for AT123D Modeling – Arsenic 27
Figure E-5. Predicted Contaminant Mass Loading for AT123D Modeling – Barium 27
Figure E-6. Predicted Contaminant Mass Loading for AT123D Modeling – Hexavalent Chromium 28
Figure E-7. Predicted Contaminant Mass Loading for AT123D Modeling – Nickel 28
Figure E-8. Predicted Contaminant Mass Loading for AT123D Modeling – Selenium 29
Figure E-9. Predicted Contaminant Mass Loading for AT123D Modeling – Thallium 29
Figure E-10. Predicted Contaminant Mass Loading for AT123D Modeling – beta-BHC 30
Figure E-11. Predicted Concentration of Arsenic in Groundwater Based on AT123D Modeling 30
Figure E-12. Predicted Concentration of Barium in Groundwater Based on AT123D Modeling 31
Figure E-13. Predicted Concentration of Nickel in Groundwater Based on AT123D Modeling 31
Figure E-14. Predicted Concentration of Selenium in Groundwater Based on AT123D Modeling 32
Figure E-15. Predicted Concentration of Thallium in Groundwater Based on AT123D Modeling 32
Figure E-16. Predicted Concentration of Beta-BHC in Groundwater Based on AT123D Modeling 33

Tables

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Table E-1. Physical and Chemical Properties of Inorganic SRCs in Surface and Subsurface Soil and Sediment

Analyte	K_d (L/kg)	Reference	HLC (atm-m^3/mol)	Reference	C_w (mg/L)	SSL Type	Generic SSL (mg/kg)	Reference	SSL Type
Inorganic Chemicals									
Aluminum	1.50E+03	a	NA	-	2.00E+01	RSL	3.00E+04	a	Risk
Antimony	4.50E+01	a	NA	-	6.00E-03	MCL	2.70E-01	a	MCL
Arsenic	2.90E+01	a	NA	-	1.00E-02	MCL	2.90E-01	a	MCL
Barium	4.10E+01	a	NA	-	2.00E+00	MCL	8.20E+01	a	MCL
Beryllium	7.90E+02	a	NA	-	4.00E-03	MCL	3.20E+00	a	MCL
Cadmium	7.50E+01	a	NA	-	5.00E-03	MCL	3.80E-01	a	MCL
Chromium	1.80E+06	a	NA	-	1.00E-01	MCL	1.80E+05	a	MCL
Chromium, hexavalent	1.90E+01	a	NA	-	3.50E-05	RSL	6.70E-04	a	Risk
Cobalt	4.50E+01	b	NA	-	6.00E-03	RSL	2.70E-01	a	Risk
Copper	3.50E+01	a	NA	-	1.30E+00	MCL	4.60E+01	a	MCL
Cyanide	9.90E+00	a	2.42E-02	a	2.00E-01	MCL	2.00E+00	a	MCL
Lead	9.00E+02	a	NA	-	1.50E-02	MCL	1.40E+01	a	MCL
Mercury	5.20E+01	a	1.14E-02	a	2.00E-03	MCL	1.00E-01	a	MCL
Nickel	6.50E+01	a	NA	-	3.90E-01	RSL	2.60E+01	a	Risk
Selenium	5.00E+00	a	NA	-	5.00E-02	MCL	2.60E-01	a	MCL
Silver	8.30E+00	a	NA	-	9.40E-02	RSL	8.00E-01	a	Risk
Thallium	7.10E+01	a	NA	-	2.00E-03	MCL	1.40E-01	a	MCL
Vanadium	1.00E+03	a	NA	-	8.60E-02	RSL	8.60E+01	a	Risk
Zinc	6.20E+01	a	NA	-	6.00E+00	RSL	3.70E+02	a	Risk

[a]U.S. Environmental Protection Agency (USEPA) RSL generic tables June 2015; found at: http://www2.epa.gov/risk/risk-based-screening-table-generic-tables.
C_w = Target groundwater concentration (either MCL or RSL)
HLC = Henry's Law Constant.
K_d = Distribution coefficient.
L/kg = Liters per kilogram.
MCL = Maximum contaminant level.
mg/L = Milligrams per liter.
NA = Not applicable.
RSL = USEPA Regional Screening Level (USEPA 2015).
SRC = Site-related contaminant.
SSL = Soil screening level.

Table E-2. Physical and Chemical Properties of Organic SRCs in Surface and Subsurface Soil and Sediment

Analyte	K_{oc} (L/kg)	Reference	HLC (atm-m^3/mol)	Reference	C_w (mg/L)	SSL Type	Generic SSL (mg/kg)	Reference	SSL Type
Explosives									
1,3-Dinitrobenzene	3.52E+02	a	4.90E-08	a	2.00E-03	RSL	1.80E-03	a	Risk
2,4,6-Trinitrotoluene	2.81E+03	a	2.08E-08	a	2.50E-03	RSL	1.50E-02	a	Risk
2,6-Dinitrotoluene	5.87E+02	a	7.47E-07	a	4.80E-05	RSL	6.70E-05	a	Risk
4-Amino-2,6-Dinitrotoluene	2.83E+02	a	1.62E-10	a	3.90E-02	RSL	3.00E-02	a	Risk
HMX	5.32E+02	a	8.67E-10	a	1.00E+00	RSL	1.30E+00	a	Risk
Nitrocellulose	1.00E+01	a	3.29E-23	a	6.00E+04	RSL	1.30E+04	a	Risk
Tetryl	4.61E+03	a	2.71E-09	a	3.90E-02	RSL	3.70E-01	a	Risk
Semi-volatile Organic Compounds									
2-Methylnaphthalene	2.48E+03	a	5.18E-04	a	3.60E-02	RSL	1.90E-01	a	Risk
Acenaphthene	5.03E+03	a	1.84E-04	a	5.30E-01	RSL	5.50E+00	a	Risk
Acenaphthylene[c]	7.40E+03	b	1.84E-04	b	5.30E-01	RSL	5.50E+00	a	Risk
Anthracene	1.64E+04	a	5.56E-05	a	1.80E+00	RSL	5.80E+01	a	Risk
Benz(a)anthracene	1.77E+05	a	1.20E-05	a	1.20E-05	RSL	4.25E-03	a	Risk
Benzenemethanol	2.15E+01	a	3.37E-07	a	2.00E+00	RSL	4.80E-01	a	Risk
Benzo(a)pyrene	5.87E+05	a	4.57E-07	a	2.00E-04	MCL	2.40E-01	a	MCL
Benzo(b)fluoranthene	5.99E+05	a	6.57E-07	a	3.40E-05	RSL	4.10E-02	a	Risk
Benzo(ghi)perylene[d]	1.07E+07	b	1.40E-07	b	1.20E-01	RSL	1.30E+01	a	Risk
Benzo(k)fluoranthene	5.87E+05	a	5.84E-07	a	3.40E-04	RSL	4.00E-01	a	Risk
Benzoic Acid	1.66E+01	a	3.81E-08	a	7.50E+01	RSL	1.80E+01	a	Risk
Bis(2-ethylhexyl)phthalate	1.20E+05	a	2.70E-07	a	6.00E-03	MCL	1.40E+00	a	MCL
Butyl benzyl phthalate	7.16E+03	a	1.26E-06	a	1.60E-02	RSL	2.40E-01	a	Risk
Chrysene	1.81E+05	a	5.23E-06	a	3.40E-03	RSL	1.20E+00	a	Risk
Di-n-butyl phthalate	1.16E+03	a	1.81E-06	a	9.00E-01	RSL	2.30E+00	a	Risk
Dibenz(a,h)anthracene	1.91E+06	a	1.41E-07	a	3.40E-06	RSL	1.30E-02	a	Risk
Fluoranthene	5.55E+04	a	8.86E-06	a	8.00E-01	RSL	8.90E+01	a	Risk
Fluorene	9.16E+03	a	9.62E-05	a	2.90E-01	RSL	5.40E+00	a	Risk
Indeno(1,2,3-cd)pyrene	1.95E+06	a	3.48E-07	a	3.40E-05	RSL	1.30E-01	a	Risk
Naphthalene	1.54E+03	a	4.40E-04	a	1.70E-04	RSL	5.40E-04	a	Risk
Phenanthrene[e]	1.82E+04	b	3.93E-05	b	1.20E-01	RSL	1.30E+01	a	Risk
Pyrene	5.43E+04	a	1.19E-05	a	1.20E-01	RSL	1.30E+01	a	Risk

Table E-2. Physical and Chemical Properties of Organic SRCs in Surface and Subsurface Soil and Sediment (continued)

Analyte	K_{oc} (L/kg)	Reference	HLC (atm-m^3/mol)	Reference	C_w (mg/L)	SSL Type	Generic SSL (mg/kg)	Reference	SSL Type
Pesticides/PCBs									
beta-BHC	2.81E+03	a	5.14E-06	a	2.50E-05	RSL	1.40E-04	a	Risk
delta-BHC	NA	-	NA	-	NA	-	NA	-	-
PCB-1254	1.31E+05	a	2.83E-04	a	7.80E-06	RSL	2.00E-03	a	Risk
Volatile Organic Compounds									
2-Butanone	4.51E+00	a	5.69E-05	a	5.60E+00	RSL	1.20E+00	a	Risk
Acetone	2.36E+00	a	3.50E-05	a	1.40E+01	RSL	2.90E+00	a	Risk
Carbon Disulfide	2.17E+01	a	1.44E-02	a	8.10E-01	RSL	2.40E-01	a	Risk
Methylene Chloride	2.17E+01	a	3.25E-03	a	5.00E-03	MCL	1.30E-03	a	MCL

[a]U.S. Environmental Protection Agency (USEPA) RSL generic tables June 2015; found at: http://www2.epa.gov/risk/risk-based-screening-table-generic-tables.
[b]USEPA 1994. *Risk Reduction Engineering Laboratory Treatability Database*, Version 5.0, Office of Research and Development, Cincinnati, Ohio.
[c]Acenaphthene C_w and generic SSL was used as a surrogate for acenaphthylene.
[d]Pyrene C_w and generic SSL was used as a surrogate for benzo(*ghi*)perylene.
[e]Pyrene C_w and generic SSL was used as a surrogate for phenanthrene.
BHC = Hexachlorocyclohexane
C_w = Target groundwater concentration (either MCL or RSL).
HLC = Henry's Law Constant.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
L/kg = Liters per kilogram.
K_{oc} = Organic carbon partition coefficient.
MCL = Maximum contaminant level.
mg/kg = Milligrams per kilogram.
mg/L = Milligrams per liter.
NA = Not applicable.
PCB = Polychlorinated biphenyl.
RSL = USEPA Regional Screening Level (USEPA 2015).
SRC = Site-related contaminant.
SSL = Soil screening level.

Table E-3. HELP Model Parameters for Developing Water Balance Estimates

Layer	Layer Type	Thickness (inches)	Effective K (cm/sec)
1	1--Vertical Percolation Layer	60	2.50E-05
2	3--Barrier Soil Liner	84	8.20E-06

Evapotranspiration and Weather Data	
Station Latitude =	41.24
Maximum Leaf Area Index =	3.5
Start of Growing Season (Julian Date) =	120
End of Growing Season (Julian Date) =	290
Evaporative Zone Depth (inches) =	20 (Fair)

General Design and Evaporative Zone Data	
Fraction of Area Allowing Runoff (%) =	100
Default Soil Database Texture =	Silty Clay
Vegetative Cover =	Poor Stand of Grass
Surface Slope (%) =	4
Slope Length (ft) =	500
SCS Runoff Curve Number =	93

Precipitation Data
Synthetically Generated Using Cleveland, Ohio, Coefficients

Temperature Data
Synthetically Generated Using Cleveland, Ohio, Coefficients

Solar Radiation Data
Synthetically Generated Using Cleveland, Ohio, Coefficients

cm/sec = Centimeters per second.
ft = Feet.
HELP = Hydrologic Evaluation of Landfill Performance.
K = Hydraulic conductivity.SCS = Soil Conservation Service

Table E-4. Initial CMCOPCs Based on Maximum Concentration of SRCs Compared to GSSL for Soil – Pond Bank Aggregate

Analyte	CAS Number	Maximum Concentration (mg/kg)	GSSL (mg/kg)	GSSL Type	Initial CMCOPC? (Yes/No)	CMCOPC Justification	Samples > SSL/Total Samples	Sample ID at Maximum Concentration	Date Collected
Inorganic Chemicals									
Aluminum	7429-90-5	1.92E+04	3.00E+04	Risk	No	Below SSL	0/ 30	ULCPss-005-0001-SO	07/18/01
Arsenic	**7440-38-2**	**2.84E+01**	**2.90E-01**	**MCL**	**Yes**	**Exceeds SSL**	**30/ 30**	**ULCPsd-010-0001-SD**	**08/21/01**
Barium	**7440-39-3**	**9.04E+01**	**8.20E+01**	**MCL**	**Yes**	**Exceeds SSL**	**1/ 30**	**ULCPss-001-0001-SO**	**07/17/01**
Cadmium	**7440-43-9**	**4.90E-01**	**3.80E-01**	**MCL**	**Yes**	**Exceeds SSL**	**1/ 30**	**ULCPsd-010-0001-SD**	**08/21/01**
Chromium	7440-47-3	2.48E+01	1.80E+05	MCL	No	Below SSL	0/ 30	ULCPss-005-0001-SO	07/18/01
Chromium, hexavalent	**18540-29-9**	**1.00E+00**	**6.70E-04**	**Risk**	**Yes**	**Exceeds SSL**	**1/ 1**	**ULCPsd-010-0001-SD**	**08/21/01**
Cobalt	**7440-48-4**	**1.64E+01**	**2.70E-01**	**Risk**	**Yes**	**Exceeds SSL**	**30/ 30**	**CPCsb-032-5113-SO**	**03/24/10**
Copper	7440-50-8	2.39E+01	4.60E+01	MCL	No	Below SSL	0/ 30	ULCPss-005-0001-SO	07/18/01
Cyanide	57-12-5	1.20E+00	2.00E+00	MCL	No	Below SSL	0/ 11	ULCPsd-010-0001-SD	08/21/01
Lead	**7439-92-1**	**3.13E+01**	**1.40E+01**	**MCL**	**Yes**	**Exceeds SSL**	**20/ 30**	**CPCss-042-5020-SO**	**02/23/10**
Mercury	7439-97-6	7.40E-02	1.00E-01	MCL	No	Below SSL	0/ 30	CPCss-043-5021-SO	02/23/10
Nickel	**7440-02-0**	**3.17E+01**	**2.60E+01**	**Risk**	**Yes**	**Exceeds SSL**	**6/ 30**	**CPCsb-032-5116-SO**	**03/24/10**
Selenium	**7782-49-2**	**1.60E+00**	**2.60E-01**	**MCL**	**Yes**	**Exceeds SSL**	**27/ 30**	**CPCsb-032-5114-SO**	**03/24/10**
Silver	7440-22-4	4.50E-01	8.00E-01	Risk	No	Below SSL	0/ 30	ULCPss-001-0001-SO	07/17/01
Thallium	**7440-28-0**	**2.50E-01**	**1.40E-01**	**MCL**	**Yes**	**Exceeds SSL**	**12/ 30**	**ULCPss-001-0001-SO**	**07/17/01**
Vanadium	7440-62-2	3.53E+01	8.60E+01	Risk	No	Below SSL	0/ 30	ULCPss-004-0001-SO	07/17/01
Zinc	7440-66-6	1.21E+02	3.70E+02	Risk	No	Below SSL	0/ 30	ULCPsd-010-0001-SD	08/21/01
Semi-volatile Organic Compounds									
2-Methylnaphthalene	91-57-6	1.40E-02	1.90E-01	Risk	No	Below SSL	0/ 20	CPCsb-032-5116-SO	03/24/10
Acenaphthylene	208-96-8	1.20E-02	5.50E+00	Risk	No	Below SSL	0/ 20	CPCsb-035-5123-SO	03/29/10
Benz(a)anthracene	**56-55-3**	**6.60E-02**	**4.25E-03**	**Risk**	**Yes**	**Exceeds SSL**	**4/ 20**	**CPCss-042-5020-SO**	**02/23/10**
Benzenemethanol	100-51-6	4.40E-01	4.80E-01	Risk	No	Below SSL	0/ 19	CPCss-038-5016-SO	02/23/10
Benzo(a)pyrene	50-32-8	6.60E-02	2.40E-01	MCL	No	Below SSL	0/ 20	CPCsb-035-5124-SO	03/29/10
Benzo(b)fluoranthene	**205-99-2**	**8.00E-02**	**4.10E-02**	**Risk**	**Yes**	**Exceeds SSL**	**2/ 20**	**CPCsb-035-5124-SO**	**03/29/10**
Benzo(ghi)perylene	191-24-2	6.00E-02	1.30E+01	Risk	No	Below SSL	0/ 20	CPCsb-035-5124-SO	03/29/10
Benzo(k)fluoranthene	207-08-9	3.00E-02	4.00E-01	Risk	No	Below SSL	0/ 20	CPCsb-035-5124-SO	03/29/10
Benzoic Acid	65-85-0	1.70E+01	1.80E+01	Risk	No	Below SSL	0/ 19	CPCss-038-5016-SO	02/23/10
Bis(2-ethylhexyl)phthalate	117-81-7	2.30E-01	1.40E+00	MCL	No	Below SSL	0/ 20	CPCss-039-5017-SO	02/23/10

