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APPENDICES

APPENDIX A

BATCH LEACHING TEST DATA

Table A-1 Toxicity Characteristic Leaching Procedure results

Type		Extraction Fluid No.	Concentration of metal (mg/L)		
			As	Cr	Cu
Hard untreated wood	6/10 inch outer	1	0.01	ND	BDL
		1	ND	ND	BDL
		1	ND	ND	BDL
	Average		0.00	0.00	0.02
	cross section	1	ND	ND	BDL
		1	ND	ND	ND
		1	ND	ND	0.10
Average		0.00	0.00	0.04	
Hard CCA-treated wood	6/10 inch outer	1	13.12	3.55	4.44
		1	20.39	1.42	6.20
		1	19.60	2.94	6.03
	Average		17.70	2.64	5.56
	cross section	1	16.63	0.79	4.40
		1	6.06	0.94	5.22
		1	4.93	1.69	4.87
Average		9.21	1.14	4.83	
Soft untreated wood	6/10 inch outer	1	ND	ND	ND
		1	ND	ND	BDL
		1	ND	ND	ND
	Average		0.00	0.00	0.01
	cross section	1	ND	ND	BDL
		1	ND	ND	ND
		1	ND	ND	ND
Average		0.00	0.00	0.00	
Soft CCA-treated wood	6/10 inch outer	1	2.20	0.22	0.56
		1	3.98	0.54	1.51
		1	3.71	0.77	1.37
	Average		3.30	0.51	1.15
	cross section	1	1.93	0.20	0.82
		1	1.55	0.35	0.47
		1	1.74	0.24	1.17
Average		1.74	0.26	0.82	

ND = Not detect

BDL = Below Detection Limit (0.005 mg/L for As, 0.06 mg/L for Cr, 0.05mg/L for Cu)

Table A-1 Toxicity Characteristic Leaching Procedure results (continued)

Type		Extraction Fluid No.	Concentration of metal (mg/L)		
			As	Cr	Cu
Weathered CCA-treated wood	cross section	1	5.52	0.49	6.13
		1	4.27	0.40	6.27
		1	4.96	0.48	7.68
	Average		4.92	0.46	6.70
Ash untreated wood	cross section	2	ND	ND	ND
		2	ND	ND	ND
		2	0.08	ND	ND
	Average		0.03	0.00	0.00
Ash CCA-treated wood	cross section	2	122.47	4,312.00	64.00
		2	116.84	3,496.00	71.96
		2	111.28	3,778.00	116.12
	Average		116.87	3,862.00	84.03

ND = Not detect

BDL = Below Detection Limit (0.005 mg/L for As, 0.06 mg/L for Cr, 0.05mg/L for Cu)

Table A-2 Waste Extraction Test results

Type		Concentration of metal (mg/L)		
		As	Cr	Cu
Hard untreated wood	6/10 inch outer	ND	ND	BDL
		ND	BDL	ND
		ND	ND	0.18
	Average	0.00	0.00	0.06
	cross section	ND	ND	BDL
		ND	ND	BDL
		ND	ND	ND
Average	0.00	0.00	0.01	
Hard CCA-treated wood	6/10 inch outer	15.88	3.74	22.43
		18.66	7.49	27.11
		16.96	6.44	22.15
	Average	17.17	5.89	23.89
	cross section	6.86	3.47	10.41
		10.98	4.40	11.49
		9.74	5.63	12.26
Average	9.19	4.50	10.55	

ND = Not detect

BDL = Below Detection Limit (0.005 mg/L for As, 0.06 mg/L for Cr, 0.05mg/L for Cu)

Table A-2 Waste Extraction Test results (continued)

Type		Concentration of metal (mg/L)		
		As	Cr	Cu
Soft untreated wood	6/10 inch outer	ND	ND	BDL
		ND	ND	BDL
		ND	ND	ND
	Average	0.00	0.00	0.01
	cross section	ND	ND	BDL
		ND	ND	ND
		ND	ND	BDL
Average	0.00	0.00	0.01	
Soft CCA-treated wood	6/10 inch outer	11.84	2.95	21.53
		10.11	3.80	9.21
		12.06	3.98	10.18
	Average	11.34	3.57	13.64
	cross section	1.13	0.80	0.77
		1.47	0.74	0.64
		1.49	1.01	0.45
Average	1.36	0.85	0.62	
Weathered CCA-treated wood	cross section	1.60	0.45	0.97
		1.93	0.47	0.94
		1.49	0.46	0.98
	Average	1.67	0.46	0.96
Ash untreated wood	cross section	0.03	ND	ND
		0.04	ND	ND
		0.01	ND	BDL
	Average	0.02	0.00	0.01
Ash CCA-treated wood	cross section	106.65	1,624.25	109.58
		125.96	1,566.00	108.00
		92.17	1,374.25	125.50
	Average	108.26	1,521.50	114.36

ND = Not detect

BDL = Below Detection Limit (0.005 mg/L for As, 0.06 mg/L for Cr, 0.05mg/L for Cu)

