TABLE 2.1

HISTORIC SOIL SAMPLING ANALYTICAL RESULTS
SOUTH DAYTON DUMP AND LANDFILL SITE
OPERABLE UNIT 2
MORAINE, OHIO

Sample Location:			*S10(EPA)*	*S07(OEPA)*	*S08(OEPA)*	*TT-16*	*TT-17*	*TT-17*	*TT-18*	*TT-18*
Sample ID:			*S10*	*96-DV-03-S07*	*96-DV-03-S08*	*S-38443-093008-KMV-033*	*S-38443-093008-KMV-034*	*S-38443-093008-KMV-035*	*S-38443-100108-KMV-036*	*S-38443-100108-KMV-037*
Sample Date:	*USEPA Regional Screening Levels [1]*		*10/23/1990*	*7/9/1996*	*7/9/1996*	*9/30/2008*	*9/30/2008*	*9/30/2008*	*10/1/2008*	*10/1/2008*
Sample Depth:			*0-1 ft BWS*	*0-0.2 ft BWS*	*0.2-0.3 ft BWS*	*2 ft BWS*	*5 ft BWS*	*14 ft BWS*	*5 ft BWS*	*12 ft BWS*
Parameter	*Residential Soil Criteria a*	*Industrial Soil Criteria b*								
Volatiles										
1,1,1-Trichloroethane	8700	38000	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
1,1,2,2-Tetrachloroethane	0.56	2.8	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
1,1,2-Trichloroethane	1.1	5.3	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
1,1-Dichloroethane	3.3	17	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
1,1-Dichloroethene	240	1100	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
1,2,4-Trichlorobenzene	22	99	-	-	-	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
1,2-Dibromo-3-chloropropane (DBCP)	0.0054	0.069	-	-	-	0.0094 U	0.01 U	0.012 U	R	0.0098 U
1,2-Dibromoethane (Ethylene dibromide)	0.034	0.17	-	-	-	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
1,2-Dichlorobenzene	1900	9800	-	-	-	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
1,2-Dichloroethane	0.43	2.2	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
1,2-Dichloroethene (total)	700	9200	0.005 U	0.011 U	0.011 U	-	-	-	-	-
1,2-Dichloropropane	0.94	4.7	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
1,3-Dichlorobenzene	-	-	-	-	-	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
1,4-Dichlorobenzene	2.4	12	-	-	-	0.0047 U	0.005 U	0.0061 U	0.023 J	0.0049 U
2-Butanone (Methyl ethyl ketone) (MEK)	28000	200000	0.01 U	0.011 U	0.011 U	0.0047 J	0.02 U	0.024 U	R	0.02 U
2-Hexanone	210	1400	-	0.011 U	0.011 U	0.019 U	0.02 U	0.024 U	R	0.02 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	5300	53000	0.01 U	0.011 U	0.011 U	0.019 U	0.02 U	0.024 U	R	0.02 U
Acetone	61000	630000	0.005 U	0.011 U	0.011 U	0.013 J	0.02 U	0.024 U	R	0.02 U
Benzene	1.1	5.4	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Bromodichloromethane	0.27	1.4	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Bromoform	62	220	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Bromomethane (Methyl bromide)	7.3	32	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Carbon disulfide	820	3700	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Carbon tetrachloride	0.61	3	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Chlorobenzene	290	1400	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Chloroethane	15000	61000	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Chloroform (Trichloromethane)	0.29	1.5	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Chloromethane (Methyl chloride)	120	500	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
cis-1,2-Dichloroethene	160	2000	-	-	-	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
cis-1,3-Dichloropropene	-	-	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Cyclohexane	7000	29000	-	-	-	0.0094 U	0.01 U	0.012 U	0.21 J	0.0098 U
Dibromochloromethane	0.68	3.3	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Dichlorodifluoromethane (CFC-12)	94	400	-	-	-	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Ethylbenzene	5.4	27	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Isopropyl benzene	2100	11000	-	-	-	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Methyl acetate	78000	1000000	-	-	-	0.0094 U	0.01 U	0.012 U	R	0.0098 U
Methyl cyclohexane	-	-	-	-	-	0.0094 U	0.01 U	0.012 U	0.41 J	0.00074 J
Methyl tert butyl ether (MTBE)	43	220	-	-	-	0.019 U	0.02 U	0.024 U	R	0.02 U
Methylene chloride	56	960	-	0.011 JBU	0.016	0.0047 U	0.005 U	0.0061 U	0.5 J	0.0049 U
Styrene	6300	36000	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Tetrachloroethene	22	110	0.005 U	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Toluene	5000	45000	0.005 U	0.011 U	0.01 J	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
trans-1,2-Dichloroethene	150	690	-	-	-	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
trans-1,3-Dichloropropene	-	-	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Trichloroethene	0.91	6.4	0.005 U	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U

TABLE 2.1

HISTORIC SOIL SAMPLING ANALYTICAL RESULTS
SOUTH DAYTON DUMP AND LANDFILL SITE
OPERABLE UNIT 2
MORAINE, OHIO

Sample Location:			*S10(EPA)*	*S07(OEPA)*	*S08(OEPA)*	*TT-16*	*TT-17*	*TT-17*	*TT-18*	*TT-18*
Sample ID:			*S10*	*96-DV-03-S07*	*96-DV-03-S08*	*S-38443-093008-KMV-033*	*S-38443-093008-KMV-034*	*S-38443-093008-KMV-035*	*S-38443-100108-KMV-036*	*S-38443-100108-KMV-037*
Sample Date:	*USEPA Regional Screening Levels [1]*		*10/23/1990*	*7/9/1996*	*7/9/1996*	*9/30/2008*	*9/30/2008*	*9/30/2008*	*10/1/2008*	*10/1/2008*
Sample Depth:			*0-1 ft BWS*	*0-0.2 ft BWS*	*0.2-0.3 ft BWS*	*2 ft BWS*	*5 ft BWS*	*14 ft BWS*	*5 ft BWS*	*12 ft BWS*
Parameter	*Residential Soil Criteria a*	*Industrial Soil Criteria b*								
Trichlorofluoromethane (CFC-11)	790	3400	-	-	-	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Trifluorotrichloroethane (Freon 113)	43000	180000	-	-	-	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Vinyl chloride	0.06	1.7	-	0.011 U	0.011 U	0.0047 U	0.005 U	0.0061 U	R	0.0049 U
Xylenes (total)	630	2700	0.005 U	0.011 U	0.011 U	0.0094 U	0.01 U	0.012 U	R	0.0021 J
Semi-Volatiles										
1,2,4-Trichlorobenzene	22	99	-	0.38 U	0.37 U	-	-	-	-	-
1,2-Dichlorobenzene	1900	9800	-	0.38 U	0.37 U	-	-	-	-	-
1,3-Dichlorobenzene	-	-	-	0.38 U	0.37 U	-	-	-	-	-
1,4-Dichlorobenzene	2.4	12	-	0.38 U	0.37 U	-	-	-	-	-
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	4.6	22	-	-	-	0.24 U	0.11 U	0.5 U	0.14 U	0.11 U
2,4,5-Trichlorophenol	6100	62000	-	0.94 U	0.92 U	0.36 U	0.16 U	0.75 U	0.2 U	0.16 U
2,4,6-Trichlorophenol	44	160	-	0.38 U	0.37 U	0.36 U	0.16 U	0.75 U	0.2 U	0.16 U
2,4-Dichlorophenol	180	1800	-	0.38 U	0.37 U	0.36 U	0.16 U	0.75 U	0.2 U	0.16 U
2,4-Dimethylphenol	1200	12000	-	0.38 U	0.37 U	0.36 U	0.16 U	0.75 U	0.2 U	0.16 U
2,4-Dinitrophenol	120	1200	-	0.94 U	0.92 U	0.79 U	0.36 U	1.6 U	0.45 U	0.35 U
2,4-Dinitrotoluene	1.6	5.5	-	0.38 U	0.37 U	0.48 U	0.22 U	1 U	0.27 U	0.21 U
2,6-Dinitrotoluene	61	620	-	0.38 U	0.37 U	0.48 U	0.22 U	1 U	0.27 U	0.21 U
2-Chloronaphthalene	6300	82000	-	0.38 U	0.37 U	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
2-Chlorophenol	390	5100	-	0.38 U	0.37 U	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
2-Methylnaphthalene	230	2200	0.33 U	0.38 U	0.39	0.016 U	0.0073 U	0.042	0.01	0.062
2-Methylphenol	3100	31000	-	0.38 U	0.37 U	0.48 U	0.22 U	1 U	0.27 U	0.21 U
2-Nitroaniline	610	6000	-	0.94 U	0.92 U	0.48 U	0.22 U	1 U	0.27 U	0.21 U
2-Nitrophenol	-	-	-	0.38 U	0.37 U	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
3,3'-Dichlorobenzidine	1.1	3.8	-	-	-	0.24 U	0.11 U	0.5 U	0.14 U	0.11 U
3-Nitroaniline	-	-	-	0.94 U	0.92 U	0.48 U	0.22 U	1 U	0.27 U	0.21 U
4,6-Dinitro-2-methylphenol	4.9	49	-	0.94 U	0.92 U	0.36 U	0.16 U	0.75 U	0.2 U	0.16 U
4-Bromophenyl phenyl ether	-	-	-	0.38 U	0.37 U	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
4-Chloro-3-methylphenol	6100	62000	-	0.38 U	0.37 U	0.36 U	0.16 U	0.75 U	0.2 U	0.16 U
4-Chloroaniline	2.4	8.6	-	0.38 U	0.37 U	0.36 U	0.16 U	0.75 U	0.2 U	0.16 U
4-Chlorophenyl phenyl ether	-	-	-	0.38 U	0.37 U	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
4-Methylphenol	6100	62000	-	0.38 U	0.37 U	0.48 U	0.22 U	1 U	0.27 U	0.21 U
4-Nitroaniline	24	86	-	0.94 U	0.92 U	0.48 U	0.22 U	1 U	0.27 U	0.21 U
4-Nitrophenol	-	-	-	0.94 U	0.92 U	0.79 U	0.36 U	1.6 U	0.45 U	0.35 U
Acenaphthene	3400	33000	0.11 J	0.38 U	0.091 J	0.045	0.0085	0.25	0.0091 U	0.14
Acenaphthylene	-	-	-	0.38 U	0.37 U	0.087	0.0073 U	0.033 U	0.0091 U	0.008
Acetophenone	7800	100000	-	-	-	0.24 U	0.11 U	0.5 U	0.14 U	0.11 U
Anthracene	17000	170000	0.34 J	0.38 U	0.29 J	0.19	0.018	0.37	0.0091 U	0.05
Atrazine	2.1	7.5	-	-	-	0.48 U	0.22 U	1 U	0.27 U	0.21 U
Benzaldehyde	7800	100000	-	-	-	0.24 U	0.11 U	0.5 U	0.14 U	0.11 U
Benzo(a)anthracene	0.15	2.1	1.8[a]	0.058 J	1.1[a]	0.7[a]	0.084	1.2[a]	0.0091 U	0.078
Benzo(a)pyrene	0.015	0.21	1.2[ab]	0.062 J[a]	0.82[ab]	0.87[ab]	0.089[a]	0.99[ab]	0.0091 U	0.073[a]
Benzo(b)fluoranthene	0.15	2.1	2.5[ab]	0.38 U	1[a]	1.1[a]	0.12	1.3[a]	0.0091 U	0.1
Benzo(g,h,i)perylene	-	-	0.99	0.38 U	0.16 J	0.63	0.067	0.56	0.0091 U	0.05
Benzo(k)fluoranthene	1.5	21	0.4 J	0.38 U	0.95	0.4	0.059	0.6	0.0091 U	0.042
Biphenyl (1,1-Biphenyl)	51	210	-	-	-	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U

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SOUTH DAYTON DUMP AND LANDFILL SITE
OPERABLE UNIT 2
MORAINE, OHIO

Sample Location:			*S10(EPA)*	*S07(OEPA)*	*S08(OEPA)*	*TT-16*	*TT-17*	*TT-17*	*TT-18*	*TT-18*
Sample ID:			*S10*	*96-DV-03-S07*	*96-DV-03-S08*	*S-38443-093008-KMV-033*	*S-38443-093008-KMV-034*	*S-38443-093008-KMV-035*	*S-38443-100108-KMV-036*	*S-38443-100108-KMV-037*
Sample Date:	*USEPA Regional Screening Levels [1]*		*10/23/1990*	*7/9/1996*	*7/9/1996*	*9/30/2008*	*9/30/2008*	*9/30/2008*	*10/1/2008*	*10/1/2008*
Sample Depth:			*0-1 ft BWS*	*0-0.2 ft BWS*	*0.2-0.3 ft BWS*	*2 ft BWS*	*5 ft BWS*	*14 ft BWS*	*5 ft BWS*	*12 ft BWS*
Parameter	*Residential Soil Criteria a*	*Industrial Soil Criteria b*								
bis(2-Chloroethoxy)methane	180	1800	-	0.38 U	0.37 U	0.24 U	0.11 U	0.5 U	0.14 U	0.11 U
bis(2-Chloroethyl)ether	0.21	1	-	0.38 U	0.37 U	0.24 U	0.11 U	0.5 U	0.14 U	0.11 U
bis(2-Ethylhexyl)phthalate (DEHP)	35	120	0.33 U	0.032 J	0.23 J	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
Butyl benzylphthalate (BBP)	260	910	0.096 J	0.026 J	0.37 U	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
Caprolactam	31000	310000	-	-	-	0.79 U	0.36 U	1.6 U	0.45 U	0.35 U
Carbazole	-	-	-	0.38 J	0.28 J	0.09 J	0.055 U	0.4	0.068 U	0.053 U
Chrysene	15	210	0.33 U	0.083 J	1.2	0.82	0.11	1.4	0.0091 U	0.08
Dibenz(a,h)anthracene	0.015	0.21	0.11 J[a]	0.38 U	0.31 J[ab]	0.15[a]	0.014	0.14[a]	0.0091 U	0.011
Dibenzofuran	78	1000	0.33 U	0.38 U	0.16 J	0.12 U	0.055 U	0.18 J	0.068 U	0.084
Diethyl phthalate	49000	490000	-	0.38 U	0.37 U	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
Dimethyl phthalate	-	-	-	0.38 U	0.37 U	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
Di-n-butylphthalate (DBP)	6100	62000	0.33 U	0.028 J	0.37 U	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
Di-n-octyl phthalate (DnOP)	730	7400	-	0.38 U	0.019 J	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
Fluoranthene	2300	22000	2.5	0.11 J	2	1.7	0.23	3.7	0.0091 U	0.19
Fluorene	2300	22000	0.12 J	0.38 U	0.087 J	0.064	0.0085	0.25	0.0091 U	0.1
Hexachlorobenzene	0.3	1.1	-	0.38 U	0.37 U	0.016 U	0.0073 U	0.033 U	0.0091 U	0.0071 U
Hexachlorobutadiene	6.2	22	-	0.38 U	0.37 U	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
Hexachlorocyclopentadiene	370	3700	-	0.38 U	0.37 U	0.79 U	0.36 U	1.6 U	0.45 U	0.35 U
Hexachloroethane	12	43	-	0.38 U	0.37 U	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
Indeno(1,2,3-cd)pyrene	0.15	2.1	0.97[a]	0.048 J	0.48[a]	0.54[a]	0.055	0.53[a]	0.0091 U	0.045
Isophorone	510	1800	-	0.38 U	0.37 U	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
Naphthalene	3.6	18	0.33 U	0.38 U	0.25 J	0.016 U	0.0073 U	0.11	0.0091 U	0.046
Nitrobenzene	4.8	24	-	0.38 U	0.37 U	0.24 U	0.11 U	0.5 U	0.14 U	0.11 U
N-Nitrosodi-n-propylamine	0.069	0.25	-	0.38 U	0.37 U	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
N-Nitrosodiphenylamine	99	350	0.33 U	0.38 U	0.027 J	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
Pentachlorophenol	0.89	2.7	-	0.94 U	0.92 U	0.36 U	0.16 U	0.75 U	0.2 U	0.16 U
Phenanthrene	-	-	1.8	0.063 J	1.7	0.85	0.14	3.4	0.0091 U	0.25
Phenol	18000	180000	-	0.38 U	0.37 U	0.12 U	0.055 U	0.25 U	0.068 U	0.053 U
Pyrene	1700	17000	3.4	0.13 J	1.9	1.4	0.18	2.9	0.0091 U	0.16
Metals										
Aluminum	77000	990000	10600	6890	14300	5270	6830	3180	5680	2310
Antimony	31	410	2.4 U	0.68 U	278[a]	7.2 UJ	6.6 UJ	0.65 J	0.78 J	6.4 U
Arsenic	0.39	1.6	8.1[ab]	6.0[ab]	141[ab]	5.5[ab]	6.8[ab]	10.9[ab]	17.7[ab]	2.9[ab]
Barium	15000	190000	120	112	13000	53.8	78.0	73.0	389	17.8 J
Beryllium	160	2000	0.35 B	0.62 B	0.77 B	0.24 J	0.33 J	0.36 J	0.97	0.099 J
Cadmium	70	800	1 U	0.57 B	0.69 B	0.29 J	0.18 J	0.11 J	0.68 U	0.10 J
Calcium	-	-	83700	12900	5410	91200 J	50600 J	27500 J	5650	142000
Chromium	-	-	27.6	17.3	62.0	7.8	10.4	8.1	11.7	4.6
Cobalt	23	300	4.7 B	6.6 B	17.5	4.8 J	6.3	2.6 J	4.5 J	2.8 J
Copper	3100	41000	37.6 EJ	22.5	1830	12.6	12.3	21.3	17.2	8.6
Iron	55000	720000	16300	13200	59500[a]	11200	14200	12000	9890	6040
Lead	400	800	94.8	31.5	652[a]	18.4 J	14.9 J	7.5 J	6.4 J	9.1 J
Magnesium	-	-	28000	6100	2480	44300	13800	13400	1290	53600
Manganese	1800	23000	446	681	614	624 J	441 J	76.0 J	84.9	297
Mercury	10	43	0.008 U	0.18	0.11 U	0.035 J	0.040 J	0.054 J	0.14 U	0.11 U