Table E-4. Initial CMCOPCs Based on Maximum Concentration of SRCs Compared to GSSL for Soil – Pond Bank Aggregate (continued)

Analyte	CAS Number	Maximum Concentration (mg/kg)	GSSL (mg/kg)	GSSL Type	Initial CMCOPC? (Yes/No)	CMCOPC Justification	Samples > SSL/Total Samples	Sample ID at Maximum Concentration	Date Collected
Chrysene	218-01-9	6.30E-02	1.20E+00	Risk	No	Below SSL	0/ 20	CPCsb-035-5124-SO	03/29/10
Di-n-butyl phthalate	84-74-2	2.70E-02	2.30E+00	Risk	No	Below SSL	0/ 20	CPCsb-034-5119-SO	03/29/10
Dibenz(a,h)anthracene	**53-70-3**	**2.10E-02**	**1.30E-02**	**Risk**	**Yes**	**Exceeds SSL**	**1/ 20**	**CPCsb-035-5124-SO**	**03/29/10**
Fluoranthene	206-44-0	1.10E-01	8.90E+01	Risk	No	Below SSL	0/ 20	CPCsb-035-5124-SO	03/29/10
Indeno(1,2,3-cd)pyrene	193-39-5	3.70E-02	1.30E-01	Risk	No	Below SSL	0/ 20	CPCsb-035-5124-SO	03/29/10
Phenanthrene	85-01-8	9.30E-02	1.30E+01	Risk	No	Below SSL	0/ 20	CPCss-042-5020-SO	02/23/10
Pyrene	129-00-0	8.80E-02	1.30E+01	Risk	No	Below SSL	0/ 20	CPCsb-035-5124-SO	03/29/10
Explosives									
Nitrocellulose	9004-70-0	1.60E+00	1.30E+04	Risk	No	Below SSL	0/ 5	CPCsb-035-5124-SO	03/29/10
Pesticide/PCB									
beta-BHC	**319-85-7**	**3.50E-03**	**1.40E-04**	**Risk**	**Yes**	**Exceeds SSL**	**1/ 5**	**CPCsb-035-5123-SO**	**03/29/10**

BHC = Hexachlorocyclohexane.
CAS = Chemical Abstract Service.
CMCOPC = Contaminant migration chemical of potential concern.
GSSL = Generic soil screening level.
ID = Identification.
MCL = Maximum contaminant level.
mg/kg = Milligrams per kilogram.
PCB = Polychlorinated biphenyl.
SRC = Site-related contaminant.
SSL = Soil screening level.
Bold = SRCs that exceed the GSSL.

Table E-5. DAF Calculation for Soil – Pond Bank Aggregate

$$DAF = 1 + \frac{(K \times i \times d)}{(q \times L)}$$

$$d = \sqrt{0.0112 \times L^2} + d_a \times \left[1 - \exp\left(\frac{-L \times q}{K \times i \times d_a}\right)\right]$$

Parameter	Symbol	Value	Unit	Note
DAF	DAF	1.00	unitless	Calculated from DAF equation shown above
Aquifer Hydraulic Conductivity	K	1.78E+00	m/year	Average from Upper and Lower Cobbs Ponds monitoring wells (MKM 2005)
Horizontal Hydraulic Gradient	i	1.10E-02	m/m	Average hydraulic gradient determined from Figure 3-1
Percolation Rate	q	9.40E-02	m/year	Developed from HELP model from Cleveland, Ohio, weather data
Source Length Parallel to Groundwater flow	L	274	m	Based on width of Pond Bank soil aggregate in Figure 3-1
Mixing Zone Depth	d	6	m	Determined from the lower value between above equation for d (d = 35.00 m) and d_a
Aquifer Thickness	d_a	6	m	Facility-wide assumption for the unconsolidated aquifer presented in the Load Line 1 investigation (USACE 2003)

DAF = Dilution attenuation factor.

HELP = Hydrologic Evaluation of Landfill Performance.

MKM 2005. *Final Phase II Remedial Investigation Report for Upper and Lower Cobbs Ponds*. September 2005.

USACE (U.S. Army Corps of Engineers) 2003. *Phase II Remedial Investigation Report for the Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. June 2003.

Table E-6. Initial CMCOPCs Based on Comparison of the SRC's Maximum Concentration to SSSL with a DAF of 1.00 – Pond Bank Aggregate

Analyte	CAS Number	Maximum Concentration (mg/kg)	SSSL (mg/kg)	Initial CMCOPC? (Yes/No)	CMCOPC Justification	Sample ID at Maximum Concentration	Date Collected
Inorganic Chemicals							
Arsenic	**7440-38-2**	**2.84E+01**	**2.90E-01**	**Yes**	**Exceeds SSSL**	**ULCPsd-010-0001-SD**	**08/21/01**
Barium	**7440-39-3**	**9.04E+01**	**8.20E+01**	**Yes**	**Exceeds SSSL**	**ULCPss-001-0001-SO**	**07/17/01**
Cadmium	**7440-43-9**	**4.90E-01**	**3.80E-01**	**Yes**	**Exceeds SSSL**	**ULCPsd-010-0001-SD**	**08/21/01**
Chromium, hexavalent	**18540-29-9**	**1.00E+00**	**6.70E-04**	**Yes**	**Exceeds SSSL**	**ULCPsd-010-0001-SD**	**08/21/01**
Cobalt	**7440-48-4**	**1.64E+01**	**2.70E-01**	**Yes**	**Exceeds SSSL**	**CPCsb-032-5113-SO**	**03/24/10**
Lead	**7439-92-1**	**3.13E+01**	**1.40E+01**	**Yes**	**Exceeds SSSL**	**CPCss-042-5020-SO**	**02/23/10**
Nickel	**7440-02-0**	**3.17E+01**	**2.60E+01**	**Yes**	**Exceeds SSL**	**CPCsb-032-5116-SO**	**03/24/10**
Selenium	**7782-49-2**	**1.60E+00**	**2.60E-01**	**Yes**	**Exceeds SSSL**	**CPCsb-032-5114-SO**	**03/24/10**
Thallium	**7440-28-0**	**2.50E-01**	**1.40E-01**	**Yes**	**Exceeds SSSL**	**ULCPss-001-0001-SO**	**07/17/01**
Semi-volatile Organic Compounds							
Benz(a)anthracene	**56-55-3**	**6.60E-02**	**4.25E-03**	**Yes**	**Exceeds SSSL**	**CPCss-042-5020-SO**	**02/23/10**
Benzo(b)fluoranthene	**205-99-2**	**8.00E-02**	**4.10E-02**	**Yes**	**Exceeds SSSL**	**CPCsb-035-5124-SO**	**03/29/10**
Dibenz(a,h)anthracene	**53-70-3**	**2.10E-02**	**1.30E-02**	**Yes**	**Exceeds SSSL**	**CPCsb-035-5124-SO**	**03/29/10**
Pesticide/PCB							
beta-BHC	**319-85-7**	**3.50E-03**	**1.40E-04**	**Yes**	**Exceeds SSSL**	**CPCsb-035-5123-SO**	**03/29/10**

BHC = Hexachlorocyclohexane.
CAS = Chemical Abstract Service.
CMCOPC = Contaminant migration chemical of potential concern.
DAF = Dilution attenuation factor.
ID = Identification.
mg/kg = Milligrams per kilogram.
PCB = Polychlorinated biphenyl.
SRC = Site-related contaminant.
SSSL = Site-specific soil screening level (generic soil screening level multiplied by a DAF of 1.00).
Bold = SRCs that exceed the SSSL.

Table E-7. Initial CMCOPCs Based on Arrival Time to Groundwater Table in Less Than or Equal to 1,000 Years – Pond Bank Aggregate

$$R = 1 + \frac{\rho_b K_d}{\theta_w}$$

$$T = L_z \theta_w R / q$$

Parameter	Symbol	Value	Unit	Note
Percolation Rate	q	0.31	ft/year	Developed from HELP model from Cleveland, Ohio, weather data
Soil-water Distribution Coefficient	K_d	chemical-specific	L/kg	See footnotes below for references
Organic Carbon Distribution Coefficient	K_{oc}	chemical-specific	L/kg	See footnotes below for references
Fraction Organic Carbon	f_{oc}	0.0041	unitless	The average of the PBA08 RI geotechnical samples CPCSB-033-5117-SO and CPCSB-033-5118-SO
Water-filled Soil Porosity	θ_w	0.3471	unitless	
Bulk Density (dry)	ρ_b	1.71	g/cm^3	
Leaching Zone	Lz	sample-specific	ft	Distance from last layer of soil contamination greater than background concentration to top of water table
Retardation Factor	R	chemical-specific	unitless	Calculated by equation shown above
Arrival Time	T	chemical-specific	year	Calculated by equation shown above

Analyte	Initial CMCOPC Sample ID	Sample Depth[a] (ft)	Leaching Zone[b] (ft)	K_{oc} (L/kg)	Reference	K_d (L/kg)	Reference	Retardation Factor (R)	Arrival Time (T) from Sample Maximum Depth to Groundwater (years)	T<1,000? From Sample Depth to Groundwater Table (Yes/No)
Inorganic Chemicals										
Arsenic	**ULCPsd-010-0001-SD**	**0.0 - 0.5**	**2.5**	**NA**	**-**	**2.90E+01**	**c**	**1.44E+02**	**403**	**Yes**
Barium	**ULCPss-001-0001-SO**	**0.0 - 1.0**	**2.0**	**NA**	**-**	**4.10E+01**	**c**	**2.03E+02**	**455**	**Yes**
Cadmium	ULCPsd-010-0001-SD	0.0 - 0.5	2.5	NA	-	7.50E+01	c	3.70E+02	1,040	No
Chromium, hexavalent	**ULCPsd-010-0001-SD**	**0.0 - 0.5**	**2.5**	**NA**	**-**	**1.90E+01**	**c**	**9.46E+01**	**265**	**Yes**
Cobalt	CPCsb-032-5113-SO	0.0 - 1.0	9.0	NA	-	4.50E+01	c	2.23E+02	2,240	No
Lead	CPCss-042-5020-SO	1.0 - 4.0	9.0	NA	-	9.00E+02	c	4.43E+03	44,700	No
Nickel	**ULCPss-008-0001-SO**	**0.0 - 1.0**	**1.0**	**NA**	**-**	**6.50E+01**	**c**	**3.21E+02**	**360**	**Yes**
Selenium	**CPCsb-032-5114-SO**	**1.0 - 4.0**	**6.0**	**NA**	**-**	**5.00E+00**	**c**	**2.56E+01**	**172**	**Yes**
Thallium	**ULCPss-001-0001-SO**	**0.0 - 1.0**	**2.0**	**NA**	**-**	**7.10E+01**	**c**	**3.51E+02**	**786**	**Yes**
Semi-volatile Organic Compounds										
Benz(a)anthracene	CPCss-042-5020-SO	1.0 - 4.0	9.0	1.77E+05	c	7.26E+02	d	3.58E+03	36,000	No
Benzo(b)fluoranthene	CPCsb-035-5124-SO	1.0 - 4.0	9.0	5.99E+05	c	2.46E+03	d	1.21E+04	122,000	No
Dibenz(a,h)anthracene	CPCsb-035-5124-SO	1.0 - 4.0	9.0	1.91E+06	c	7.83E+03	d	3.86E+04	389,000	No
Pesticide/PCB										
beta-BHC	**CPCsb-035-5123-SO**	**0.0 - 1.0**	**12.0**	**2.81E+03**	**c**	**1.15E+01**	**d**	**5.78E+01**	**776**	**Yes**

[a]The maximum depth of an initial CMCOPC (based on the maximum depth that an analyte is detected above facility-wide background).
[b]Based on boring logs provided in Appendix A and potentiometric surface map in Figure 3-1 of the RI Report.
[c]U.S. Environmental Protection Agency regional screening level generic tables June 2015; found at: < http://www2.epa.gov/risk/risk-based-screening-table-generic-tables>.
[d]K_d value for organic chemicals calculated by multiplying the organic carbon partition coefficient by fraction organic carbon of 0.0041 (average of PBA08 RI geotechnical samples CPCSB-033-5117-SO and CPCSB-033-5118-SO).

BHC = Hexachlorocyclohexane.
CMCOPC = Contaminant migration chemical of potential concern.
ft = Feet.
Ft/year = Feet per Year .
g/cm^3 = Grams per cubic centimeter.
HELP = Hydrologic Evaluation of Landfill Performance.
ID = Identification.
K_{oc} = Organic carbon partition coefficient.
L/kg = Liters per kilogram.
NA = Not applicable.
PBA08 RI = Performance-Based Acquisition 2008 Remedial Investigation.
PCB = Polychlorinated biphenyl.
Bold = Initial CMCOPCs that exceed the 1,000-year travel time screen.