Table A-3 Total metal concentration

Type		Concentration of metal (mg/L)		
		As	Cr	Cu
Hard untreated wood	6/10 inch outer	BDL	ND	0.244
		BDL	BDL	BDL
		BDL	BDL	BDL
	Average	BDL	BDL	0.103
	cross section	ND	ND	BDL
		ND	ND	ND
		ND	ND	ND
Average	ND	ND	BDL	
Hard CCA-treated wood	6/10 inch outer	14.225	23.250	14.410
		17.865	27.841	12.659
		12.400	24.325	14.980
	Average	14.830	25.139	14.016
	cross section	4.980	6.443	4.397
		5.901	10.750	4.271
		4.558	7.200	4.892
Average	5.146	8.131	4.520	
Soft untreated wood	6/10 inch outer	0.005	BDL	0.063
		BDL	BDL	BDL
		0.009	BDL	BDL
	Average	0.005	BDL	BDL
	cross section	ND	ND	BDL
		ND	ND	BDL
		ND	ND	0.051
Average	ND	ND	BDL	
Soft CCA-treated wood	6/10 inch outer	13.761	25.040	7.542
		14.125	23.854	6.437
		10.983	25.360	6.453
	Average	12.956	24.751	6.811
	cross section	0.025	1.878	0.630
		1.272	1.036	0.892
		1.401	1.605	0.632
Average	0.899	1.506	0.718	
Weathered CCA-treated wood	cross section	7.819	14.840	10.390
		10.256	14.170	7.850
		7.590	16.200	8.951
	Average	8.555	15.070	9.064

ND = Not detect

BDL = Below Detection Limit (0.005 mg/L for As, 0.06 mg/L for Cr, 0.05mg/L for Cu)

Table A-3 Total metal concentration (continued)

Type		Concentration of metal (mg/L)		
		As	Cr	Cu
Ash untreated wood	cross section	0.023	BDL	0.090
		0.054	BDL	BDL
		0.035	BDL	BDL
	Average	0.037	BDL	BDL
Ash CCA-treated wood	cross section	238.300	616.500	290.000
		210.600	644.100	328.000
		252.100	621.000	321.000
	Average	233.667	627.200	313.000

ND = Not detect

BDL = Below Detection Limit (0.005 mg/L for As, 0.06 mg/L for Cr, 0.05mg/L for Cu)

APPENDIX B

PRECIPITATION DATA

Table B-2 Amount of daily rainfall added into the lysimeter from May to October

Amount of daily rainfall added into the lysimeter from May to October												
Date	May		June		July		August		September		October	
	mm	cm ³	mm	cm ³	mm	cm ³	mm	cm ³	mm	cm ³	mm	cm ³
1	0.0	0	18.7	606	0.0	0	11.8	382	28.3	917	0.0	0
2	26.8	868	23.5	761	0.2	6	T	0	7.3	237	0.0	0
3	0.0	0	16.4	531	0.0	0	0.0	0	34.3	1,111	15.6	505
4	0.0	0	2.8	91	T	0	4.9	159	T	0	0.0	0
5	T	0	7.2	233	8.1	262	0.0	0	50.0	1,620	0.0	0
6	3.6	117	20.7	671	0.0	0	2.8	91	6.5	211	0.0	0
7	8.1	262	0.1	3	0.0	0	4.9	159	12.7	411	1.0	32
8	20.4	661	0.2	6	0.0	0	4.5	146	9.3	301	3.5	113
9	T	0	3.3	107	1.5	49	0.4	13	5.3	172	0.0	0
10	0.0	0	4.3	139	0.0	0	0.0	0	41.0	1,328	0.0	0
11	0.0	0	0.0	0	0.0	0	0.8	26	53.2	1,724	0.0	0
12	0.0	0	T	0	47.7	1545	38.5	1,247	2.9	94	0.0	0
13	0.0	0	9.2	298	2.3	75	13.1	424	0.0	0	2.3	75

Table B-1 Amount of daily rainfall added into the lysimeter from May to October (continued)

Amount of daily rainfall added into the lysimeter from May to October												
Date	May		June		July		August		September		October	
	mm	cm ³	mm	cm ³	mm	cm ³	mm	cm ³	mm	cm ³	mm	cm ³
14	0.0	0	0.0	0	33.6	1,089	9.8	318	9.3	301	1.1	36
15	0.0	0	17.4	564	3.2	104	0.0	0	4.4	143	0.0	0
16	0.0	0	0.3	10	0.1	3	2.4	78	T	0	0.0	0
17	0.0	0	6.5	211	0.0	0	11.1	360	0.9	29	0.0	0
18	0.0	0	T	0	0.0	0	2.4	78	50.0	1,620	0.0	0
19	0.0	0	19.7	638	4.8	156	0.1	3	69.1	2,239	17.6	570
20	T	0	7.4	240	19.9	645	0.9	29	T	0	0.0	0
21	1.3	42	18.8	609	2.0	65	7.2	233	T	0	0.0	0
22	0.0	0	0.0	0	27.1	878	3.5	113	0.0	0	0.0	0
23	0.0	0	12.6	408	0.0	0	5.0	162	3.3	107	0.0	0
24	1.9	62	0.0	0	15.4	499	0.0	0	T	0	2.7	87
25	0.0	0	T	0	7.6	246	0.6	19	0.0	0	0.0	0
26	0.0	0	T	0	5.6	181	0.0	0	0.0	0	2.4	78
27	2.4	78	2.0	65	0.0	0	12.3	399	15.7	509	0.7	23
28	0.0	0	2.4	78	0.0	0	6.8	220	12.4	402		
29	11.0	356	0.0	0	0.0	0	0.0	0	18.2	590		
30	28.8	933	0.0	0	T	0	0.1	3	2.2	71		
31	0.4	13		0	0.0	0	11.3	366				
Total	104.7	3,392	193.5	6,269	179.1	5,803	155.2	5,028	436.3	14,136	46.9	1,520
R-day	10		20		15		23		21		13	

T = Rainfall amount less than 0.1 mm.