TABLE 2.1

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SOUTH DAYTON DUMP AND LANDFILL SITE
OPERABLE UNIT 2
MORAINE, OHIO

Sample Location:			*S10(EPA)*	*S07(OEPA)*	*S08(OEPA)*	*TT-16*	*TT-17*	*TT-17*	*TT-18*	*TT-18*
Sample ID:			*S10*	*96-DV-03-S07*	*96-DV-03-S08*	*S-38443-093008-KMV-033*	*S-38443-093008-KMV-034*	*S-38443-093008-KMV-035*	*S-38443-100108-KMV-036*	*S-38443-100108-KMV-037*
Sample Date:	*USEPA Regional Screening Levels [1]*		*10/23/1990*	*7/9/1996*	*7/9/1996*	*9/30/2008*	*9/30/2008*	*9/30/2008*	*10/1/2008*	*10/1/2008*
Sample Depth:			*0-1 ft BWS*	*0-0.2 ft BWS*	*0.2-0.3 ft BWS*	*2 ft BWS*	*5 ft BWS*	*14 ft BWS*	*5 ft BWS*	*12 ft BWS*
Parameter	*Residential Soil Criteria a*	*Industrial Soil Criteria b*								
Nickel	1500	20000	23.1	12.9	78.3	10.7	11.0	7.5	8.8	7.4
Potassium	-	-	1190 B	886 B	1400	960 J	725 J	399 J	1070	365 J
Selenium	390	5100	2.6	0.90 U	2.1	30.0 U	27.5 U	1.1 J	3.7 J	26.6 U
Silver	390	5100	1.1 B	0.45 B	0.23 B	1.2 U	1.1 U	1.2 U	1.4 U	1.1 U
Sodium	-	-	136 B	207 B	254 B	162 J	550 U	625 U	130 J	177 J
Thallium	0.78	10	2 U	2.2 B[a]	4.0[a]	0.14 U	0.15 U	0.46	0.54	0.11 U
Vanadium	390	5200	24.3	17.4	18.5	14.5 J	18.1 J	13.8 J	28.2	6.2
Zinc	23000	310000	126	76.9	286	42.4 J	40.0 J	27.3 J	10.3	23.2
PCBs										
Aroclor-1016 (PCB-1016)	3.9	21	-	0.038 U	0.037 U	0.04 UJ	0.036 UJ	0.041 U	0.045 UJ	0.035 UJ
Aroclor-1221 (PCB-1221)	0.14	0.54	-	0.076 U	0.074 U	0.04 UJ	0.036 UJ	0.041 U	0.045 UJ	0.035 UJ
Aroclor-1232 (PCB-1232)	0.14	0.54	-	0.038 U	0.037 U	0.04 UJ	0.036 UJ	0.041 U	0.045 UJ	0.035 UJ
Aroclor-1242 (PCB-1242)	0.22	0.74	-	0.038 U	0.037 U	0.04 UJ	0.036 UJ	0.041 U	0.045 UJ	0.035 UJ
Aroclor-1248 (PCB-1248)	0.22	0.74	1.4 X[ab]	0.038 U	0.037 U	0.04 UJ	0.036 UJ	0.059	0.045 UJ	0.035 UJ
Aroclor-1254 (PCB-1254)	0.22	0.74	-	0.038 U	0.037 U	0.04 UJ	0.036 UJ	0.041 U	0.045 UJ	0.035 UJ
Aroclor-1260 (PCB-1260)	0.22	0.74	0.41 X[a]	0.038 U	0.037 U	0.04 UJ	0.036 UJ	0.041 U	0.045 UJ	0.035 UJ
Pesticides										
4,4'-DDD	2	7.2	-	0.00065 J	0.0037 U	0.1 UJ	0.19 UJ	0.042 UJ	0.023 UJ	0.036 UJ
4,4'-DDE	1.4	5.1	-	0.0038 U	0.0024 PJ	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
4,4'-DDT	1.7	7	-	0.0016 PJ	0.0088 P	0.1 UJ	0.19 UJ	0.042 UJ	0.023 UJ	0.036 UJ
Aldrin	0.029	0.1	-	0.0019 U	0.0019 U	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
alpha-BHC	0.077	0.27	-	0.0019 U	0.00071 PJ	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
alpha-Chlordane	-	-	-	0.0019 U	0.0019 U	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
beta-BHC	0.27	0.96	-	0.0019 U	0.0019 U	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
delta-BHC	-	-	-	0.0019 U	0.0019 U	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
Dieldrin	0.03	0.11	-	0.0038 U	0.0037 U	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
Endosulfan I	-	-	-	0.00042 PJ	0.0019 U	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
Endosulfan II	-	-	-	0.0014 J	0.0054	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
Endosulfan sulfate	-	-	-	0.0038 U	0.0037 U	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
Endrin	18	180	-	0.0038 U	0.0037 U	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
Endrin aldehyde	-	-	-	0.0064 P	0.0037 U	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
Endrin ketone	-	-	-	0.0038 U	0.0037 U	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
gamma-BHC (lindane)	0.52	2.1	-	0.0019 U	0.0018 J	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
gamma-Chlordane	-	-	-	0.0019 U	0.0019 U	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
Heptachlor	0.11	0.38	-	0.0019 U	0.0019 U	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
Heptachlor epoxide	0.053	0.19	-	0.0019 U	0.0019 U	0.1 U	0.19 U	0.042 U	0.023 U	0.036 U
Methoxychlor	310	3100	-	0.019 U	0.019 U	0.2 UJ	0.36 UJ	0.082 UJ	0.045 UJ	0.07 UJ
Toxaphene	0.44	1.6	-	0.19 U	0.19 U	4 UJ	7.4 UJ	1.7 UJ	0.91 UJ	1.4 UJ

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TABLE 2.1

HISTORIC SOIL SAMPLING ANALYTICAL RESULTS
SOUTH DAYTON DUMP AND LANDFILL SITE
OPERABLE UNIT 2
MORAINE, OHIO

Sample Location:			*S10(EPA)*	*S07(OEPA)*	*S08(OEPA)*	*TT-16*	*TT-17*	*TT-17*	*TT-18*	*TT-18*
Sample ID:			*S10*	*96-DV-03-S07*	*96-DV-03-S08*	*S-38443-093008-KMV-033*	*S-38443-093008-KMV-034*	*S-38443-093008-KMV-035*	*S-38443-100108-KMV-036*	*S-38443-100108-KMV-037*
Sample Date:	*USEPA Regional Screening Levels [1]*		*10/23/1990*	*7/9/1996*	*7/9/1996*	*9/30/2008*	*9/30/2008*	*9/30/2008*	*10/1/2008*	*10/1/2008*
Sample Depth:			*0-1 ft BWS*	*0-0.2 ft BWS*	*0.2-0.3 ft BWS*	*2 ft BWS*	*5 ft BWS*	*14 ft BWS*	*5 ft BWS*	*12 ft BWS*
Parameter	*Residential Soil Criteria a*	*Industrial Soil Criteria b*								
Herbicides										
2,4,5-TP (Silvex)	490	4900	-	-	-	0.024 U	0.022 U	0.025 U	0.027 U	0.021 U
2,4-Dichlorophenoxyacetic acid (2,4-D)	690	7700	-	-	-	0.096 U	0.088 U	0.1 U	0.11 U	0.085 U
General Chemistry										
Cyanide (total)	22	140	-	0.30 B	2.3	0.60 U	0.55 U	0.25 J	0.68 U	0.52 J
Total solids (%)	-	-	-	-	-	83.3	91.0	80.1	73.2	94.1

Notes:

All concentrations are expressed in units of milligrams per kilogram (mg/kg) unless otherwise noted.

[1] - United States Environmental Protection Agency Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites, November 2012.

ft BWS - Feet below water surface

B - Compound is found in the associated blank as well as in the sample (Organics).

E - Estimated or not reported due to interference. (Inorganics)

E - This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument. (Organics)

J - Indicates an estimated value.

P - Indicates there is a greater than 25% difference for detected concentrations between two GC columns. The lower of the two values is reported.

R - The parameter was rejected.

U - Compound was analyzed for but not detected.

UJ - The parameter was not detected. The associate numerical values is the estimated sample quantitation limit.

X - Denotes manually entered data. This always occurs on multi-component quantitations and sometimes occurs on individual pesticides when the analyst had to correct the integration of a peak.

- - Not applicable.

TABLE 2.2

HISTORIC SURFACE WATER ANALYTICAL RESULTS
SOUTH DAYTON DUMP AND LANDFILL SITE
OPERABLE UNIT 2
MORAINE, OHIO

Sample Location:					*SW-1-99*	*SW-1-00*	*SW-2-99*	*SW-2-00*	*SW-3-99*	*SW-3-00*
Sample ID:					*SW-1*	*SW-1*	*SW-2*	*SW-2*	*SW-3*	*SW-3*
Sample Date:					*4/16/1999*	*5/12/2000*	*4/16/1999*	*5/12/2000*	*4/16/1999*	*5/12/2000*
	USEPA Regional Screening Levels [1]		*Ecological Screening Value*	*Ecological Screening Value Reference [2]*						
Parameter	*MCL*	*TapWater*								
	a	*b*	*c*							
Volatiles										
1,1,1-Trichloroethane	0.2	7.5	0.076	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
1,1,2,2-Tetrachloroethane	-	0.000066	0.26	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
1,1,2-Trichloroethane	0.005	0.00024	0.74	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
1,1-Dichloroethane	-	0.0024	0.047	EPA R V	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
1,1-Dichloroethene	0.007	0.26	0.21	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
1,2-Dichloroethane	0.005	0.00015	2	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
1,2-Dichloroethene (total)	-	0.13	-	-	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
1,2-Dichloropropane	0.005	0.00038	0.36	EPA R V	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
2-Butanone (Methyl ethyl ketone) (MEK)	-	4.9	22	O OMZA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
2-Hexanone	-	0.034	-	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	-	1	0.17	EPA R V	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Acetone	-	12	1.7	EPA R V	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzene	0.005	0.00039	0.16	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Bromodichloromethane	0.08	0.00012	-	-	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Bromoform	0.08	0.0079	0.23	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Bromomethane (Methyl bromide)	-	0.007	0.016	EPA R V	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon disulfide	-	0.72	0.015	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Carbon tetrachloride	0.005	0.00039	0.24	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Chlorobenzene	0.1	0.072	0.047	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Chloroethane	-	21	1.1	M. C	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloroform (Trichloromethane)	0.08	0.00019	0.14	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Chloromethane (Methyl chloride)	-	0.19	-	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
cis-1,3-Dichloropropene	-	-	-	-	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Dibromochloromethane	0.08	0.00015	-	-	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Ethylbenzene	0.7	0.0013	0.061	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Methylene chloride	0.005	0.0099	1.9	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Styrene	0.1	1.1	0.032	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Tetrachloroethene	0.005	0.0097	0.053	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Toluene	1	0.86	0.062	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
trans-1,3-Dichloropropene	-	-	-	-	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Trichloroethene	0.005	0.00044	0.22	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Vinyl chloride	0.002	0.000015	0.93	O OMZA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylenes (total)	10	0.19	0.027	O OMZA	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U

Notes:

All concentrations are expressed in units of milligrams per litre (mg/L) unless otherwise noted.
MCL - Maximum contaminant level.
U - Compound was analyzed for but not detected.
[1] - United States Environmental Protection Agency Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites, November 2012
[2] - Ohio OMZA: Ohio River Basin Aquatic Life and Human Health Tier I Criteria and Tier II Values, Outside Mixing Zone Area OAC 3745-1-32, July 27, 2005.
USEPA NRWQC: National Recommended Water Quality Criteria, EPA-822-R-02-047, Continuous Chronic Concentration, Office of Water, November 2002.
EPA Region V: Ecological Data Quality Levels, August 22, 2003. Available on the Internet at http://www.epa.gov/Region5/rcraca/edql.html

TABLE 2.3

HISTORIC SEDIMENT ANALYTICAL RESULTS
SOUTH DAYTON DUMP AND LANDFILL SITE
OPERABLE UNIT 2
MORAINE, OHIO

Sample Location: [2]			*S15(OEPA)*	*S16(OEPA)*	*S17(OEPA)*	*S17(OEPA)*	*S18(OEPA)*	*S19(OEPA)*	*SEDIMENT-1*	*SED-1*	*SEDIMENT-2*	*SED-2*	*SEDIMENT-3*	*SED-3*
Sample ID: [2]			*96-DV-03-S15*	*96-DV-03-S16*	*96-DV-03-S17*	*96-DV-03-D17*	*96-DV-03-S18*	*96-DV-03-S19*	*SEDIMENT-1*	*SED-1*	*SEDIMENT-2*	*SED-2*	*SEDIMENT-3*	*SED-3*
Sample Date:			*7/9/1996*	*7/9/1996*	*7/9/1996*	*7/9/1996*	*7/9/1996*	*7/9/1996*	*4/16/1999*	*5/12/2000*	*4/16/1999*	*5/12/2000*	*4/16/1999*	*5/12/2000*
Sample Depth:			*15-18 ft BWS*	*15-18 ft BWS*	*0-0.5 ft BWS*	*0-0.5 ft BWS*	*0-0.5 ft BWS*	*0-0.5 ft BWS*	-	-	-	-	-	-
Sample Location:	*USEPA Regional Screening Levels [1]*		*Quarry Pond*	*Quarry Pond*	*GMR*	*Duplicate GMR*	*GMR*	*GMR*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*
Parameter	*Residential Soil Criteria a*	*Industrial Soil Criteria b*												
Volatiles														
1,1,1-Trichloroethane	8700	38000	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
1,1,2,2-Tetrachloroethane	0.56	2.8	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
1,1,2-Trichloroethane	1.1	5.3	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
1,1-Dichloroethane	3.3	17	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
1,1-Dichloroethene	240	1100	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
1,2-Dichloroethane	0.43	2.2	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
1,2-Dichloroethene (total)	700	9200	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
1,2-Dichloropropane	0.94	4.7	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
2-Butanone (Methyl ethyl ketone) (MEK)	28000	200000	0.026 U	0.01 J	0.015 U	0.014 U	0.005 J	0.018 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
2-Hexanone	210	1400	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	5300	53000	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Acetone	61000	630000	0.047	0.043	0.015 U	0.014 U	0.033	0.019	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.037
Benzene	1.1	5.4	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Bromodichloromethane	0.27	1.4	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Bromoform	62	220	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Bromomethane (Methyl bromide)	7.3	32	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon disulfide	820	3700	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Carbon tetrachloride	0.61	3	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Chlorobenzene	290	1400	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Chloroethane	15000	61000	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloroform (Trichloromethane)	0.29	1.5	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Chloromethane (Methyl chloride)	120	500	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
cis-1,3-Dichloropropene	-	-	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Dibromochloromethane	0.68	3.3	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Ethylbenzene	5.4	27	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Methylene chloride	56	960	0.026 BUJ	0.029 BUJ	0.015 BUJ	0.014 BUJ	0.018 BUJ	0.018 BUJ	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Styrene	6300	36000	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Tetrachloroethene	22	110	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Toluene	5000	45000	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.001 J	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.014
trans-1,3-Dichloropropene	-	-	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Trichloroethene	0.91	6.4	0.0008 J	0.029 U	0.0007 J	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Vinyl chloride	0.06	1.7	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylenes (total)	630	2700	0.026 U	0.029 U	0.015 U	0.014 U	0.018 U	0.018 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Semi-Volatiles														
1,2,4-Trichlorobenzene	22	99	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
1,2-Dichlorobenzene	1900	9800	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
1,3-Dichlorobenzene	-	-	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
1,4-Dichlorobenzene	2.4	12	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
2,4,5-Trichlorophenol	6100	62000	2.1 U	2.4 U	1.3 U	1.2 U	1.5 U	1.5 U	-	-	-	-	-	-
2,4,6-Trichlorophenol	44	160	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
2,4-Dichlorophenol	180	1800	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
2,4-Dimethylphenol	1200	12000	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
2,4-Dinitrophenol	120	1200	2.1 U	2.4 U	1.3 U	1.2 U	1.5 U	1.5 U	-	-	-	-	-	-
2,4-Dinitrotoluene	1.6	5.5	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
2,6-Dinitrotoluene	61	620	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
2-Chloronaphthalene	6300	82000	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
2-Chlorophenol	390	5100	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
2-Methylnaphthalene	230	2200	0.12 J	0.075 J	0.023 J	0.019 J	0.016 J	0.031 J	-	-	-	-	-	-
2-Methylphenol	3100	31000	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
2-Nitroaniline	610	6000	2.1 U	2.4 U	1.3 U	1.2 U	1.5 U	1.5 U	-	-	-	-	-	-
2-Nitrophenol	-	-	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-

