

## **TABLES**

**Table 1. Constituents Detected in Groundwater and Surface Water  
Marion County Landfill Site, Marion County, West Virginia**

Contaminant	Sampling Location	Number of Samples <sup>1</sup>	Number of Detections	Range of Concentrations Measured at levels Greater Than the CCV (ppb)	Maximum Detected Concentration (ppb)	Environmental Guideline Comparison Value (CV) (ppb)	Type of CV	Number of Detections Greater Than CV
Boron	Upstream	10	2	192 - 260	260	100	I-EMEG <sub>child</sub>	2
Cadmium	Upstream	10	6	2.9 - 6.3	6.3	2	C-EMEG <sub>child</sub>	2
Lead	Upstream	10	7	28 - 28	28	15	EPA Action Level	1
Manganese	Upstream	10	9	600 - 3600	3600	500	RMEG <sub>child</sub>	5
Manganese	Upstream Sampling Pt. 2	3	1	510 - 510	510	500	RMEG <sub>child</sub>	1
Cadmium	Upstream Sampling Pt. 3	16	3	10 - 12	12	2	C-EMEG <sub>child</sub>	3
Manganese	Pond C-1 Influent	6	5	700 - 12000	12000	500	RMEG <sub>child</sub>	3
Arsenic	Pond C-1 Influent	6	3	5 - 8	8	0.02	CREG	3
Lead	Pond C-1 Influent	6	4	29 - 43	43	15	EPA Action Level	2
Iron	Pond C-1 Influent	6	5	3390 - 31600	31600	300	SMCL	5
Boron	Well 5	2	1	361 - 361	361	100	I-EMEG <sub>child</sub>	1
Lead	Well 5	2	1	25 - 25	25	15	EPA Action Level	1
Manganese	Well 5	2	1	11200 - 11200	11200	500	RMEG <sub>child</sub>	1
Chloromethane	Well 5	2	1	4.8 - 4.8	4.8	3	LTHA	1
Arsenic	Well 4	1	1	42 - 42	42	0.02	CREG	1
Boron	Well 4	1	1	300 - 300	300	100	I-EMEG <sub>child</sub>	1
Lead	Well 4	1	1	22 - 22	22	15	EPA Action Level	1
Manganese	Well 4	1	1	1050 - 1050	1050	500	RMEG <sub>child</sub>	1
Chloromethane	Well 4	1	1	3.2 - 3.2	3.2	3	LTHA	1
Boron	Well 3	1	1	189 - 189	189	100	I-EMEG <sub>child</sub>	1
Manganese	Well 3	1	1	824 - 824	824	500	RMEG <sub>child</sub>	1
Chloromethane	Well 3	1	1	4.3 - 4.3	4.3	3	LTHA	1
Boron	Well 2	2	1	117 - 117	117	100	I-EMEG <sub>child</sub>	1
Manganese	Well 2	2	1	10900 - 10900	10900	500	RMEG <sub>child</sub>	1

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Boron	Pond E	19	4	130 - 550	550	100	I-EMEG <sub>child</sub>	3
Cadmium	Pond E	19	14	2.7 - 56	56	2	C-EMEG <sub>child</sub>	9
Iron	Pond E	19	17	450 - 4100	4100	300	SMCL	3
Lead	Pond E	19	14	21 - 25	25	15	EPA Action Level	2
Manganese	Pond E	19	15	748 - 4700	4700	500	RMEG <sub>child</sub>	11
Nickel	Pond E	19	8	454 - 454	454	200	RMEG <sub>child</sub>	1
Iron	Leachate Drain	1	1	34200 - 34200	34200	300	SMCL	1
Lead	Leachate Drain	1	1	91 - 91	91	15	EPA Action Level	1
Manganese	Leachate Drain	1	1	19300 - 19300	19300	500	RMEG <sub>child</sub>	1
Nickel	Leachate Drain	1	1	1190 - 1190	1190	200	RMEG <sub>child</sub>	1
Zinc	Leachate Drain	1	1	5600 - 5600	5600	2000	LTHA	1
Benzene	Leachate Drain	1	1	9 - 9	9	0.6	CREG	1
Chlordane	Leachate Drain	1	1	25 - 25	25	0.1	CREG	1
Chloroethane	Leachate Drain	1	1	17 - 17	17	4.6	EPA Reg 9	1
Chloromethane	Leachate Drain	1	1	10 - 10	10	3	LTHA	1
Ethylbenzene	Leachate Drain	1	1	48 - 48	48	5	LTHA, MCL	1
Toluene	Leachate Drain	1	1	310 - 310	310	200	I-EMEG <sub>child</sub>	1
Trichloroethylene	Leachate Drain	1	1	6 - 6	6	0.09	CREG	1
Cadmium	Pond A	15	8	2.5 - 100	100	2	C-EMEG <sub>child</sub>	3
Iron	Pond A	15	13	360 - 4580	4580	300	SMCL	8
Lead	Pond A	15	10	23 - 30	30	15	EPA Action Level	3
Manganese	Pond A	15	13	600 - 7750	7750	500	RMEG <sub>child</sub>	6
Bis(2-ethylhexyl)phthalate	Pond A	15	1	19 - 19	19	3	CREG	1
Boron	Pond B	12	3	190 - 290	290	100	I-EMEG <sub>child</sub>	2
Cadmium	Pond B	12	6	1 - 4.2	4.2	2	C-EMEG <sub>child</sub>	2
Iron	Pond B	12	10	350 - 600	600	300	SMCL	5
Lead	Pond B	12	7	16 - 20	20	15	EPA Action Level	2
Manganese	Pond B	12	10	80 - 2200	2200	500	RMEG <sub>child</sub>	6