Table E-8. Results for SRCs in Sediment at Backwater Area Aggregate

Analyte	CAS Number	Background Criteria (mg/kg)[a]	Maximum Sediment Concentration (mg/kg)	Sediment Sample ID	K_{oc} (L/kg)	Reference	K_d (L/kg)	Reference	Maximum Calculated Leachate Concentration (C_L) (mg/L)[b]	DAF[c]	Maximum Calculated Groundwater Concentration (C_L/DAF) (mg/L)	MCL or RSL (mg/L)	MCL or RSL?	Maximum Calculated Groundwater Concentration > MCL or RSL?	Initial Sediment CMCOPC?
Inorganic Chemicals															
Aluminum	7429-90-5	1.39E+04	1.86E+04	ULCPsd-013-0001-SD	NA	-	1.50E+03	f	1.24E+01	32	3.84E-01	2.00E+01	RSL	No	No
Antimony	7440-36-0	0.00E+00	2.10E+00	CPCsd-047-5025-SD	NA	-	4.50E+01	f	4.67E-02	49	9.60E-04	6.00E-03	MCL	No	No
Barium	7440-39-3	1.23E+02	1.51E+02	CPCsd-047-5025-SD	NA	-	4.10E+01	f	3.68E+00	171	2.16E-02	2.00E+00	MCL	No	No
Beryllium	7440-41-7	3.80E-01	1.10E+00	ULCPsd-004-0001-SD	NA	-	7.90E+02	f	1.39E-03	21	6.60E-05	4.00E-03	MCL	No	No
Cadmium	7440-43-9	0.00E=00	2.30E+00	CPCsd-047-5025-SD	NA	-	7.50E+01	f	3.07E-02	511	6.00E-05	5.00E-03	MCL	No	No
Chromium	7440-47-3	1.81E+01	5.65E+01	ULCPsd-009-0001-SD	NA	-	1.90E+01	f	2.97E+00	2,063	1.44E-03	1.00E-01	MCL	No	No
Cobalt	7440-48-4	9.10E+00	2.28E+01	CPCsd-047-5025-SD	NA	-	4.50E+01	f	5.07E-01	1,299	3.90E-04	6.00E-03	RSL	No	No
Copper	7440-50-8	2.76E+01	6.23E+01	CPCsd-047-5025-SD	NA	-	3.50E+01	f	1.78E+00	848	2.10E-03	1.30E+00	MCL	No	No
Cyanide	57-12-5	0.00E+00	5.50E-01	ULCPsd-009-0001-SD	NA	-	9.90E+00	f	5.56E-02	21	2.63E-03	2.00E-01	MCL	No	No
Lead	7439-92-1	2.74E+01	5.79E+01	ULCPsd-009-0001-SD	NA	-	9.00E+02	f	6.43E-02	96	6.67E-04	1.50E-02	MCL	No	No
Mercury	7439-97-6	6.00E-02	1.10E-01	ULCPsd-005-0001-SD	NA	-	5.20E+01	f	2.12E-03	21	1.00E-04	2.00E-03	MCL	No	No
Nickel	7440-02-0	1.77E+01	3.55E+01	CPCsd-047-5025-SD	NA	-	6.50E+01	f	5.46E-01	287	1.90E-03	3.90E-01	RSL	No	No
Selenium	7782-49-2	1.70E+00	2.70E+00	CPCsd-047-5025-SD	NA	-	5.00E+00	f	5.40E-01	2,348	2.30E-04	5.00E-02	MCL	No	No
Silver	**7440-22-4**	**0.00E=00**	**2.30E+01**	**ULCPsd-007-0001-SD**	**NA**	**-**	**8.30E+00**	**f**	**2.77E+00**	**21**	**1.31E-01**	**9.40E-02**	**RSL**	**Yes**	**Yes**
Vanadium	7440-62-2	2.61E+01	3.00E+01	ULCPsd-013-0001-SD	NA	-	1.00E+03	f	3.00E-02	51	5.86E-04	8.60E-02	RSL	No	No
Anions															
Nitrate/Nitrite (NO_3/NO_2-N)	14797-55-8	0.00E+00	2.20E+00	ULCPsd-016-0001-SD	None	-	None	-	NA	NA	NA	1.00E+01	MCL	No	No
Explosives															
2,4,6-Trinitrotoluene	118-96-7	None	3.20E-01	ULCPsd-005-0001-SD	2.81E+03	f	1.15E+01	g	2.78E-02	21	1.32E-03	2.50E-03	RSL	No	No
2,6-Dinitrotoluene	**606-20-2**	**None**	**1.60E-01**	**ULCPsd-005-0001-SD**	**5.87E+02**	**f**	**2.41E+00**	**g**	**6.64E-02**	**21**	**3.15E-03**	**4.80E-05**	**RSL**	**Yes**	**Yes**
Nitrocellulose	9004-70-0	None	1.04E+01	CPCsd-047-5025-SD	1.00E+01	f	4.10E-02	g	2.54E+02	21	1.20E+01	6.00E+04	RSL	No	No
Tetryl	479-45-8	None	2.40E-02	CPCsd-047-5025-SD	4.61E+03	f	1.89E+01	g	1.27E-03	21	6.02E-05	3.90E-02	RSL	No	No
Semi-volatile Organic Compounds															
Anthracene	120-12-7	None	2.20E-01	ULCPsd-015-0002-SD	1.64E+04	f	6.71E+01	g	3.28E-03	21	1.55E-04	1.80E+00	RSL	No	No
Benz(a)anthracene	**56-55-3**	**None**	**8.30E-01**	**ULCPsd-015-0002-SD**	**1.77E+05**	**f**	**7.26E+02**	**g**	**1.14E-03**	**21**	**5.42E-05**	**1.20E-05**	**RSL**	**Yes**	**Yes**
Benzo(a)pyrene	50-32-8	None	8.90E-01	ULCPsd-015-0002-SD	5.87E+05	f	2.41E+03	g	3.70E-04	21	1.75E-05	2.00E-04	MCL	No	No
Benzo(b)fluoranthene	205-99-2	None	8.60E-01	ULCPsd-015-0002-SD	5.99E+05	f	2.46E+03	g	3.50E-04	21	1.66E-05	3.40E-05	RSL	No	No
Benzo(ghi)perylene[d]	191-24-2	None	4.90E-01	ULCPsd-015-0002-SD	1.07E+07	h	4.39E+04	g	1.12E-05	21	5.29E-07	1.20E-01	RSL	No	No
Benzo(k)fluoranthene	207-08-9	None	8.00E-01	ULCPsd-015-0002-SD	5.87E+05	f	2.41E+03	g	3.32E-04	21	1.58E-05	3.40E-04	RSL	No	No
Bis(2-ethylhexyl)phthalate	117-81-7	None	1.60E-01	CPCsd-047-5025-SD	1.20E+05	f	4.90E+02	g	3.26E-04	21	1.55E-05	6.00E-03	MCL	No	No
Chrysene	218-01-9	None	9.30E-01	ULCPsd-015-0002-SD	1.81E+05	f	7.42E+02	g	1.25E-03	21	5.94E-05	3.40E-03	RSL	No	No
Di-n-butyl phthalate	84-74-2	None	3.40E-02	CPCsd-048-5786-SD	1.16E+03	f	4.76E+00	g	7.15E-03	21	3.39E-04	9.00E-01	RSL	No	No
Dibenz(a,h)anthracene	53-70-3	None	6.60E-02	CPCsd-047-5025-SD	1.91E+06	f	7.84E+03	g	8.42E-06	21	3.99E-07	3.40E-06	RSL	No	No
Fluoranthene	206-44-0	None	1.80E+00	ULCPsd-015-0002-SD	5.55E+04	f	2.28E+02	g	7.91E-03	21	3.75E-04	8.00E-01	RSL	No	No
Fluorene	86-73-7	None	5.30E-02	CPCsd-047-5025-SD	9.16E+03	f	3.76E+01	g	1.41E-03	21	6.69E-05	2.90E-01	RSL	No	No
Indeno(1,2,3-cd)pyrene	193-39-5	None	4.80E-01	ULCPsd-015-0002-SD	1.95E+06	f	8.00E+03	g	6.00E-05	21	2.85E-06	3.40E-05	RSL	No	No
Phenanthrene[e]	85-01-8	None	9.10E-01	ULCPsd-015-0002-SD	1.82E+04	h	7.46E+01	g	1.22E-02	21	5.78E-04	1.20E-01	RSL	No	No
Pyrene	129-00-0	None	1.90E+00	ULCPsd-015-0002-SD	5.43E+04	f	2.23E+02	g	8.53E-03	21	4.04E-04	1.20E-01	RSL	No	No

Table E-8. Results for SRCs in Sediment at Backwater Area Aggregate (continued)

Analyte	CAS Number	Background Criteria (mg/kg)[a]	Maximum Sediment Concentration (mg/kg)	Sediment Sample ID	K_{oc} (L/kg)	Reference	K_d (L/kg)	Reference	Maximum Calculated Leachate Concentration (C_L) (mg/L)[b]	DAF[c]	Maximum Calculated Groundwater Concentration (C_L/DAF) (mg/L)	MCL or RSL (mg/L)	MCL or RSL?	Maximum Calculated Groundwater Concentration > MCL or RSL?	Initial Sediment CMCOPC?
Organics-Pesticide/PCB															
PCB-1254	11097-69-1	None	4.70E-02	ULCPsd-006-0001-SD	1.31E+05	f	5.35E+02	g	8.78E-05	21	4.16E-06	7.80E-06	RSL	No	No
Organics-Volatile															
2-Butanone	78-93-3	None	5.50E-02	CPCsd-047-5025-SD	4.51E+00	f	1.85E-02	g	2.97E+00	21	1.41E-01	5.60E+00	RSL	No	No
Acetone	67-64-1	None	1.90E-01	CPCsd-047-5025-SD	2.36E+00	f	9.69E-03	g	1.96E+01	21	9.29E-01	1.40E+01	RSL	No	No
Methylene chloride	**75-09-2**	**None**	**4.80E-02**	**ULCPsd-006-0001-SD**	**2.17E+01**	**f**	**8.91E-02**	**g**	**5.39E-01**	**21**	**2.55E-02**	**5.00E-03**	**MCL**	**Yes**	**Yes**

Sediment samples were taken from 0–1.8 ft below ground surface at discrete sample locations in the Backwater Area south of the railroad that is just north of Load Line 3 Road.
[a]Background criteria are the criteria for sediment from final facility-wide background values for the Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).
[b]Maximum calculated leachate concentration = maximum sediment concentration divided by the distribution coefficient (K_d).
[c]An aggregate-specific DAF was calculated based on the sediment and co-located surface water concentrations. The lowest calculated DAF (21 for beryllium) was used for analytes that did not have an aggregate-specific DAF.
[d]Pyrene RSL was used as a surrogate for benzo(*ghi*)perylene.
[e]Pyrene RSL was used as a surrogate for phenanthrene.
[f]U.S. Environmental Protection Agency (USEPA) RSL generic tables June 2015; found at: < http://www2.epa.gov/risk/risk-based-screening-table-generic-tables>.
[g]K_d value for organic chemicals calculated by multiplying K_{oc} by f_{oc} of 0.0041 (the average of the Performance-Based Acquisition 2008 RI geotechnical samples CPCSB-033-5117-SO and CPCSB-033-5118-SO).
[h]USEPA 1994. Risk Reduction Engineering Laboratory Treatability Database, Version 5.0, Office of Research and Development, Cincinnati, Ohio.
CAS = Chemical Abstract Service.
CMCOPC = Contaminant migration chemical of potential concern.
DAF = Dilution attenuation factor.
ID = Identification.
K_d = Distribution coefficient.
K_{oc} = Organic carbon distribution coefficient.
L/kg = Liters per kilogram.
MCL = Maximum contaminant level.
mg/kg = Milligrams per kilogram.
mg/L = Milligrams per liter.
NA = Not applicable.
PCB = Polychlorinated biphenyl.
RSL = Regional screening level (USEPA 2015).
Bold = Identified initial sediment CMCOPC.

Table E-9. Results for SRCs in Sediment at Upper Cobbs Pond Aggregate

Analyte	CAS Number	Background Criteria (mg/kg)[a]	Maximum Sediment Concentration (mg/kg)	Sediment Sample ID	K_{oc} (L/kg)	Reference	K_d (L/kg)	Reference	Maximum Calculated Leachate Concentration (C_L) (mg/L)[b]	DAF[c]	Maximum Calculated Groundwater Concentration (C_L/DAF) (mg/L)	MCL or RSL (mg/L)	MCL or RSL?	Maximum Calculated Groundwater Concentration > MCL or RSL?	Initial Sediment CMCOPC?
Inorganic Chemicals															
Aluminum	7429-90-5	3.39E+04	2.14E+04	ULCPsd-017-0001-SD	NA	-	1.50E+03	f	1.43E+01	37	3.86E-01	2.00E+01	RSL	No	No
Antimony	7440-36-0	0.00E+00	1.90E+00	CPCsd-046-5024-SD	NA	-	4.50E+01	f	4.22E-02	45	9.40E-04	6.00E-03	MCL	No	No
Barium	7440-39-3	1.23E+02	1.57E+02	CPCsd-046-5024-SD	NA	-	4.10E+01	f	3.83E+00	228	1.68E-02	2.00E+00	MCL	No	No
Beryllium	7440-41-7	3.80E-01	1.30E+00	ULCPsd-017-0001-SD	NA	-	7.90E+02	f	1.65E-03	31	5.31E-05	4.00E-03	MCL	No	No
Cadmium	7440-43-9	0.00+00	2.30E+00	CPCsd-046-5024-SD	NA	-	7.50E+01	f	3.07E-02	31	9.89E-04	5.00E-03	MCL	No	No
Chromium	7440-47-3	1.81E+01	9.16E+01	CPCsd-046-5024-SD	NA	-	1.90E+01	f	4.82E+00	8,171	5.90E-04	1.00E-01	MCL	No	No
Chromium, hexavalent	**18540-29-9**	**0.00+00**	**1.06E+01**	**ULCPsd-018-0001-SD**	**NA**	**-**	**1.90E+01**	**f**	**5.58E-01**	**8,171**	**6.83E-05**	**3.50E-05**	**RSL**	**Yes**	**Yes**
Cobalt	**7440-48-4**	**9.10E+00**	**1.93E+01**	**ULCPsd-017-0001-SD**	**NA**	**-**	**4.50E+01**	**f**	**4.29E-01**	**31**	**1.38E-02**	**6.00E-03**	**RSL**	**Yes**	**Yes**
Copper	7440-50-8	2.76E+01	1.06E+02	ULCPsd-017-0001-SD	NA	-	3.50E+01	f	3.03E+00	1,564	1.94E-03	1.30E+00	MCL	No	No
Lead	7439-92-1	2.74E+01	5.24E+01	CPCsd-046-5024-SD	NA	-	9.00E+02	f	5.82E-02	149	3.90E-04	1.50E-02	MCL	No	No
Mercury	7439-97-6	6.00E-02	1.50E-01	CPCsd-046-5024-SD	NA	-	5.20E+01	f	2.88E-03	31	9.30E-05	2.00E-03	MCL	No	No
Nickel	7440-02-0	1.77E+01	4.11E+01	CPCsd-046-5024-SD	NA	-	6.50E+01	f	6.32E-01	333	1.90E-03	3.90E-01	RSL	No	No
Selenium	7782-49-2	1.70E+00	2.90E+00	CPCsd-046-5024-SD	NA	-	5.00E+00	f	5.80E-01	2,417	2.40E-04	5.00E-02	MCL	No	No
Silver	7440-22-4	0.00E+00	1.10E+01	ULCPsd-017-0001-SD	NA	-	8.30E+00	f	1.33E+00	31	4.28E-02	9.40E-02	RSL	No	No
Vanadium	7440-62-2	2.61E+01	3.34E+01	ULCPsd-018-0001-SD	NA	-	1.00E+03	f	3.34E-02	31	1.08E-03	8.60E-02	RSL	No	No
Anions															
Nitrate/Nitrite (NO_3/NO_2-N)	14797-55-8	0.00+00	5.30E+00	FSW-SD-030-0000	None	-	None	-	NA	NA	NA	1.00E+01	MCL	No	No
Miscellaneous															
Ammonia	7664-41-7	0.00+00	6.90E+01	FSW-SD-030-0000	None	-	None	-	NA	NA	NA	None	NA	No	No
Total Phosphorus as P	7723-14-0	0.00+00	2.70E+02	FSW-SD-030-0000	None	-	None	-	NA	NA	NA	None	NA	No	No
Explosives															
1,3-Dinitrobenzene	99-65-0	None	3.60E-02	CPCsd-046-5024-SD	3.52E+02	f	1.44E+00	g	2.50E-02	31	8.06E-04	2.00E-03	RSL	No	No
2,4,6-Trinitrotoluene	118-96-7	None	1.50E-01	CPCsd-046-5024-SD	2.81E+03	f	1.15E+01	g	1.30E-02	31	4.20E-04	2.50E-03	RSL	No	No
4-Amino-2,6-Dinitrotoluene	19406-51-0	None	1.20E-01	CPCsd-046-5024-SD	2.83E+02	f	1.16E+00	g	1.03E-01	1,480	6.99E-05	3.90E-02	RSL	No	No
HMX	2691-41-0	None	8.30E-02	CPCsd-046-5024-SD	5.32E+02	f	2.18E+00	g	3.81E-02	31	1.23E-03	1.00E+00	RSL	No	No
Nitrocellulose	9004-70-0	None	5.70E+00	CPCsd-046-5024-SD	1.00E+01	f	4.10E-02	g	1.39E+02	31	4.48E+00	6.00E+04	RSL	No	No
Tetryl	479-45-8	None	1.90E-02	CPCsd-046-5024-SD	4.61E+03	f	1.89E+01	g	1.01E-03	31	3.25E-05	3.90E-02	RSL	No	No
Semi-volatile Organic Compounds															
Acenaphthylene	208-96-8	None	2.00E-02	CPCsd-046-5784-SD	7.40E+03	f	3.03E+01	g	6.59E-04	31	2.13E-05	5.30E-01	RSL	No	No
Anthracene	120-12-7	None	1.00E-02	CPCsd-046-5784-SD	1.64E+04	f	6.72E+01	g	1.49E-04	31	4.80E-06	1.80E+00	RSL	No	No
Benz(a)anthracene	56-55-3	None	7.80E-02	CPCsd-046-5024-SD	1.77E+05	f	7.26E+02	g	1.07E-04	31	3.47E-06	1.20E-05	RSL	No	No
Benzo(a)pyrene	50-32-8	None	1.20E-01	CPCsd-046-5024-SD	5.87E+05	f	2.41E+03	g	4.99E-05	31	1.61E-06	2.00E-04	MCL	No	No
Benzo(b)fluoranthene	205-99-2	None	1.90E-01	CPCsd-046-5024-SD	5.99E+05	f	2.46E+03	g	7.74E-05	31	2.50E-06	3.40E-05	RSL	No	No
Benzo(ghi)perylene[d]	191-24-2	None	1.10E-01	CPCsd-046-5024-SD	1.07E+07	h	4.39E+04	g	2.51E-06	31	8.09E-08	1.20E-01	RSL	No	No
Benzo(k)fluoranthene	207-08-9	None	6.70E-02	CPCsd-046-5024-SD	5.87E+05	f	2.41E+03	g	2.78E-05	31	8.98E-07	3.40E-04	RSL	No	No
Bis(2-ethylhexyl)phthalate	117-81-7	None	8.40E-01	FSW-SD-030-0000	1.20E+05	f	4.92E+02	g	1.71E-03	31	5.51E-05	6.00E-03	RSL	No	No
Butyl benzyl phthalate	85-68-7	None	1.60E-01	FSW-SD-030-0000	7.16E+03	f	2.94E+01	g	5.45E-03	31	1.76E-04	1.60E-02	RSL	No	No
Chrysene	218-01-9	None	1.10E-01	CPCsd-046-5024-SD	1.81E+05	f	7.42E+02	g	1.48E-04	31	4.78E-06	3.40E-03	RSL	No	No
Di-n-butyl phthalate	84-74-2	None	2.70E+00	FSW-SD-030-0000	1.16E+03	f	4.76E+00	g	5.68E-01	31	1.83E-02	9.00E-01	RSL	No	No
Fluoranthene	206-44-0	None	2.20E-01	CPCsd-046-5024-SD	5.55E+04	f	2.28E+02	g	9.67E-04	31	3.12E-05	8.00E-01	RSL	No	No