TABLE 2.3

HISTORIC SEDIMENT ANALYTICAL RESULTS
SOUTH DAYTON DUMP AND LANDFILL SITE
OPERABLE UNIT 2
MORAINE, OHIO

Sample Location: [2]			*S15(OEPA)*	*S16(OEPA)*	*S17(OEPA)*	*S17(OEPA)*	*S18(OEPA)*	*S19(OEPA)*	*SEDIMENT-1*	*SED-1*	*SEDIMENT-2*	*SED-2*	*SEDIMENT-3*	*SED-3*
Sample ID: [2]			*96-DV-03-S15*	*96-DV-03-S16*	*96-DV-03-S17*	*96-DV-03-D17*	*96-DV-03-S18*	*96-DV-03-S19*	*SEDIMENT-1*	*SED-1*	*SEDIMENT-2*	*SED-2*	*SEDIMENT-3*	*SED-3*
Sample Date:			*7/9/1996*	*7/9/1996*	*7/9/1996*	*7/9/1996*	*7/9/1996*	*7/9/1996*	*4/16/1999*	*5/12/2000*	*4/16/1999*	*5/12/2000*	*4/16/1999*	*5/12/2000*
Sample Depth:			*15-18 ft BWS*	*15-18 ft BWS*	*0-0.5 ft BWS*	*0-0.5 ft BWS*	*0-0.5 ft BWS*	*0-0.5 ft BWS*	-	-	-	-	-	-
Sample Location:	*USEPA Regional Screening Levels [1]*		*Quarry Pond*	*Quarry Pond*	*GMR*	*Duplicate GMR*	*GMR*	*GMR*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*
Parameter	*Residential Soil Criteria a*	*Industrial Soil Criteria b*												
3,3'-Dichlorobenzidine	1.1	3.8	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
3-Nitroaniline	-	-	2.1 U	2.4 U	1.3 U	1.2 U	1.5 U	1.5 U	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	4.9	49	2.1 U	2.4 U	1.3 U	1.2 U	1.5 U	1.5 U	-	-	-	-	-	-
4-Bromophenyl phenyl ether	-	-	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
4-Chloro-3-methylphenol	6100	62000	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
4-Chloroaniline	2.4	8.6	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
4-Chlorophenyl phenyl ether	-	-	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
4-Methylphenol	6100	62000	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
4-Nitroaniline	24	86	2.1 U	2.4 U	1.3 U	1.2 U	1.5 U	1.5 U	-	-	-	-	-	-
4-Nitrophenol	-	-	2.1 U	2.4 U	1.3 U	1.2 U	1.5 U	1.5 U	-	-	-	-	-	-
Acenaphthene	3400	33000	0.059 J	0.092 J	0.021 J	0.015 J	0.04 J	0.089 J	-	-	-	-	-	-
Acenaphthylene	-	-	0.85 U	0.061 J	0.16 J	0.15 J	0.014 J	0.022 J	-	-	-	-	-	-
Anthracene	17000	170000	0.11 J	0.23 J	0.4 J	0.39 J	0.075 J	0.17 J	-	-	-	-	-	-
Benzo(a)anthracene	0.15	2.1	0.49 J[a]	1.5[a]	2.2[ab]	2.1[a]	0.6[a]	1.3[a]	-	-	-	-	-	-
Benzo(a)pyrene	0.015	0.21	0.46 J[ab]	1.5[ab]	2.1[ab]	2.1[ab]	0.58[ab]	1.1[ab]	-	-	-	-	-	-
Benzo(b)fluoranthene	0.15	2.1	0.8 J[a]	2.5[ab]	2.7[ab]	2.3[ab]	1[a]	1.8[a]	-	-	-	-	-	-
Benzo(g,h,i)perylene	-	-	0.49 J	2	2.2	1.6	0.66	1.4	-	-	-	-	-	-
Benzo(k)fluoranthene	1.5	21	0.3 J	0.95	0.93	0.93	0.41 J	0.69	-	-	-	-	-	-
bis(2-Chloroethoxy)methane	180	1800	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
bis(2-Chloroethyl)ether	0.21	1	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	35	120	0.85 U	0.47 J	0.5 U	0.084 J	0.33 J	0.36 J	-	-	-	-	-	-
Butyl benzylphthalate (BBP)	260	910	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.084 J	-	-	-	-	-	-
Carbazole	-	-	0.085 J	0.11 J	0.02 J	0.015 J	0.084 J	0.19 J	-	-	-	-	-	-
Chrysene	15	210	0.55 J	1.5	2.5	2.1	0.71	1.5	-	-	-	-	-	-
Dibenz(a,h)anthracene	0.015	0.21	0.12 J[a]	0.48 J[ab]	0.43 J[ab]	0.32 J[ab]	0.15 J[a]	0.31 J[ab]	-	-	-	-	-	-
Dibenzofuran	78	1000	0.07 J	0.095 J	0.011 J	0.007 J	0.034 J	0.1 J	-	-	-	-	-	-
Diethyl phthalate	49000	490000	0.85 U	0.039 J	0.024 J	0.027 J	0.051 J	0.033 J	-	-	-	-	-	-
Dimethyl phthalate	-	-	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
Di-n-butylphthalate (DBP)	6100	62000	0.85 BUJ	0.94 BUJ	0.5 BUJ	0.46 BUJ	0.58 BUJ	0.6 BUJ	-	-	-	-	-	-
Di-n-octyl phthalate (DnOP)	730	7400	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
Fluoranthene	2300	22000	1.1	2.6	2	2	1.4	2.2	-	-	-	-	-	-
Fluorene	2300	22000	0.076 J	0.16 J	0.053 J	0.043 J	0.06 J	0.13 J	-	-	-	-	-	-
Hexachlorobenzene	0.3	1.1	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
Hexachlorobutadiene	6.2	22	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
Hexachlorocyclopentadiene	370	3700	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
Hexachloroethane	12	43	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	0.15	2.1	0.46 J[a]	1.9[a]	1.9[a]	1.4[a]	0.65[a]	1.4[a]	-	-	-	-	-	-
Isophorone	510	1800	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
Naphthalene	3.6	18	0.07 J	0.077 J	0.031 J	0.025 J	0.018 J	0.063 J	-	-	-	-	-	-
Nitrobenzene	4.8	24	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
N-Nitrosodi-n-propylamine	0.069	0.25	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
N-Nitrosodiphenylamine	99	350	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
Pentachlorophenol	0.89	2.7	2.1 U	2.4 U	1.3 U	1.2 U	1.5 U	1.5 U	-	-	-	-	-	-
Phenanthrene	-	-	0.89	1.5	0.7	0.61	0.83	1.9	-	-	-	-	-	-
Phenol	18000	180000	0.85 U	0.94 U	0.5 U	0.46 U	0.58 U	0.6 U	-	-	-	-	-	-
Pyrene	1700	17000	1.3	3	4.7 E	3.7 E	1.4	2.7	-	-	-	-	-	-

TABLE 2.3

HISTORIC SEDIMENT ANALYTICAL RESULTS
SOUTH DAYTON DUMP AND LANDFILL SITE
OPERABLE UNIT 2
MORAINE, OHIO

Sample Location: [2]			*S15(OEPA)*	*S16(OEPA)*	*S17(OEPA)*	*S17(OEPA)*	*S18(OEPA)*	*S19(OEPA)*	*SEDIMENT-1*	*SED-1*	*SEDIMENT-2*	*SED-2*	*SEDIMENT-3*	*SED-3*
Sample ID: [2]			*96-DV-03-S15*	*96-DV-03-S16*	*96-DV-03-S17*	*96-DV-03-D17*	*96-DV-03-S18*	*96-DV-03-S19*	*SEDIMENT-1*	*SED-1*	*SEDIMENT-2*	*SED-2*	*SEDIMENT-3*	*SED-3*
Sample Date:			*7/9/1996*	*7/9/1996*	*7/9/1996*	*7/9/1996*	*7/9/1996*	*7/9/1996*	*4/16/1999*	*5/12/2000*	*4/16/1999*	*5/12/2000*	*4/16/1999*	*5/12/2000*
Sample Depth:			*15-18 ft BWS*	*15-18 ft BWS*	*0-0.5 ft BWS*	*0-0.5 ft BWS*	*0-0.5 ft BWS*	*0-0.5 ft BWS*	-	-	-	-	-	-
Sample Location:	*USEPA Regional Screening Levels [1]*		*Quarry Pond*	*Quarry Pond*	*GMR*	*Duplicate GMR*	*GMR*	*GMR*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*
Parameter	*Residential Soil Criteria a*	*Industrial Soil Criteria b*												
Metals														
Aluminum	77000	990000	2750	6590	9750	8450	8940	8600	-	-	-	-	-	-
Antimony	31	410	9.1 U	13.5 U	7.9 U	8.1 U	10 U	10.1 U	-	-	-	-	-	-
Arsenic	0.39	1.6	10.3[ab]	12.6[ab]	9.2[ab]	9.2[ab]	6.0[ab]	9[ab]	-	-	-	-	-	-
Barium	15000	190000	73.0	137	128	125	117	130	-	-	-	-	-	-
Beryllium	160	2000	0.28 B	0.35 B	0.54 B	0.48 B	0.5 B	0.47 B	-	-	-	-	-	-
Cadmium	70	800	1.0 U	1.5 U	0.89 U	0.91 U	1.1 U	1.1 U	-	-	-	-	-	-
Calcium	-	-	53600	11800	61700	58100	81900	74900	-	-	-	-	-	-
Chromium	-	-	23.1	17.2	14.9	13.7	18	22.3	-	-	-	-	-	-
Cobalt	23	300	3.7 B	6.7 B	6.6 B	6.2 B	6.5 B	7.2 B	-	-	-	-	-	-
Copper	3100	41000	29.3	24.7	29.3	29.0	26	33.5	-	-	-	-	-	-
Iron	55000	720000	11300	13500	16400	15500	15000	15800	-	-	-	-	-	-
Lead	400	800	33.7	42.0	51.6	47.2	30.5	47.9	-	-	-	-	-	-
Magnesium	-	-	13600	21600	17200	16100	24200	20600	-	-	-	-	-	-
Manganese	1800	23000	205	545	299	258	330	420	-	-	-	-	-	-
Mercury	10	43	0.08 U	0.12 U	0.63	0.65	0.09 U	0.13 B	-	-	-	-	-	-
Nickel	1500	20000	13.4	18.7 B	16.2	17.9	19.9	23.7	-	-	-	-	-	-
Potassium	-	-	297 B	736 B	812 B	709 B	1090 B	991 B	-	-	-	-	-	-
Selenium	390	5100	1.1 B	0.59 B	0.4 B	0.59 B	0.73 B	0.59 B	-	-	-	-	-	-
Silver	390	5100	1.4 U	2.1 U	1.2 U	1.2 U	1.5 U	1.5 U	-	-	-	-	-	-
Sodium	-	-	165 B	206 B	144 B	131 B	191 B	183 B	-	-	-	-	-	-
Thallium	0.78	10	0.68 B	0.98 U	1.0 B[a]	0.66 B	0.84 B[a]	0.9 B[a]	-	-	-	-	-	-
Vanadium	390	5200	9.6 B	16.8 B	21.8	19.2	20.2	20	-	-	-	-	-	-
Zinc	23000	310000	80.7	143	93.6 B	80.4	114	132	-	-	-	-	-	-
PCBs														
Aroclor-1016 (PCB-1016)	3.9	21	0.087 U	0.094 U	0.05 U	0.046 U	0.058 U	0.06 U	-	-	-	-	-	-
Aroclor-1221 (PCB-1221)	0.14	0.54	0.18 U	0.19 U	0.1 U	0.093 U	0.12 U	0.12 U	-	-	-	-	-	-
Aroclor-1232 (PCB-1232)	0.14	0.54	0.087 U	0.094 U	0.05 U	0.046 U	0.058 U	0.06 U	-	-	-	-	-	-
Aroclor-1242 (PCB-1242)	0.22	0.74	0.087 U	0.094 U	0.05 U	0.046 U	0.058 U	0.06 U	-	-	-	-	-	-
Aroclor-1248 (PCB-1248)	0.22	0.74	0.087 U	0.094 U	0.05 U	0.046 U	0.058 U	0.06 U	-	-	-	-	-	-
Aroclor-1254 (PCB-1254)	0.22	0.74	0.66[a]	0.094 U	0.05 U	0.046 U	0.058 U	0.06 U	-	-	-	-	-	-
Aroclor-1260 (PCB-1260)	0.22	0.74	0.087 U	0.094 U	0.05 U	0.046 U	0.058 U	0.06 U	-	-	-	-	-	-
Pesticides														
4,4'-DDD	2	7.2	0.0017 JP	0.0094 U	0.0022 JP	0.0049	0.0034 JP	0.0036 JP	-	-	-	-	-	-
4,4'-DDE	1.4	5.1	0.0087 U	0.0022 JP	0.0050 U	0.0046 U	0.0026 JP	0.0024 JP	-	-	-	-	-	-
4,4'-DDT	1.7	7	0.0044 JP	0.0024 JP	0.0021 JP	0.0022 JP	0.0027 JP	0.0023 JP	-	-	-	-	-	-
Aldrin	0.029	0.1	0.0045 U	0.0049 U	0.0026 U	0.0024 U	0.0030 U	0.0013 JP	-	-	-	-	-	-
alpha-BHC	0.077	0.27	0.0045 U	0.0049 U	0.0026 U	0.0024 U	0.0030 U	0.0031 U	-	-	-	-	-	-
alpha-Chlordane	-	-	0.012	0.0018 JP	0.00072 JP	0.0024 U	0.0070 P	0.0066 P	-	-	-	-	-	-
beta-BHC	0.27	0.96	0.0045 U	0.0049 U	0.0026 U	0.0024 U	0.0030 U	0.0031 U	-	-	-	-	-	-
delta-BHC	-	-	0.0045 U	0.0049 U	0.0014 JP	0.0015 JP	0.0030 U	0.0031 U	-	-	-	-	-	-
Dieldrin	0.03	0.11	0.0096 P	0.0026 JP	0.00086 JP	0.0046 U	0.0025 JP	0.0040 JP	-	-	-	-	-	-
Endosulfan I	-	-	0.0045 U	0.0049 U	0.0026 U	0.0024 U	0.0030 U	0.0031 U	-	-	-	-	-	-
Endosulfan II	-	-	0.0087 U	0.0094 U	0.0050 U	0.0046 U	0.0058 U	0.0060 U	-	-	-	-	-	-
Endosulfan sulfate	-	-	0.0037 JP	0.0094 U	0.0050 U	0.0046 U	0.0030 JP	0.0060 U	-	-	-	-	-	-
Endrin	18	180	0.034	0.0094 U	0.0034 JP	0.0048 P	0.0024 JP	0.0060 U	-	-	-	-	-	-
Endrin aldehyde	-	-	0.0079 JP	0.0094 U	0.0050 U	0.0046 U	0.0058 U	0.0060 U	-	-	-	-	-	-
Endrin ketone	-	-	0.0087 U	0.0049 J	0.0032 JP	0.0040 JP	0.0058 U	0.0025 JP	-	-	-	-	-	-

TABLE 2.3

HISTORIC SEDIMENT ANALYTICAL RESULTS
SOUTH DAYTON DUMP AND LANDFILL SITE
OPERABLE UNIT 2
MORAINE, OHIO

Sample Location: [2]			*S15(OEPA)*	*S16(OEPA)*	*S17(OEPA)*	*S17(OEPA)*	*S18(OEPA)*	*S19(OEPA)*	*SEDIMENT-1*	*SED-1*	*SEDIMENT-2*	*SED-2*	*SEDIMENT-3*	*SED-3*
Sample ID: [2]			*96-DV-03-S15*	*96-DV-03-S16*	*96-DV-03-S17*	*96-DV-03-D17*	*96-DV-03-S18*	*96-DV-03-S19*	*SEDIMENT-1*	*SED-1*	*SEDIMENT-2*	*SED-2*	*SEDIMENT-3*	*SED-3*
Sample Date:			*7/9/1996*	*7/9/1996*	*7/9/1996*	*7/9/1996*	*7/9/1996*	*7/9/1996*	*4/16/1999*	*5/12/2000*	*4/16/1999*	*5/12/2000*	*4/16/1999*	*5/12/2000*
Sample Depth:			*15-18 ft BWS*	*15-18 ft BWS*	*0-0.5 ft BWS*	*0-0.5 ft BWS*	*0-0.5 ft BWS*	*0-0.5 ft BWS*	-	-	-	-	-	-
Sample Location:	*USEPA Regional Screening Levels [1]*		*Quarry Pond*	*Quarry Pond*	*GMR*	*Duplicate GMR*	*GMR*	*GMR*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*	*Quarry Pond*
Parameter	*Residential Soil Criteria a*	*Industrial Soil Criteria b*												
gamma-BHC (lindane)	0.52	2.1	0.0045 U	0.0049 U	0.0026 U	0.0024 U	0.0030 U	0.0031 U	-	-	-	-	-	-
gamma-Chlordane	-	-	0.0049 P	0.0032 J	0.0014 J	0.0024 U	0.0069	0.0056 P	-	-	-	-	-	-
Heptachlor	0.11	0.38	0.0045 U	0.0049 U	0.0026 U	0.0024 U	0.0030 U	0.0031 U	-	-	-	-	-	-
Heptachlor epoxide	0.053	0.19	0.0045 U	0.0049 U	0.0026 U	0.0024 U	0.0030 U	0.0031 U	-	-	-	-	-	-
Methoxychlor	310	3100	0.018 J	0.017 JP	0.05	0.065	0.0089 JP	0.012 JP	-	-	-	-	-	-
Toxaphene	0.44	1.6	0.45 U	0.49 U	0.26 U	0.24 U	0.3 U	0.31 U	-	-	-	-	-	-
General Chemistry														
Cyanide (total)	22	140	0.27 B	0.17 U	0.19 B	0.21 B	0.23 B	0.32 B	-	-	-	-	-	-
Percent moisture (%)	-	-	-	-	-	-	-	-	13.5	15	15.0	13	20.3	32
Total organic carbon (TOC)	-	-	-	-	-	-	-	-	390	-	550	-	100 U	-

Notes:

All concentrations are expressed in units of milligrams per kilogram (mg/kg) unless otherwise noted.

[1] - United States Environmental Protection Agency Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites, November 2012.

[2] - Sample IDs and locations SEDIMENT-1, SEDIMENT-2, SEDIMENT-3 are equivalent to SED-1, SED-2 and SED-3, respectively

ft BWS - Feet below water surface

GMR - Great Miami River

B - Value is real, but above instrument detection limit and below contract-required detection limit (Inorganics).

B - Compound is found in the associated blank as well as in the sample (Organics).

E - This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument.

J - Indicates an estimated value.

P - Indicates there is a greater than 25% difference for detected concentrations between two GC columns. The lower of the two values is reported.

UJ - The parameter was not detected. The associate numerical values is the estimated sample quantitation limit.

U - Compound was analyzed for but not detected.

- - Not applicable.

TABLE 2.4

HISTORIC SOIL VAPOR VOC ANALYTICAL RESULTS
OPERABLE UNIT 2
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Sample Location:					*GP06-09*	*GP07-09*	*GP08-09*	*GP09-09*	*GP10-09*
Sample ID:					*A-038443-091609-NH-019*	*A-038443-091609-GL-020*	*A-038443-091709-NH-021*	*A-038443-091509-NH-009*	*A-038443-091509-GL-010*
Sample Date:					*9/16/2009*	*9/16/2009*	*9/17/2009*	*9/15/2009*	*9/15/2009*
	RESIDENTIAL SVSL		*INDUSTRIAL SVSL*						
Parameter	*ELCR*	*HI*	*ELCR*	*HI*					
	a	*b*	c	d					
Volatiles									
1,1,1-Trichloroethane	-	52000	-	220000	1.6 U	55 U	0.93 J	18	14
1,1,2,2-Tetrachloroethane	0.42	-	2.1	-	2.1 U	70 U	2.1 U	2.1 U	2.1 U
1,1,2-Trichloroethane	1.5	2.1	7.7	8.8	1.6 U	55 U	1.6 U	1.6 U	1.6 U
1,1-Dichloroethane	15	-	77	-	1.2 U	41 U	1.2 U	1.2 U	2.1
1,1-Dichloroethene	-	2100	-	8800	0.79 U	40 U	0.79 U	0.79 U	0.79 U
1,2,4-Trichlorobenzene	-	21	-	88	5.9 U	190 U	5.9 U	5.9 U	5.9 U
1,2-Dibromo-3-chloropropane (DBCP)	0.0016	2.1	0.02	8.8	9.7 UJ	490 UJ	9.7 UJ	9.7 UJ	9.7 UJ
1,2-Dibromoethane (Ethylene dibromide)	0.041	94	0.20	390	3.1 U	78 U	3.1 U	3.1 U	3.1 U
1,2-Dichlorobenzene	-	2100	-	8800	2.4 U	61 U	2.4 U	2.4 U	2.4 U
1,2-Dichloroethane	0.94	73	4.7	310	0.81 U	62 U	0.81 U	0.81 U	0.81 U
1,2-Dichloropropane	2.4	42	12	180	0.92 U	70 U	0.92 U	0.92 U	0.92 U
1,3-Dichlorobenzene[e]	2.2	8300	11	35000	2.4 U	120 U	2.0 J	2.4 U	2.4 U
1,4-Dichlorobenzene	2.2	8300	11	35000	2.4 U	120 U	2.4 U	2.4 U	2.4 U
2-Butanone (Methyl ethyl ketone) (MEK)	-	52000	-	220000	2.9 U	150 U	1.9 J	1.5 J	3.2
2-Hexanone	-	310	-	1300	2.0 U	210 U	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	-	31000	-	130000	1.6 U	210 U	1.6 U	1.6 U	3.9 J
Acetone	-	320000	-	1400000	7.1 U	120 U	17 UJ	11 U	21 U
Benzene	3.1	310	16	1300	0.96 U	49 U	1.8	1.9	1.7
Bromodichloromethane	0.66	-	3.3	-	2.0 U	68 U	2.0 U	2.0 U	2.0 U
Bromoform	22	-	110	-	4.1 U	100 U	4.1 U	4.1 U	4.1 U
Bromomethane (Methyl bromide)	-	52	-	220	1.6 U	79 U	1.6 U	1.6 U	1.6 U
Carbon disulfide	-	7300	-	31000	6.5	160 U	8.4	13	11
Carbon tetrachloride	4.1	1000	20	4400	1.9 U	64 U	1.9 U	1.9 U	1.9 U
Chlorobenzene	-	520	-	2200	1.4 U	47 U	1.4 U	1.9	1.4 U
Chloroethane	-	100000	-	440000	1.1 U	53 U	1.1 U	1.1 U	1.1 U
Chloroform (Trichloromethane)	1.1	1000	5.3	4300	1.5 U	49 U	1.2 J[a]	14[ac]	4.5[a]
Chloromethane (Methyl chloride)	-	940	-	3900	1.7 U	42 UJ	1.7 U	1.5 J	1.2 J
cis-1,2-Dichloroethene[x]	-	630	-	2600	0.79 U	40 U	0.79 U	1.4	0.79 U
cis-1,3-Dichloropropene[j]	6.1	210	31	880	1.8 U	46 U	1.8 U	1.8 U	1.8 U
Cyclohexane	-	63000	-	260000	1.7 U	35 U	2.1	1.7 U	1.7 U
Dibromochloromethane	0.9	-	4.5	-	3.4 U	86 U	3.4 U	3.4 U	3.4 U
Dichlorodifluoromethane (CFC-12)	-	1000	-	4400	4.0	75 U	63	2.5	24
Ethylbenzene	9.7	10000	49	44000	1.3 U	44 U	4.4	3.2	5.4
Isopropyl benzene	-	4200	-	18000	2.5 U	50 U	2.5 U	2.5 U	2.5 U
Methyl tert butyl ether (MTBE)	94	31000	470	130000	3.6 U	37 U	3.6 U	3.6 U	1.4 J
Methylene chloride	960	6300	12000	26000	1.0 U	19 J	0.55 J	1.0 U	1.0 U
Naphthalene	0.72	31	3.6	130	2.6 U	160 U	2.6 U	3.8[ac]	7.9[ac]
Styrene	-	10000	-	44000	1.7 U	43 U	1.7 U	1.7 U	1.7 U
Tetrachloroethene	94	420	470	1800	1.5 J	69 U	25	120[a]	40
Toluene	-	52000	-	220000	1.1 U	27 J	22	12	18
trans-1,2-Dichloroethene	-	630	-	2600	0.79 U	40 U	0.79 U	0.79 U	0.79 U
trans-1,3-Dichloropropene[f]	6.1	210	31	880	1.8 U	46 UJ	1.8 U	1.8 U	1.8 U
Trichloroethene	4.3	21	30	88	1.0 J	54 U	1.6 J	2000[bcd]	40[abc]
Trichlorofluoromethane (CFC-11)	-	7300	-	31000	8.8	40 J	74	5.2	5.2
Trifluorotrichloroethane (Freon 113)	-	310000	-	1300000	3.8 U	78 U	3.8 U	3.8 U	3.8 U
Vinyl chloride	1.6	1000	28	4400	0.51 U	52 U	0.51 U	0.51 U	0.51 U
Xylenes (total)	-	1000	-	4400	1.3 U	44 U	13	19	30