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Boron	Pond H	10	3	160 - 17800	17800	100	I-EMEG <sub>child</sub>	3
Cadmium	Pond H	10	5	2.5 - 10	10	2	C-EMEG <sub>child</sub>	3
Iron	Pond H	10	8	70 - 1100	1100	300	SMCL	4
Lead	Pond H	10	4	16 - 19	19	15	EPA Action Level	4
Manganese	Pond H	10	8	1100 - 11200	11200	500	RMEG <sub>child</sub>	7
Nickel	Pond H	10	3	219 - 254	254	200	RMEG <sub>child</sub>	2
Arsenic	AMD Seep	22	2	0.85 - 5	5	0.02	CREG	2
Boron	AMD Seep	22	11	130 - 550	550	100	I-EMEG <sub>child</sub>	9
Cadmium	AMD Seep	22	18	2.7 - 70	70	2	C-EMEG <sub>child</sub>	10
Chromium	AMD Seep	22	18	183 - 183	183	100	LTHA	1
Iron	AMD Seep	22	22	400 - 101000	101000	300	SMCL	22
Lead	AMD Seep	22	19	16 - 47	47	15	EPA Action Level	10
Manganese	AMD Seep	22	21	2000 - 17000	17000	500	RMEG <sub>child</sub>	21
Nickel	AMD Seep	22	16	260 - 1460	1460	200	RMEG <sub>child</sub>	7
Cadmium	Downstream Pt. 1	16	3	7000 - 21000	21000	2	C-EMEG <sub>child</sub>	3
Lead	Downstream Pt. 1	16	6	2000 - 10000	10000	15	EPA Action Level	2
Manganese	Downstream Pt. 1	16	8	700 - 850	850	500	RMEG <sub>child</sub>	2
Cyanide	Water Well	7	1	3000 - 3000	3000	200	RMEG <sub>child</sub>	1
Iron	Water Well	7	7	800 - 4500	4500	300	SMCL	2
Boron	Downstream	25	9	128 - 458	458	100	I-EMEG <sub>child</sub>	7
Cadmium	Downstream	25	18	2.3 - 21	21	2	C-EMEG <sub>child</sub>	9
Nickel	Downstream	25	16	347 - 347	347	200	RMEG <sub>child</sub>	1
Arsenic	MW 1	19	9	4 - 60	60	0.02	CREG	7
Barium	MW 1	19	11	827 - 827	827	700	RMEG <sub>child</sub>	1
Cadmium	MW 1	19	13	3 - 46	46	2	C-EMEG <sub>child</sub>	7
Chromium	MW 1	19	13	232 - 298	298	100	LTHA	2
Iron	MW 1	19	16	384 - 8580	8580	300	SMCL	15
Lead	MW 1	19	15	16 - 284	284	15	EPA Action Level	10
Manganese	MW 1	19	14	970 - 2600	2600	500	RMEG <sub>child</sub>	6
Molybdenum	MW 1	19	9	100 - 50004.7	50004.7	50	RMEG <sub>child</sub>	4
Nickel	MW 1	19	14	204 - 428	428	200	RMEG <sub>child</sub>	2
Vanadium	MW 1	19	9	6 - 125	125	30	I-EMEG <sub>child</sub>	4

