APPENDIX M

FATE AND TRANSPORT TABLES

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Table M-1. Physical and Chemical Properties of Metal SRCs at Demolition Area 2

Chemicals of Interest	K_d (L/kg)	Reference	H' (atm-m^3/mol)	Reference	C_w (mg/L)	C_w Reference	Generic SSL (DAF=1)	Reference
Antimony	4.50E+01	a	NA		6.00E-03	MCL	3.00E-01	a
Arsenic	2.90E+01	a	NA		1.00E-02	MCL	2.90E-01	a
Barium	4.10E+01	a	NA		2.00E+00	MCL	8.20E+01	a
Beryllium	7.90E+02	a	NA		4.00E-03	MCL	3.00E+00	a
Cadmium	7.50E+01	a	NA		5.00E-03	MCL	4.00E-01	a
Chromium (total)	1.90E+01	a	NA		1.00E-01	MCL	2.00E+00	a
Copper	3.50E+01	b	NA		1.30E+00	MCL	4.58E+01	
Lead	1.60E+04	c	NA		1.50E-02	MCL	2.40E+02	a
Manganese	7.50E+02	c	NA		8.76E-01	PRG9	6.57E+02	
Mercury	5.20E+01	a	1.14E-02	a	2.00E-03	MCL	1.00E-01	
Nickel	6.50E+01	a	NA		7.30E-01	PRG9	7.00E+00	a
Selenium	5.00E+00	a	NA		5.00E-02	MCL	3.00E-01	a
Zinc	6.20E+01	a	NA		1.10E+01	PRG9	6.20E+02	a

Cw = target groundwater concentration (either MCL or PRG9).
DAF = Dilution attenuation factor.
H' = Henry's Law constant.
Kd = Distribution coefficient.
MCL = Clean Water Act drinking water maximum contaminant level.
NA = Not applicable.
PRG9 = EPA Region 9 preliminary remedial goal.
SRC = Site-related contaminant.

References:

a. EPA Soil Screening Guidance: Technical Background Document, May 1996.
b. Baes and Sharp 1983.
c. Sheppard and Thibault 1990.
d. RREL = Risk Reduction Engineering Laboratory (EPA 1994).

Table M-2. Physical and Chemical Properties of Organic SRCs at Demolition Area 2

Chemicals of Interest	K_{oc} (L/kg)	Reference	H' (atm-m^3/mol)	Reference	C_w (mg/L)	C_w Reference
Volatile Organic Compounds						
Acetone	5.75E-01	a	3.88E-05	a	6.08E-01	PRG9
Tetrachloroethylene	2.65E+02	a	1.84E-02	a	5.00E-03	MCL
Toluene	1.40E+02	a	6.64E-03	a	1.00E+00	MCL
Semivolatile Organic Compounds						
Bis(2-ethylhexyl) phthalate	1.11E+05	a	1.02E-07	a	6.00E-03	MCL
Di-n-butyl phthalate	1.57E+03	a	9.38E-10	a	3.60E+00	PRG9
n-Nitrosodiphenylamine	1.29E+03	a	5.00E-06	a	1.40E-02	PRG9
Explosives						
2-Amino-4,6-dinitrotoluene	NF		NF		NA	
4-Amino-2,6-dinitrotoluene	NF		NF		NA	
2,4-Dinitrotoluene	9.55E+01	a	9.26E-08	a	7.30E-02	PRG9
HMX	NF		NF		1.80E+00	PRG9
RDX	4.67E+00	d	NF		6.10E-04	PRG9
Tetryl	2.75E+01	l	NF		3.60E-01	PRG9
2,4,6-Trinitrotoluene	213000	d	NF		0.002241051	PRG9

MCL = Clean Water Act drinking water maximum contaminant level.
Cw = Target groundwater concentration (either MCL or PRG9).
H' = Henry's Law constant.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
Kd = Distribution coefficient.
Koc = Octanol-water coefficient.
NA = Not available.
NF = Not found.
PRG9 = EPA Region 9 preliminary remedial goal.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
SRC = Site-related contaminant.

References:

a. EPA Soil Screening Guidance: Technical Background Document, May 1996.
b. Baes and Sharp 1983.
c. Sheppard and Thibault 1990.
d. RREL = Risk Reduction Engineering Laboratory (EPA 1994).
e. RBCA = Risk-based corrective action manual and protocol (SAIC 1999).
f. Calculated from EPA Superfund Office of Emergency and Remedial Response Soil Screening Guidance http://risk.lsd.ornl.gov.
l. Estimated Koc for Tetryl.
- Log Kow = 1.64, Koc = 0.63 Kow where Sw = Solubility in water (umol/L).
- Obtained Sw =1800 mg/L from EPA Risk Reduction Engineering Laboratory Treatability Data Base (EPA 1994).
- Noted MW = 227.10 g/mol implying Sw = 7926 umol/L.