Notes:

All concentrations are expressed in units of micrograms per cubic meter ($\mu g/m^3$) unless otherwise noted.
J - The parameter was positively identified; however, the associated parameter concentration is estimated.
ELCR - Estimated Lifetime Cancer Risk
HI - Hazard Index
SVSL = Soil Vapor Screening Level.
U - The parameter was not detected. The associated numerical value is the sample quantitation limit.
UJ - The parameter was not detected. The associate numerical values is the estimated sample quantitation limit.
The residential soil vapor screening levels (SVSLs) are based on the USEPA 2012 Regional Screening Levels (November 2012) for Residential Air. The RSLs are derived assuming a 10^{-6} target estimated lifetime cancer risk level or a hazard index of 1.
The SVSLs were derived from the USEPA (November 2012) RSLs by applying the USEPA Region 5 Vapor Intrusion Guidebook (Oct 2010) default soil-vapor-to-indoor-air attenuation factor of 0.1.
[e] = An RSL is not available for 1,3-dichlorobenzene; the RSL for 1,4-dichlorobenzene was considered an evaluation surrogate for 1,3-dichlorobenzene.
[x] = An RSL is not available for cis-1,2-dichloroethene; the RSL for trans-1,2-dichloroethene was considered an evaluation surrogate for cis-1,2-dichloroethene.
[j] = An RSL is not available for cis-1,3-dichloropropene; the RSL for 1,3-dichloropropene was considered an evaluation surrogate for cis-1,3-dichloropropene.
[f] = An RSL is not available for trans-1,3-dichloropropene; the RSL for 1,3-dichloropropene was considered an evaluation surrogate for trans-1,3-dichloropropene.

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TABLE 2.5

HISTORIC SOIL VAPOR FIELD PARAMETERS
OPERABLE UNIT 2
SOUTH DAYTON DUMP AND LANDFILL
MORAINE, OHIO

Sample Location:	*GP06-09*	*GP06-09*	*GP06-09*	*GP06-09*	*GP06-09*	*GP07-09*	*GP07-09*	*GP07-09*	*GP07-09*	*GP07-09*	*GP08-09*	*GP08-09*	*GP08-09*	*GP08-09*	*GP08-09*	*GP09-09*
Sample ID:	*GP06-09*	*GP06-09*	*GP06-09*	*GP06-09*	*GP06-09*	*GP07-09*	*GP07-09*	*GP07-09*	*GP07-09*	*GP07-09*	*GP08-09*	*GP08-09*	*GP08-09*	*GP08-09*	*GP08-09*	*GP09-09*
Sample Date:	*9/18/2009*	*10/14/2009*	*12/9/2009*	*11/1/2012*	*1/10/2013*	*9/18/2009*	*10/14/2009*	*12/9/2009*	*11/1/2012*	*1/10/2013*	*9/18/2009*	*10/14/2009*	*12/9/2009*	*11/1/2012*	*1/10/2013*	*9/18/2009*
Parameter																
Field Parameters																
Methane	0.1	0	0	0 / 0	0 / 0	0	0	0	0 / 0	0 / 0	0	0	0	0 / 0.1	0 / 0	0.1
Carbon Dioxide (%)	8.2	6.1	2.5	2.4 / 2.1	1.5 / 1.5	13.6	12.8	5.1	6.2 / 6.7	13.7 / 13.8	10.5	9.1	3.9	0 / 0.4	1.5 / 2.1	9.2
Oxygen (%)	--	10.1	16	19.1 / 19.5	19.3 / 19.0	--	4.4	13.9	13.1 / 12.8	4.7 / 5.0	--	7.8	16	21.9 / 21.6	21.2 / 20.6	--
Lower Explosive Limit (%)	--	0	0	0 / 0	0 / 0	--	0	0	0 / 0	0 / 0	--	0	0	0 / 2	0 / 0	--
Manometer Pressure (inches H_2O)	--	0	-1.1	0.8	0	--	0	0	2.81	2.41	--	0	0	0.8	-0.4	--
PID (ppm)	--	0	0	--	--	--	0	0	--	--	--	0	0	--	--	--
Barometric Pressure (in. Hg)	29.28	29.27	28.58	--	--	29.28	29.27	28.58	--	--	29.28	29.27	28.58	--	--	29.28
Balance (%)	--	83.8	81.5	78.5 / 78.4	79.2 / 79.5	--	82.9	81	80.7 / 80.5	81.6 / 81.2	--	83	80.1	78.1 / 77.9	77.3 / 77.3	--
Ambient Air Temperature (^{0}F)	--	--	35	--	--	--	--	35	--	--	--	--	35	--	--	--

Notes:

Bold values exceed 10% of the LEL for methane
Bold and shaded values exceed the LEL for methane (5%)
Bold, shaded, and *italic* values exceed the UEL for methane (15%)
UEL - Upper explosive limit
LEL - Lower explosive limit
19.1 / 19.5 - filtered / unfiltered field reading
- - Not applicable.

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TABLE 2.5

HISTORIC SOIL VAPOR FIELD PARAMETERS
OPERABLE UNIT 2
SOUTH DAYTON DUMP AND LANDFILL
MORAINE, OHIO

Sample Location:	*GP09-09*	*GP09-09*	*GP09-09*	*GP09-09*	*GP10-09*	*GP10-09*	*GP10-09*	*GP10-09*	*GP10-09*
Sample ID:	*GP09-09*	*GP09-09*	*GP09-09*	*GP09-09*	*GP10-09*	*GP10-09*	*GP10-09*	*GP10-09*	*GP10-09*
Sample Date:	*10/14/2009*	*12/9/2009*	*11/1/2012*	*1/7/2013*	*9/18/2009*	*10/14/2009*	*12/9/2009*	*11/1/2012*	*1/7/2013*
Parameter									
Field Parameters									
Methane	0	0	0 / 0	0 / 0	0	0.1	0	0 / 0	0 / 0
Carbon Dioxide (%)	8.1	4.4	4.2 / 4.5	4.9 / 4.4	4.4	3.5	2.4	4.0 / 4.3	4.1 / 4.5
Oxygen (%)	12.1	13.5	19.8 / 19.7	16.2 / 16.2	13.5	--	8.3	3.1 / 2.4	0.1 / 0.0
Lower Explosive Limit (%)	0	0	0 / 0	0 / 0	0	--	0	0 / 0	0 / 0
Manometer Pressure (inches H_2O)	0	-0.4	0	0	-0.4	--	-2	5.22	4.42
PID (ppm)	0	0	--	--	0	--	0	--	--
Barometric Pressure (in. Hg)	29	28.64	--	--	28.64	29.28	28.64	--	--
Balance (%)	79.8	82.1	76 / 75.8	78.9 / 79.4	82.1	--	89.3	92.9 / 93.3	95.8 / 95.5
Ambient Air Temperature (^{0}F)	--	35	--	--	35	--	35	--	--

Notes:

Bold values exceed 10% of the LEL for methane
Bold and shaded values exceed the LEL for methane (5%)
Bold, shaded, and *italic* values exceed the UEL for methane (15%)
UEL - Upper explosive limit
LEL - Lower explosive limit
19.1 / 19.5 - filtered / unfiltered field reading
- - Not applicable.

TABLE 3.1

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SOUTHERN PARCELS FILL INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*Soil on Southern Parcels*	
Investigation Phase:	*Phase 1A*	*Phase 2*
Investigation Item:	*Comparison to Industrial Soil Criteria and Site-Specific Risk Values*	*Additional sampling (if necessary) to develop risk assessment exposure estimates*
DQO Step		
1 *State the Problem*		
i) Problem description	- Soil and sediment samples from the Quarry Pond Parcels contained PAHs at concentrations less than, and arsenic concentrations greater than screening levels in soil (SSLs) that are protective of groundwater. - Insufficient soil quality data exist for the Southern Parcels (OU2) in order to determine the presence or absence of direct contact risks to receptors via soil exposure pathways. - This investigation shall determine the lateral and vertical extent of the fill material to support the overall site assessment; - Characterize the fill material (surface and subsurface) to identify direct contact risks, as for input to the Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA); - Determine if potential soil contamination is a result of migration from the Site or off-Site sources	If soil containing contaminants at concentrations greater than screening values and background reference conditions is found in Phases 1A and 1B for Southern Parcels, additional soil samples will be collected to delineate soil impacts or to remove data gaps. The quantity of data must be sufficient to support a risk assessment.
ii) Planning team	See note at bottom	
iii) Conceptual model	- Contaminants in soil may pose a risk to receptors via the direct contact pathway. Cover material at the Site is limited or non-existent, which could lead to erosional run-off of contaminants towards the Quarry Pond. - Infiltrating precipitation can cause contaminants in soil to migrate downwards, ultimately impacting groundwater.	
iv) General intended use for data	The soil and groundwater data collected from each soil borehole will be used to identify direct contact risks and groundwater contamination, respectively associated with soil and groundwater samples from the Southern Parcels. The data collected will be compared against health-based risk values and applicable USEPA Industrial Soil Regional Screening Levels (RSLs) to identify risks associated with soil samples from the Southern Parcels.	The collected data will be used to generate exposure estimates for an assessment of direct contact risks, groundwater contamination, and risks to ecological receptors. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.
v) Resources, constraints, deadlines	Sufficient resources will be committed to sample soil on the Southern Parcels under the OU2 RI/FS work plan. Sampling may be postponed due to flooding.	
2 *Goals of the Study:*		
i) Primary study question	Do soil samples from the Southern Parcels contain contaminants at concentrations greater than industrial soil and/or site-specific risk-based values?	Does soil on the Southern Parcels contain contaminants originating from the Site that may pose unacceptable human health risks or unacceptable risks to ecological receptors?

TABLE 3.1

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SOUTHERN PARCELS FILL INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*Soil on Southern Parcels*	
Investigation Phase:	*Phase 1A*	*Phase 2*
Investigation Item:	*Comparison to Industrial Soil Criteria and Site-Specific Risk Values*	*Additional sampling (if necessary) to develop risk assessment exposure estimates*
DQO Step		
ii) Alternate outcomes or actions	- If sampling demonstrates that contaminant concentrations in soil are less than risk-based screening levels/criteria, no further sampling or remedial action is planned. - If sampling demonstrates that contaminant concentrations in soils are greater than screening levels/criteria, and greater than background reference conditions (see Phase 1B to right), further evaluation and/or remedial measures may be warranted.	- If sampling demonstrates that human health and ecological risks are acceptable, no further action is required. - If sampling demonstrates unacceptable human health or ecological risks, further evaluation, risk management and/or remediation would be required.
iii) Type of problem (decision or estimation)[1]	Decision (Action Level)	Estimation
iv.a) Decision statement	Determine whether any contaminant concentrations are greater than USEPA Industrial soil RSLs criteria or site-specific risk values in Southern Parcel soils.	--
iv.b) Estimation statement & assumptions	--	The parameter of interest is the mean (for estimating direct contact risks) of soil contaminant concentrations within an identified exposure area on the Southern Parcels.
3 *Identify Information Inputs:*		
i) Information types needed	- Soil sample analysis is required to assess conditions in the Southern Parcels. - Soil samples will be collected on a random basis (random oriented grid) from each exposure area. - Soil samples will also be collected at data gap locations or areas of suspected soil contamination.	- This would be a supplemental data collection effort, with analyses performed on soil samples obtained to fill in any data gaps across the exposure area.
ii) Information sources	- New and existing data from the investigation will form the basis of assessment. The results from all soil samples collected from the Southern Parcels will be considered during interpretation of the data obtained.	- New data from the investigation will form the basis of assessment. Any available previous data (e.g., from Phase 1), within the exposure area will also be used.
iii) Basis of Action Level	Action Levels are: - USEPA Industrial Soil RSLs	--
iv) Appropriate sampling & analysis methods	Methods are described in the Field Sampling Plan (CRA, January 2011) and the Quality Assurance Project Plan (CRA, September 2008).	

TABLE 3.1

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SOUTHERN PARCELS FILL INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*Soil on Southern Parcels*	
Investigation Phase:	*Phase 1A*	*Phase 2*
Investigation Item:	*Comparison to Industrial Soil Criteria and Site-Specific Risk Values*	*Additional sampling (if necessary) to develop risk assessment exposure estimates*
DQO Step		
4 *Define the Boundaries of the Study:*		
i) Target population, sample units	The target population is surficial and subsurface soils on the Southern Parcels. The sampling units are individual samples collected from the soil, divided into background reference, and exposure units for assessment of risks to human receptors.	Target population is soil on the Southern Parcels comprising the exposure units for assessment of exposure risks for human receptors.
ii) Specify spatial boundaries	The spatial boundaries are the limits of the Southern Parcels (OU2) Site boundaries. Surficial soil is to a maximum depth of 2 ft bgs. The spatial boundaries of the sub-surface soil samples will be to a depth of 15 ft bgs, i.e., the maximum soil depth construction workers would be expected to encounter. Additional unsaturated soil samples will be collected at depths greater than 15 ft bgs. Boreholes will be advanced up to 5 ft into native material, to the base of landfill waste, the water table, or until refusal.	The spatial boundaries are the limits of the Southern Parcels (OU2) Site boundaries. Surficial soil is to a maximum depth of 2 ft bgs. The spatial boundaries of the sub-surface soil samples will be to a maximum depth of 15 ft bgs, i.e., the maximum soil depth construction workers would be expected to encounter. The spatial boundaries to evaluate risks to groundwater will be the entire depth of soil above the water table.
iii) Specify temporal boundaries	The temporal boundaries are indefinite, assuming continued exposure at levels found during sampling. The practical temporal limits are based on the exposure assumptions of the Action Levels.	
iv) Identify any other practical constraints	Practical constraints anticipated for sampling of Southern Parcel soil include the presence of cars on the Jim City Parcels and buildings and equipment on the Ron Barnett Parcels. Safety issues associated with sampling adjacent to surface water will also be considered for sampling activities on the Quarry Pond Parcels.	Practical constraints anticipated for sampling of Southern Parcels soil include the presence of cars on the Jim City Parcels and buildings and equipment on the Ron Barnett Parcels. Off-Site sampling, if required for delineation purposes, may be restricted by permission of property owners.

TABLE 3.1

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SOUTHERN PARCELS FILL INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*Soil on Southern Parcels*	
Investigation Phase:	*Phase 1A*	*Phase 2*
Investigation Item:	*Comparison to Industrial Soil Criteria and Site-Specific Risk Values*	*Additional sampling (if necessary) to develop risk assessment exposure estimates*
DQO Step		
v.a) Scale of inference for decision making	Comparisons to Action Levels will be carried out on an individual-location basis.	--
v.b) Scale of estimates	--	The scale of the exposure estimate is to be identified in a Site-specific risk assessment.
5 *Develop the Analytic Approach:*		
i.a) Specify Action Level	1) USEPA Industrial Soil RSLs	--
i.b) Specify estimator	--	The arithmetic mean (per USEPA RAGS requirements) surface soil concentration of each contaminant that is greater than screening criteria.
ii.a) Specify population parameter of interest and theoretical decision rule	Individual observations at sampling locations on the Southern Parcels.	--
ii.b) Specify estimation procedure	--	The study will estimate the mean concentration of the exposure unit population represented by the soil samples obtained.
6 *Specify Performance or Acceptance Criteria:*		
i.a) Set baseline (null) and alternative hypotheses	Baseline H_0: soil sample concentrations are less than Action Levels. Alternative H_1: soil samples contain contaminant concentrations greater than Action Levels.	--
i.b) Specify how uncertainty accounted for in estimate	--	Uncertainty will be accounted for using a confidence interval on the population mean (per USEPA RAGS guidance).
ii.a) Determine impact of decision errors (false positives/negatives)	N/A: no statistical test is employed (direct comparison to Action Levels)	--

TABLE 3.1

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SOUTHERN PARCELS FILL INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*Soil on Southern Parcels*	
Investigation Phase:	*Phase 1A*	*Phase 2*
Investigation Item:	*Comparison to Industrial Soil Criteria and Site-Specific Risk Values*	*Additional sampling (if necessary) to develop risk assessment exposure estimates*
DQO Step		
ii.b) Specify confidence level for estimate	--	The confidence level of the estimate will be 95 percent, unless specified otherwise (based on data distribution and/or the presence of non-detect results) in USEPA's ProUCL Technical Guide (2010).
iii) Specify "gray region" for test	N/A: no statistical test is employed (direct comparison to Action Levels)	--
iv.a) Set tolerable limits on decision errors	N/A: no statistical test is employed (direct comparison to Action Levels)	--
iv.b) Specify performance or acceptance criteria	--	The lesser value of the 95 percent UCL on the population mean or the maximum individual measurement will be required.
7 *Develop the Plan for Obtaining Data:*		
i) Select sampling design	Soil samples from Southern Parcels will be collected from four exposure areas (Jim City Parcels, Ron Barnett Parcels, Quarry Pond Parcel soil, Quarry Pond embankments including Parcel 3275). Exposure areas are determined based on current use and ownership, potential future use, and topography.	The number of additional soil samples required, for delineation purposes and removal of data gaps, will be determined based on the results of the Phase 1A and 1B investigations.
	Separate sets of data will be collected for (i) surface soil 0-2', (ii) subsurface soil 2-15', and (iii) unsaturated samples from a minimum of 12 locations at depths greater than 15 ft bgs. Additional soil samples will be collected at intervals within boreholes exhibiting evidence of contamination (based on field screening, visual and olfactory observations) A minimum of 8 samples per exposure area, per USEPA's ProUCL Technical Guide (2010), spaced on a regular grid with random origin (i.e., a systematic random sampling design), will be obtained for each exposure area identified in the risk assessment. Additional samples will be collected in the areas of any data gaps. A minimum of 10 samples will be collected from sub-surface soil (2-15'). Additional samples wll be collected from subsurface soil (>15' at 3 locations per exposure area and additional locations) if impacts are identified.	