APPENDIX C

LEACHATE AMOUNT GENERATED FROM EACH LYSIMETER

Table C-1 Lechate generation from each lysimeter

Day after filling (d)	Rainfall added (mL)	Leachate generated from lysimeter (mL)					
		Lys No. 1	LysNo. 2	LysNo. 3	Lys No. 4	Lys No. 5	Lys No. 6
1	0	0	0	0	0	1000	698
2	868	0	0	0	0	124	221
3	0	622	644	0	0	62	42
4	0	19	0	0	0	62	126
5	0	0	0	0	0	54	87
6	117	0	0	0	0	22	28
7	262	0	0	0	0	32	52
8	661	38	53	0	0	30	32
9	0	125	153	0	0	22	43
10	0	404	425	0	0	157	43
11	0	0	0	0	0	38	149
12	0	0	0	0	0	69	94
13	0	0	0	0	0	38	23
14	0	0	0	0	0	28	31
15	0	0	0	0	0	22	7
16	0	0	0	0	0	10	2
17	0	0	0	0	0	19	0
18	0	0	0	0	0	32	4
19	0	0	0	0	0	14	0
20	0	0	0	0	0	0	0
21	42	0	0	0	0	0	0
22	0	24	27	0	0	18	63
23	0	0	0	0	0	0	0
24	62	0	0	0	0	27	0
25	0	0	0	0	0	29	0
26	0	0	0	0	0	0	0
27	78	0	0	0	0	20	13
28	0	8	29	0	0	17	10
29	356	0	0	0	0	35	0
30	933	200	218	0	0	17	0
31	13	721	758	0	230	478	125
32	606	18	7.8	0	19	164	183

Table C-1 Lechate generation from each lysimeter (continued)

Day after filling (d)	Rainfall added (mL)	Leachate generated from lysimeter (mL)					
		Lys No. 1	LysNo. 2	LysNo. 3	Lys No. 4	Lys No. 5	Lys No. 6
33	761	433	443	0	131	381	300
34	531	600	558	157	258	409	621
35	91	351	321	193	135	361	384
36	233	37	18	5	10	69	150
37	671	199	157	2	14.8	18	71
38	3	505	590	318	327	458	428
39	6	14	0	30	20	138	235
40	107	3.3	1	7.8	9.3	41	90
41	139	40	92	0	0	53	91
42	0	75	40	0	0	46	81
43	0	0	0	0	0	45	65
44	298	0	0	0	0	72	67
45	0	145	106	19	34	73	46
46	564	38	32	0	0	110	71
47	10	344	320	212	251	370	282
48	211	33	26	58	38	147	207
49	0	54	19	19	46	110	132
50	638	0	0	0	0	102	92
51	240	445	411	334	372	459	421
52	609	138	128	116	175	185	220
53	0	432	350	505	370	533	543
54	408	3	9	42	31	160	209
55	0	246	184	258	278	267	242
56	0	0	0	0	0	86	123
57	0	5.4	6.4	3.3	9	93	118
58	65	22	17	9	7	59	60
59	78	14	9	10	17	52	72
60	0	27	0	0	0	50	61
61	0	0	0	3	4	38	63
62	0	0	3	1	5	31	30
63	6	24	19	21	20	42	46
64	0	0	0	0	0	34	44
65	0	0	0	0	0	37	52
66	262	0	0	0	0	36	36
67	0	112	74	11	19	36	38
68	0	0	0	11	5	34	38
69	0	0	0	48	12	38	32
70	49	0	0	9.4	7	60	48
71	0	15	12	0	37	33	30

Table C-1 Leachate generation from each lysimeter (continued)

Day after filling (d)	Rainfall added (mL)	Leachate generated from lysimeter (mL)					
		Lys No. 1	LysNo. 2	LysNo. 3	Lys No. 4	Lys No. 5	Lys No. 6
72	0	0	0	10	9	39	56
73	1,545	1	2	8	2	30	24
74	75	1,240	1,204	1,174	1,188	913	624
75	1,089	25	20	106	101	241	280
76	104	864	898	972	985	989	948
77	3	46	28	111	93	152	257
78	0	20	22	49	40	109	113
79	0	0	0	43	26	81	94
80	156	7	0	15	13	57	60
81	645	58	66	31	28	63	73
82	65	420	417	475	517	393	409
83	878	34	22	105	79	168	200
84	0	677	662	745	795	705	660
85	499	19	17	92	63	188	231
86	246	320	321	370	383	322	304
87	181	138	104	240	219	270	286
88	0	86	68	147	156	152	160
89	0	12	11	71	55	112	143
90	0	6	7	42	30	85	97
91	0	10	3	7	21	73	81
92	0	0	0	12	15	49	53
93	382	2	7	19	17	65	58
94	0	101	198	158	161	70	68
95	0	9	12	38	44	82	42
96	159	17	5	46	32	72	53
97	0	36	26	43	58	74	80
98	91	5	0	30	35	50	57
99	159	36	34	31	35	74	61
100	146	36	43	61	92	95	56
101	13	22	12	104	101	38	36
102	0	9	7	62	53	132	102
103	26	21	14	65	34	92	99
104	1,247	0	0	30	20	53	63
105	424	1,022	1,015	1,025	1,162	878	810
106	318	282	265	401	395	438	410
107	0	198	184	242	249	197	238
108	78	20	11	100	68	160	188
109	360	24	19	36	33	105	131
110	78	209	218	244	268	153	134