Table M-3. Physical and Chemical Properties of Initial CMCOPCs at Demolition Area 2 Required for SESOIL Modeling

Site-Related Chemicals	Molecular Weight	Solubility (mg/L)	Kd or Koc (L/kg)	Diffusion Coefficient in Air (cm^2/s)	Biodegradation Rate (1/day)
Metals					
Antimony	122.0	3.85E+04	4.50E+01	N/A	N/A
Arsenic	74.9	3.02E+04	2.90E+01	N/A	N/A
Barium	137.3	1.00E+05	4.10E+01	N/A	N/A
Chromium	52.0	1.20E+04	1.90E+01	N/A	N/A
Copper	63.6	1.00E+05	3.50E+01	N/A	N/A
Selenium	79.0	1.00E+03	5.00E+00	N/A	N/A
Volatile Organic Compounds					
Tetrachloroethene	165.8	2.00E+02	2.65E+02	7.20E-02	4.19E-04
Explosives					
2,4-Dinitrotoluene	182.1	2.70E+02	9.55E+01	2.03E-01	1.90E-03
RDX	222.3	6.00E+01	4.67E+00	1.00E-02	NF
Tetryl	287.2	7.40E+01	2.75E+01	NF	NF

CMCOPC = Contaminant migration contaminant of potential concern.
Kd = Distribution coefficient.
Koc = Organic-carbon partition coefficient.
N/A = Not applicable.
NF = Not found.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
SESOIL = Seasonal Soil Compartment (model).

Table M-4. Climatic Data from SESOIL for Demolition Area 2
(Station: Youngstown WSO AP, Ohio)[a]

Month	Air Temp (^{o}C)	Cloud Cover	Humidity	ALBEDO	Evapotranspiration[b] (cm/d)	Precipitation (cm)	Duration (days)	Storms per Month	Model Days in Month
October	12	0.60	0.70	0.17	0	6.46	0.42	5.33	30.4
November	5.22	0.70	0.75	0.24	0	7.4	0.53	6.67	30.4
December	-1.06	0.80	0.75	0.31	0	7.06	0.57	6.14	30.4
January	-2.94	0.80	0.80	0.3	0	7.06	0.61	5.69	30.4
February	-2.33	0.70	0.75	0.32	0	5.76	0.53	5.09	30.4
March	2.33	0.70	0.70	0.29	0	8.26	0.55	7.14	30.4
April	9.11	0.70	0.70	0.19	0	8.83	0.48	7.4	30.4
May	14.61	0.60	0.70	0.16	0	8.46	0.45	7.15	30.4
June	19.89	0.60	0.70	0.16	0	9.07	0.36	6.57	30.4
July	21.89	0.50	0.70	0.16	0	9.8	0.3	6.06	30.4
August	21.11	0.55	0.70	0.16	0	8.14	0.3	6.06	30.4
September	17.67	0.55	0.70	0.16	0	7.85	0.4	5.44	30.4

[a]1996 data from Youngstown, OH, Weather Service Office - Airport Station.
[b]Data calculated in SESOIL model. 0.00 indicates evapotranspiration is calculated from other climatic data.
SESOIL = Seasonal Soil Compartment (model).

Table M-5. Development of Preliminary CMCOPCs Based on Comparison of the SRCs Exposure Concentration with its (GSSL with a DAF = 1