TABLE 3.1

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SOUTHERN PARCELS FILL INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*Soil on Southern Parcels*	
Investigation Phase:	*Phase 1A*	*Phase 2*
Investigation Item:	*Comparison to Industrial Soil Criteria and Site-Specific Risk Values*	*Additional sampling (if necessary) to develop risk assessment exposure estimates*
DQO Step		
ii) Specify/evaluate key assumptions supporting the design	The calculation of 95 percent upper confidence limits on a population mean makes assumptions of data characteristics (e.g., distribution and proportion of detected values), as fully discussed in the USEPA ProUCL Technical Guide (2010). Additionally, the presence of outlying values will be tested, and if present their impact on the values obtained evaluated.	The calculation of 95 percent upper confidence limits on a population mean makes assumptions of data characteristics (e.g., distribution and proportion of detected values), as fully discussed in the USEPA ProUCL Technical Guide (2010). Additionally, the presence of outlying values will be tested, and if present their impact on the values obtained evaluated.

Notes:

(1) If investigating a "decision problem", follow items ending in ".a" in subsequent DQO steps (e.g., "ii.a" or "iii.a").
If investigating an "estimation problem", follow ".b" items.
Once the baseline risk assessment for OU2 has been performed, possible remedial goals (PRGs) will be derived from the calculator using site-specific risks.

-- Item not applicable for the type of problem (decision vs. estimation) investigated.

The planning team includes: Steve Quigley (CRA Project Director); Adam Loney (CRA project manager);
Wesley Dyck, Daniela Araujo (CRA statistics expert);
April Gowing, Steve Harris, Vincent Nero and Dan Smith (CRA risk assessment experts);
Paul Wiseman, Rawa Fleisher, Angela Bown (CRA chemists/quality assurance staff);
Julian Hayward, Andrew Sousa, Valerie Chan (CRA project engineers); Mark Hilverda (CRA project hydrogeologist);
Leslie Patterson (USEPA Regional Project Manager); Mark Allen (Ohio EPA representative); and property owner stakeholders.

TABLE 3.2

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- GROUNDWATER INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step	*Medium:*	*Groundwater on Southern Parcels*	
	Investigation Phase:	*Phase 1*	*Phase 2*
	Investigation Item:	*Investigation of Base of Soil/Fill on Southern Parcels*	*Groundwater Investigation (if necessary)*
1	*State the Problem*		
	i) Problem description	-Fill areas may contain materials that can produce impacts to underlying groundwater due to leaching and infiltration into groundwater - Insufficient soil quality data exist for the Southern Parcels (OU2) in order to determine the presence or absence of direct contact risks to receptors via soil exposure pathways. - Collection and analyses of soil samples from Southern Parcels is required to make this assessment. - Collection and analyses of off-Site background soil samples is required to determine if potential soil contamination is a result of migration from the Site or off-Site sources. - Soil and sediment samples from the Quarry Pond Parcels contained PAHs at concentrations less than, and arsenic concentrations greater than screening levels in soil (SSLs) that are protective of groundwater.	- If soil samples collected from the base of the borehole and groundwater samples collected from temporary monitoring wells contain contaminant concentrations greater than USEPA MCL RSL criteria, a groundwater investigation will be conducted to delineate areas of groundwater contamination within the Southern Parcel boundary.
	ii) Planning team	See note at bottom	
	iii) Conceptual model	- Contaminants that migrate to soils overlaying the water table may pose a risk for mobilization and transport of contaminats. The presumed groundwater flow direction is westward towards the Great Miami River and thus, contaminants reaching the water table may be mobilized to this freshwater body and carried further downstream. Mobilization to a surface water body results in a direct contact risk.	
	iv) General intended use for data	The soil data collected from each soil borehole will be used to identify areas on the Southern Parcel that may contribute to groundwater contamination. The data collected will be compared against health-based risk values and applicable USEPA screening levels in soil (SSLs) that are protective of groundwater to identify risks associated with soil samples from the Southern Parcels.	The collected data and any previously generated data (historic monitoring wells and vertical aquifer samples (VAS)) will be used to generate exposure estimates for an assessment of direct contact risks, groundwater contamination, and risks to ecological receptors. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.
	v) Resources, constraints, deadlines	Sufficient resources will be committed to sample soil and water on the Southern Parcels under the OU2 RI/FS work plan. Sampling may be postponed due to flooding.	
2	*Goals of the Study:*		
	i) Primary study question	- Do soil samples from the base of the soil borings in the Southern Parcels contain contaminants at concentrations greater than USEPA screening levels in soil (SSLs) that are protective of groundwater, and pose a threat to underlying groundwater?	- Do groundwater samples from monitoring wells installed around the perimeter of the Southern Parcels contain contaminants at concentrations greater than USEPA maximum contaminant level (MCL) Regional Screening Levels (RSLs)?
	ii) Alternate outcomes or actions	- If sampling demonstrates that contaminant concentrations in soil are less than risk-based screening levels/criteria, no further sampling or remedial action is planned. - If soil samples collected from the base of the borehole demonstrate that contaminant concentrations in soils are greater than screening levels/criteria, and greater than background reference conditions, groundwater investigative activities may be warranted.	- If sampling demonstrates that human health and ecological risks are acceptable, no further action is required. - If sampling demonstrates unacceptable human health or ecological risks, further evaluation, risk management and/or remediation would be required.

TABLE 3.2

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- GROUNDWATER INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step	*Medium:*	*Groundwater on Southern Parcels*	
	Investigation Phase:	*Phase 1*	*Phase 2*
	Investigation Item:	*Investigation of Base of Soil/Fill on Southern Parcels*	*Groundwater Investigation (if necessary)*
	iii) Type of problem (decision or estimation)[1]	Decision (Action Level)	Decision (Action Level)
	iv.a) Decision statement	Determine whether any contaminant concentrations in the base of the soil boring are greater than USEPA screening levels in soil (SSLs) that are protective of groundwater and/or site-specific risk values in Southern Parcel soils.	The data will be compared against health-based risk values and applicable USEPA MCL RSL criteria. The data collected from permanent groundwater monitoring wells will ultimately be used in the Baseline Risk Assessment for OU1, and potentially OU2.
	iv.b) Estimation statement & assumptions	--	--
3	*Identify Information Inputs:*		
	i) Information types needed	- Soil sample analysis is required to assess conditions in the Southern Parcels. - Soil samples will be collected on a random basis (random oriented grid) from each exposure area. - Soil samples will also be collected at data gap locations or areas of suspected soil contamination.	- Groundwater data from monitoring wells installed along the perimeter of the Southern Parcels.
	ii) Information sources	- New and existing data from the investigation will form the basis of assessment. The results from soil samples collected from the base of the soil borings from the Southern Parcels will be considered during interpretation of the data obtained.	- New data from the investigation will form the basis of assessment. Any available previous data (e.g., from historic monitoring wells and VAS samples), within the exposure area will also be used.
	iii) Basis of Action Level	Action Levels are: - USEPA screening levels in soil (SSLs) that are protective of groundwater	Action levels are: - USEPA maximum contaminant level (MCL) Regional Screening Levels (RSLs) or Tap Water levels where MCLs are unavailable
	iv) Appropriate sampling & analysis methods	Methods are described in the Field Sampling Plan (CRA, January 2011) and the Quality Assurance Project Plan (CRA, September 2008).	
4	*Define the Boundaries of the Study:*		
	i) Target population, sample units	- The target population are base soils on the Southern Parcels. The sampling units are individual samples collected from the soil, divided into background reference, and exposure units for assessment of mobilization risk to groundwater.	Target population is groundwater within the Southern Parcel. Sampling units are individual groundwater samples collected from monitoring wells.

TABLE 3.2

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- GROUNDWATER INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step	*Medium:*	*Groundwater on Southern Parcels*	
	Investigation Phase:	*Phase 1*	*Phase 2*
	Investigation Item:	*Investigation of Base of Soil/Fill on Southern Parcels*	*Groundwater Investigation (if necessary)*
	ii) Specify spatial boundaries	The spatial boundaries are the limits of the Southern Parcels (OU2) Site boundaries. Surficial soil is to a maximum depth of 2 ft bgs. The spatial boundaries of the sub-surface soil samples will be to a depth of 15 ft bgs, i.e., the maximum soil depth construction workers would be expected to encounter. Additional unsaturated soil samples will be collected at depths greater than 15 ft bgs. Boreholes will be advanced up to 5 ft into native material, to the base of landfill waste, the water table, or until refusal.	The spatial boundaries are areas within the Southern Parcel boundary identified in the soil/fill investigation to be areas of potential contamination due to Site-related plumes.
	iii) Specify temporal boundaries	The temporal boundaries are indefinite, assuming continued exposure at levels found during sampling. The practical temporal limits are based on the exposure assumptions of the Action Levels.	- Permanent monitoring wells can be installed at any time based on the results of the soil/fill investigation. - Two sampling events will be carried out at newly installed monitoring wells, during periods of high (i.e. February - April) or low (i.e., June - September) groundwater elevations. Seasonal groundwater flow fluctuations will be evaluated based on historic Site data, and will be demonstrated by the completion of a Site-wide groundwater elevation monitoring round
	iv) Identify any other practical constraints	- Practical constraints anticipated for sampling of Southern Parcel soil include the presence of cars on the Jim City Parcels and buildings and equipment on the Ron Barnett Parcels. - Safety issues associated with sampling adjacent to surface water will also be considered for sampling activities on the Quarry Pond Parcels.	
	v.a) Scale of inference for decision making	Comparisons to Action Levels will be carried out on an individual-location basis.	
	v.b) Scale of estimates	--	--
5	*Develop the Analytic Approach:*		
	i.a) Specify Action Level	USEPA screening levels in soil (SSLs) that are protective of groundwater	USEPA maximum contaminant level (MCL) Regional Screening Levels (RSLs) or Tap Water levels where MCLs are unavailable
	i.b) Specify estimator	--	--
	ii.a) Specify population parameter of interest and theoretical decision rule	Individual observations at sampling locations on the Southern Parcels.	
	ii.b) Specify estimation procedure	--	--

TABLE 3.2

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- GROUNDWATER INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step	*Medium:*	*Groundwater on Southern Parcels*	
	Investigation Phase:	*Phase 1*	*Phase 2*
	Investigation Item:	*Investigation of Base of Soil/Fill on Southern Parcels*	*Groundwater Investigation (if necessary)*
6	*Specify Performance or Acceptance Criteria:*		
	i.a) Set baseline (null) and alternative hypotheses	Baseline H_0: soil sample concentrations are less than Action Levels Alternative H_1: soil samples contain contaminant concentrations greater than Action Levels	Baseline H_0: groundwater sample concentrations are less than Action Levels or are consistent with upgradient conditions (i.e., source is upgradient, either on or off-Site) Alternative H_1: groundwater sample concentrations are greater than Action Levels or upgradient conditions (i.e., contamination is Site-related).
	i.b) Specify how uncertainty accounted for in estimate	--	--
	ii.a) Determine impact of decision errors (false positives/negatives)	N/A: no statistical test is employed (direct comparison to Action Levels)	N/A: no statistical test is employed (direct comparison to Action Levels)
	ii.b) Specify confidence level for estimate	--	--
	iii) Specify "gray region" for test	N/A: no statistical test is employed (direct comparison to Action Levels)	
	iv.a) Set tolerable limits on decision errors	N/A: no statistical test is employed (direct comparison to Action Levels)	
	iv.b) Specify performance or acceptance criteria	--	--
7	*Develop the Plan for Obtaining Data:*		
	i) Select sampling design	- Soil samples from Southern Parcels will be collected from four exposure areas (Jim City Parcels, Ron Barnett Parcels, Quarry Pond Parcel soil, Quarry Pond embankments including Parcel 3275). - Exposure areas are determined based on current use and ownership, potential future use, and topography.	- Groundwater samples from Southern Parcels will be collected from four exposure areas (Jim City Parcels, Ron Barnett Parcels, Quarry Pond Parcel soil, Quarry Pond embankments including Parcel 3275). - Exposure areas are determined based on current use and ownership, potential future use, and topography.

TABLE 3.2

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- GROUNDWATER INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step	*Medium:* / *Investigation Phase:* / *Investigation Item:*	*Groundwater on Southern Parcels*	
		Phase 1	*Phase 2*
		Investigation of Base of Soil/Fill on Southern Parcels	*Groundwater Investigation (if necessary)*
		Separate sets of data will be collected for (i) surface soil 0-2', (ii) subsurface soil 2-15', and (iii) unsaturated samples from a minimum of 12 locations at depths greater than 15 ft bgs. Additional soil samples will be collected at intervals within boreholes exhibiting evidence of contamination (based on field screening, visual and olfactory observations) - One groundwater sample will be collected for laboratory analysis at the base of each soil boring where groundwater is encountered, using a temporary well screen positioned at the base of the borehole. These data will serve to provide an indication of potential impacts to groundwater related to infiltration of surface water through the fill material.	- Monitoring wells will be installed at select locations identified as areas of potentially unacceptable risks or areas of significantly elevated contaminant concentrations. Respondents will discuss Phase 1 data, and all previous data with USEPA to determine the next steps and suitable locations of permanent monitoring wells. - Two sampling events will be carried out at newly installed monitoring wells. Parameters included in the second round of analysis may be decreased depending on the results of the first round.
		A minimum of 8 samples per exposure area, per USEPA's ProUCL Technical Guide (2010), spaced on a regular grid with random origin (i.e., a systematic random sampling design), will be obtained for each exposure area identified in the risk assessment. Additional samples will be collected in the areas of any data gaps. A minimum of 10 samples will be collected from sub-surface soil (2-15'). Additional samples wll be collected from subsurface soil (>15' at 3 locations per exposure area and additional locations) if impacts are identified.	- A stratified-random design would be used to ensure that a suitable network of on-Site and upgradient monitoring wells is established to determine potential on-Site source areas. This design would include a more-intense well network (i.e., smaller strata) near known on-Site activities, and larger strata in other areas. A sufficient number of upgradient monitoring locations (3 to 4) would be employed to represent spatial variability in groundwater flowing towards the Site.
	ii) Specify/evaluate key assumptions supporting the design	The calculation of 95 percent upper confidence limits on a population mean makes assumptions of data characteristics (e.g., distribution and proportion of detected values), as fully discussed in the USEPA ProUCL Technical Guide (2010). Additionally, the presence of outlying values will be tested, and if present their impact on the values obtained evaluated.	

Notes:

(1) Vapor Intrusion Investigation Work Plan, submitted to USEPA on December 17, 2010.

(2) If investigating a "decision problem", follow items ending in ".a" in subsequent DQO steps (e.g., "ii.a" or "iii.a").
If investigating an "estimation problem", follow ".b" items.

-- Item not applicable for the type of problem (decision vs. estimation) investigated.

The planning team includes: Steve Quigley (CRA Project Director); Adam Loney (CRA project manager);
Wesley Dyck, Daniela Araujo (CRA statistics expert);
April Gowing, Steve Harris, Vincent Nero and Dan Smith (CRA risk assessment experts);
Paul Wiseman and Rawa Fleisher (CRA chemists/quality assurance staff);
Julian Hayward, Andrew Sousa, Valerie Chan (CRA project engineer); Mark Hilverda (CRA project hydrogeologist);
Leslie Patterson (USEPA Regional Project Manager); Mark Allen (Ohio EPA representative); and property owner stakeholders.

TABLE 3.3

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SOUTHERN PARCELS SOIL GAS INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

	Medium:	*Soil Gas on Southern Parcels*	
	Investigation Phase:	*Phase 1*	*Phase 2*
	Investigation Item:	*Investigation of Soil/Fill on Southern Parcels*	*Soil Gas Probe Investigation based on Southern Parcels Soil/Fill investigation (if necessary)*
DQO Step:			
1	*State the Problem*		
	i) Problem description	- Fill areas may contain materials that can produce elevated concentrations of explosive gases and NMOCs in landfill gas, and VOCs in soil gas. - Businesses operating on Site are located above or immediately adjacent to fill material, in close proximity to the soil gas probe locations where elevated levels of VOCs and explosive gases were detected. - A datagap exists with respect to the characterization of the fill material within the Southern Parcel area.	- If soil borehole samples containing contaminant concentrations greater than ODH Industrial Action Levels are identified within the Southern Parcel boundary, actual on-Site soil gas concentrations will be investigated through the installation of soil gas probes in the fill area to assess the present conditions and potential for migration.
	ii) Planning team	See note at bottom	
	iii) Conceptual model	- VOCs, such as TCE, may volatilize from groundwater into vadose zone soil gas, which may migrate to indoor air via foundation cracks and utility penetrations in buildings. - Workers or residents in buildings where VOCs are present at concentrations greater than target criteria may be subject to potential risks due to inhalation hazards.	
	iv) General intended use for data	The collected soil gas data will be used for direct comparison to Ohio Department of Health (ODH) Industrial Action Levels. As such, each result will represent a reasonable worst-case maximum potential concentration migrating to indoor air at each structure. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.	
	v) Resources, constraints, deadlines	Sufficient resources have been reserved to collect and analyze soil gas from the probes. An iterative sampling approach may be required to refine estimates based on earlier findings from the OU1 vapor intrusion investigation.	Sampling may be constrained by access agreements to off-Site parcels or buildings. An iterative sampling approach may be required to refine estimates based on findings from the soil/fill investigation.
2	*Goals of the Study:*		
	i) Primary study question	- Do contaminant concentrations in soil vapor pose an unacceptable risk, via the vapor intrusion pathway, to occupants of structures on, or immediately adjacent to the Site? - Are concentrations of combustible gases within a structure greater than the screening criterion of 1 and 10 percent of the LEL (as per the USEPA Region V Vapor Intrusion Guidebook, October 2010), or the regulatory criterion of 25 percent of the LEL (as per OAC Chapter 3745-27-12)? - Taken together, how do the concentrations of contaminants and combustible gases in soil vapor affect future use of the Site? - Does the OU2 soil vapor act as a source of soil gas to the structures studied in the Vapor Intrusion investigation?	