Table C-1 Lechate generation from each lysimeter (continued)

Day after filling (d)	Rainfall added (mL)	Leachate generated from lysimeter (mL)					
		Lys No. 1	LysNo. 2	LysNo. 3	Lys No. 4	Lys No. 5	Lys No. 6
110	78	209	218	244	268	153	134
111	3	36	20	86	91	47	56
112	29	0	0	19	9	54	41
113	233	36	27	101	71	139	162
114	113	110	117	70	109	59	64
115	162	23	21	62	76	55	53
116	0	75	67	155	141	154	57
117	19	15	20	66	53	111	115
118	0	8	12	39	41	81	93
119	399	7	0	53	24	52	61
120	220	215	208	181	208	72	49
121	0	140	158	201	222	270	208
122	3	8	10	222	60	119	165
123	366	18	9	270	33	78	102
124	917	188	192	208	209	127	93
125	237	716	698	840	850	762	720
126	1,111	148	134	720	227	285	195
127	0	1,001	1,004	1,102	1,066	1,100	1,156
128	1,620	28	20	80	66	157	181
129	211	1,429	1,036	1,472	1,398	1,281	1,342
130	411	141	102	167	142	190	202
131	301	330	300	425	417	440	477
132	172	230	186	246	265	261	262
133	1,328	93	83	121	119	159	127
134	1,724	1,128	1,164	1,159	1,178	1,098	1,011
135	94	1,502	1,564	1,380	1,422	1,538	1,514
136	0	88	47	194	176	249	292
137	301	21	19	63	50	103	150
138	143	217	219	203	230	220	219
139	0	104	102	66	95	82	93
140	29	0	0	58	55	68	86
141	1,620	9	5	43	35	7	73
142	2,239	1,210	1,220	1,403	1,452	1,204	1,250
143	0	1,925	1,980	2,102	2,098	2,132	2,181
144	0	29	23	82	81	142	198
145	0	5	0	38	41	125	98
146	107	0	0	0	0	145	34
147	0	61	52	72	75	109	118
148	0	29	38	70	67	84	97

Table C-1 Leachate generation from each lysimeter (continued)

Day after filling (d)	Rainfall added (mL)	Leachate generated from lysimeter (mL)					
		Lys No. 1	LysNo. 2	LysNo. 3	Lys No. 4	Lys No. 5	Lys No. 6
149	0	8	5	8	19	62	54
150	509	0	0	0	0	41	34
151	402	459	361	330	348	375	361
152	590	382	379	351	367	384	363
153	71	576	588	574	577	532	564
154	0	62	65	58	64	89	93
155	0	5	3	21	30	61	56
156	505	0	0	8	7	54	61
157	0	387	398	372	368	399	415
158	0	28	30	42	51	126	110
159	0	9	12	29	22	68	83
160	32	5	3	10	14	52	44
161	113	20	15	12	21	42	51
162	0	58	63	43	58	82	70
163	0	20	16	42	39	54	66
164	0	9	3	22	31	42	53
165	0	3	1	10	21	31	29
166	75	0	0	5	16	34	27
167	36	38	42	41	30	63	58
168	0	21	26	32	37	53	48
169	0	19	11	26	18	44	52
170	0	11	5	15	13	32	40
171	0	2	3	9	7	25	31
172	570	0	0	3	3	20	23
173	0	432	457	398	407	309	328
174	0	51	47	58	43	71	90
175	0	15	12	31	24	43	56
176	0	6	11	28	21	35	47
177	87	7	9	17	19	41	34
178	0	52	43	40	38	61	73
179	78	17	13	21	25	43	54
180	23	32	41	32	45	44	56
Total	36,149	26,622	25,721	26,489	26,301	32,796	32,773

APPENDIX D

STATISTICAL DATA

Table D-1 A one-way ANOVA for analyzed leachates generation from Lysimeter Nos. 1-6

a) Leachates generated from Lysimeter Nos. 1 and 2

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2257.506	1	2257.506	.024	.876
Within Groups	33155598.824	358	92613.405		
Total	33157856.330	359			

b) Leachates generated from Lysimeter Nos. 3 and 4

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	98.596	1	98.596	.001	.975
Within Groups	34771746.112	358	97127.782		
Total	34771844.708	359			

c) Leachates generated from Lysimeter Nos. 5 and 6

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6206.970	1	6206.970	.071	.791
Within Groups	30328278.022	345	87908.052		
Total	30334484.991	346			

(If the Sig. value is less than 0.05, the mean difference is significant at the 0.05 level)