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Arsenic	Well 1 (Redrilled)	31	7	1.7 - 90	90	0.02	CREG	7
Barium	Well 1 (Redrilled)	31	1	960 - 960	960	700	RMEG <sub>child</sub>	1
Boron	Well 1 (Redrilled)	31	7	140 - 410	410	100	I-EMEG <sub>child</sub>	7
Cadmium	Well 1 (Redrilled)	31	19	2.8 - 33	33	2	C-EMEG <sub>child</sub>	15
Chromium	Well 1 (Redrilled)	31	17	160 - 298	298	100	LTHA	4
Cyanide	Well 1 (Redrilled)	31	2	2000 - 2000	2000	200	MCL, RMEG	1
Lead	Well 1 (Redrilled)	31	22	16 - 284	284	15	EPA Action Level	18
Manganese	Well 1 (Redrilled)	31	24	800 - 3200	3200	500	RMEG <sub>child</sub>	14
Nickel	Well 1 (Redrilled)	31	16	204 - 428	428	200	RMEG <sub>child</sub>	3
Vanadium	Well 1 (Redrilled)	31	2	270 - 270	270	30	I-EMEG <sub>child</sub>	1
Iron	Leachate Pond	8	8	390 - 1300	1300	300	SMCL	7
Lead	Leachate Pond	8	6	19 - 36	36	15	EPA Action Level	2
Manganese	Leachate Pond	8	6	1000 - 4500	4500	500	RMEG <sub>child</sub>	2
Arsenic	Pond D	15	2	5 - 9	9	0.02	CREG	2
Boron	Pond D	15	8	130 - 1610	1610	100	I-EMEG <sub>child</sub>	8
Cadmium	Pond D	15	8	2.2 - 22	22	2	C-EMEG <sub>child</sub>	4
Chromium	Pond D	15	8	11 - 130	130	100	LTHA	5
Iron	Pond D	15	13	470 - 14800	14800	300	SMCL	11
Lead	Pond D	15	11	16 - 35	35	15	EPA Action Level	6
Manganese	Pond D	15	13	530 - 9170	9170	500	RMEG <sub>child</sub>	11
Arsenic	MW4	16	2	20 - 60	60	0.02	CREG	2
Boron	MW4	16	3	410 - 440	440	100	I-EMEG <sub>child</sub>	3
Cadmium	MW4	16	7	2.4 - 6.8	6.8	2	C-EMEG <sub>child</sub>	6
Cyanide	MW4	16	2	20 - 310	310	200	RMEG <sub>child</sub> , MCL	1
Iron	MW4	16	15	550 - 42600	42600	300	SMCL	11
Manganese	MW4	16	14	1200 - 2200	2200	500	RMEG <sub>child</sub>	7
Arsenic	8" PVC Pipe	24	2	10 - 51	51	0.02	CREG	2
Boron	8" PVC Pipe	24	10	130 - 980	980	100	I-EMEG <sub>child</sub>	8
Cadmium	8" PVC Pipe	24	18	2.3 - 58	58	2	C-EMEG <sub>child</sub>	14
Chromium	8" PVC Pipe	24	20	123 - 174	174	100	LTHA	2
Lead	8" PVC Pipe	24	23	18 - 430	430	15	EPA Action Level	15
Manganese	8" PVC Pipe	24	23	1640 - 17000	17000	500	RMEG <sub>child</sub>	22
Nickel	8" PVC Pipe	24	19	310 - 1150	1150	200	RMEG <sub>child</sub>	3
Iron	8" PVC Pipe	24	23	2750 - 95000	95000	300	SMCL	13
Vanadium	8" PVC Pipe	24	1	170 - 170	170	30	I-EMEG <sub>child</sub>	1

**Table 1. Constituents Detected in Groundwater and Surface Water  
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Notes: Concentrations listed are total metals in surface water or ground water.  
For contaminants with multiple health-based comparison values, the lowest (most conservative) comparison value was selected for this presentation. In most cases, this value corresponded to the protective level for children.