TABLE 3.3

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SOUTHERN PARCELS SOIL GAS INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*Soil Gas on Southern Parcels*	
Investigation Phase:	*Phase 1*	*Phase 2*
Investigation Item:	*Investigation of Soil/Fill on Southern Parcels*	*Soil Gas Probe Investigation based on Southern Parcels Soil/Fill investigation (if necessary)*
DQO Step:		
ii) Alternate outcomes or actions	- If soil gas or soil borehole samples collected from the probes or boreholes, respectively, contain VOCs at concentrations less than the regulatory criteria, and methane below 1 and 10 percent of the LEL, no further action is necessary. - If VOCs and/or methane are present at concentrations greater than the criteria, then further evaluation is required.	
iii) Type of problem (decision or estimation)[(2)]	Decision (Action Level)	Decision (Action Level)
iv.a) Decision statement	Determine whether VOCs are present in soil samples within the fill material and along the southern and western perimeters of the Quarry Pond Parcels at levels posing potential risk to occupants of on-Site structures specified in the Vapor Intrusion Investigation Work Plan (CRA, December 17, 2010).[(1)]	Determine whether VOCs are present in the fill material and along the southern and western perimeters of the Quarry Pond Parcels at levels posing potential risk to occupants of off Site structures identified as being at risk from volatilization of groundwater into indoor air based on Phase 2 of the Groundwater DQO investigation and Southern Parcels soil investigation.
iv.b) Estimation statement & assumptions	--	--
3 *Identify Information Inputs:*		
i) Information types needed	- Analytical data and explosive gas monitoring from soil boreholes and gas probes installed within the fill material.	- This would be a new data collection effort, with analyses performed on samples collected from soil gas probes installed within the fill material.
ii) Information sources	- New data from the Southern Parcels soil investigation will form the basis of assessment.	- New data from the Southern Parcels soil investigation will form the basis of assessment.
iii) Basis of Action Level	Action Levels are: - Ohio Department of Health (ODH) Industrial Action Levels	
iv) Appropriate sampling & analysis methods	Methods are described in the Field Sampling Plan (CRA, January 2011) and the Quality Assurance Project Plan (CRA, September 2008).	Methods are described in the Vapor Intrusion Investigation Work Plan (CRA, December 17, 2010) and Field Sampling Plan (CRA, January 2011). VOC and naphthalene analysis is via EPA method TO-15.

TABLE 3.3

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SOUTHERN PARCELS SOIL GAS INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*Soil Gas on Southern Parcels*	
Investigation Phase:	*Phase 1*	*Phase 2*
Investigation Item:	*Investigation of Soil/Fill on Southern Parcels*	*Soil Gas Probe Investigation based on Southern Parcels Soil/Fill investigation (if necessary)*
DQO Step:		
	During the soil borehole investigation, Methane values will be recorded in the field using an RKI Eagle 2 equipped with a methane elimination mode to differentiate methane from VOCs.	During soil gas probe installation, methane values will be recorded in the field using an FID or combustible gas meter. To confirm the field readings, a percentage of the Summa Canisters will be analyzed for methane via ASTM D1946.
4	***Define the Boundaries of the Study:***	
i) Target population, sample units	The target population is surficial and subsurface soils on the Southern Parcels. The sampling units are individual samples collected from the soil, divided into background reference, and exposure units for assessment of risks to human receptors.	Target population is soil gas within the fill area where concentrations of VOCs in soil are greater than ODH Industrial Action Levels, and therefore, represent a vapor intrusion risk.
ii) Specify spatial boundaries	Spatial boundaries are the limits of the Southern Parcels within the OU2 boundary, which included the fill area and occupied buildings.	Spatial boundaries are the limits of the Southern Parcels within the OU2 boundary, which included the fill area and occupied buildings, where concentrations of contaminants are greater than ODH Industrial Action Levels.
iii) Specify temporal boundaries	The temporal boundaries are indefinite, assuming continued exposure at levels found during sampling. The practical temporal limits are based on exposure assumptions used in the derivation of the Action Levels.	
iv) Identify any other practical constraints	- Practical constraints anticipated for sampling of Southern Parcel soil include the presence of cars on the Jim City Parcels and buildings and equipment on the Ron Barnett Parcels. - Safety issues associated with sampling adjacent to surface water will also be considered for sampling activities on the Quarry Pond Parcels.	- Practical constraints anticipated for sampling of Southern Parcel soil include the presence of cars on the Jim City Parcels and buildings and equipment on the Ron Barnett Parcels. - Safety issues associated with sampling adjacent to surface water will also be considered for sampling activities on the Quarry Pond Parcels. - Depending on soil borehole sample analytical results, the soil gas probe may not be able to be screened in intervals that delineate the specific stratigraphic layer(s) contributing to combustible gas concentrations.
v.a) Scale of inference for decision making	The decision unit is the fill area within the Southern Parcels.	
v.b) Scale of estimates	--	

TABLE 3.3

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SOUTHERN PARCELS SOIL GAS INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

	Medium:	*Soil Gas on Southern Parcels*	
	Investigation Phase:	*Phase 1*	*Phase 2*
	Investigation Item:	*Investigation of Soil/Fill on Southern Parcels*	*Soil Gas Probe Investigation based on Southern Parcels Soil/Fill investigation (if necessary)*
DQO Step:			
5	*Develop the Analytic Approach:*		
	i.a) Specify Action Level	1) ODH Industrial Action Levels 2) 1 and 10 percent of the LEL 3) 25 percent of the LEL	
	i.b) Specify estimator	--	
	ii.a) Specify population parameter of interest and theoretical decision rule	Maximum concentration in soil gas samples and explosive gas measurements at each structure compared directly to criteria.	
	ii.b) Specify estimation procedure	--	
6	*Specify Performance or Acceptance Criteria:*		
	i.a) Set baseline (null) and alternative hypotheses	Baseline H_0: soil vapor contamination concentrations are less than Action Levels Alternative H_1: soil vapor contamination concentrations are greater than Action Levels	
	i.b) Specify how uncertainty accounted for in estimate	--	
	ii.a) Determine impact of decision errors (false positives/negatives)	N/A: since comparing to maximum value, no statistical test is employed	
	ii.b) Specify confidence level for estimate	--	
	iii) Specify "gray region" for test	N/A: since comparing to maximum value, no statistical test is employed	
	iv.a) Set tolerable limits on decision errors	N/A: since comparing to maximum value, no statistical test is employed	

TABLE 3.3

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SOUTHERN PARCELS SOIL GAS INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*Soil Gas on Southern Parcels*	
Investigation Phase:	*Phase 1*	*Phase 2*
Investigation Item:	*Investigation of Soil/Fill on Southern Parcels*	*Soil Gas Probe Investigation based on Southern Parcels Soil/Fill investigation (if necessary)*
DQO Step:		
iv.b) Specify performance or acceptance criteria	--	
7 *Develop the Plan for Obtaining Data:*		
i) Select sampling design	- Soil samples from Southern Parcels will be collected from from four exposure areas (Jim City Parcels, Ron Barnett Parcels, Quarry Pond Parcel soil, Quarry Pond embankments including Parcel 3275). '- Soil borehole sample analytical results will be compared to ODH Action Levels	- CRA will install temporary soil gas probes at select locations dependent on the observations CRA makes during the drilling of the soil borings - CRA will assess the need for further soil gas monitoring within or beyond the fill material limits, based on the results of the initial monitoring.
ii) Specify/evaluate key assumptions supporting the design	--	

Notes:

(1) Vapor Intrusion Investigation Work Plan, submitted to USEPA on December 17, 2010.

(2) If investigating a "decision problem", follow items ending in ".a" in subsequent DQO steps (e.g., "ii.a" or "iii.a").
If investigating an "estimation problem", follow ".b" items.

NMOC Non-methane organic compounds

-- Item not applicable for the type of problem (decision vs. estimation) investigated.
The planning team includes: Steve Quigley (CRA Project Director); Adam Loney (CRA project manager);
Wesley Dyck, Daniela Araujo (CRA statistics expert);
April Gowing, Steve Harris, Vincent Nero and Dan Smith (CRA risk assessment experts);
Paul Wiseman and Rawa Fleisher (CRA chemists/quality assurance staff);
Julian Hayward, Andrew Sousa, Valerie Chan (CRA project engineer); Mark Hilverda (CRA project hydrogeologist);
Leslie Patterson (USEPA Regional Project Manager); Mark Allen (Ohio EPA representative); and property owner stakeholders.

TABLE 3.4

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SURFACE WATER INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step:	*Medium:*	*Surface Water*		
	Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 1C*
	Investigation Item:	*Comparison to Ambient Water Quality Criteria*	*Comparison to Upstream Conditions*	*Quarry Pond Surface Water Sampling*
1	*State the Problem*			
	i) Problem description	Surface water samples have not previously been obtained from the Great Miami River (GMR) as it flow past by the Site. It is unknown whether the Site has any measurable impact on water quality in the GMR.		Limited historic surface water samples have been obtained from the Quarry Pond. Historic Quarry Pond surface water samples did not contain any VOCs. No other parameters were assessed. The impact of Site contaminants on the Quarry Pond is not known.
	ii) Planning team	See note at bottom		
	iii) Conceptual model	- Shallow groundwater from the Site typically flows towards the west and/or north towards the GMR, which could carry contaminants into its surface waters. - Erosion of surface soils from the Site could also carry Site-related contaminants to the GMR, which is at a lower elevation, via overland surface flow. - During flood events, any potential GMR contaminants originating off-Site could affect the Site. - Surface water is well mixed and any contaminants would be evenly distributed throughout the water column.		- Shallow and deep groundwater from the Site typically flows towards the west towards the Quarry Pond, which could carry contaminants into the Quarry Pond. - During flood events, off-Site contaminants would be deposited on-Site. - Erosion of surface soils from the Site could also carry Site-related contaminants to the Quarry Pond, which is at a lower elevation, via overland surface flow.
	iv) General intended use for data	The data collected will be compared against ambient water quality criteria to assess if aquatic ecosystem health is potentially impaired. In addition, CRA will visually inspect the bank of the GMR adjacent to the Site for evidence of discharges potentially related to the Site (i.e., erosion rills, iron oxidation, turbidity, etc.). Sample locations will be matched up with Site discharges, if observed. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.	The data collected from sampling locations along the Site's boundaries will be compared to upstream (background) conditions, to determine if there are any measurable inputs of contaminants from the Site. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.	The data collected will be compared against ambient water quality criteria to assess if aquatic ecosystem health is potentially impaired. In addition, CRA will visually inspect the Quarry Pond embankments for evidence of discharges (i.e., erosion rills, iron oxidation, turbidity, etc.). Sample locations will be matched up with Site discharges, if observed. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.
	v) Resources, constraints, deadlines	Surface water quality may be influenced by rainfall events, water temperature and other seasonal effects, which requires monitoring at different times of the year and under different conditions. Surface water sampling may not be possible during high flows or during ice-cover conditions. Surface water sampling will be completed during low flow periods where contaminants entering via groundwater would present the greatest risks.		
2	*Goals of the Study:*			
	i) Primary study question	Does surface water quality fail to meet ambient water quality criteria for protection of human health (direct contact and ingestion) and aquatic organisms?	Does the Site add contaminants to surface water in the GMR as it flows past the Site?	Does surface water quality fail to meet ambient water quality criteria for protection of aquatic organisms and human health (trespassers)?

TABLE 3.4

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SURFACE WATER INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*Surface Water*		
Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 1C*
DQO Investigation Item:	*Comparison to Ambient Water Quality Criteria*	*Comparison to Upstream Conditions*	*Quarry Pond Surface Water Sampling*
Step:			
ii) Alternate outcomes or actions	- If sampling demonstrates that ambient water quality criteria are met, no further monitoring is planned. - If sampling demonstrates that criteria are not met, and that contaminant concentrations are greater than upstream conditions (see Phase 1B to right), further evaluation and/or control measures may be warranted.	- If sampling demonstrates conditions adjacent to the Site are less than those found upstream, no further monitoring is planned. - If sampling demonstrates conditions are greater than upstream, and that contaminant concentrations are greater than Action Level criteria (see Phase 1A to left), further evaluation and/or control measures may be warranted.	- If sampling demonstrates that ambient water quality criteria are met, no further monitoring is planned. - If sampling demonstrates that criteria are not met, further evaluation and/or control measures may be warranted.
iii) Type of problem (decision or estimation)[1]	Decision (Action Level)		
iv.a) Decision statement	Determine whether any contaminants are present at concentration greater than ambient water quality criteria in the GMR as it flows past the Site.	Determine whether any measurable input of contaminants from the Site, relative to upstream conditions, occurs in the GMR as it flows past the Site.	Determine whether any contaminants are greater than ambient water quality criteria in the Quarry Pond.
iv.b) Estimation statement & assumptions	--		
3 *Identify Information Inputs:*			
i) Information types needed	Surface water sample analysis is required to assess conditions in the GMR as it flows past the Site.		Surface water samples are required to assess conditions in the Quarry Pond.
ii) Information sources	New data from the investigation will form the basis of assessment.		New data from the investigation will form the basis of assessment.
iii) Basis of Action Level	Action Levels are: - Ambient water quality criteria (Ohio drainage basin) - USEPA RSL target risk > 10^{-6} for human health - Hazard Index > 1 (non-carcinogens)	The selected Action Level is a Background Threshold Value (e.g., 95th percentile) based on upstream conditions.	Action Levels are: - Ambient water quality criteria (Ohio drainage basin) - USEPA RSL target risk > 10^{-6} - Hazard Index > 1 (non-carcinogens)
iv) Appropriate sampling & analysis methods	Methods are described in the Field Sampling Plan (CRA, January 2011), CRA's Standard Operating Procedures, and the Quality Assurance Project Plan (CRA, September 2008). VOC samples will be collected using a peristaltic pump to minimize sample aeration while allowing for sample preservation. All other parameters will be sampled by directly dipping sample containers in the surface water body (GMR or Quarry Pond).		
4 *Define the Boundaries of the Study:*			
i) Target population, sample units	The target population is all water flowing in the GMR as it flows past the Site. The sampling units are individual grab samples collected from the GMR, divided into upstream and near-Site reaches.		The target population is all water in the Quarry Pond. The sampling units are individual grab samples collected from the Quarry Pond.

TABLE 3.4

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SURFACE WATER INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step:	*Medium:*	*Surface Water*		
	Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 1C*
	Investigation Item:	*Comparison to Ambient Water Quality Criteria*	*Comparison to Upstream Conditions*	*Quarry Pond Surface Water Sampling*
	ii) Specify spatial boundaries	Upstream sampling locations are those occuring to the east of Dryden Road, on the near-Site side of any dams. Near-Site sampling locations are those occuring to the west of Dryden Road (i.e., as surface water flows past the Site), and these will be located on the near (south/east) shore of the GMR.		Spatial boundaries are the boundaries of Quarry Pond surface water.
	iii) Specify temporal boundaries	The temporal boundaries are defined by the duration of monitoring, which will occur over two sampling rounds		The temporal boundaries are defined by the duration of monitoring, which will occur over two sampling rounds.
	iv) Identify any other practical constraints	Sampling may be postponed due to flooding or iced conditions in the GMR. The outfall of the City of Dayton Waste Water Treatment Plant across the river GMR, just south of the downstream limit of the Site, may substantially impact downstream water quality, making any subsequent Site effects difficult to discern. If any dams/weirs are encountered, samples will be collected from the side of the dam closest to the Site (i.e., downstream of any upstream dams, and upstream of any downstream dams). Dilution of contaminants is likely towards the center and far bank of the GMR, and increases with distance downstream of the Site.		Sampling may be postponed due to flooding or iced conditions in the Quarry Pond.
	v.a) Scale of inference for decision making	Comparisons to Action Levels will be carried out on an individual-location basis. For the RA, the 95% UCL of the mean concentration in an exposure unit will be used.	Comparisons to upstream conditions will be carried out on an individual-location basis.	Comparisons to Action Levels will be carried out on an individual-location basis.
	v.b) Scale of estimates	--		
5	***Develop the Analytic Approach:***			
	i.a) Specify Action Level	Ambient Water Quality Criteria	Background Threshold Values based on upstream data, following USEPA's ProUCL Technical Guide (2010)	Ambient Water Quality Criteria
	i.b) Specify estimator	--		
	ii.a) Specify population parameter of interest and theoretical decision rule	Individual observations at near-Site sampling locations.		
	ii.b) Specify estimation procedure	--		
6	***Specify Performance or Acceptance Criteria:***			
	i.a) Set baseline (null) and alternative hypotheses	Baseline H_0: surface water concentrations are less than Action Levels Alternative H_1: surface water concentrations are greater than Action Levels	Baseline H_0: near-Site surface water is no different than upstream Alternative H_1: near-Site surface water contains contaminant concentrations greater than upstream conditions	Baseline H_0: surface water concentrations are less than Action Levels Alternative H_1: surface water contaminant oncentrations are greater than Action Levels

TABLE 3.4

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SURFACE WATER INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step:	*Medium:*	*Surface Water*		
	Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 1C*
	Investigation Item:	*Comparison to Ambient Water Quality Criteria*	*Comparison to Upstream Conditions*	*Quarry Pond Surface Water Sampling*
	i.b) Specify how uncertainty accounted for in estimate	--		
	ii.a) Determine impact of decision errors (false positives/negatives)	N/A: no statistical test is employed (direct comparison to Action Levels)	- If a false positive (Type I) error occurs, unnecessary additional investigation may occur. - If a false negative (Type II) error occurs, conditions that are not due to background conditions and that pose potential risk to aquatic ecosystem and/or human receptors could persist.	N/A: no statistical test is employed (direct comparison to Action Levels)
	ii.b) Specify confidence level for estimate	--		
	iii) Specify "gray region" for test	N/A: no statistical test is employed (direct comparison to Action Levels)	N/A: since comparing to maximum value, no statistical test is employed	N/A: no statistical test is employed (direct comparison to Action Levels)
	iv.a) Set tolerable limits on decision errors	N/A: no statistical test is employed (direct comparison to Action Levels)	The Background Threshold Values will be calculated using a 95 percent confidence level, making the false positive rate no greater than 5 percent. Since individual near-Site samples will be compared against background samples, the false negative rate will be controlled by two sampling events completed over the study period. An assessment of the decision performance curve achieved based on the monitoring data will be undertaken.	N/A: no statistical test is employed (direct comparison to Action Levels)
	iv.b) Specify performance or acceptance criteria	--		
7	*Develop the Plan for Obtaining Data:*			
	i) Select sampling design	Near-Site samples will be collected close to the proximate (south/east) shore of the GMR, at the mid-point of the GMR at the upstream edge of the Site, and on the near-Site side of any dams; and at intervals of 800 ft (12 samples per event). Ten samples will be collected at regular intervals of 400 ft in each of two sampling events (22 samples total).	Upstream samples will be collected at different locations, on the near-Site side of any dams, to provide a suitable data set (8-10 samples, per USEPA's ProUCL Technical Guide, 2010) for the calculation of Background Threshold Values. Near-Site samples will be collected along two three-point transects, upstream of the Site.	Prior to surface water sample collection, visual inspection of the Quarry Pond embankment will be completed to identify any areas of discharge (i.e., rust stains, eddies, sediment, etc.). Five samples will be collected at various points within the Quarry Pond in each of two sampling events (10 samples total).