Table E-9. Results for SRCs in Sediment at Upper Cobbs Pond Aggregate (continued)

Analyte	CAS Number	Background Criteria (mg/kg)[a]	Maximum Sediment Concentration (mg/kg)	Sediment Sample ID	K_{oc} (L/kg)	Reference	K_d (L/kg)	Reference	Maximum Calculated Leachate Concentration (C_L) (mg/L)[b]	DAF[c]	Maximum Calculated Groundwater Concentration (C_L/DAF) (mg/L)	MCL or RSL (mg/L)	MCL or RSL?	Maximum Calculated Groundwater Concentration > MCL or RSL?	Initial Sediment CMCOPC?
Indeno(1,2,3-cd)pyrene	193-39-5	None	9.00E-02	CPCsd-046-5024-SD	1.95E+06	f	8.00E+03	g	1.13E-05	31	3.63E-07	3.40E-05	RSL	No	No
Phenanthrene[e]	85-01-8	None	7.00E-02	CPCsd-046-5024-SD	1.82E+04	h	7.46E+01	g	9.38E-04	31	3.03E-05	1.20E-01	RSL	No	No
Pyrene	129-00-0	None	1.80E-01	CPCsd-046-5024-SD	5.43E+04	f	2.23E+02	g	8.09E-04	31	2.61E-05	1.20E-01	RSL	No	No
Pesticide/PCB															
delta-BHC	319-86-8	None	1.80E-03	CPCsd-046-5784-SD	None	-	None	-	NA	NA	NA	None	NA	No	No
PCB-1254	11097-69-1	None	3.20E-02	ULCPsd-020-0001-SD	1.31E+05	f	5.35E+02	g	5.98E-05	31	1.93E-06	7.80E-06	RSL	No	No
Volatile Organic Compounds															
2-Butanone	78-93-3	None	3.30E-02	CPCsd-046-5024-SD	4.51E+00	f	1.85E-02	g	1.78E+00	31	5.76E-02	5.60E+00	RSL	No	No
Acetone	67-64-1	None	9.10E-02	CPCsd-046-5024-SD	2.36E+00	f	9.69E-03	g	9.39E+00	31	3.03E-01	1.40E+01	RSL	No	No

Sediment samples were taken from 0–2 ft below ground surface at discrete sample locations and one incremental sampling method sample in the Upper Cobbs Pond Area.
[a]Background criteria for sediment from final facility-wide background values for the Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).
[b]Maximum calculated leachate concentration = maximum sediment concentration divided by the distribution coefficient (K_d).
[c]An aggregate-specific DAF was calculated based on the sediment and co-located surface water concentrations. The lowest calculated DAF (31 for vanadium) was used for analytes that did not have an aggregate-specific DAF.
[d]Pyrene RSL was used as a surrogate for benzo(*ghi*)perylene.
[e]Pyrene RSL was used as a surrogate for phenanthrene.
[f]U.S. Environmental Protection Agency (USEPA) regional screening level generic tables June 2015; found at: < http://www2.epa.gov/risk/risk-based-screening-table-generic-tables>.
[g]K_d value for organics calculated by multiplying K_{oc} by f_{oc} of 0.0041 (the average of the Performance-Based Acquisition 2008 RI geotechnical samples CPCSB-033-5117-SO and CPCSB-033-5118-SO).
[h]USEPA 1994. Risk Reduction Engineering Laboratory Treatability Database, Version 5.0, Office of Research and Development, Cincinnati, Ohio
BHC = Hexachlorocyclohexane.
CAS = Chemical Abstract Service.
CMCOPC = Contaminant migration chemical of potential concern.
DAF = Dilution attenuation factor.
ID = Identification.
K_d = Distribution coefficient.
K_{oc} = Organic carbon distribution coefficient.
L/kg = Liters per kilogram.
MCL = Maximum contaminant level.
mg/kg = Milligrams per kilogram.
mg/L = Milligrams per liter.
NA = Not applicable.
PCB = Polychlorinated biphenyl.
RSL = Regional screening level (USEPA 2015).
Bold = Identified initial sediment CMCOPC.

Table E-10. Results for SRCs in Sediment at Lower Cobbs Pond Aggregate

Analyte	CAS Number	Background Criteria (mg/kg)[a]	Maximum Sediment Concentration (mg/kg)	Sediment Sample ID	K_{oc} (L/kg)	Reference	K_d (L/kg)	Reference	Maximum Calculated Leachate Concentration (C_L) (mg/L)[b]	DAF[c]	Maximum Calculated Groundwater Concentration (C_L/DAF) (mg/L)	MCL or RSL (mg/L)	MCL or RSL?	Maximum Calculated Groundwater Concentration > MCL or RSL?	Initial Sediment CMCOPC?
Inorganic Chemicals															
Aluminum	7429-90-5	1.39E+04	1.64E+04	ULCPsd-026-0001-SD	NA	-	1.50E+03	f	1.09E+01	21	5.23E-01	3.65E+01	RSL	No	No
Antimony	7440-36-0	0.00+00	1.40E+00	CPCsd-045-5023-SD	NA	-	4.50E+01	f	3.11E-02	35	8.80E-04	6.00E-03	MCL	No	No
Arsenic	7440-38-2	1.95E+01	3.43E+01	ULCPsd-026-0001-SD	NA	-	2.90E+01	f	1.18E+00	389	3.04E-03	1.00E-02	MCL	No	No
Barium	7440-39-3	1.23E+02	1.49E+02	CPCsd-045-5023-SD	NA	-	4.10E+01	f	3.63E+00	148	2.46E-02	2.00E+00	MCL	No	No
Beryllium	7440-41-7	3.80E-01	9.30E-01	CPCsd-045-5023-SD	NA	-	7.90E+02	f	1.18E-03	39	3.00E-05	4.00E-03	MCL	No	No
Cadmium	7440-43-9	0.00+00	1.50E+00	CPCsd-045-5023-SD	NA	-	7.50E+01	f	2.00E-02	500	4.00E-05	5.00E-03	MCL	No	No
Chromium	**7440-47-3**	**1.81E+01**	**1.50E+02**	**ULCPsd-023-0001-SD**	**NA**	**-**	**1.90E+01**	**f**	**7.89E+00**	**16**	**4.78E-01**	**1.00E-01**	**MCL**	**Yes**	**Yes**
Chromium, hexavalent	**18540-29-9**	**0.00+00**	**5.70E+00**	**ULCPsd-021-0001-SD**	**NA**	**-**	**1.90E+01**	**f**	**3.00E-01**	**16**	**1.82E-02**	**3.50E-05**	**RSL**	**Yes**	**Yes**
Cobalt	7440-48-4	9.10+00	2.13E+01	ULCPsd-025-0001-SD	NA	-	4.50E+01	f	4.73E-01	2,059	2.30E-04	6.00E-03	RSL	No	No
Copper	7440-50-8	2.76E+01	1.49E+02	ULCPsd-023-0001-SD	NA	-	3.50E+01	f	4.26E+00	229	1.86E-02	1.30E+00	MCL	No	No
Cyanide	57-12-5	0.00	4.00E-01	ULCPsd-024-0001-SD	NA	-	9.90E+00	f	4.04E-02	16	2.45E-03	2.00E-01	MCL	No	No
Lead	7439-92-1	27.40	6.04E+01	ULCPsd-024-0001-SD	NA	-	9.00E+02	f	6.71E-02	43	1.57E-03	1.50E-02	MCL	No	No
Mercury	7439-97-6	0.06	1.00E-01	FSW-SD-031-0000	NA	-	5.20E+01	f	1.92E-03	16	1.17E-04	2.00E-03	MCL	No	No
Nickel	7440-02-0	17.70	3.02E+01	CPCsd-045-5023-SD	NA	-	6.50E+01	f	4.65E-01	147	3.16E-03	3.90E-01	RSL	No	No
Selenium	7782-49-2	1.70	2.20E+00	CPCsd-045-5023-SD	NA	-	5.00E+00	f	4.40E-01	1,375	3.20E-04	5.00E-02	MCL	No	No
Silver	7440-22-4	0.00	2.40E+00	ULCPsd-021-0001-SD	NA	-	8.30E+00	f	2.89E-01	16	1.75E-02	9.40E-02	RSL	No	No
Vanadium	7440-62-2	26.10	3.22E+01	ULCPsd-026-0001-SD	NA	-	1.00E+03	f	3.22E-02	24	1.33E-03	8.60E-02	RSL	No	No
Anions															
Nitrate/Nitrite (NO_3/NO_2-N)	14797-55-8	0.00	8.50E+00	FSW-SD-031-0000	None	-	None	-	NA	NA	NA	1.00E+01	MCL	No	No
Miscellaneous															
Ammonia	7664-41-7	0.00	6.10E+01	FSW-SD-031-0000	None	-	None	-	NA	NA	NA	None	NA	No	No
Total Phosphorus as P	7723-14-0	0.00	3.60E+02	FSW-SD-031-0000	None	-	None	-	NA	NA	NA	None	NA	No	No
Explosives															
HMX	2691-41-0	None	1.70E-02	CPCsd-044-5022-SD	5.32E+02	f	2.18E+00	g	7.80E-03	16	4.73E-04	1.00E+00	RSL	No	No
Nitrocellulose	9004-70-0	None	7.80E+00	CPCsd-045-5023-SD	1.00E+01	f	4.10E-02	g	1.90E+02	16	1.15E+01	6.00E+04	RSL	No	No
Tetryl	479-45-8	None	2.20E-02	CPCsd-045-5023-SD	4.61E+03	f	1.89E+01	g	1.17E-03	16	7.06E-05	3.90E-02	RSL	No	No
Semi-volatile Organic Compounds															
2-Methylnaphthalene	91-57-6	None	2.50E-02	CPCsd-045-5783-SD	2.48E+03	f	1.02E+01	g	2.46E-03	16	1.49E-04	3.60E-02	RSL	No	No
Acenaphthene	83-32-9	None	9.90E-03	CPCsd-045-5783-SD	5.03E+03	f	2.06E+01	g	4.80E-04	16	2.91E-05	5.30E-01	RSL	No	No
Acenaphthylene	208-96-8	None	9.10E-02	CPCsd-045-5783-SD	7.40E+03	f	3.03E+01	g	3.00E-03	16	1.82E-04	5.30E-01	RSL	No	No
Anthracene	120-12-7	None	7.00E-02	CPCsd-045-5783-SD	1.64E+04	f	6.72E+01	g	1.04E-03	16	6.31E-05	1.80E+00	RSL	No	No
Benz(a)anthracene	**56-55-3**	**None**	**3.40E-01**	**CPCsd-045-5783-SD**	**1.77E+05**	**f**	**7.26E+02**	**g**	**4.69E-04**	**16**	**2.84E-05**	**1.20E-05**	**RSL**	**Yes**	**Yes**
Benzo(a)pyrene	50-32-8	None	4.70E-01	CPCsd-045-5783-SD	5.87E+05	f	2.41E+03	g	1.95E-04	16	1.18E-05	2.00E-04	MCL	No	No
Benzo(b)fluoranthene	205-99-2	None	8.00E-01	CPCsd-045-5783-SD	5.99E+05	f	2.46E+03	g	3.26E-04	16	1.97E-05	3.40E-05	RSL	No	No
Benzo(ghi)perylene[d]	191-24-2	None	4.70E-01	CPCsd-045-5783-SD	1.07E+07	h	4.39E+04	g	1.07E-05	16	6.49E-07	1.20E-01	RSL	No	No
Benzo(k)fluoranthene	207-08-9	None	2.10E-01	CPCsd-045-5783-SD	5.87E+05	f	2.41E+03	g	8.73E-05	16	5.29E-06	3.40E-04	RSL	No	No
Chrysene	218-01-9	None	4.00E-01	CPCsd-045-5783-SD	1.81E+05	f	7.42E+02	g	5.39E-04	16	3.27E-05	3.40E-03	RSL	No	No
Di-n-butyl phthalate	84-74-2	None	1.04E+00	FSW-SD-031-0000	1.16E+03	f	4.74E+00	g	2.18E-01	16	1.32E-02	9.00E-01	RSL	No	No