Media	Group	Analysis Type	Analyte	Units	Exposure Concentration	GSSL*DAF	Preliminary CMCOPC (DAF = 1?)
			Explosives				
Soils	DA2 AREA A	All Depths	2,4,6-Trinitrotoluene	mg/kg	5.10E-02	5.70E-04	Yes
Soils	DA2 AREA A	All Depths	2-Amino-4,6-Dinitrotoluene	mg/kg	9.52E-02		
Soils	DA2 AREA A	All Depths	4-Amino-2,6-Dinitrotoluene	mg/kg	8.02E-02		
Soils	DA2 AREA A	All Depths	Tetryl	mg/kg	1.54E-01	9.18E-02	Yes
			Inorganics				
Soils	DA2 AREA A	All Depths	Arsenic	mg/kg	1.81E+01	2.90E-01	Yes
Soils	DA2 AREA A	All Depths	Barium	mg/kg	2.03E+02	8.20E+01	Yes
Soils	DA2 AREA A	All Depths	Beryllium	mg/kg	9.22E-01	3.00E+00	
Soils	DA2 AREA A	All Depths	Cadmium	mg/kg	1.96E+00	4.00E-01	Yes
Soils	DA2 AREA A	All Depths	Chromium	mg/kg	1.98E+01	2.00E+00	Yes
Soils	DA2 AREA A	All Depths	Chromium, Hexavalent	mg/kg	2.30E+01	2.00E+00	Yes
Soils	DA2 AREA A	All Depths	Copper	mg/kg	1.41E+02	4.58E+01	Yes
Soils	DA2 AREA A	All Depths	Lead	mg/kg	1.01E+02	2.40E+02	
Soils	DA2 AREA A	All Depths	Mercury	mg/kg	2.07E-01	1.00E-01	Yes
Soils	DA2 AREA A	All Depths	Nickel	mg/kg	3.98E+01	7.00E+00	Yes
Soils	DA2 AREA A	All Depths	Zinc	mg/kg	2.25E+02	6.20E+02	
			Organic-Semivolatiles				
Soils	DA2 AREA A	All Depths	bis(2-ethylhexyl) phthalate	mg/kg	2.60E-02	1.80E+02	
Soils	DA2 AREA A	All Depths	di-n-Butyl Phthalate	mg/kg	3.10E-01	2.70E+02	
Soils	DA2 AREA A	All Depths	n-Nitrosodiphenylamine	mg/kg	2.60E-02	6.00E-02	
			Organic-Volatiles				
Soils	DA2 AREA A	All Depths	Tetrachloroethene	mg/kg	4.20E-03	3.00E-03	Yes
Soils	DA2 AREA A	All Depths	Toluene	mg/kg	2.00E-03	6.00E-01	

Table M-5. Development of Preliminary CMCOPCs Based on Comparison of the SRCs Exposure Concentration with its GSSL with a DAF = 1 (continued)

Media	Group	Analysis Type	Analyte	Units	Exposure Concentration	GSSL*DAF	Preliminary CMCOPC (DAF = 1?)
			Explosives				
Soils	DA2 AREA B	All Depths	2,4,6-Trinitrotoluene	mg/kg	5.29E-01	5.70E-04	Yes
Soils	DA2 AREA B	All Depths	2,4-Dinitrotoluene	mg/kg	5.28E-02	4.00E-05	Yes
Soils	DA2 AREA B	All Depths	2-Amino-4,6-Dinitrotoluene	mg/kg	5.86E-02		
Soils	DA2 AREA B	All Depths	4-Amino-2,6-Dinitrotoluene	mg/kg	1.46E-01		
Soils	DA2 AREA B	All Depths	HMX	mg/kg	2.57E-01	3.60E-01	
Soils	DA2 AREA B	All Depths	RDX	mg/kg	1.72E-01	1.28E-04	Yes
Soils	DA2 AREA B	All Depths	Tetryl	mg/kg	1.68E+01	9.18E-02	Yes
			Inorganics				
Soils	DA2 AREA B	All Depths	Antimony	mg/kg	9.69E-01	3.00E-01	Yes
Soils	DA2 AREA B	All Depths	Barium	mg/kg	1.14E+02	8.20E+01	Yes
Soils	DA2 AREA B	All Depths	Beryllium	mg/kg	6.60E-01	3.00E+00	
Soils	DA2 AREA B	All Depths	Cadmium	mg/kg	3.30E+00	4.00E-01	Yes
Soils	DA2 AREA B	All Depths	Chromium	mg/kg	2.61E+01	2.00E+00	Yes
Soils	DA2 AREA B	All Depths	Chromium, Hexavalent	mg/kg	2.80E+01	2.00E+00	Yes
Soils	DA2 AREA B	All Depths	Copper	mg/kg	1.21E+03	4.58E+01	Yes
Soils	DA2 AREA B	All Depths	Lead	mg/kg	1.06E+02	2.40E+02	
Soils	DA2 AREA B	All Depths	Manganese	mg/kg	9.78E+02	6.57E+02	Yes
Soils	DA2 AREA B	All Depths	Mercury	mg/kg	1.81E+01	1.00E-01	Yes
Soils	DA2 AREA B	All Depths	Nickel	mg/kg	1.77E+01	7.00E+00	Yes
Soils	DA2 AREA B	All Depths	Selenium	mg/kg	9.97E-01	3.00E-01	Yes
Soils	DA2 AREA B	All Depths	Zinc	mg/kg	4.65E+02	6.20E+02	
			Organic-Volatiles				
Soils	DA2 AREA B	All Depths	Acetone	mg/kg	1.90E-02	8.00E-01	
Soils	DA2 AREA B	All Depths	Tetrachloroethene	mg/kg	3.70E-03	3.00E-03	Yes
Soils	DA2 AREA B	All Depths	Toluene	mg/kg	7.00E-03	6.00E-01	