TABLE 3.4

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SURFACE WATER INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*Surface Water*		
Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 1C*
DQO Investigation Item:	*Comparison to Ambient Water Quality Criteria*	*Comparison to Upstream Conditions*	*Quarry Pond Surface Water Sampling*
Step:			
	Prior to surface water sample collection, a Site boundary visual inspection will be completed to identify any areas of discharge (i.e., rust stains, eddies, sediment, etc.). Surface water sampling will be collected during periods of GMR low-flow and the two sampling rounds will be completed at least three months apart.	Surface water sampling will be collected during periods of GMR low-flow and the two sampling rounds will be completed at least three months apart.	Two sampling rounds will be completed at least three months apart.
ii) Specify/evaluate key assumptions supporting the design	Mixing in the GMR is expected to be reasonably complete over the travel length of the GMR (greater than one mile) adjacent to the Site. Sampling at key locations (upstream edge, mid-Site, upstream of the WWTP, and downstream) will represent the range of ambient conditions in surface water.	The calculation of Background Threshold Values (statistical limits on an upper percentile, e.g. 95th) for the upstream population of surface waters depends on data characteristics (e.g., distribution and proportion of detected values), as fully discussed in the USEPA ProUCL Technical Guide (2010). Additionally, the presence of outlying values will be tested, and if present their impact on the values obtained evaluated.	

Notes:

(1) If investigating a "decision problem", follow items ending in ".a" in subsequent DQO steps (e.g., "ii.a" or "iii.a").
If investigating an "estimation problem", follow ".b" items.

-- Item not applicable for the type of problem (decision vs. estimation) investigated.

The planning team includes: Steve Quigley (CRA Project Director); Adam Loney (CRA project manager);
Wesley Dyck, Daniela Araujo (CRA statistics expert);
April Gowing, Steve Harris, Vincent Nero and Dan Smith (CRA risk assessment experts);
Paul Wiseman, Rawa Fleisher, Angela Bown (CRA chemists/quality assurance staff);
Julian Hayward, Andrew Sousa, Valerie Chan (CRA project engineers); Mark Hilverda (CRA project hydrogeologist);
Leslie Patterson (USEPA Regional Project Manager); Mark Allen (Ohio EPA representative); and property owner stakeholders.

TABLE 3.5

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SEDIMENT INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*GMR Sediment*			*Quarry Pond Sediments*
Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 2*	*Phase 1C*
DQO Step: / *Investigation Item:*	*Comparison to Ecological Screening Values*	*Comparison to Upstream Conditions*	*Benthic Sampling*	*Comparison to Ecological Screening Value*
1 *State the Problem*				
i) Problem description	Previous Great Miami River (GMR) sampling found PAH concentrations and some pesticide concentrations greater than conservative ecological screening levels, and arsenic and PAHs concentrations greater than USEPA residential soil RSLs. However, these common contaminants were also found, in similar concentrations, in upstream samples taken by OEPA (1995) in routine sampling of the GMR. Therefore, further data are needed to 1) assess whether downstream concentrations are greater than upstream concentrations and, if so, whether downstream samples pose potential risks to ecological and human receptors. It is unknown whether the Site has a measurable impact on sediment quality in the GMR.		If contaminant concentrations are greater than sediment benchmarks protective of aquatic life (Phase 1A), significantly greater than upstream concentrations (Phase 1B), and are potentially Site-related, a benthic community survey will be completed in accordance with USEPA Rapid Bioassessment Protocols (EPA 841-B-99-002) or OEPA assessment methods.	Previous on-Site sediment sampling has been limited to the Quarry Pond. This previous Quarry Pond sediment sampling found PAH concentrations greater than conservative ESVs, and aresnic and PAH concentrations greater than USEPA industrial soil RSLs. Further data are needed to assess whether Quarry Pond sediments pose potential risks to ecological and human health risks.
ii) Planning team	See note at bottom			See note at bottom
iii) Conceptual model	- Shallow groundwater from the Site typically flows towards the west and/or north towards the GMR, which could carry contaminants into its sediment. - Erosion of surface soils from the Site could also carry Site-related contaminants to the GMR, which is at a lower elevation, via overland surface flow. - During flood events, off-Site contaminants could be deposited on-Site.			- Shallow and deep groundwater from the Site typically flows towards the west towards the Quarry Pond, which could carry contaminants into its sediment. - Erosion of surface soils from the Site could carry Site-related contaminants to the Quarry Pond, which is at a lower elevation, via overland surface flow. - During flood events, off-Site contaminants could be deposited on-Site.
iv) General intended use for data	The data collected will be compared against Ecological Screening Values (ESVs) to assess whether aquatic ecosystem health is potentially impaired. Additionally, CRA will compare the data to USEPA Residential Soil criteria as a screening evaluation to identify any potential human health risks. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.	The data collected from sampling locations along the Site's boundaries will be compared to upstream conditions, to determine if there are any measurable inputs of contaminants from the Site. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.	The data collected will be used to detect aquatic life impairments and assess their relative severity. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.	The data collected will be compared against ESVs to assess if Quarry Pond aquatic ecosystem health is potentially impaired. Additionally, CRA will compare the data to USEPA Residential Soil criteria to identify any potential human health risks. The data collected will ultimately be used in the Baseline Risk Assessment for OU2. The data will be used to determine if there is a need to cap or otherwise
v) Resources, constraints, deadlines	Sufficient resources will be committed to sample sediments under the OU2 RI/FS work plan.			Sufficient resources will be committed to sample sediments under the OU2 RI/FS work plan.

TABLE 3.5

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SEDIMENT INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

	Medium:	*GMR Sediment*			*Quarry Pond Sediments*
	Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 2*	*Phase 1C*
DQO Step:	*Investigation Item:*	*Comparison to Ecological Screening Values*	*Comparison to Upstream Conditions*	*Benthic Sampling*	*Comparison to Ecological Screening Value*
2	*Goals of the Study:*				
i) Primary study question		Does near-Site sediment contain contaminants at concentrations greater than ESVs and/or Residential soil criteria for protection of human health?	Does the Site add significantly to contaminants in sediments in the GMR adjacent to and down-gradient of the Site?	Are benthic organisms at risk due to sediment concentrations caused by Site-related contamination?	Do sediments in the Quarry Pond contain contaminant concentrations greater than ESVs and/or Industrial soil criteria for protection of human health?
ii) Alternate outcomes or actions		- If sampling demonstrates that contaminants in sediment are less than screening levels/criteria, no further sampling is planned. - If sampling demonstrates that contaminants are present at concentrations greater than screening levels/criteria, and that contaminant concentrations are greater than upstream conditions (see Phase 1B to right), further evaluation and/or remedial measures may be warranted.	- If sampling demonstrates conditions adjacent to the Site are less than those found upstream, no further sampling is planned. - If sampling demonstrates contaminant concentrations are greater than those upstream, and that contaminant concentrations are greater than Action Level criteria (see Phase 1A to left), further evaluation and/or remediation may be warranted. Further evaulation may consist of an ecological study (i.e., benthic community study).	- If the community survey demonstrates that aquatic life in the GMR is not affected by Site-related contaminants, no further sampling is planned. - If the community survey demonstrates that Site-related contaminants impair aquatic life in the GMR, further evaluation and/or remedial measures may be warranted.	- If sampling demonstrates that contaminants in sediment are less than screening levels/criteria, no further sampling is planned. - If sampling demonstrates that contaminants are present at concentrations greater than screening levels/criteria, further evaluation and/or remedial measures may be warranted (i.e., acute bioassays on representative Quarry Pond sediments).
iii) Type of problem (decision or estimation)[1]		Decision (Action Level)	Decision (Action Level)	Decision (Action Level)	Decision (Action Level)
iv.a) Decision statement		Determine whether any contaminant concentrations are greater than ESVs, or if the sum of Equilibrium Partitioning Sediment Benchmark Toxic Units ($\sum ESBTU_{FCV}$) > 1, or if the organic carbon normalized excess Simultaneously Extracted Metal ($\sum SEM$) > 150 $\mu mol/g_{oc}$ in the GMR sediments near the Site, or if the concentrations of arsenic are greater than its Probable Effects Concentration (PEC).	Determine whether any measurable input of contaminants from the Site, relative to upstream conditions, occurs in the GMR sediments near the Site.	Determine whether any measureable impact to aquatic life in the GMR occurs due to contaminants from the Site, relative to upstream conditions	Determine whether any contaminant concentrations are greater than ESVs, USEPA Residential soil criteria, Sum of Equilibrium Partitioning Sediment Benchmark Toxic Units ($\sum ESBTU_{FCV}$) > 1, or organic carbon normalized excess Simultaneously Extracted Metal ($\sum SEM$) > 150 $\mu mol/goc$ in the on-Site pond sediments near the Site.
iv.b) Estimation statement & assumptions		--	--	--	--

TABLE 3.5

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SEDIMENT INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*GMR Sediment*			*Quarry Pond Sediments*
Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 2*	*Phase 1C*
DQO Step: / *Investigation Item:*	*Comparison to Ecological Screening Values*	*Comparison to Upstream Conditions*	*Benthic Sampling*	*Comparison to Ecological Screening Value*
3 *Identify Information Inputs:*				
i) Information types needed	Sediment sample analysis is required to assess conditions in the GMR near the Site.		A Benthic community survey may be required to assess the impact to aquatic life in the GMR near the Site.	Sediment sample analysis is required to assess conditions in the Quarry Pond.
ii) Information sources	- New data from the investigation will form the basis of assessment. The results from three previous sediment samples collected from the GMR and Quarry Pond, as well as results of soil samples will be considered during interpretation of the data obtained. - Sediment samples will be analyzed for PAHs, divalent metals (copper, cadmium, mercury, nickel, lead and zinc) using AVS/SEM analyses, and total metals (including arsenic).		- New data from the community survey will form the basis of assessment. The results from Phase 1A and 1B (see left) will be considered during interpretation of the data obtained.	- New data from the investigation will form the basis of assessment. The results from previous sediment samples collected from the Quarry Pond, as well as results of soil samples will be considered during interpretation of the data obtained. Sediment samples will be analyzed for PAHs, divalent metals (copper, cadmium, mercury, nickel, lead and zinc) using AVS/SEM analyses, and total metals (including arsenic).
iii) Basis of Action Level	Action Levels are: - Final Chronic Values (FCV) for PAHs, $\sum ESBTU_{FCV} < 1$ - Excess SEM < 150 µmol/g_{oc} - PEC values for arsenic	The selected Action Level is a Background Threshold Value (e.g., 95th percentile) based on upstream conditions.	Population and community level response will be evaluated.	Action Levels are: - Final Chronic Values (FCV) for PAHs, $\sum ESBTU_{FCV} < 1$ - Excess SEM < 150 µmol/g_{oc} - PEC values for arsenic
iv) Appropriate sampling & analysis methods	Methods are described in the Field Sampling Plan (CRA, January 20110, CRA's Standard Operating Procedures, and the Quality Assurance Project Plan (CRA, September 2008). Organic carbon in sediments will be analyzed using the Lloyd Kahn or Walkley-Black methods. PAH results will be evaluated against $\sum ESBTU_{FCV}$, as detailed in USEPA, 2003. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures. EPA-600-R-02-013. Divalent metals results will be evaluated against the organic carbon normalized excess $\sum SEM$.		A benthic community survey will be completed in accordance with USEPA Rapid Bioassessment Protocols (EPA 841-B-99-002) or OEPA assessment methods (OEPA, 1989. Biological criteria for the protection of aquatic life), depending on the habitat.	Methods are described in the Field Sampling Plan, CRA's Standard Operating Procedures, and the Quality Assurance Project Plan. Organic carbon in sediments will be analyzed using the Lloyd Kahn or Walkley-Black methods. PAH results will be evaluated against $\sum ESBTU_{FCV}$, as detailed in USEPA, 2003. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures. EPA-600-R-02-013. Metals results will be evaluated against the organic carbon normalized excess $\sum SEM$.

TABLE 3.5

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SEDIMENT INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step:	*Medium:*	*GMR Sediment*			*Quarry Pond Sediments*
	Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 2*	*Phase 1C*
	Investigation Item:	*Comparison to Ecological Screening Values*	*Comparison to Upstream Conditions*	*Benthic Sampling*	*Comparison to Ecological Screening Value*
4	***Define the Boundaries of the Study:***				
	i) Target population, sample units	The target population is the upper (available) layer of sediments (2 - 4 inches below sediment/water interface) in the GMR adjacent to the Site. The sampling units are individual grab samples collected from the near-Site reaches of the GMR. Depositional areas will be targeted for sediment sample locations. Sediment samples will also be collected in depositional locations immediately downstream of any point discharges identified between the upstream dam and the southern Site boundary.	The target population is the upper (available) layer of sediments (2 - 4 inches below sediment/water interface) in the upstream sampling locations. The sampling units are individual grab samples collected from the upstream reaches of the GMR. Depositional areas will be targeted for sediment sample locations. Sediment samples will be collected in depositional locations immediately downstream of any point discharges identified between the upstream dam and east of the Dryden Road bridge.	The target population is the aquatic life in the GMR in the vicinity of the Site. The sampling units are composite samples collected from the GMR, divided by upstream, near-Site, and downstream reaches. Sampling efforts may be concentrated in near-shore habitats, where most species will be collected.	The target population is the upper (available) layer of sediments (2 - 4 inches below sediment/water interface) in the Quarry Pond. The sampling units are individual grab samples collected from the Quarry Pond. Depositional areas and areas where visual evidence of potential leachate migration is observed will be targeted for sediment sample locations.
	ii) Specify spatial boundaries	Near-Site sampling locations are those occuring to the west of the Dryden Road bridge (i.e., as surface water passes the Site), and these will be located on the near (south and east) shore of the GMR. Sediment samples will be collected from the top of the sediment layer (i.e., 2 - 4 inches below the sediment/water interface) in the GMR.	Upstream sampling locations are to the east of the Dryden Road bridge. Sediment samples will be collected from the top of the sediment layer (i.e., 2 - 4 inches below the sediment/water interface) in the GMR.	Upstream sampling locations are to the east of the Dryden Road bridge. Near-Site sampling locations are those occuring to the west of the Dryden Road bridge (i.e., as surface water passes the Site), and these will be located on the near (south and east) shore of the GMR. Downstream sampling locations are to the south of the City of Dayton Wastewater Treatment Plant.	Sediment samples will be collected from the top of the sediment layer (i.e., 2 - 4 inches below the sediment/water interface) in the Quarry Pond.
	iii) Specify temporal boundaries	The temporal boundaries are indefinite, assuming continued exposure at levels found during sampling. The practical temporal limits are based on exposure assumptions forming the basis for the Action Levels.			The temporal boundaries are indefinite, assuming continued exposure at levels found during sampling. The practical temporal limits are based on exposure assumptions forming the basis the Action Levels.
	iv) Identify any other practical constraints	Sampling may be postponed due to flooding or iced conditions in the GMR. If any dams/weirs are encountered, samples will be collected from the side of the dam closest to the Site (i.e., downstream of any upstream dams, and upstream of any downstream dams).			Sampling may be postponed due to flooding or iced conditions of the Quarry Pond.
	v.a) Scale of inference for decision making	Comparisons to Action Levels will be carried out on an individual-location basis.	Comparisons to upstream conditions will be carried out on an individual-location basis.	Criteria in biological indices will be used to evaluate the impacts on aquatic life.	Comparisons to Action Levels will be carried out on an individual-location basis.
	v.b) Scale of estimates	--	--	--	--

TABLE 3.5

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SEDIMENT INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step:	*Medium:*	*GMR Sediment*			*Quarry Pond Sediments*
	Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 2*	*Phase 1C*
	Investigation Item:	*Comparison to Ecological Screening Values*	*Comparison to Upstream Conditions*	*Benthic Sampling*	*Comparison to Ecological Screening Value*
5	*Develop the Analytic Approach:*				
	i.a) Specify Action Level	1) FCV for PAHs, $\sum ESBTU_{FCV} < 1$ 2) Excess SEM < 150 µmol/g_{oc} 3) PEC for arsenic	Background Threshold Values based on upstream data, following USEPA's ProUCL Technical Guide (2010)	Critiera in biological indices, consisting of the Index of Well-Being (Gammon 1976; Gammon *et al. 1981)*, the Index of Biotic Integrity (Karr 1981; Fausch *et al.* 1984), and the Invertebrate Community Index (DeShon *et al.* unpublished)	1) PEC values for arsenic metals 2) FCV for PAHs, $\sum ESBTU_{FCV} < 1$ 3) USEPA Industrial Soil criteria 4) Excess SEM < 150 µmol/$gram_{oc}$
	i.b) Specify estimator	--	--	--	--
	ii.a) Specify population parameter of interest and theoretical decision rule	Individual observations at near-Site sampling locations.		Cumulative observations at near-Site sampling locations.	Individual observations at near-Site sampling locations.
	ii.b) Specify estimation procedure	--	--	--	--
6	*Specify Performance or Acceptance Criteria:*				
	i.a) Set baseline (null) and alternative hypotheses	Baseline H_0: sediment concentrations are less than Action Levels Alternative H_1: sediment contaminant concentrations are greater than Action Levels	Baseline H_0: Concentrations of Site-related chemicals in near-Site sediments are no different than upstream Alternative H_1: Concentrations of Site-related chemicals in near-Site sediments contain contaminants at concentrations greater than upstream conditions	Baseline H_0: aquatic ecosystem in near-Site reaches are no different than upstream Alternative H_1: aquatic ecosystem in near-Site reaches is impaired in comparison to upstream conditions.	Baseline H_0: sediment concentrations are less than Action Levels Alternative H_1: sediment contaminant concentrations are greater than Action Levels
	i.b) Specify how uncertainty accounted for in estimate	--	--	--	--
	ii.a) Determine impact of decision errors (false positives/negatives)	N/A: no statistical test is employed (direct comparison to Action Levels)	- If a false positive (Type I) error occurs, unnecessary additional investigation may occur. - If a false negative (Type II) error occurs, conditions that are not due to background concentrations and pose potential risk to aquatic ecosystem and/or human receptors could persist.	- If a false positive (Type I) error occurs, unnecessary additional investigation may occur. - If a false negative (Type II) error occurs, conditions posing potential risk to the aquatic ecosystem could persist.	N/A: no statistical test is employed (direct comparison to Action Levels)
	ii.b) Specify confidence level for estimate	--	--	--	--