Table E-10. Results for SRCs in Sediment at Lower Cobbs Pond Aggregate (continued)

Analyte	CAS Number	Background Criteria (mg/kg)[a]	Maximum Sediment Concentration (mg/kg)	Sediment Sample ID	K_{oc} (L/kg)	Reference	K_d (L/kg)	Reference	Maximum Calculated Leachate Concentration (C_L) (mg/L)[b]	DAF[c]	Maximum Calculated Groundwater Concentration (C_L/DAF) (mg/L)	MCL or RSL (mg/L)	MCL or RSL?	Maximum Calculated Groundwater Concentration > MCL or RSL?	Initial Sediment CMCOPC?
Dibenz(a,h)anthracene	53-70-3	None	1.20E-01	CPCsd-045-5783-SD	1.91E+06	f	7.83E+03	g	1.53E-05	16	9.29E-07	3.40E-06	RSL	No	No
Fluoranthene	206-44-0	None	4.80E-01	CPCsd-045-5783-SD	5.55E+04	f	2.28E+02	g	2.11E-03	16	1.28E-04	8.00E-01	RSL	No	No
Fluorene	86-73-7	None	2.00E-02	CPCsd-045-5783-SD	9.16E+03	f	3.76E+01	g	5.33E-04	16	3.23E-05	2.90E-01	RSL	No	No
Indeno(1,2,3-cd)pyrene	193-39-5	None	4.30E-01	CPCsd-045-5783-SD	1.95E+06	f	8.00E+03	g	5.38E-05	16	3.26E-06	3.40E-05	RSL	No	No
Naphthalene	**91-20-3**	**None**	**3.80E-02**	**CPCsd-045-5783-SD**	**1.54E+03**	**f**	**6.31E+00**	**g**	**6.02E-03**	**16**	**3.65E-04**	**1.70E-04**	**RSL**	**Yes**	**Yes**
Phenanthrene[e]	85-01-8	None	1.50E-01	CPCsd-045-5783-SD	1.82E+04	h	7.46E+01	g	2.01E-03	16	1.22E-04	1.20E-01	RSL	No	No
Pyrene	129-00-0	None	4.10E-01	CPCsd-045-5783-SD	5.43E+04	f	2.23E+02	g	1.84E-03	16	1.12E-04	1.20E-01	RSL	No	No
Volatile Organic Compounds															
2-Butanone	78-93-3	None	4.70E-02	CPCsd-045-5023-SD	4.51E+00	f	1.85E-02	g	2.54E+00	16	1.54E-01	5.60E+00	RSL	No	No
Acetone	67-64-1	None	1.70E-01	CPCsd-045-5023-SD	2.36E+00	f	9.69E-03	g	1.75E+01	16	1.06E+00	1.40E+01	RSL	No	No
Carbon Disulfide	75-15-0	None	3.30E-03	CPCsd-045-5023-SD	2.17E+01	f	8.91E-02	g	3.70E-02	16	2.24E-03	8.10E-01	RSL	No	No

Sediment samples were taken from 0– 2 ft below ground surface at discrete sample locations and one incremental sampling method sample in Lower Cobbs Pond Area.
[a]Background criteria for sediment from final facility-wide background values for the Ravenna Army Ammunition Plant, published in the *Final Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001).
[b]Maximum calculated leachate concentration = maximum sediment concentration divided by the distribution coefficient (K_d).
[c]An aggregate-specific DAF was calculated based on the sediment and co-located surface water concentrations. The lowest calculated DAF (16 for thallium) was used for analytes that did not have an aggregate-specific DAF.
[d]Pyrene RSL was used as a surrogate for benzo(*ghi*)perylene.
[e]Pyrene RSL was used as a surrogate for phenanthrene.
[f]U.S. Environmental Protection Agency (USEPA) regional screening level generic tables June 2015; found at: < http://www2.epa.gov/risk/risk-based-screening-table-generic-tables>.
[g]K_d value for organic chemicals calculated by multiplying K_{oc} by f_{oc} of 0.0041 (the average of the Performance-Based Acquisition 2008 RI geotechnical samples CPCSB-033-5117-SO and CPCSB-033-5118-SO).
[h]USEPA 1994. Risk Reduction Engineering Laboratory Treatability Database, Version 5.0, Office of Research and Development, Cincinnati, Ohio
CAS = Chemical Abstract Service.
CMCOPC = Contaminant migration chemical of potential concern.
DAF = Dilution Attenuation Factor.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocane.
ID = Identification.
K_d = Distribution coefficient.
K_{oc} = Organic carbon distribution coefficient.
L/kg = Liters per kilogram.
MCL = Maximum Contaminant Level.
mg/kg = Milligrams per kilogram.
mg/L = Milligrams per liter.
NA = Not applicable.
RSL = Regional screening level (USEPA 2015).
Bold = Identified initial sediment CMCOPC.

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Table E-11. Climatic Data from SESOIL for Upper and Lower Cobbs Ponds AOC

Month	Air Temp (°C)	Cloud Cover	Humidity	Albedo	Evapotranspiration[a] (cm/day)	Precipitation (cm)	Duration (days)	Storms per Month	Model Days in Month
October	12	0.60	0.70	0.17	0.00	6.46	0.42	5.33	30.4
November	5.22	0.70	0.75	0.24	0.00	7.4	0.53	6.67	30.4
December	-1.06	0.80	0.75	0.31	0.00	7.06	0.57	6.14	30.4
January	-2.94	0.80	0.80	0.3	0.00	7.06	0.61	5.69	30.4
February	-2.33	0.70	0.75	0.32	0.00	5.76	0.53	5.09	30.4
March	2.33	0.70	0.70	0.29	0.00	8.26	0.55	7.14	30.4
April	9.11	0.70	0.70	0.19	0.00	8.83	0.48	7.4	30.4
May	14.61	0.60	0.70	0.16	0.00	8.46	0.45	7.15	30.4
June	19.89	0.60	0.70	0.16	0.00	9.07	0.36	6.57	30.4
July	21.89	0.50	0.70	0.16	0.00	9.8	0.3	6.06	30.4
August	21.11	0.55	0.70	0.16	0.00	8.14	0.3	6.06	30.4
September	17.67	0.55	0.70	0.16	0.00	7.85	0.4	5.44	30.4

[a]Data calculated in SESOIL model. 0.00 indicates evapotranspiration is calculated from other climatic data - 1996 data from Youngstown, Ohio, Weather Service Office - Airport Station

AOC = Area of concern.
°C = Degrees Celsius.
cm = Centimeter.
cm/day = Centimeters per day.
SESOIL = Seasonal Soil Compartment.

Table E-12. Physical and Chemical Properties of Initial CMCOPCs Selected for SESOIL Modeling – Pond Bank Aggregate

Initial CMCOPC	Molecular Weight	Solubility (mg/L)	Reference	K_d (L/kg)[a]	Reference	Diffusion Coefficient in Air (cm^2/sec)	Reference	Biodegradation Rate (1/day)	Sample Location	Application Area (cm^2)
Inorganic Chemicals										
Arsenic	74.9	0.00E+00	b	2.90E+01	b	NA	NA	NA	ULCPsd-010	3.72E+05
Barium	137.3	0.00E+00	b	4.10E+01	b	NA	NA	NA	ULCPss-001	3.48E+05
Chromium, hexavalent	52.0	1.69E+06	b	1.90E+01	b	NA	NA	NA	ULCPsd-010	3.72E+05
Nickel	58.7	0.00E+00	b	6.50E+01	b	NA	NA	NA	CPCsb-032	3.72E+05
Selenium	79.0	0.00E+00	b	5.00E+00	b	NA	NA	NA	CPCsb-032	3.72E+05
Thallium	204.4	0.00E+00	b	7.10E+01	b	NA	NA	NA	ULCPss-001	3.48E+05
Pesticide/PCB										
beta-BHC	290.8	2.40E-01	b	1.15E+01	b	2.77E-02	b	NA	CPCsb-035	3.72E+05

[a]K_d value for organic chemicals calculated by multiplying the organic carbon partition coefficient by fraction organic carbon of 0.0041 (the average of the Performance-Based Acquisition 2008 Remedial Investigation geotechnical samples CPCSB-033-5117-SO and CPCSB-033-5118-SO).

[b]U.S. Environmental Protection Agency regional screening level generic tables June 2015; found at: < http://www2.epa.gov/risk/risk-based-screening-table-generic-tables>.

cm = Centimeter.

cm^2/sec = Square centimeters per second.

CMCOPC = Contaminant migration chemical of potential concern.

K_d = Distribution coefficient.

L/kg = Liters per kilogram.

mg/L = Milligrams per liter.

NA = Not applicable.

PCB = Polychlorinated biphenyl

SESOIL = Seasonal soil compartment model.

Table E-13. Load Application Data for SESOIL Model of Initial CMCOPCs – Pond Bank Aggregate

3-ft-thick Vadose Zone

Analyte	Number of Layers	Layer Number	Thickness of Layer (ft)	Number of Sublayers	Sublayer Number	Concentration (mg/kg)	Layer Purpose
Arsenic	4	1	1	2	1	28.4	Contaminant Loading
					2	0	Leaching
		2	0.75	3	1	0	
					2	0	
					3	0	
		3	0.75	3	1	0	
					2	0	
					3	0	
		4	0.5	1	1	0	
Barium	4	1	1	2	1	90.4	Contaminant Loading
					2	90.4	
		2	0.75	3	1	0	Leaching
					2	0	
					3	0	
		3	0.75	3	1	0	
					2	0	
					3	0	
		4	0.5	1	1	0	
Chromium, hexavalent	4	1	1	2	1	1.00	Contaminant Loading
					2	0	Leaching
		2	0.75	3	1	0	
					2	0	
					3	0	
		3	0.75	3	1	0	
					2	0	
					3	0	
		4	0.5	1	1	0	
Thallium	4	1	1	2	1	0.25	Contaminant Loading
					2	0.25	
		2	0.75	3	1	0	Leaching
					2	0	
					3	0	
		3	0.75	3	1	0	
					2	0	
					3	0	
		4	0.5	1	1	0	

Table E-13. Load Application Data for SESOIL Model of Initial CMCOPCs – Pond Bank Aggregate (continued)

10-ft-thick Vadose Zone

Analyte	Number of Layers	Layer Number	Thickness of Layer (ft)	Number of Sublayers	Sublayer Number	Concentration (mg/kg)	Layer Purpose
Nickel	4	1	1	2	1	25.7	Contaminant Loading
					2	25.7	
		2	3	3	1	26.5	
					2	26.5	
					3	26.5	
		3	6	6	1	27.7	
					2	27.7	
					3	27.7	
					4	31.7	
					5	31.7	
					6	31.7	
		4	0.25	1	1	0	Leaching
Selenium	4	1	1	2	1	1.2	Contaminant Loading
					2	1.2	
		2	3	3	1	1.6	
					2	1.6	
					3	1.6	
		3	6	6	1	0.88	
					2	0.88	
					3	0.88	
					4	1.1	
					5	1.1	
					6	1.1	
		4	0.25	1	1	0	Leaching

13-ft-thick Vadose Zone

Analyte	Number of Layers	Layer Number	Thickness of Layer (ft)	Number of Sublayers	Sublayer Number	Concentration (mg/kg)	Layer Purpose
beta-BHC	4	1	1	2	1	0.0035	Contaminant Loading
					2	0.0035	
		2	5.75	3	1	0	Leaching
					2	0	
					3	0	
		3	5.75	3	1	0	
					2	0	
					3	0	
		4	0.5	1	1	0	

BHC = Hexachlorocyclohexane.
CMCOPC = Contaminant migration chemical of potential concern.
ft = Feet.
mg/kg = Milligrams per kilogram.
SESOIL = Seasonal Soil Compartment model.

Table E-14. Physical and Chemical Properties of Final CMCOPCs Selected for AT123D Modeling – Pond Bank Aggregate

Analyte	K_d (L/kg)	Reference	Retardation Factor (R)	Reference	Diffusion Coefficient in Water (cm^2/sec)	Reference	Biodegradation Rate (1/day)	Reference
Inorganic Chemicals								
Arsenic	2.90E+01	a	1.44E+02	b	NA	NA	0.00E+00	NA
Barium	4.10E+01	a	2.03E+02	b	NA	NA	0.00E+00	NA
Nickel	6.50E+01	a	3.21E+02	b	NA	NA	0.00E+00	NA
Selenium	5.00E+00	a	2.56E+01	b	NA	NA	0.00E+00	NA
Thallium	7.10E+01	a	3.51E+02	b	NA	NA	0.00E+00	NA
Pesticide/PCB								
beta-BHC	1.15E+01	c	5.78E+01	b	7.40E-06	a	0.00E+00	NA

[a]U.S. Environmental Protection Agency soil screening guidance assuming a neutral pH: *Technical Background Document*, May 1996.
[b]R value calculated from Table E-7.
[c]K_d value for organic chemicals calculated by multiplying the organic carbon partition coefficient by fraction organic carbon of 0.0041 (the average of the Performance-Based Acquisition 2008 Remedial Investigation geotechnical samples CPCSB-033-5117-SO and CPCSB-033-5118-SO).
AT123D = Analytical Transient 1-,2-,3-Dimensional.
BHC = Hexachlorocyclohexane.
cm^2/sec = Square centimeters per second.
CMCOPC = Contaminant migration chemical of potential concern.
K_d = Distribution coefficient.
L/kg = Liters per kilogram.
NA = Not applicable.
PCB = Polychlorinated biphenyl.