CMCOPC = Contaminant migration contaminant of potential concern.
GSSL * DAF = Generic soil screening level multiplied by a dilution attenuation factor of 1.
SRC = Site-related contaminant.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

Table M-6. List of Preliminary CMCOPCs (Extracted from Table M-5)

Media	Group	Analysis Type	Analyte	Units	Exposure Concentration	GSSL*DAF	Preliminary CMCOPC (DAF = 1?)
			Explosives				
Soils	DA2 AREA A	All Depths	2,4,6-Trinitrotoluene	mg/kg	5.10E-02	5.70E-04	Yes
Soils	DA2 AREA A	All Depths	Tetryl	mg/kg	1.54E-01	9.18E-02	Yes
			Inorganics				
Soils	DA2 AREA A	All Depths	Arsenic	mg/kg	1.81E+01	2.90E-01	Yes
Soils	DA2 AREA A	All Depths	Barium	mg/kg	2.03E+02	8.20E+01	Yes
Soils	DA2 AREA A	All Depths	Cadmium	mg/kg	1.96E+00	4.00E-01	Yes
Soils	DA2 AREA A	All Depths	Chromium	mg/kg	1.98E+01	2.00E+00	Yes
Soils	DA2 AREA A	All Depths	Chromium, Hexavalent	mg/kg	2.30E+01	2.00E+00	Yes
Soils	DA2 AREA A	All Depths	Copper	mg/kg	1.41E+02	4.58E+01	Yes
Soils	DA2 AREA A	All Depths	Mercury	mg/kg	2.07E-01	1.00E-01	Yes
Soils	DA2 AREA A	All Depths	Nickel	mg/kg	3.98E+01	7.00E+00	Yes
			Organic-Volatiles				
Soils	DA2 AREA A	All Depths	Tetrachloroethene	mg/kg	4.20E-03	3.00E-03	Yes
			Explosives				
Soils	DA2 AREA B	All Depths	2,4,6-Trinitrotoluene	mg/kg	5.29E-01	5.70E-04	Yes
Soils	DA2 AREA B	All Depths	2,4-Dinitrotoluene	mg/kg	5.28E-02	4.00E-05	Yes
Soils	DA2 AREA B	All Depths	RDX	mg/kg	1.72E-01	1.28E-04	Yes
Soils	DA2 AREA B	All Depths	Tetryl	mg/kg	1.68E+01	9.18E-02	Yes
			Inorganics				
Soils	DA2 AREA B	All Depths	Antimony	mg/kg	9.69E-01	3.00E-01	Yes
Soils	DA2 AREA B	All Depths	Barium	mg/kg	1.14E+02	8.20E+01	Yes
Soils	DA2 AREA B	All Depths	Cadmium	mg/kg	3.30E+00	4.00E-01	Yes
Soils	DA2 AREA B	All Depths	Chromium	mg/kg	2.61E+01	2.00E+00	Yes
Soils	DA2 AREA B	All Depths	Chromium, Hexavalent	mg/kg	2.80E+01	2.00E+00	Yes
Soils	DA2 AREA B	All Depths	Copper	mg/kg	1.21E+03	4.58E+01	Yes
Soils	DA2 AREA B	All Depths	Manganese	mg/kg	9.78E+02	6.57E+02	Yes
Soils	DA2 AREA B	All Depths	Mercury	mg/kg	1.81E+01	1.00E-01	Yes
Soils	DA2 AREA B	All Depths	Nickel	mg/kg	1.77E+01	7.00E+00	Yes
Soils	DA2 AREA B	All Depths	Selenium	mg/kg	9.97E-01	3.00E-01	Yes

Table M-6. List of Preliminary CMCOPCs (Extracted from Table M-5) (continued)

Media	Group	Analysis Type	Analyte	Units	Exposure Concentration	GSSL*DAF	Preliminary CMCOPC (DAF = 1?)
Organic-Volatiles							
Soils	DA2 AREA B	All Depths	Tetrachloroethene	mg/kg	3.70E-03	3.00E-03	Yes

GSSL * DAF = Generic soil screening level multiplied by a dilution attenuation factor of 1.
CMCOPC = Contaminant migration contaminant of potential concern.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