Table D-2 A one-way ANOVA for analyzed pH, conductivity, and ORP results from Lysimeter Nos. 1-6

a) Lysimeter Nos. 1 and 2

		Sum of Squares	df	Mean Square	F	Sig.
pH	Between Groups	.015	1	.015	.121	.729
	Within Groups	5.567	44	.127		
	Total	5.582	45			
conductivity	Between Groups	.543	1	.543	34.422	.000
	Within Groups	.695	44	.016		
	Total	1.238	45			
ORP	Between Groups	59508.049	1	59508.049	39.893	.000
	Within Groups	65634.744	44	1491.699		
	Total	125142.792	45			

b) Lysimeter Nos. 3 and 4

		Sum of Squares	df	Mean Square	F	Sig.
pH	Between Groups	.635	1	.635	8.500	.006
	Within Groups	2.839	38	.075		
	Total	3.474	39			
conductivity	Between Groups	.021	1	.021	.079	.780
	Within Groups	10.167	38	.268		
	Total	10.188	39			
ORP	Between Groups	1786.366	1	1786.366	3.530	.068
	Within Groups	19231.311	38	506.087		
	Total	21017.677	39			

c) Lysimeter Nos. 5 and 6

		Sum of Squares	df	Mean Square	F	Sig.
pH	Between Groups	.276	1	.276	.725	.399
	Within Groups	17.507	46	.381		
	Total	17.783	47			
conductivity	Between Groups	20.528	1	20.528	1.504	.226
	Within Groups	627.707	46	13.646		
	Total	648.235	47			
ORP	Between Groups	353.765	1	353.765	.190	.665
	Within Groups	85799.044	46	1865.197		
	Total	86152.808	47			

(If the Sig. value is less than 0.05, the mean difference is significant at the 0.05 level)

Table D-3 A one-way ANOVA for analyzed TOC and DOC results from Lysimeter Nos. 1-6

a) Lysimeter Nos. 1 and 2

		Sum of Squares	df	Mean Square	F	Sig.
TOC	Between Groups	19320.091	1	19320.091	6.425	.015
	Within Groups	126302.545	42	3007.203		
	Total	145622.636	43			
DOC	Between Groups	17881.114	1	17881.114	6.073	.018
	Within Groups	123663.136	42	2944.360		
	Total	141544.250	43			

b) Lysimeter Nos. 3 and 4

		Sum of Squares	df	Mean Square	F	Sig.
TOC	Between Groups	1311.025	1	1311.025	2.979	.092
	Within Groups	16723.950	38	440.104		
	Total	18034.975	39			
DOC	Between Groups	1071.225	1	1071.225	2.539	.119
	Within Groups	16032.550	38	421.909		
	Total	17103.775	39			

c) Lysimeter Nos. 5 and 6

		Sum of Squares	df	Mean Square	F	Sig.
TOC	Between Groups	99889991.273	1	99889991.273	2.960	.093
	Within Groups	1417124062.273	42	33741049.102		
	Total	1517014053.546	43			
DOC	Between Groups	87617456.818	1	87617456.818	3.562	.066
	Within Groups	1033086771.909	42	24597304.093		
	Total	1120704228.727	43			

(If the Sig. value is less than 0.05, the mean difference is significant at the 0.05 level)

Table D-4 A one-way ANOVA for analyzed TA and VA results from Lysimeter Nos. 5 and 6

a) Volatile acid (VA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	23046371.273	1	23046371.273	.143	.707
Within Groups	6754502930.637	42	160821498.349		
Total	6777549301.910	43			

b) Total alkalinity (TA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10572466.506	1	10572466.506	2.314	.136
Within Groups	173591653.438	38	4568201.406		
Total	184164119.944	39			

(If the Sig. value is less than 0.05, the mean difference is significant at the 0.05 level)

Table D-5 A one-way ANOVA for analyzed As, Cr, and Cu results from Lysimeter Nos. 1-6

a) Lysimeter Nos. 1 and 2

		Sum of Squares	df	Mean Square	F	Sig.
As	Between Groups	2834.117	1	2834.117	11.815	.001
	Within Groups	10554.128	44	239.867		
	Total	13388.245	45			
Cr	Between Groups	2125.136	1	2125.136	4.473	.040
	Within Groups	20904.489	44	475.102		
	Total	23029.625	45			
Cu	Between Groups	452.280	1	452.280	6.821	.012
	Within Groups	2917.635	44	66.310		
	Total	3369.916	45			

b) Lysimeter Nos. 3 and 4

		Sum of Squares	df	Mean Square	F	Sig.
As	Between Groups	2.714	1	2.714	13.492	.001
	Within Groups	7.643	38	.201		
	Total	10.357	39			
Cr	Between Groups	.454	1	.454	4.171	.048
	Within Groups	4.133	38	.109		
	Total	4.587	39			
Cu	Between Groups	.115	1	.115	5.748	.022
	Within Groups	.760	38	.020		
	Total	.876	39			

c) Lysimeter Nos. 5 and 6

		Sum of Squares	df	Mean Square	F	Sig.
As	Between Groups	28.005	1	28.005	19.045	.000
	Within Groups	64.702	44	1.470		
	Total	92.707	45			
Cr	Between Groups	.000	1	.000	2.566	.116
	Within Groups	.001	44	.000		
	Total	.001	45			
Cu	Between Groups	.000	1	.000	.073	.788
	Within Groups	.009	44	.000		
	Total	.009	45			