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Figures

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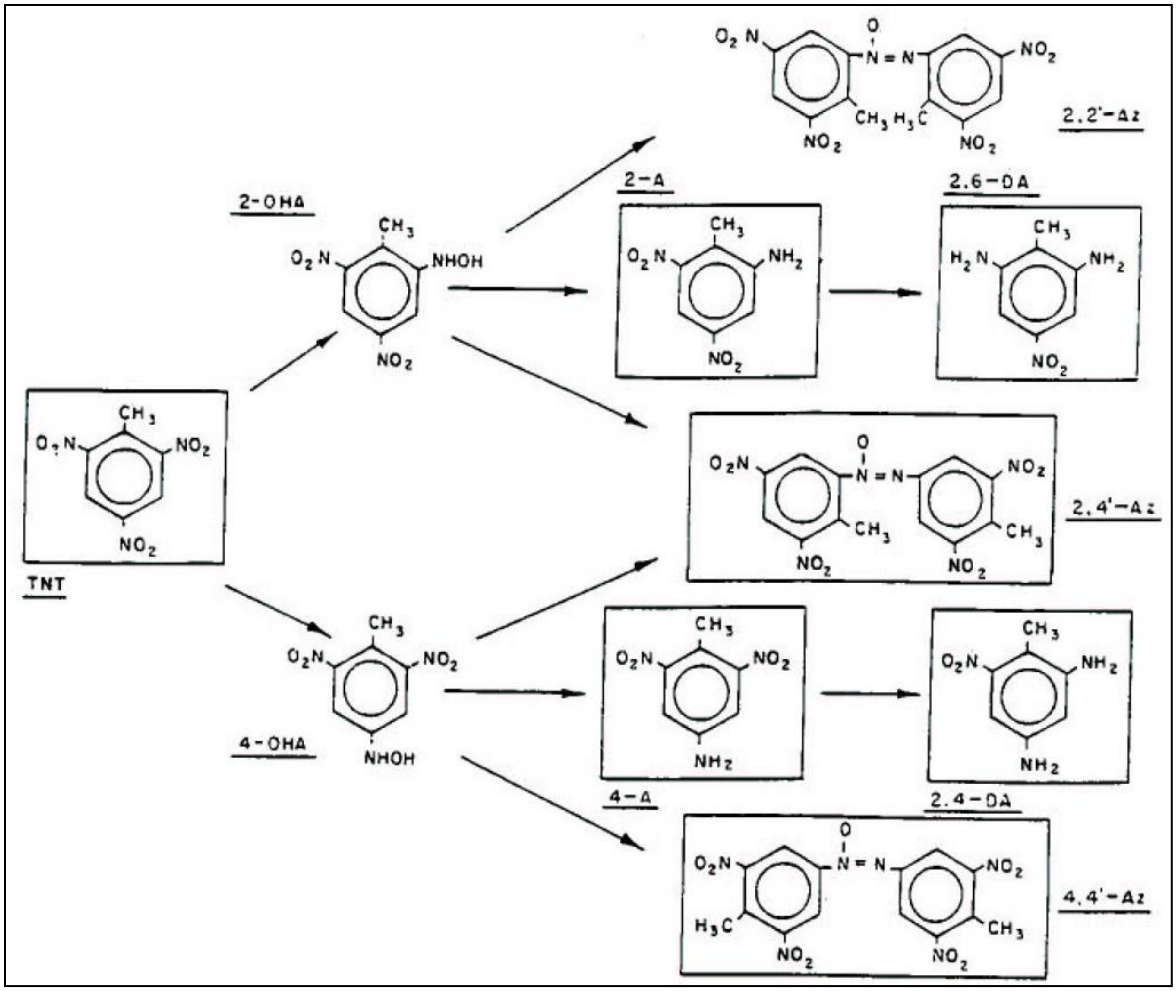

Figure E-1. TNT Biotransformation Pathway

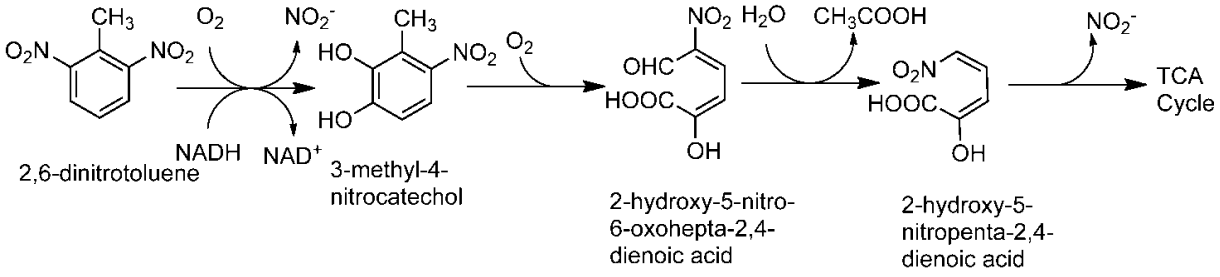

Figure E-2. 2,6-DNT Biotransformation Pathway

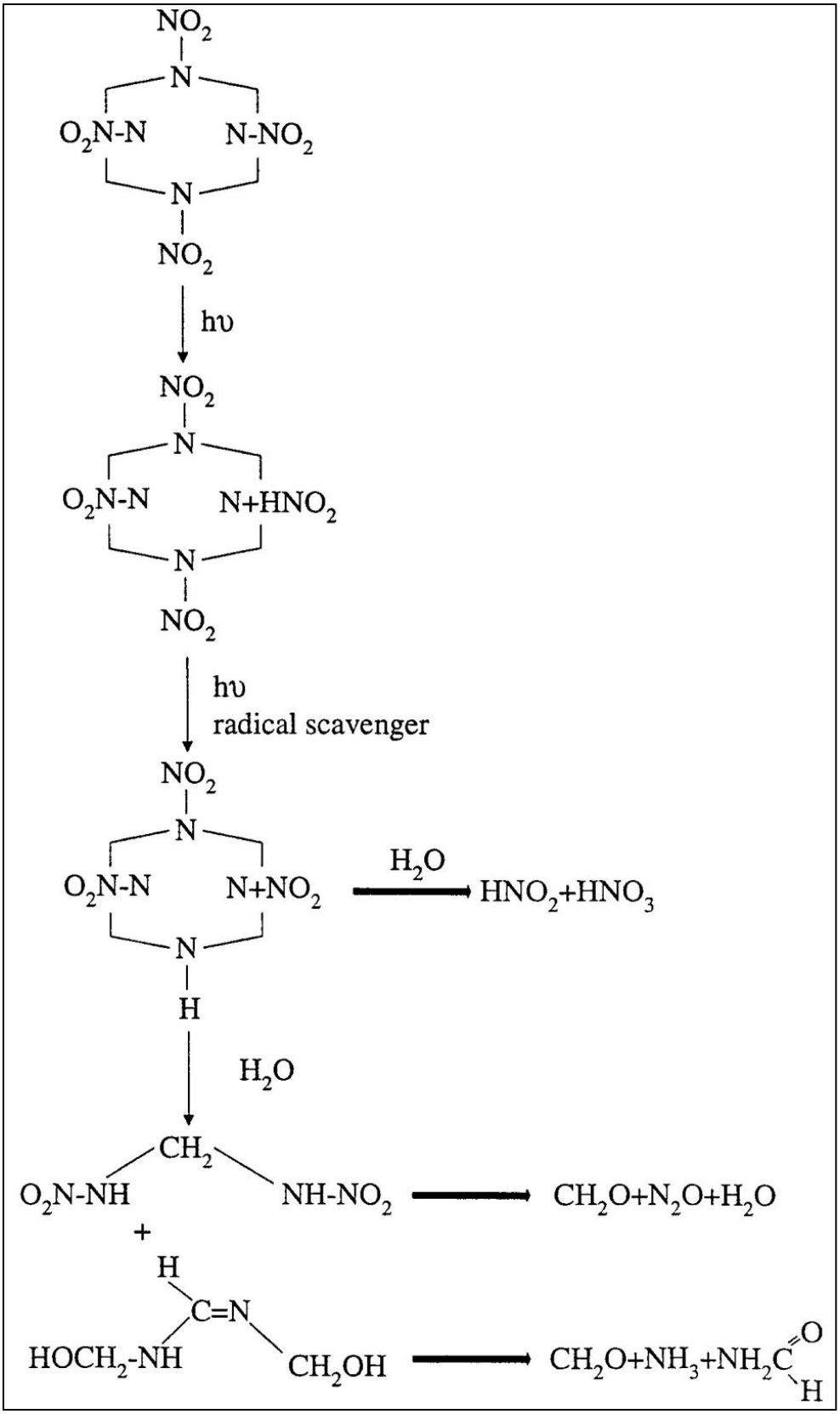

Figure E-3. HMX Biotransformation Pathway

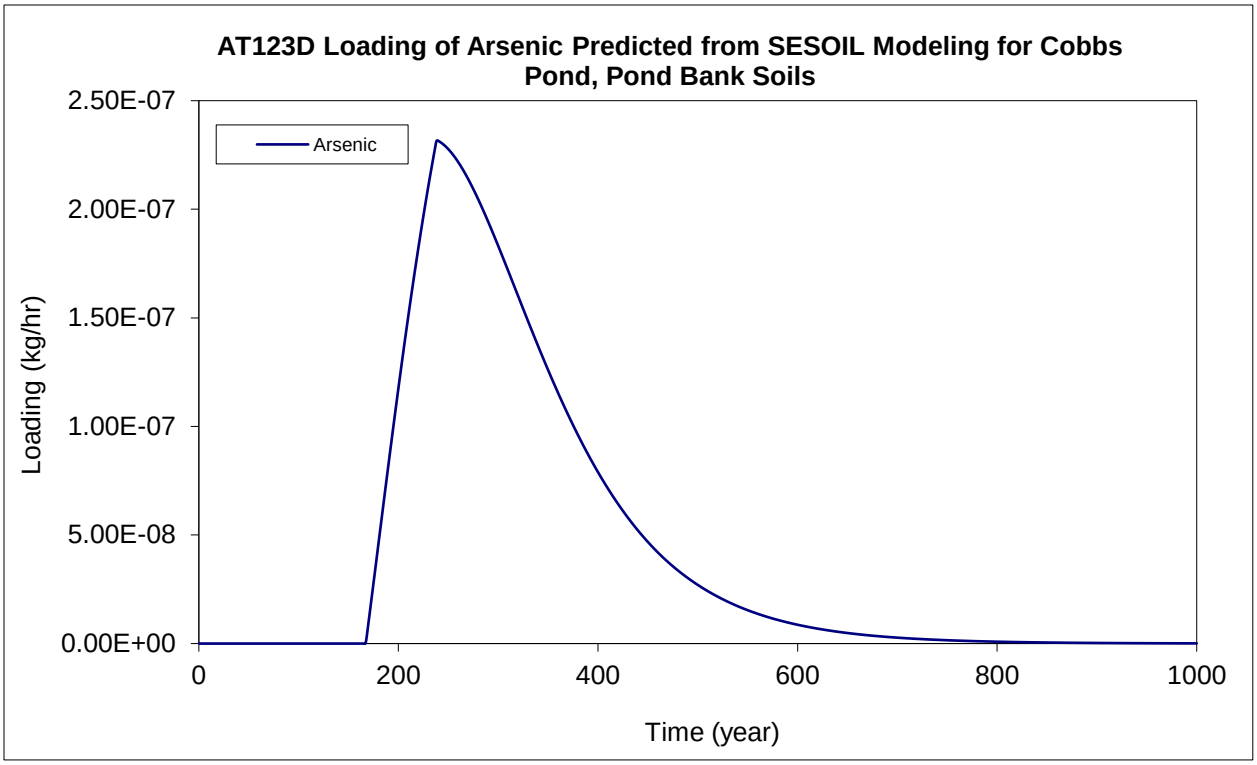

Figure E-4. Predicted Contaminant Mass Loading for AT123D Modeling – Arsenic

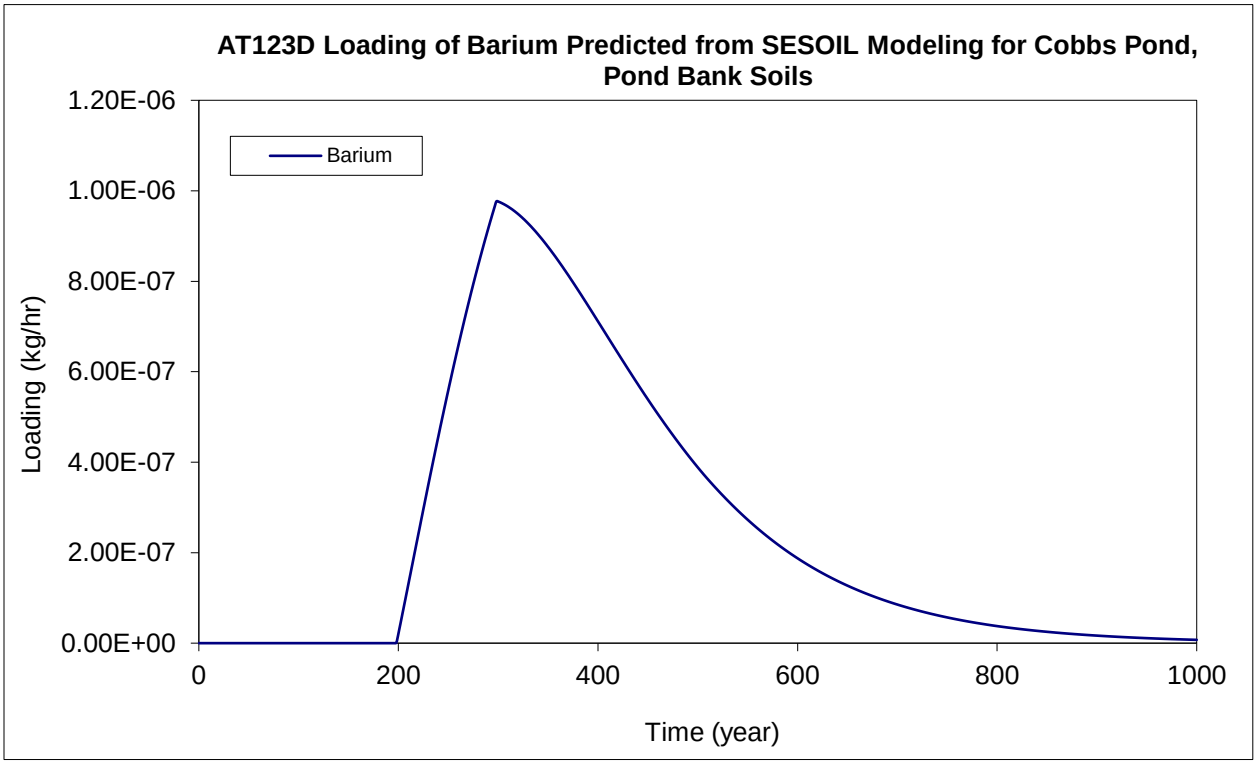

Figure E-5. Predicted Contaminant Mass Loading for AT123D Modeling – Barium

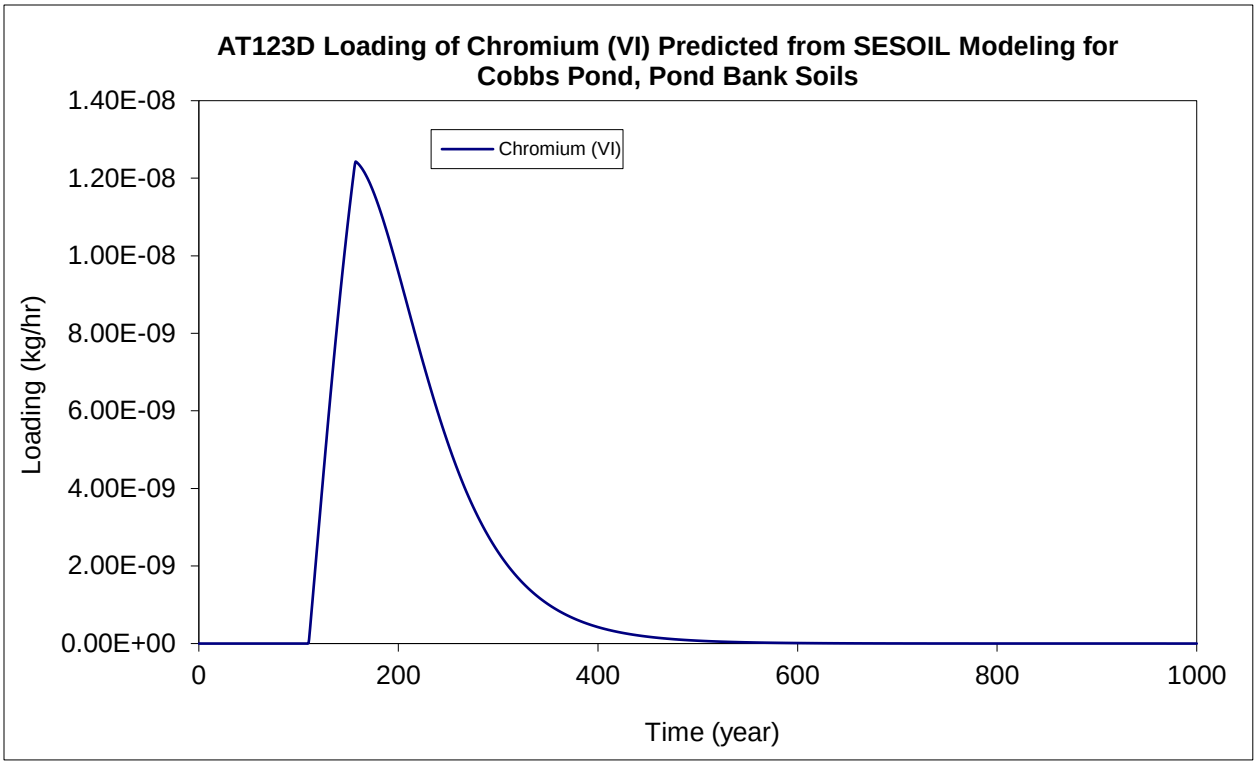

Figure E-6. Predicted Contaminant Mass Loading for AT123D Modeling – Hexavalent Chromium