Table M-7. Development of Final CMCOPCs Based on Arrival Time <= 1,500 Years

$$R = 1 + \frac{\rho_b K_d}{\theta_w} \qquad T = L_z \theta_w R / q$$

Parameter	Symbol	Value		Units		Notes		
Percolation rate	q	0.3100		ft/year		0.1 * (Precipitation)		
Soil-water distribution coefficient	K_d	constituent-specific		L/kg		Literature		
Organic carbon distribution coefficient	K_{oc}	constituent-specific		L/kg		Literature		
Fraction organic carbon	f_{oc}	0.0066		unitless				
Water-filled soil porosity	q_w	0.2400		unitless		Site-specific (Moisture Content by Weight=11.8%)		
Bulk density (dry)	r_b	2.2400		gm/cm^3		Site-specific		
Leaching zone	Lz	4.0000		ft				
Retardation factor	R	constituent-specific		unitless		Calculated		
Arrival time	T	constituent-specific		year		Calculated		
Chemicals of Interest		**K_{oc} (L/kg)**		**K_d (L/kg)**		**R**	**T (year)**	**T < 1,500?**
Metals and Inorganic Compounds								
Antimony				4.50E+01	a	4.21E+02	1.30E+03	Yes
Arsenic				2.90E+01	a	2.72E+02	8.41E+02	Yes
Barium				4.10E+01	a	3.84E+02	1.19E+03	Yes
Beryllium				7.90E+02	a	7.37E+03	2.28E+04	
Cadmium				7.50E+01	a	7.01E+02	2.17E+03	
Chromium (total)				1.90E+01	a	1.78E+02	5.52E+02	Yes
Copper				3.50E+01	b	3.28E+02	1.01E+03	Yes
Lead				1.60E+04	c	1.49E+05	4.62E+05	
Manganese				7.50E+02	c	7.00E+03	2.17E+04	
Mercury				5.20E+01	a	4.86E+02	1.51E+03	
Nickel				6.50E+01	a	6.08E+02	1.88E+03	
Selenium				5.00E+00	a	4.77E+01	1.48E+02	Yes
Zinc				6.20E+01	a	5.80E+02	1.80E+03	
Volatile Organic Compounds								
Acetone		5.75E-01	a	3.80E-03		1.04E+00	3.21E+00	Yes
Tetrachloroethene		2.65E+02	a	1.75E+00		1.73E+01	5.36E+01	Yes
Toluene		1.40E+02	a	9.24E-01		9.62E+00	2.98E+01	Yes
Semivolatile Organic Compounds								
Bis(2-ethylhexyl) phthalate		1.11E+05	a	7.33E+02		6.84E+03	2.12E+04	
Di-n-butyl phthalate		1.57E+03	a	1.04E+01		9.77E+01	3.03E+02	Yes
n-Nitrosodiphenylamine		1.29E+03	a	8.51E+00		8.05E+01	2.49E+02	Yes
Explosives								
2-Amino-4,6-dinitrotoluene				0.00E+00		1.00E+00	3.10E+00	Yes
4-Amino-2,6-dinitrotoluene				0.00E+00		1.00E+00	3.10E+00	Yes
2,4-Dinitrotoluene		9.55E+01	a	6.30E-01		6.88E+00	2.13E+01	Yes
HMX				0.00E+00		1.00E+00	3.10E+00	Yes
Nitroglycerine		1.54E+02	k	1.02E+00		1.05E+01	3.25E+01	Yes
RDX		4.67E+00	g	3.08E-02		1.29E+00	3.99E+00	Yes

Table M-7. Development of Final CMCOPCs Based on Arrival Time <= 1500 Years (continued)

Chemicals of Interest		K_{oc} (L/kg)		K_d (L/kg)		R	T (yr)	T < 1500?
Tetryl		2.75E+01	l	1.82E-01		2.69E+00	8.34E+00	Yes
2,4,6-Trinitrotoluene		2.13E+05		1.41E+03		1.31E+04	4.06E+04	

CMCOPC = Contaminant migration contaminant of potential concern.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

References:

a. EPA Soil Screening Guidance: Technical Background Document, May 1996.
b. Baes and Sharp 1983.
c. Sheppard and Thibault 1990.
d. RREL.
e. RBCA.
f. Load Line 1 GSSL.xls.
g. Load Line 1 GSSL Update.xls.
h. From Load Line 1.
k. Estimated Koc for Nitroglycerine using EPA, 1985.
- log Kow = 5 – 0.67 Log Sw, Koc = 0.63 Kow where Dw = Solubility in water (umol/L).
- Obtained Sw = 1800 mg/L from EPA Risk Reduction Engineering Laboratory Treatability Data Base (EPA 1994).
- Noted MW = 227.10 g/mol implying Sw = 7926 umol/L.
l. Estimated Koc for tetryl.
- log Kow = 1.64, Koc = 0.63 Kow where Sw = Solubility in water (umol/L).
- Obtained Sw = 1800 mg/L from EPA Risk Reduction Engineering Laboratory Treatability Data Base (EPA 1994).
- Noted MW = 227.10 g/mol implying Sw = 7926 umol/L.