(If the Sig. value is less than 0.05, the mean difference is significant at the 0.05 level)

APPENDIX E
LEACHATE CHARACTERISTIC
AND
DETECTION LIMITS OF THE INSTRUMENT

Table E-1 Lysimeter pH

Day after filling (d)	pH					
	Lysimeter No. 1	Lysimeter No. 2	Lysimeter No. 3	Lysimeter No. 4	Lysimeter No. 5	Lysimeter No. 6
7	6.48	6.27	NS	NS	3.74	3.87
14	6.45	5.94	NS	NS	3.77	3.86
21	NS	NS	NS	NS	4.14	4.46
28	6.04	6.87	NS	NS	6.77	4.80
35	6.71	6.61	7.07	7.16	5.90	5.57
42	5.17	6.28	6.71	6.83	5.81	5.53
49	6.94	6.76	7.16	7.17	5.76	5.71
56	6.51	6.27	7.27	7.64	5.16	5.46
63	7.56	6.54	7.56	8.02	5.77	5.58
70	6.82	6.37	7.45	7.83	5.70	5.50
77	6.66	6.54	7.25	7.65	5.45	5.34
84	6.35	7.08	7.08	7.45	5.49	5.35
91	6.48	6.62	7.41	7.61	5.67	5.39
98	6.61	6.74	7.24	7.58	5.88	5.40
105	6.89	6.66	7.03	7.71	5.43	5.32
112	6.87	6.58	7.69	7.90	5.46	5.39
119	6.42	6.81	7.54	7.84	5.52	5.50
126	6.58	6.73	7.64	7.69	5.58	5.62
133	6.45	6.64	7.35	7.71	5.72	5.74
139	6.38	6.56	7.61	7.77	5.64	5.68
149	6.46	6.31	7.72	7.56	5.89	5.64
159	6.41	6.45	7.25	7.68	5.72	5.82
169	6.20	6.34	7.64	7.84	5.80	5.66
180	6.00	6.31	7.41	7.48	5.84	5.78
Average	6.50	6.53	7.35	7.61	5.48	5.33
Minimum	5.17	5.94	6.71	6.83	3.74	3.86
Maximum	7.56	7.08	7.72	8.02	6.77	5.82

ND = Not detected

NS = No Sample Available

Table E-2 Conductivity

Day after filling (d)	Conductivity (mS/cm)					
	Lysimeter No. 1	Lysimeter No. 2	Lysimeter No. 3	Lysimeter No. 4	Lysimeter No. 5	Lysimeter No. 6
7	0.19	0.61	NS	NS	14.07	13.72
14	0.17	0.49	NS	NS	14.71	14.13
21	NS	NS	NS	NS	16.72	12.63
28	0.26	0.44	NS	NS	24.10	23.10
35	0.16	0.52	1.98	1.50	20.30	22.50
42	0.24	0.65	2.19	1.97	20.70	22.60
49	0.21	0.55	2.41	2.17	21.10	23.20
56	0.31	0.65	3.01	3.13	20.80	23.40
63	0.78	0.77	2.84	3.04	21.20	23.30
70	0.33	0.69	3.63	3.39	21.10	23.10
77	0.21	0.42	2.88	2.78	17.49	19.96
84	0.34	0.46	3.25	3.12	16.98	19.04
91	0.30	0.49	2.65	3.35	15.90	18.92
98	0.35	0.54	3.01	3.31	14.60	17.10
105	0.32	0.62	3.26	3.04	15.10	17.30
112	0.43	0.63	3.53	3.43	14.54	16.13
119	0.37	0.65	3.48	3.34	13.90	16.00
126	0.41	0.59	3.42	3.38	12.80	14.90
133	0.35	0.61	3.51	3.41	14.50	15.10
139	0.48	0.52	3.55	3.39	13.90	15.42
149	0.49	0.58	3.36	3.41	10.20	11.67
159	0.47	0.61	3.48	3.20	12.84	15.38
169	0.62	0.65	3.54	3.55	15.43	13.81
180	0.59	0.64	3.13	3.28	14.51	16.47
Average	0.36	0.58	3.11	3.06	16.56	17.87
Minimum	0.16	0.42	1.98	1.50	10.20	11.67
Maximum	0.78	0.77	3.63	3.55	24.10	23.40