TABLE 3.5

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SEDIMENT INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*GMR Sediment*			*Quarry Pond Sediments*
Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 2*	*Phase 1C*
DQO Step: / *Investigation Item:*	*Comparison to Ecological Screening Values*	*Comparison to Upstream Conditions*	*Benthic Sampling*	*Comparison to Ecological Screening Value*
iii) Specify "gray region" for test	N/A: no statistical test is employed (direct comparison to Action Levels)	For comparisons to upgradient conditions, the gray region will be set equal to a difference in means (on-Site and upgradient) of one standard deviation of the upgradient data.	--	N/A: no statistical test is employed (direct comparison to Action Levels)
iv.a) Set tolerable limits on decision errors	N/A: no statistical test is employed (direct comparison to Action Levels)	The Background Threshold Values will be calculated using a 95 percent confidence level, making the false positive rate no greater than 5 percent. Limits on the false negative rate are not appropriate for comparisons of individual results to threshold values.	--	N/A: no statistical test is employed (direct comparison to Action Levels)
iv.b) Specify performance or acceptance criteria	Total sediment concentrations will be used in the comparison to Action Levels, rather than subtracting background concentrations, for evaluation in the Ecological Risk Assessment.		--	Total sediment concentrations will be used in the comparison to Action Levels, rather than subtracting background concentrations, for evaluation in the Ecological Risk Assessment.
7 *Develop the Plan for Obtaining Data:*				
i) Select sampling design	Near-Site samples will be collected close to the proximate (south/east) shore of the river at (i) the upstream edge of the Site, including both a near-shore and far-shore sample; (ii) mid-Site, downgradient of monitoring wells containing highest VOC concentrations on the side of the Site nearest the river; (iii) further downstream in the mid-Site region, halfway between (ii) and (iv); (iv) downstream of the main Site, upstream of the City's WWTP outlet; and (v) downstream of the entire Site.	Upstream samples will be collected at 9 locations to provide a suitable data set (per USEPA's ProUCL Technical Guide, 2010) for the calculation of Background Threshold Values. Upstream samples will be collected along 3 transects of 3 samples each, regularly spaced downstream of the upstream dam, and upstream low-head of the Site. Near-Site samples will be collected as described in Phase 1A (see left).	Near-Site samples will be collected close to the proximate (south/east) shore of the river at (i) the upstream edge of the Site, including both a near-shore and far-shore sample; (ii) mid-Site, downgradient of monitoring wells containing highest VOC concentrations on the side of the Site nearest the river; (iii) further downstream in the mid-Site region, halfway between (ii) and (iv); (iv) downstream of the main Site, upstream of the City's WWTP outlet; and (v) downstream of the entire Site.	Up to 9 samples will be collected from the Quarry Pond, along 3 transects of 3 samples each. Samples will be biased towards locations with fine-grained sediments with higher organic carbon (based on visual observation). Proposed sample locations will be adjusted in the field to ensure that the samples are collected from sediments most representative of potential worst-case issues.

TABLE 3.5

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- SEDIMENT INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

Medium:	*GMR Sediment*			*Quarry Pond Sediments*
Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 2*	*Phase 1C*
DQO Step: / *Investigation Item:*	*Comparison to Ecological Screening Values*	*Comparison to Upstream Conditions*	*Benthic Sampling*	*Comparison to Ecological Screening Value*
	Samples will be biased towards locations with fine-grained sediments with higher organic carbon (based on visual observation). Proposed sample locations will be adjusted in the field to ensure that the samples are collected from sediments most representative of potential worst-case issues.		The sampling effort may be concentrated in near-shore habitats where most species will be collected and will be biased toward areas where the greatest sediment impacts were identified during the Phase 1A and 1B investigations.	
ii) Specify/evaluate key assumptions supporting the design	The mechanisms of contaminant transport from the Site to river sediments, i.e., via groundwater migration and seepage or via erosion and runoff, would result in greatest impacts (if any) near-shore and potentially, due to groundwater seepage, midstream. Sampling locations have been selected reflecting this, and covering different potential directions of transport and deposition, covering the full range of possibilities from the Site.	The calculation Background Threshold Values (statistical limits on an upper percentile, e.g. 95th) for the upstream population of sediments depends on data characteristics (e.g., distribution and proportion of detected values), as fully discussed in the USEPA ProUCL Technical Guide (2010). Additionally, the presence of outlying values will be tested, and if present their impact on the values obtained evaluated.	The mechanisms of contaminant transport from the Site to river sediments, i.e., via groundwater migration and seepage or via erosion and runoff, would result in greatest impacts (if any) near-shore. Sampling locations have been selected reflecting this, and covering different potential directions of transport and deposition, covering the full range of possibilities from the Site.	The mechanisms of contaminant transport from the Site to pond sediments, i.e., via groundwater migration and seepage or via erosion and runoff, would result in greatest impacts (if any) near-shore. Sampling locations have been selected reflecting this, and covering different potential directions of transport and deposition, covering the full range of possibilities from the Site.

Notes:

(1) If investigating a "decision problem", follow items ending in ".a" in subsequent DQO steps (e.g., "ii.a" or "iii.a").
If investigating an "estimation problem", follow ".b" items.

-- Item not applicable for the type of problem (decision vs. estimation) investigated.

The planning team includes: Steve Quigley (CRA Project Director); Adam Loney (CRA project manager);
Wesley Dyck, Daniela Araujo (CRA statistics expert);
April Gowing, Steve Harris, Vincent Nero and Dan Smith (CRA risk assessment experts);
Paul Wiseman, Rawa Fleisher, Angela Bown (CRA chemists/quality assurance staff);
Julian Hayward, Andrew Sousa, Valerie Chan (CRA project engineers); Mark Hilverda (CRA project hydrogeologist);
Leslie Patterson (USEPA Regional Project Manager); Mark Allen (Ohio EPA representative); and property owner stakeholders.

TABLE 3.6

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- FLOODPLAIN SOIL INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step	*Medium:*	*Floodplain Soil*		
	Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 2*
	Investigation Item:	*Comparison to Site-Specific Risk Values*	*Comparison to Background Reference Conditions*	*Additional sampling (if necessary) to develop risk assessment exposure estimates*
1	***State the Problem***			
	i) Problem description	Potential risk to industrial workers from exposure to on-Site soils has been identified in a human health risk assessment. It is not known if potential soil contamination in off-Site locations (a) poses risks to human receptors due to recreational use, and (b) is a result of migration from the Site. Analysis of off-Site soil samples is required to make these assessments. It is also unknown whether off-Site soils pose ecological risks either in-situ or if soils are eroded and enter the Great Miami River (GMR).		If, during Phase 1, floodplain soil containing contaminants at concentrations greater than screening values and background reference conditions is identified, characterization of conditions within the exposure unit is required for risk assessment purposes.
	ii) Planning team	See note at bottom		
	iii) Conceptual model	- Cover material at the Site is limited or non-existent, which could lead to erosional run-off of contaminants towards the floodplain of the GMR. - In addition, movement of contaminants in dust particles carried by wind may result in deposition of contaminants off-Site. - Soil contaminants are assumed to have been deposited by erosion and mixed by subsequent flooding events.		
	iv) General intended use for data	The data collected will be screened against health-based risk values. The goal of the investigation is to identify risks associated with surficial soil in the floodplain. The goal is not to identify individual areas of contamination.	The data collected from sampling locations along the Site's boundaries will be comparedto upstream floodplain soil conditions, to determine if there are any measurable inputs of contaminants from the Site. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.	The collected data will be used to generate human health exposure estimates for a risk assessment. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.
	v) Resources, constraints, deadlines	Sufficient resources will be committed to sample off-Site soil under the OU2 RI / FS work plan. Sampling may be postponed due to flooding, and could be constrained due to access agreements in off-Site areas.		
2	***Goals of the Study:***			
	i) Primary study question	Do off-Site floodplain soils contain contaminants at concentrations that pose a potential risk to receptors, based on the use of screening criteria, i.e., residential soil criteria, and / or Site-specific risk-based values?	Does the Site add contaminants to soil off-Site in the floodplain of the GMR near the Site?	Do off-Site soils contain contaminants originating from the Site that may pose unacceptable health risks?

TABLE 3.6

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- FLOODPLAIN SOIL INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step	*Medium:* / *Investigation Phase:* / *Investigation Item:*	*Floodplain Soil*		
		Phase 1A ***Comparison to Site-Specific Risk Values***	***Phase 1B*** ***Comparison to Background Reference Conditions***	***Phase 2*** ***Additional sampling (if necessary) to develop risk assessment exposure estimates***
	ii) Alternate outcomes or actions	- If sampling demonstrates that any contaminants in soil are less than risk-based screening levels / criteria, no further sampling is planned. - If sampling demonstrates that contaminant concentrations are greater than screening levels / criteria, and greater than background reference conditions (see Phase 1B to right), further evaluation and / or remedial measures may be warranted.	- If sampling demonstrates conditions adjacent to the Site are not greater than those found in background reference soils, no further sampling is planned. - If sampling demonstrates conditions are greater than background, and that contaminant concentrations are greater than Action Level criteria (see Phase 1A to left), further evaluation and / or remediation may be warranted.	- If sampling demonstrates that health risks are acceptable, no further action is required. - If sampling demonstrates unacceptable risks, further evaluation, risk management and / or remediation would be required.
	iii) Type of problem (decision or estimation)[1]	Decision (Action Level)	Decision (Action Level)	Estimation
	iv.a) Decision statement	Determine whether any contaminant concentrations are greater than USEPA residential soil regional screening levels (RSLs) or site-specific risk values in off-Site floodplain soil near the Site.	Determine whether any measurable input of contaminants from the Site, relative to background reference conditions, occurs in off-Site floodplain soil near the Site.	--
	iv.b) Estimation statement & assumptions	--	--	The parameter of interest is the mean (for estimating inhalation, dermal exposure, and ingestion risks, etc.) of soil contaminant concentrations within an identified off-Site exposure area.
3	***Identify Information Inputs:***			
	i) Information types needed	- Soil sample analysis is required to assess conditions in the floodplain of the GMR near the Site. - Soil samples will be collected at locations adjacent to (i.e., downgradient of) known on-Site issues, and also biased toward erosional areas.		- This would be a supplemental data collection effort, with analyses performed on soil samples obtained to fill in any data gaps across the exposure area.
	ii) Information sources	- New data from the investigation will form the basis of assessment. The results from three previous sediment samples collected from the GMR will be considered during interpretation of the data obtained.		- New data from the investigation will form the basis of assessment. Any available previous data (e.g., from Phase 1), within the exposure area would also be used.
	iii) Basis of Action Level	Action Levels are: - USEPA Residential soil RSLs	The selected Action Level is a Background Threshold Value (e.g., 95th percentile) based on background reference conditions.	--
	iv) Appropriate sampling & analysis methods	Methods are described in the Field Sampling Plan (CRA, January 2011) and the Quality Assurance Project Plan (CRA, September 2008).		

TABLE 3.6

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- FLOODPLAIN SOIL INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step	*Medium:*	*Floodplain Soil*		
	Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 2*
	Investigation Item:	*Comparison to Site-Specific Risk Values*	*Comparison to Background Reference Conditions*	*Additional sampling (if necessary) to develop risk assessment exposure estimates*
4	***Define the Boundaries of the Study:***			
	i) Target population, sample units	The target population is surficial soil on the floodplain of the GMR near the Site. CRA has defined the exposure unit of the floodplain to be the bike path / recreational trail. The sampling units are individual samples collected from surface soil located between the Site embankment and the bike path.	The sampling units are individual samples collected from surface soil from background reference sampling locations. Background reference sampling locations will be identified in areas outside a reasonable zone of potential influence (via surface runoff or substantial airborne dust deposition) for the Site.	Target population is surficial floodplain soils comprising the exposure unit for assessment of exposure risks for human receptors.
	ii) Specify spatial boundaries	The spatial boundaries of the floodplain soil sampling locations are the floodplain soil of the GMR, located between the Site embankment and the bike path / recreational trail.	Distance from the Site and prevailing wind directions will be considered in making this determination.	The spatial boundaries are the limits of the surficial soils in the identified off-Site exposure area (based on Phase 1 findings).
	iii) Specify temporal boundaries	The temporal boundaries are indefinite, assuming continued exposure at levels found during sampling. The practical temporal limits are based on exposure assumptions of the Action Levels.		
	iv) Identify any other practical constraints	Due to the presence of a high pressure gas line in the floodplain, soil samples will be hand-dug. If different surficial soil subtrates are encountered (e.g., silt vs. sand vs. clay), these differences may require additional sampling (e.g., further reference samples) to appropriately evaluate potential Site-related impacts. Off-Site sampling may be restricted by permission of property owners, e.g. for background locations.		Further practical constraints are not anticipated for sampling of floodplain soils near to the Site.
	v.a) Scale of inference for decision making	Comparisons to Action Levels will be carried out on an individual-location basis.	Comparisons to background reference conditions will be carried out on an individual-location basis.	--
	v.b) Scale of estimates	--	--	The scale of the exposure estimate is to be identified in a Site-specific risk
5	***Develop the Analytic Approach:***			
	i.a) Specify Action Level	1) USEPA Residential Soil RSLs	Background Threshold Values based on background reference data, following USEPA's ProUCL Technical Guide (2010)	--

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SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- FLOODPLAIN SOIL INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step	*Medium:* / *Investigation Phase:* / *Investigation Item:*	*Floodplain Soil*		
		Phase 1A *Comparison to Site-Specific Risk Values*	*Phase 1B* *Comparison to Background Reference Conditions*	*Phase 2* *Additional sampling (if necessary) to develop risk assessment exposure estimates*
	i.b) Specify estimator	--	--	The arithmetic mean (per USEPA RAGS requirements) surface soil concentration of each contaminant that is greater than screening criteria.
	ii.a) Specify population parameter of interest and theoretical decision rule	Individual observations at near-Site sampling locations.		--
	ii.b) Specify estimation procedure	--	--	The study will estimate the mean concentration of the exposure unit population represented by the soil samples obtained.
6	***Specify Performance or Acceptance Criteria:***			
	i.a) Set baseline (null) and alternative hypotheses	Baseline H_0: soil sample concentrations are less than Action Levels Alternative H_1: soil samples contaminated at concentrations greater than Action Levels	Baseline H_0: near-Site floodplain soil sample concentrations are no different than reference Alternative H_1: near-Site floodplain soil samples contain contaminants at concentrations greater than reference conditions	--
	i.b) Specify how uncertainty accounted for in estimate	--	--	Uncertainty will be accounted for using a confidence interval on the population mean (per USEPA RAGS guidance).
	ii.a) Determine impact of decision errors (false positives/negatives)	N / A: no statistical test is employed (direct comparison to Action Levels)	- If a false positive (Type I) error occurs, unnecessary additional investigation (Phase 2) may occur. - If a false negative (Type II) error occurs, conditions that are not due to background concentrations of contaminants and that pose potential health risks to receptors persist.	--
	ii.b) Specify confidence level for estimate	--	--	The confidence level of the estimate will be 95 percent, unless specified otherwise (based on data distribution and / or the presence of non-detect results) in USEPA's ProUCL Technical Guide (2010).

TABLE 3.6

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SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step	*Medium:*	*Floodplain Soil*		
	Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 2*
	Investigation Item:	*Comparison to Site-Specific Risk Values*	*Comparison to Background Reference Conditions*	*Additional sampling (if necessary) to develop risk assessment exposure estimates*
	iii) Specify "gray region" for test	N / A: no statistical test is employed (direct comparison to Action Levels)	N / A: since comparing individual concentrations against reference conditions, no statistical test is employed	--
	iv.a) Set tolerable limits on decision errors	N / A: no statistical test is employed (direct comparison to Action Levels)	The Background Threshold Values will be calculated using a 95 percent confidence level, making the false positive rate no greater than 5 percent. Limits on the false negative rate are not appropriate for comparisons of individual results to threshold values.	--
	iv.b) Specify performance or acceptance criteria	--	--	The lesser value of the 95 percent UCL on the population mean or the maximum individual measurement will be used for comparison to risk-based criteria.
7	***Develop the Plan for Obtaining Data:***			
	i) Select sampling design	Near-Site surficial soil samples will be collected on the floodplain. These include (i) the upgradient edge of the Site; (ii) mid-Site, downgradient of monitoring wells containing highest VOC concentrations on the side of the Site nearest the river; (iii) further downgradient, halfway between (ii) and (iv); and (iv) at the furthest downgradient boundary of the Site.	Background reference samples will be collected at 10 locations to provide a suitable data set (per USEPA's ProUCL Technical Guide, 2010) for the calculation of Background Threshold Values. Near-Site samples will be collected as described in Phase 1A (see left).	A minimum of 10 samples, per USEPA's ProUCL Technical Guide (2010), spaced on a regular grid with random origin (i.e., a systematic random sampling design), will be obtained for each exposure area identified in the risk assessment.
		Approximately 15 surficial soil samples will be collected from the near-Site portion of the floodplain around the recreational trail.		Samples collected during Phase 1 will be included within the 10 sample data set.

TABLE 3.6

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS -- FLOODPLAIN SOIL INVESTIGATION
OU2 REMEDIAL INVESTIGATION SCOPING DOCUMENT
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step	*Medium:* / *Investigation Phase:* / *Investigation Item:*	*Floodplain Soil*		
		Phase 1A ***Comparison to Site-Specific Risk Values***	***Phase 1B*** ***Comparison to Background Reference Conditions***	***Phase 2*** ***Additional sampling (if necessary) to develop risk assessment exposure estimates***
	ii) Specify/evaluate key assumptions supporting the design	Contaminant transport from the Site to floodplain soils via erosion / runoff is expected to result in greatest impacts (if any) closest to the Site at the base of the embankment. Sampling locations have been selected reflecting this (i.e., including locations biased towards areas with highest contamination potential), and cover all different potential directions of transport / deposition from the Site.	The calculation Background Threshold Values (statistical limits on an upper percentile, e.g. 95th) for the reference population of surficial soils depends on data characteristics (e.g., distribution and proportion of detected values), as fully discussed in the USEPA ProUCL Technical Guide (2010). Additionally, the presence of outlying values will be tested, and if present their impact on the values obtained evaluated.	The calculation of 95 percent upper confidence limits on a population mean makes assumptions of data characteristics (e.g., distribution and proportion of detected values), as fully discussed in the USEPA ProUCL Technical Guide (2010). Additionally, the presence of outlying values will be tested, and if present their impact on the values obtained evaluated.

Notes:

(1) If investigating a "decision problem", follow items ending in ".a" in subsequent DQO steps (e.g., "ii.a" or "iii.a").
If investigating an "estimation problem", follow ".b" items.
Once the baseline risk assessment for OU2 has been performed, possible remedial goals (PRGs) will be derived from the calculator using site-specific risks.

-- Item not applicable for the type of problem (decision vs. estimation) investigated.

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Wesley Dyck, Daniela Araujo (CRA statistics expert);
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