Table M-8. Revised List of CMCOPCs for SESOIL Modeling (based on Table M-7)

Media	Group	Analysis Type	Analyte	SESOIL Modeling?
		Explosives		
Soils	DA2 AREA A	All Depths	Tetryl	Yes
		Inorganics		
Soils	DA2 AREA A	All Depths	Arsenic	Yes
Soils	DA2 AREA A	All Depths	Barium	Yes
Soils	DA2 AREA A	All Depths	Chromium	Yes
Soils	DA2 AREA A	All Depths	Chromium, Hexavalent	Yes
Soils	DA2 AREA A	All Depths	Copper	Yes
		Organic-Volatiles		
Soils	DA2 AREA A	All Depths	Tetrachloroethene	Yes
		Explosives		
Soils	DA2 AREA B	All Depths	2,4-Dinitrotoluene	Yes
Soils	DA2 AREA B	All Depths	RDX	Yes
Soils	DA2 AREA B	All Depths	Tetryl	Yes
		Inorganics		
Soils	DA2 AREA B	All Depths	Antimony	Yes
Soils	DA2 AREA B	All Depths	Barium	Yes
Soils	DA2 AREA B	All Depths	Chromium	Yes
Soils	DA2 AREA B	All Depths	Chromium, Hexavalent	Yes
Soils	DA2 AREA B	All Depths	Copper	Yes
Soils	DA2 AREA B	All Depths	Selenium	Yes
		Organic-Volatiles		
Soils	DA2 AREA B	All Depths	Tetrachloroethylene	Yes
		Explosives		
Soils	DA2 AREA C	All Depths	Nitroglycerine	Yes
Soils	DA2 AREA C	All Depths	Tetryl	Yes
		Inorganics		
Soils	DA2 AREA C	All Depths	Arsenic	Yes
Soils	DA2 AREA C	All Depths	Barium	Yes
Soils	DA2 AREA C	All Depths	Copper	Yes

CMCOPC = Contaminant migration contaminant of potential concern.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
SESOIL = Seasonal Soil Compartment (model).

Table M-9. Layers Used in SESOIL Model

Transect	Layer Number	Layer Thickness	Number of Sublayers	Purpose
Area A	1	0.9 m (3 ft)	3	Contaminant Loading
	2	0.9 m (3 ft)	3	Leaching
	3	0.3 m (1 ft)	2	Leaching
Area B	1	0.9 m (3 ft)	3	Contaminant Loading
	2	0.9 m (3 ft)	3	Leaching
	3	0.3 m (1 ft)	2	Leaching

SESOIL = Seasonal Soil Compartment (model).

Table M-10. SESOIL Application Data, Area A

CMCOPCs	No. of Layers	Layer No.	Thickness of Layer (ft)	No. of Sublayers	Sublayer No.	Concentration (mg/kg)
Tetryl	3	1	3	3	1	0
					2	1.80E-1
					3	1.80E-1
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0
Arsenic	3	1	3	3	1	1.99E+01
					2	1.63E+01
					3	1.63E+01
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0
Barium	3	1	3	3	1	1.68E+02
					2	2.03E+02
					3	2.03E+02
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0
Chromium	3	1	3	3	1	1.73E+01
					2	2.23E+01
					3	2.23E+01
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0
Chromium, hexavalent	3	1	3	3	1	0
					2	2.30E+01
					3	2.30E+01
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0
Copper	3	1	3	3	1	1.22E+02
					2	1.52E+02
					3	1.52E+02
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0

Table M-10. SESOIL Application Data, Area A (continued)

CMCOPCs	No. of Layers	Layer No.	Thickness of Layer (ft)	No. of Sublayers	Sublayer No.	Concentration (mg/kg)
Tetrachloroethene	3	1	3	3	1	4.20E-03
					2	0
					3	0
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0

CMCOPC = Contaminant migration contaminant of potential concern.
SESOIL = Seasonal Soil Compartment (model).