ND = Not detected

NS = No Sample Available

Table E-3 Oxidation-reduction potential

Day after filling (d)	ORP (mV)					
	Lysimeter No. 1	Lysimeter No. 2	Lysimeter No. 3	Lysimeter No. 4	Lysimeter No. 5	Lysimeter No. 6
7	146.50	259.40	NS	NS	103.30	79.70
14	55.70	214.70	NS	NS	73.70	69.60
21	NS	NS	NS	NS	99.98	128.38
28	103.72	189.82	NS	NS	94.02	126.32
35	99.72	181.72	178.62	163.12	101.62	29.52
42	102.50	190.40	182.80	169.00	130.50	117.50
49	183.02	204.22	180.42	176.22	51.12	80.42
56	123.80	233.00	187.70	152.40	60.70	107.50
63	187.30	250.70	197.40	166.60	112.10	89.50
70	262.70	282.80	231.40	187.60	103.40	95.00
77	196.78	257.80	233.98	219.08	139.08	58.38
84	210.40	248.10	219.00	189.00	98.50	48.90
91	243.10	255.40	193.40	192.40	64.00	54.10
98	187.30	240.22	201.22	186.22	51.22	45.32
105	211.10	234.00	187.40	188.50	21.80	32.40
112	137.00	234.70	190.60	169.20	14.54	16.13
119	180.20	231.90	148.50	178.40	13.40	14.50
126	173.50	251.80	136.40	124.80	12.38	13.52
133	145.20	243.00	184.58	153.72	15.64	14.88
139	187.00	259.60	169.50	141.62	10.31	13.40
149	158.90	238.74	172.72	187.50	8.99	12.87
159	139.30	234.40	184.68	164.50	7.45	10.58
169	145.70	211.32	188.42	179.85	9.88	9.83
180	138.40	225.60	156.52	168.22	8.37	7.44
Average	161.69	233.62	186.26	172.90	58.58	53.15
Minimum	55.70	181.72	136.40	124.80	7.45	7.44
Maximum	262.70	282.80	233.98	219.08	139.08	128.38

ND = Not detected

NS = No Sample Available

Table E-4 Total organic carbon

Day after filling (d)	TOC (mg/L)					
	Lysimeter No. 1	Lysimeter No. 2	Lysimeter No. 3	Lysimeter No. 4	Lysimeter No. 5	Lysimeter No. 6
7	33	16	NS	NS	24,722	23,549
14	51	43	NS	NS	22,832	23,247
21	NS	NS	NS	NS	NS	NS
28	NS	NS	NS	NS	NS	NS
35	47	14	65	42	15,867	18,036
42	77	50	131	33	22,324	23,570
49	44	42	141	34	12,516	28,548
56	65	72	111	110	15,356	25,786
63	92	88	95	76	13,592	22,547
70	100	99	77	84	15,987	23,946
77	103	72	95	89	13,549	19,549
84	102	71	88	82	10,055	16,250
91	96	60	88	87	9,946	14,404
98	97	50	91	95	10,312	11,905
105	94	47	65	76	9,724	10,064
112	161	96	63	81	9,453	10,187
119	149	104	81	72	9,888	10,056
126	168	128	74	61	9,752	9,948
133	187	136	72	89	9,310	10,107
139	176	104	70	60	9,845	9,872
149	208	129	84	73	9,758	9,884
159	229	138	92	86	9,741	9,382
169	241	142	74	94	9,452	9,570
180	238	135	98	102	9,876	9,746
Average	125.40	83.44	87.66	76.30	12,902.65	15,916.02
Minimum	33.08	14.22	62.72	33.47	9,310.00	9,382.00
Maximum	241.00	142.00	141.20	109.98	24,721.66	28,548.46

ND = Not detected

NS = No Sample Available

Table E-5 Dissolved organic carbon

Day after filling (d)	DOC (mg/L)					
	Lysimeter No. 1	Lysimeter No. 2	Lysimeter No. 3	Lysimeter No. 4	Lysimeter No. 5	Lysimeter No. 6
7	33	15	NS	NS	20,218	22,490
14	49	33	NS	NS	22,382	21,738
21	NS	NS	NS	NS	NS	NS
28	NS	NS	NS	NS	NS	NS
35	47	13	65	40	12,178	17,860
42	75	41	129	33	11,635	22,981
49	38	38	137	34	14,888	20,430
56	75	66	113	94	13,657	25,135
63	160	85	94	76	11,981	20,876
70	99	96	76	83	14,984	23,518
77	68	72	94	88	12,580	18,764
84	50	66	77	80	12,278	11,516
91	68	58	75	82	9,855	11,028
98	92	57	87	94	9,629	10,343
105	80	52	59	74	9,661	10,143
112	105	54	61	81	9,348	9,428
119	129	82	73	70	9,574	9,824
126	148	93	69	59	9,620	9,783
133	154	101	71	88	9,134	9,806
139	157	91	66	58	9,648	9,741
149	206	128	82	73	9,432	9,562
159	229	137	90	84	9,551	9,254
169	241	140	74	90	9,047	9,445
180	236	134	95	99	9,653	9,358
Average	115.38	75.15	84.28	74.02	11,860.52	14,682.78
Minimum	33.41	13.47	58.50	32.81	9,047.00	9,254.00
Maximum	241.00	140.00	136.95	99.00	22,382.20	25,134.85

ND = Not detected

NS = No Sample Available

Table E-5 Total alkalinity

Day after filling (d)	TA (mg/L)	
	Lysimeter No. 5	Lysimeter No. 6
7	ND	ND
14	ND	ND
21	NS	NS
28	NS	NS
35	12,825	12,960
42	10,890	11,250
49	3,492	6,781.5
56	9,000	12,240
63	9,450	11,520
70	7,560	10,350
77	7,740	8,190
84	6,480	7,740
91	8,640	8,280
98	7,740	7,560
105	7,110	7,650
112	7,560	9,630
119	8,100	9,630
126	6,320	5,980
133	5,780	6,340
139	5,320	6,510
149	5,980	6,815
159	6,415	6,210
169	5,980	6,480
180	6,010	6,840
Average	7,419	8,447
Minimum	3,492	5,980
Maximum	12,825	12,960