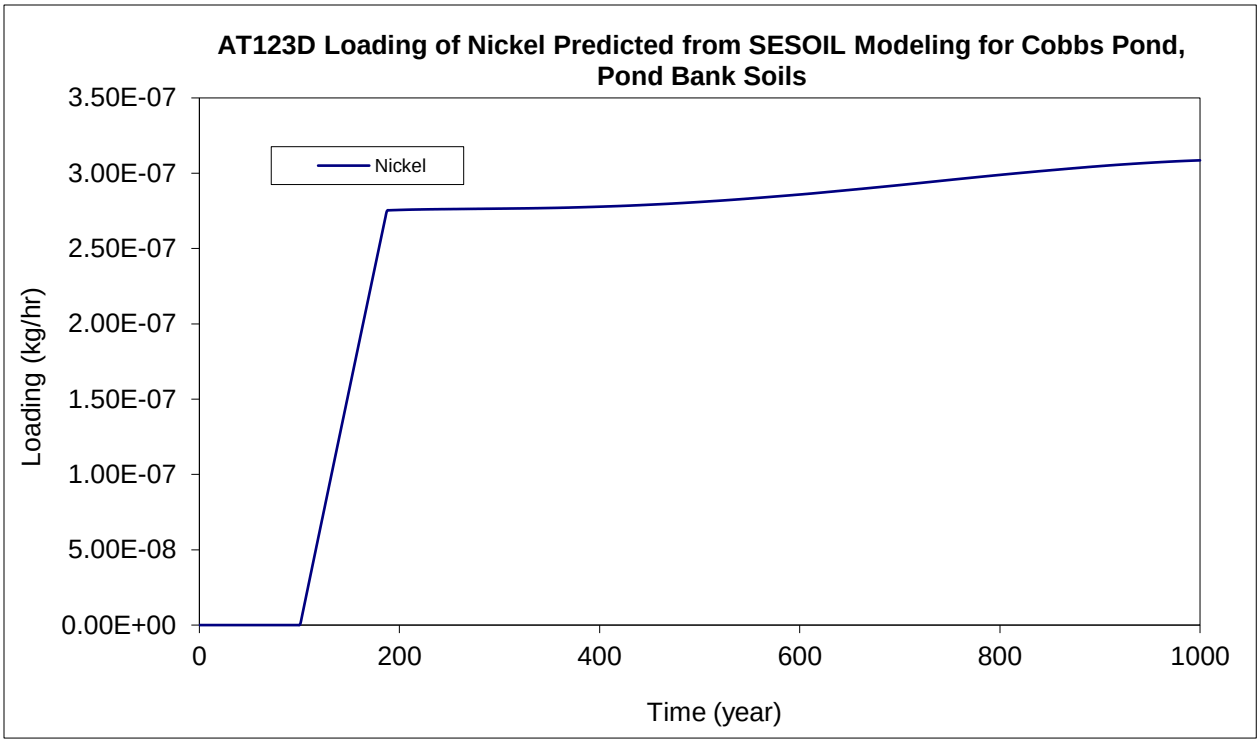

Figure E-7. Predicted Contaminant Mass Loading for AT123D Modeling – Nickel

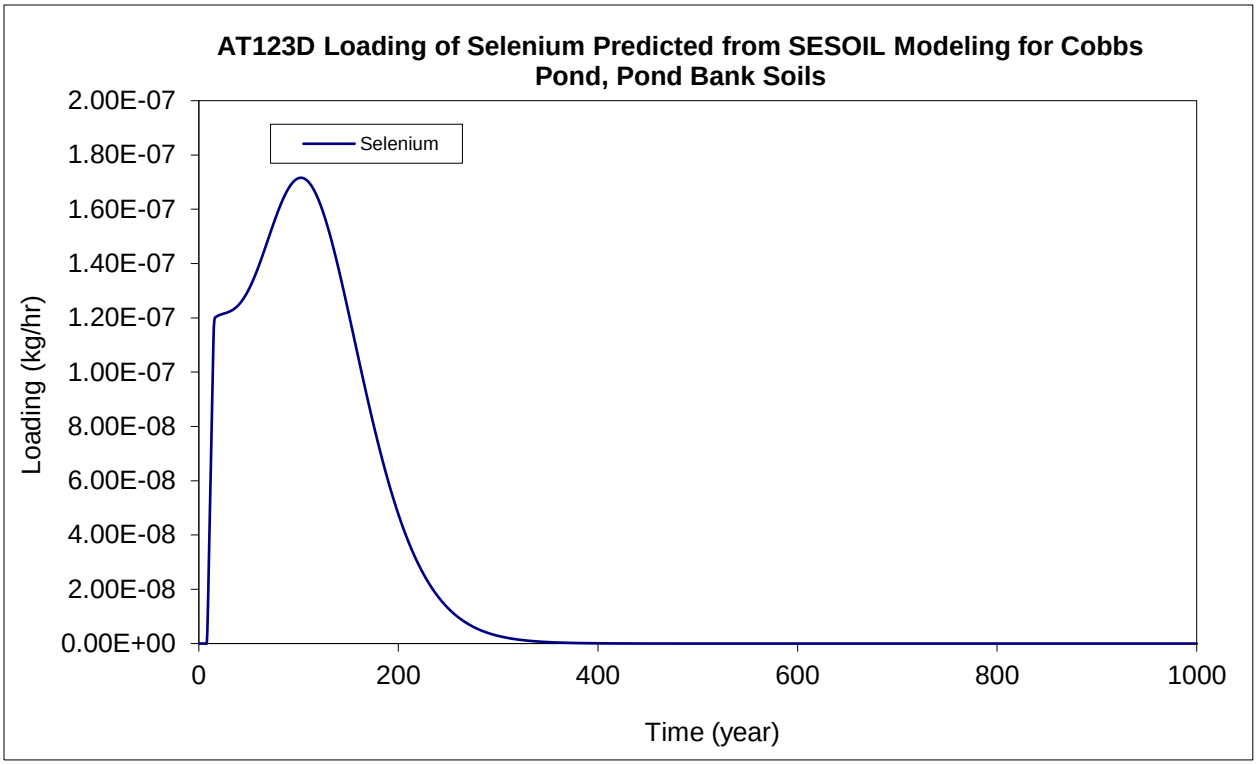

Figure E-8. Predicted Contaminant Mass Loading for AT123D Modeling – Selenium

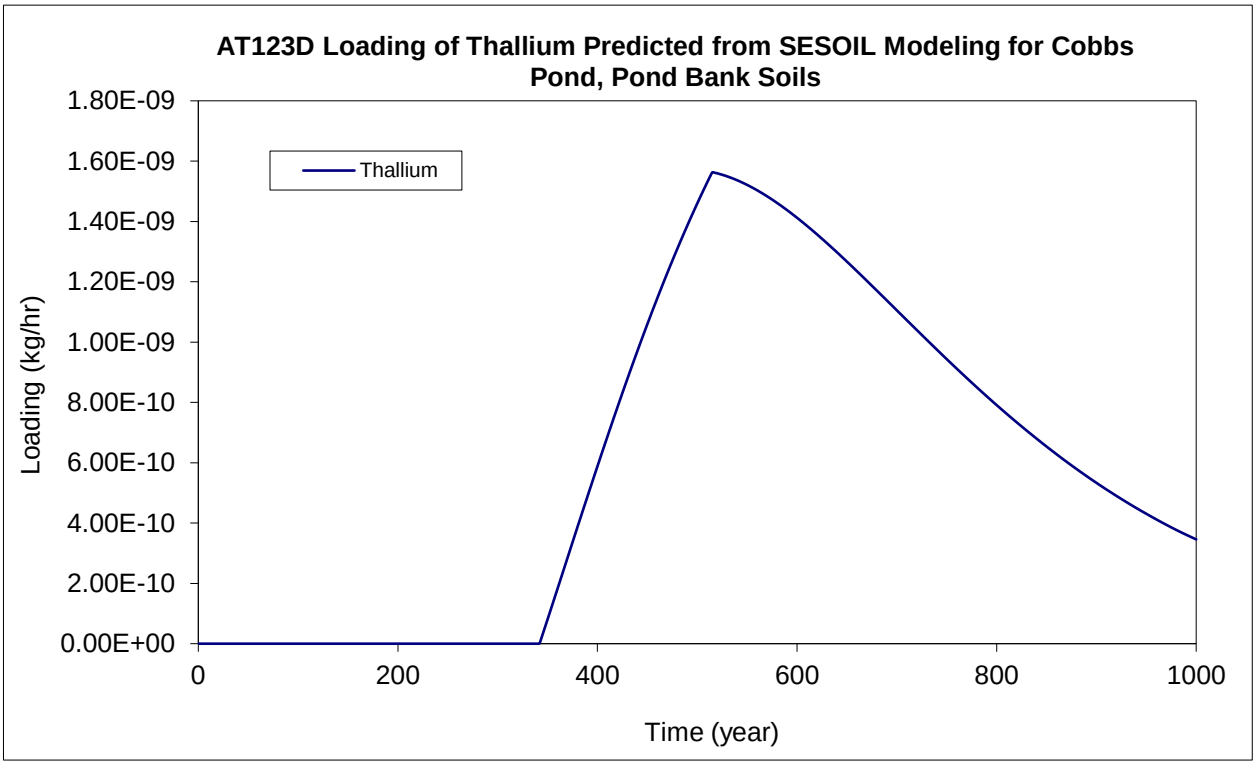

Figure E-9. Predicted Contaminant Mass Loading for AT123D Modeling – Thallium

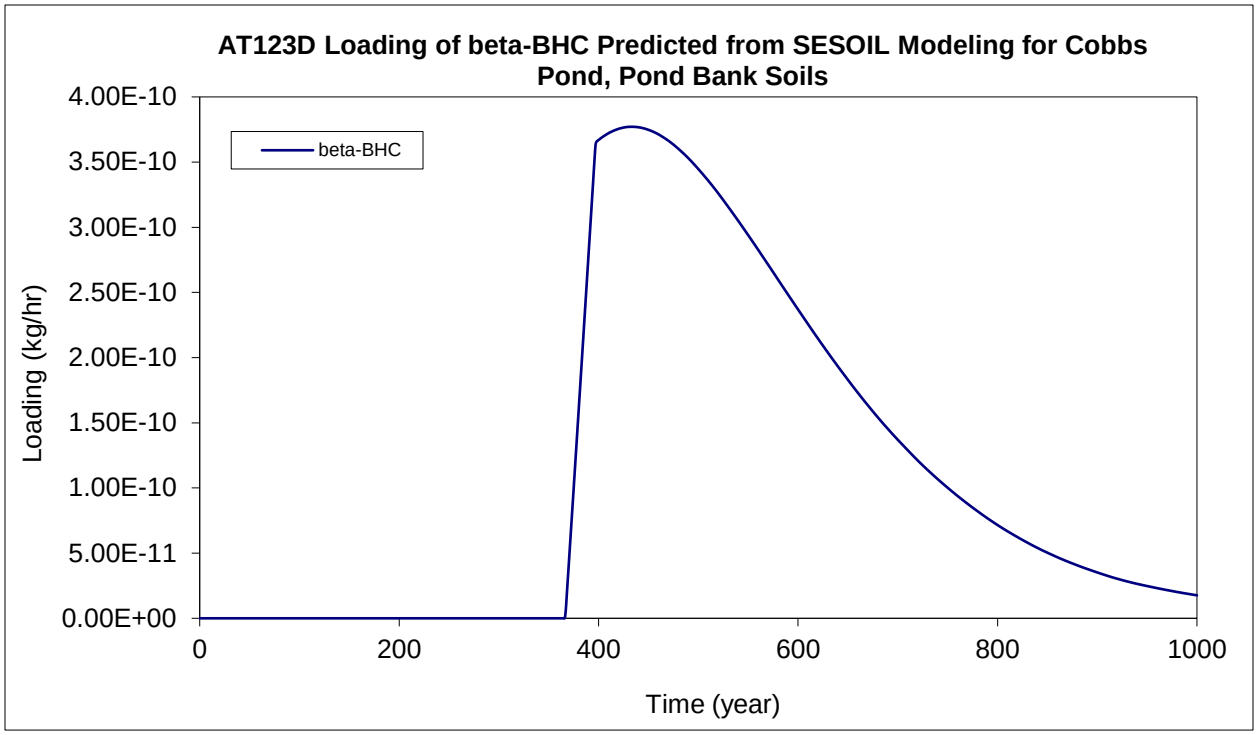

Figure E-10. Predicted Contaminant Mass Loading for AT123D Modeling – beta-BHC

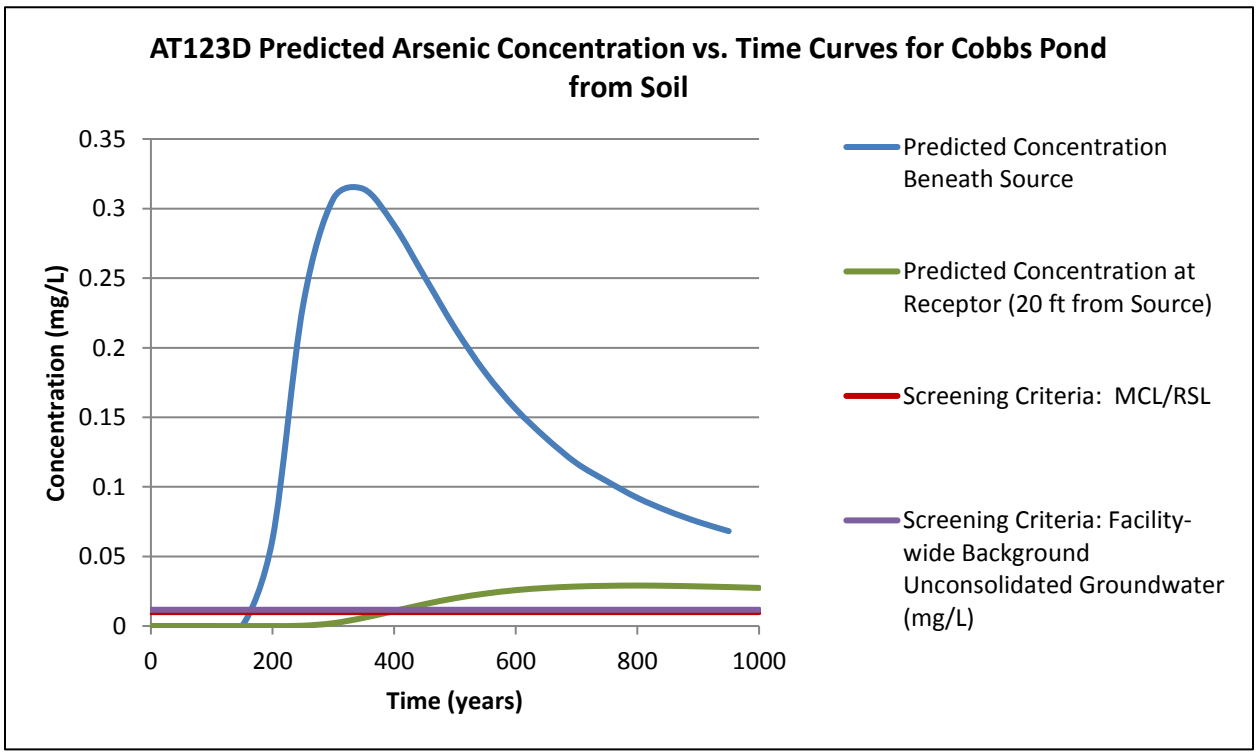

Figure E-11. Predicted Concentration of Arsenic in Groundwater Based on AT123D Modeling