Table M-11. SESOIL Application Data, Area B

CMCOPCs	No. of Layers	Layer No.	Thickness of Layer (ft)	No. of Sublayers	Sublayer No.	Concentration (mg/kg)
2,4-Dinitrotoluene	3	1	3	3	1	0
					2	5.60E-02
					3	5.60E-02
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0
RDX	3	1	3	3	1	0
					2	2.56E-01
					3	2.56E-01
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0
Tetryl	3	1	3	3	1	2.30E+00
					2	2.20E+01
					3	2.20E+01
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0
Antimony	3	1	3	3	1	1.21E+00
					2	1.24E+00
					3	1.24E+00
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0
Barium	3	1	3	3	1	1.23E+02
					2	1.17E+02
					3	1.17E+02
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0
Chromium	3	1	3	3	1	6.08E+01
					2	1.39E+01
					3	1.39E+01
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0

Table M-11. SESOIL Application Data, Area B (continued)

CMCOPCs	No. of Layers	Layer No.	Thickness of Layer (ft)	No. of Sublayers	Sublayer No.	Concentration (mg/kg)
Chromium, hexavalent	3	1	3	3	1	2.80E+01
					2	1.60E+01
					3	1.60E+01
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0
Copper	3	1	3	3	1	1.21E+03
					2	3.08E+02
					3	3.08E+02
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0
Selenium	3	1	3	3	1	1.23E+00
					2	1.01E+00
					3	1.01E+00
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0
Tetrachloroethene	3	1	3	3	1	3.70E-03
					2	0
					3	0
		2	3	3	1	0
					2	0
					3	0
		3	1	2	1	0
					2	0

CMCOPC = Contaminant migration contaminant of potential concern.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
SESOIL = Seasonal Soil Compartment (model).

Table M-12. Summary of Leachate Modeling Results for Demolition Area 2

Initial CMCOPC	RME 0 to 1 ft (mg/kg)	RME 1 to 3 ft (mg/kg)	Predicted $C_{leachate,max}$ Beneath the Source (mg/L)	Predicted Tmax (years)	Predicted $C_{gw,max}$ At the Source[a] (mg/L)	Observed $C_{gw,max}$ Downgradient of Source (mg/L)	MCL/RBC (mg/L)	Final CMCOPC[b]
Area A								
Explosives								
Tetryl	N/A	0.18	6.15E-01	6	1.36E-01	N/A	3.60E-01	No
Inorganics								
Arsenic	1.99E+01	1.63E+01	8.25E-01	529	3.98E-01	1.35E-02	1.00E-02	Yes
Barium	1.68E+02	2.03E+02	6.41E+00	743	3.15E+00	1.22E-01	2.00E+00	Yes
Chromium	1.73E+01	2.23E+01	1.47E+00	345	6.93E-01	1.35E-02	1.00E-01	Yes
Chromium, hexavalent	N/A	2.30E+01	1.15E+00	340	5.37E-01	1.20E-01	1.00E-01	Yes
Copper	1.22E+02	1.52E+02	5.55E+00	636	2.70E+00	1.94E-02	1.30E+00	Yes
Organic-Volatiles								
Tetrachloroethene	4.20E-03	N/A	1.00E-10	34	3.05E-11	N/A	5.00E-03	No
Area B								
Explosives								
2,4-Dinitrotoluene	N/A	5.60E-02	2.39E-05	12	5.52E-08	N/A	7.30E-02	No
RDX	N/A	2.56E-01	1.83E+00	3	4.11E-02	4.80E-04	6.10E-04	Yes
Tetryl	2.30E+00	2.20E+01	7.40E+01	6	1.65E+01	N/A	3.60E-01	Yes
Inorganics								
Antimony	1.21E+00	1.24E+00	3.62E-02	816	1.67E-02	N/A	6.00E-03	Yes
Barium	1.23E+02	1.17E+02	3.90E+00	743	1.79E+00	1.22E-01	2.00E+00	No
Chromium	6.08E+01	1.39E+01	1.99E+00	353	8.71E-01	1.35E-02	1.00E-01	Yes
Chromium, hexavalent	2.80E+01	1.60E+01	1.39E+00	347	6.08E-01	1.20E-01	1.00E-01	Yes
Copper	1.21E+03	3.08E+02	2.18E+01	646	9.91E+00	1.94E-02	1.30E+00	Yes
Selenium	1.23E+00	1.01E+00	2.94E-01	93	1.04E-01	N/A	5.00E-02	Yes

Table M-12. Summary of Leachate Modeling Results for Demolition Area 2 (continued)

Initial CMCOPC	RME 0 to 1 ft (mg/kg)	RME 1 to 3 ft (mg/kg)	Predicted $C_{leachate,max}$ Beneath the Source (mg/L)	Predicted Tmax (years)	Predicted $C_{gw,max}$ At the Source[a] (mg/L)	Observed $C_{gw,max}$ Downgradient of Source (mg/L)	MCL/RBC (mg/L)	Final CMCOPC[b]
Area B (continued)								
Organic-Volatiles								
Tetrachloroethylene	3.70E-03	N/A	1.00E-10	34	2.89E-11	N/A	5.00E-03	No

[a]The predicted maximum concentration in groundwater ($C_{gw,max}$) at the source was calculated using the AT123D model based on contaminant loading predicted by SESOIL.
[b]A constituent is a final CMCOPC if it reaches the water table within 1,000 years and its predicted concentration in groundwater exceeds its MCL/RBC.
CMCOPC = Contaminant migration contaminant of potential concern.
MCL = Maximum contaminant level.
N/A = Not available.
RBC = Risk-based concentration.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
RME = Reasonable maximum exposure.