Abbreviations used:

C-EMEG <sub>child</sub>	Environmental Media Evaluation Guide for children's chronic exposure (ATSDR)
CREG	Cancer Risk Evaluation Guide for $1 \times 10^{-6}$ excess cancer risk
I-EMEG <sub>child</sub>	Environmental Media Evaluation Guide for children's intermediate exposure (ATSDR)
LTHA	Lifetime Health Advisory for drinking water (EPA)
MCL	Primary Maximum Contaminant Level for drinking water (EPA)
ppb	parts per billion (One part per billion is the equivalent of one drop of impurity in 500 barrels of water.)
RMEG <sub>child</sub>	Reference Dose Media Evaluation Guide
SMCL	Secondary Maximum Contaminant Level for drinking water (EPA)

The *EPA Action Level* for lead is the concentration in tap water, which, if exceeded in over 10% of the homes tested, triggers treatment or other requirements that a water system must follow.

Footnotes:

1 For these data, number of samples represents the number of individual sampling events for which data analytical was available.

**Table 2. Chemical-Specific Toxicity Information  
Marion County Landfill, Marion County, West Virginia**

Contaminant	Sampling Location	Maximum Detected Concentration (ppm)	Child Exposure Dose (mg/kg/d)	Adult Exposure Dose (mg/kg/d)	ATSDR's Chronic Oral MRL (mg/kg/d)	ATSDR's Intermediate Oral MRL (mg/kg/d)	EPA's Chronic Oral RfD (mg/kg/d)	EPA's Oral Slope Factor (mg/kg/d) <sup>-1</sup>	EPA Cancer Class
Arsenic	Well 1 (Redrilled)	0.09	0.009	0.003	0.0003	--	0.0003	1.5	A
Barium	Well 1 (Redrilled)	1.0	0.096	0.027	--	--	0.07	--	D
Benzene	Leachate Drain	0.01	0.001	0.0003	--	--	--	0.055	A
Bis(2-ethylhexyl)phthalate	Pond A	0.02	0.002	0.001	0.06	0.1	0.02	0.014	B2
Boron	Pond H	17.8	1.780	0.509	--	0.01	0.09	--	--
Cadmium	Downstream Pt. 1	21	2.100	0.600	0.0002	--	--	--	B1
Chlordane	Leachate Drain	0.03	0.003	0.001	0.0006	0.0006	0.0005	0.35	B2
Chloroethane	Leachate Drain	0.02	0.002	0.0005	--	--	--	--	--
Chloromethane	Leachate Drain	0.01	0.001	0.0003	--	--	--	--	D
Chromium	MW 1, Well 1 (Redrilled)	0.298	0.030	0.009	--	--	0.003	41	A: Cr <sup>6+</sup> (inh); D: Cr <sup>3+</sup> /Cr <sub>tot</sub> (oral)
Cyanide	Water Well	3.0	0.300	0.086	--	--	0.02	--	D
Ethylbenzene	Leachate Drain	0.05	0.005	0.001	--	--	0.1	--	D
Iron	AMD Seep	101	10.100	2.886	--	--	--	--	--
Lead	Downstream Pt. 1	10	1.000	0.286	--	--	--	--	B2
Manganese	Leachate Drain	19.3	1.930	0.551	--	--	--	--	D
Molybdenum	MW 1	50	5.000	1.429	--	--	0.005	--	--
Nickel	AMD Seep	1.5	0.146	0.042	--	--	0.02	--	--
Selenium	MW 1	0.01	0.001	0.0002	0.005	--	0.005	--	D
Toluene	Leachate Drain	0.31	0.031	0.009	--	0.02	0.2	--	D
Trichloroethylene	Leachate Drain	0.01	0.001	0.0002	--	--	--	--	Withdrawn 7/1/94
Vanadium	Well 1 (Redrilled)	0.3	0.027	0.008	--	0.003	--	--	--
Zinc	Leachate Drain	5.6	0.560	0.160	0.3	0.3	0.3	--	D

Sources:

ATSDR 2001. Minimum Risk Levels for Hazardous Substances. Accessed December 15, 2002: <http://www.atsdr.cdc.gov/mrls.html>

USEPA 2002. Integrated Risk Information System (IRIS). Accessed December 16, 2002: <http://www.epa.gov/iris>

USEPA 1995. Health Effects Assessment Summary Tables (HEAST), FY-1995 Supplement. EPA/540/R-95/142, Washington, D.C.

Abbreviations:

ppm parts per million (A part per million is equivalent to one milligram of a chemical in a liter of water.)

mg/kg/d milligrams of chemical per kilogram of body weight per day

Applicable EPA carcinogen categories: Group A – known human carcinogen; Group B1 – probable carcinogen, based on limited evidence of carcinogenicity in humans; Group B2 – probable carcinogen, based sufficient evidence of carcinogenicity in animals; Group D – not classifiable as to human carcinogenicity.