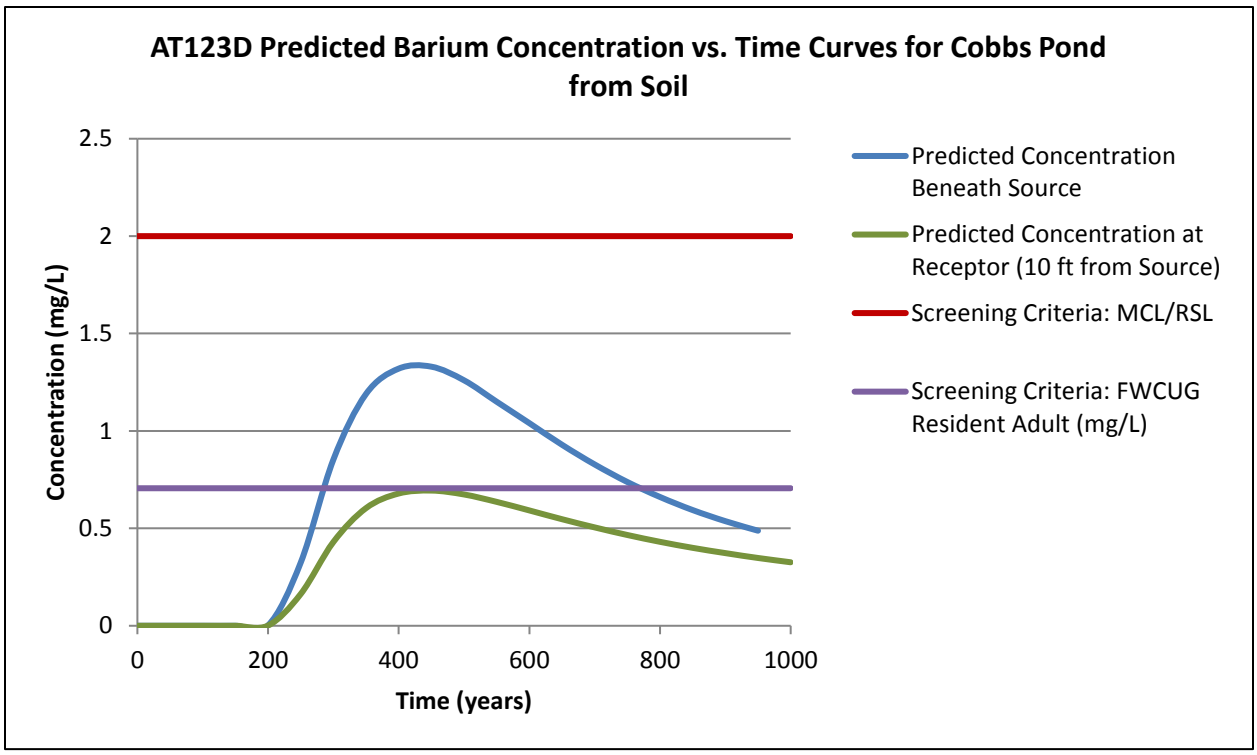

Figure E-12. Predicted Concentration of Barium in Groundwater Based on AT123D Modeling

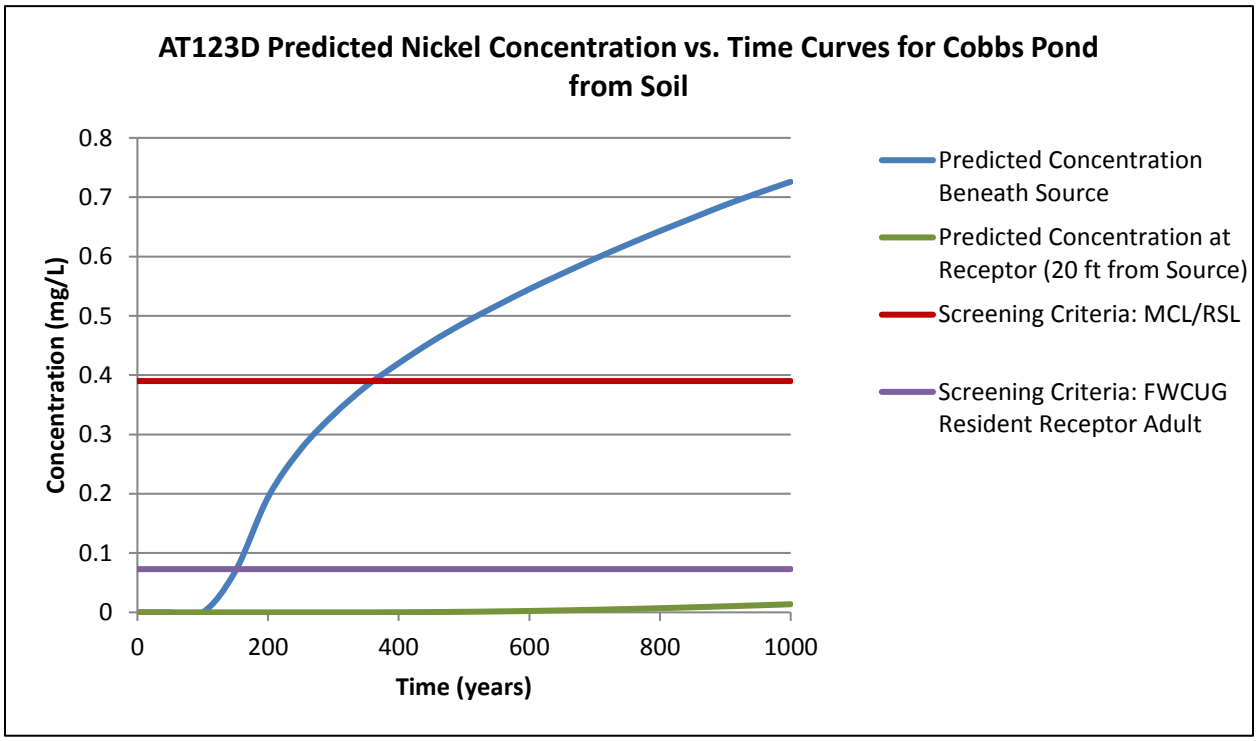

Figure E-13. Predicted Concentration of Nickel in Groundwater Based on AT123D Modeling

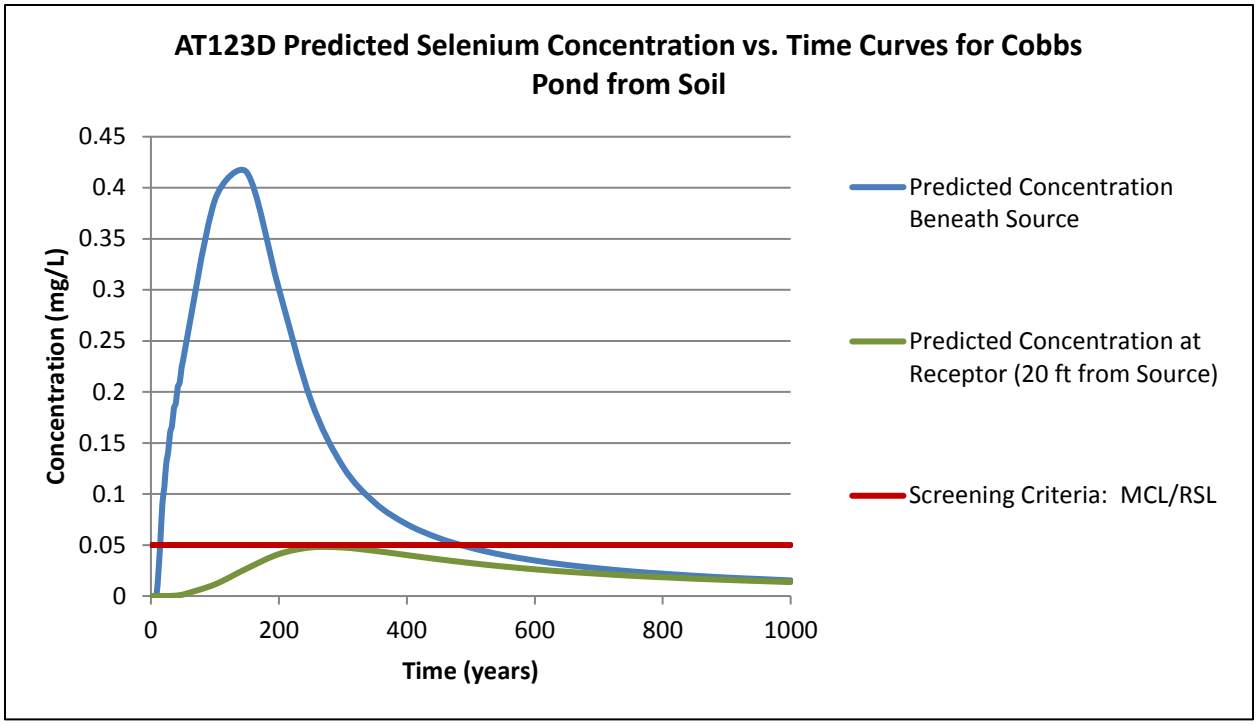

Figure E-14. Predicted Concentration of Selenium in Groundwater Based on AT123D Modeling

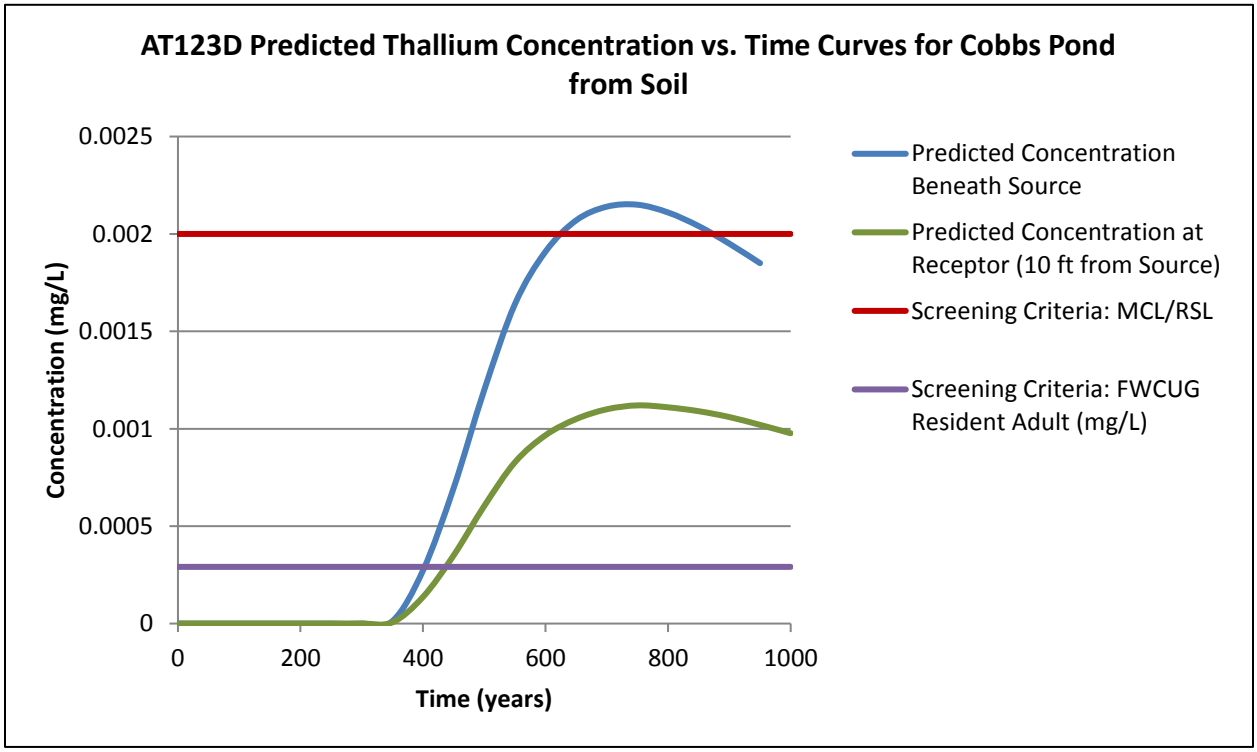

Figure E-15. Predicted Concentration of Thallium in Groundwater Based on AT123D Modeling

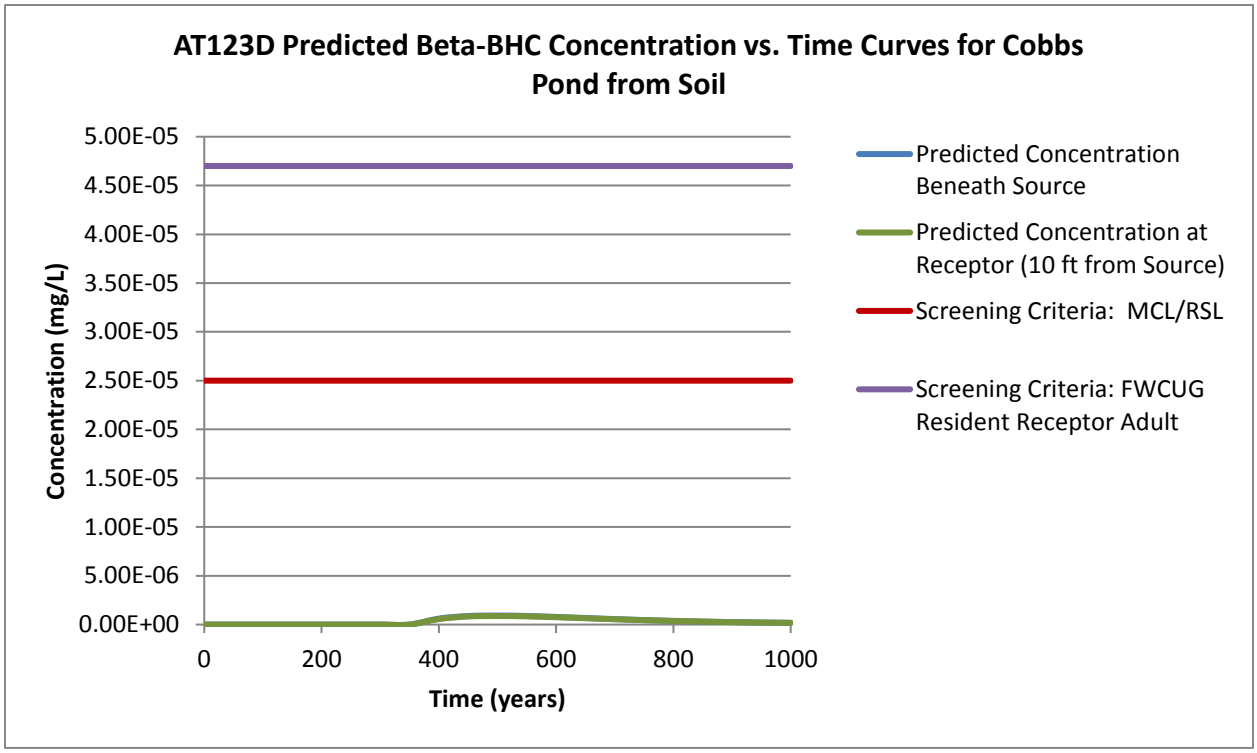

Figure E-16. Predicted Concentration of Beta-BHC in Groundwater Based on AT123D Modeling

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