Table M-13. Development of CMCOPCs Based on Comparison of the Observed Maximum Groundwater Concentration with its Target Groundwater Concentration

Analyte	Units	Maximum Concentration	MCL/RBC	Groundwater CMCOPC?
Metals				
Aluminum	mg/L	7.34E+00	3.65E+01	
Arsenic	mg/L	1.35E-02	1.00E-02	Yes
Barium	mg/L	1.22E-01	2.00E+00	
Calcium	mg/L	1.66E+02		
Chromium	mg/L	1.35E-02	1.00E-01	
Chromium, hexavalent	mg/L	1.20E-01	1.00E-01	Yes
Cobalt	mg/L	6.90E-03	7.30E-01	
Copper	mg/L	1.94E-02	1.30E+00	
Lead	mg/L	1.05E-02	1.50E-02	
Manganese	mg/L	1.09E+00	8.76E-01	Yes
Nickel	mg/L	2.13E-02	7.30E-01	
Vanadium	mg/L	1.35E-02	2.56E-01	
Zinc	mg/L	6.17E-02	1.10E+01	
Organics-Explosives				
Nitrocellulose	mg/L	6.10E-01		
RDX	mg/L	4.80E-04	6.10E-04	
Organics-Semivolatile				
di-n-Butyl Phthalate	mg/L	1.70E-03	3.60E+00	
Organics-Volatile				
Carbon Disulfide	mg/L	1.30E-03	1.04E+00	

CMCOPC = Contaminant migration contaminant of potential concern.
MCL = Maximum contaminant level.
RBC = Risk-based concentration.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

Table M-14. List of Final CMCOPCs in Groundwater based on Leachate Modeling and Observed Groundwater Concentration

Analyte	Units	Maximum Concentration	MCL/RBC	CMCOPC?
Metals				
Antimony	mg/L	1.67E-02	6.00E-03	Yes
Arsenic	mg/L	3.98E-01	1.00E-02	Yes
Barium	mg/L	3.15E+00	2.00E+00	Yes
Chromium	mg/L	8.71E-01	1.00E-01	Yes
Chromium, hexavalent	mg/L	6.08E-01	1.00E-01	Yes
Copper	mg/L	2.70E+01	1.30E+00	Yes
Manganese[b]	mg/L	1.09E+00	8.76E-01	Yes
Selenium	mg/L	1.04E-01	5.00E-02	Yes
Explosives				
RDX	mg/L	1.83E+00	6.10E-04	Yes
Tetryl	mg/L	7.40E+01	3.60E-01	Yes

[a]The maximum concentration is based on Seasonal Soil Compartment model (SESOIL)- and Analytical Transient 1-, 2-, 3-Dimensional model (AT123D)-predicted concentration at the source.
[b]The maximum concentration is based on observed groundwater ($C_{gw,max}$) at the source.
CMCOPC = Contaminant migration contaminant of potential concern.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

Table M-15. Physical and Chemical Properties of Initial CMCOPCs at Demolition Area 2 Required for AT123D Modeling

CMCOPC	Distribution Coefficient, Kd (L/kg)	Retardation factor, Rd[a]	Diffusion Coefficient in Water (cm^2/s)	Biodegradation Rate (1/day)
Metals				
Metals				
Antimony	4.50E+01	3.61E+02	1.00E-06	N/A
Arsenic	2.90E+01	2.33E+02	1.00E-06	N/A
Barium	4.10E+01	3.29E+02	1.00E-06	N/A
Chromium	1.90E+01	1.53E+02	1.00E-06	N/A
Chromium, hexavalent	1.90E+01	1.53E+02	1.00E-06	N/A
Copper	3.50E+01	2.81E+02	1.00E-06	N/A
Manganese	7.50E+02	6.00E+03	1.00E-06	N/A
Selenium	5.00E+00	4.10E+01	1.00E-06	N/A
Explosives				
RDX	9.34E-03	1.07E+00	1.00E-06	NF
Tetryl	5.50E-02	1.44E+00	1.00E-06	NF

[a]Calculated value.
CMCOPC = Contaminant migration contaminant of potential concern.
N/A = Not applicable.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

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