ND = Not detected

NS = No Sample Available

Table E-6 Volatile acid

Day after filling (d)	VA (mg/L)	
	Lysimeter No. 5	Lysimeter No. 6
7	2,830	2,346
14	4,183	3,862
21	NS	NS
28	NS	NS
35	47,255	43,408
42	31,017	28,445
49	28,298	30,771
56	17,763	28,275
63	24,795	30,667
70	24,518	30,845
77	19,582	23,482
84	16,258	16,927
91	14,253	18,459
98	3,714	4,866
105	5,404	5,479
112	3,924	4,578
119	4,031	3,954
126	3,902	4,359
133	4,120	5,231
139	3,458	3,840
149	3,214	3,687
159	3,021	3,543
169	2,987	3,241
180	2,980	3,086
Average	12,341	13,789
Minimum	2,829	2,346
Maximum	47,254	43,408

ND = Not detected

NS = No Sample Available

Table E-7 Arsenic

Day after filling (d)	Arsenic (mg/L)					
	Lysimeter No. 1	Lysimeter No. 2	Lysimeter No. 3	Lysimeter No. 4	Lysimeter No. 5	Lysimeter No. 6
7	ND	41.393	NS	NS	ND	0.020
14	ND	88.608	NS	NS	ND	0.002
21	NS	NS	NS	NS	NS	NS
28	0.006	3.435	NS	NS	0.019	0.043
35	BDL	0.083	BDL	0.005	BDL	0.530
42	ND	0.065	0.012	0.181	0.005	0.021
49	ND	70.710	0.011	0.480	0.008	0.020
56	BDL	10.980	0.009	0.809	BDL	0.020
63	BDL	0.006	0.006	0.008	0.008	BDL
70	BDL	6.858	0.013	0.069	BDL	0.019
77	BDL	11.091	ND	0.062	BDL	0.014
84	0.016	9.624	BDL	0.530	ND	1.708
91	BDL	8.235	0.015	0.363	0.017	1.316
98	ND	1.578	0.017	ND	ND	6.162
105	0.011	10.899	BDL	ND	0.015	3.580
112	BDL	8.900	0.013	0.402	ND	3.482
119	BDL	8.700	BDL	0.404	0.008	1.865
126	BDL	10.877	BDL	0.475	ND	1.020
133	0.006	9.693	ND	0.367	ND	4.466
139	BDL	7.992	ND	0.211	0.017	3.050
149	BDL	14.100	BDL	2.576	0.005	1.553
159	BDL	10.659	BDL	0.893	0.012	2.485
169	BDL	12.631	BDL	1.295	0.015	2.198
180	BDL	13.184	BDL	1.433	0.020	2.514
Average	0.00	15.67	0.01	0.53	0.01	1.57
Minimum	0.00	0.01	0.00	0.00	0.00	0.00
Maximum	0.02	88.61	0.02	2.58	0.02	6.16

ND = Not detected

NS = No Sample Available

BDL = Below Detection Limit (As = 0.005 mg/L)

Table E-8 Chromium

Day after filling (d)	Chromium (mg/L)					
	Lysimeter No. 1	Lysimeter No. 2	Lysimeter No. 3	Lysimeter No. 4	Lysimeter No. 5	Lysimeter No. 6
7	ND	45.375	NS	NS	BDL	BDL
14	ND	134.250	NS	NS	ND	ND
21	NS	NS	NS	NS	NS	NS
28	ND	0.211	NS	NS	BDL	BDL
35	ND	ND	ND	BDL	BDL	BDL
42	ND	24.275	ND	BDL	ND	BDL
49	ND	66.150	ND	0.065	ND	0.079
56	ND	4.508	ND	0.203	ND	BDL
63	ND	3.535	ND	BDL	ND	BDL
70	ND	2.530	ND	BDL	ND	BDL
77	ND	2.503	ND	0.172	ND	ND
84	ND	5.870	ND	0.102	0.076	BDL
91	ND	1.980	BDL	0.109	ND	BDL
98	ND	BDL	BDL	1.017	BDL	ND
105	ND	4.388	BDL	2.021	ND	0.064
112	ND	2.078	BDL	0.172	ND	BDL
119	ND	1.834	BDL	0.127	ND	BDL
126	ND	3.408	BDL	BDL	ND	BDL
133	ND	2.121	BDL	BDL	ND	ND
139	ND	1.047	ND	BDL	ND	ND
149	ND	3.062	ND	0.108	ND	ND
159	ND	1.300	ND	0.192	ND	ND
169	ND	1.626	ND	0.324	ND	ND
180	ND	1.883	ND	0.428	ND	ND
Average	0.00	13.65	0.00	0.26	0.00	0.02
Minimum	0.00	0.00	0.00	0.01	0.00	0.00
Maximum	0.00	134.25	0.02	2.02	0.08	0.08

ND = Not detected

NS = No Sample Available

BDL = Below Detection Limit (Cr = 0.06 mg/L)

Table E-9 Copper

Day after filling (d)	Copper (mg/L)					
	Lysimeter No. 1	Lysimeter No. 2	Lysimeter No. 3	Lysimeter No. 4	Lysimeter No. 5	Lysimeter No. 6
7	BDL	34.987	NS	NS	BDL	0.072
14	BDL	ND	NS	NS	BDL	0.134
21	NS	NS	NS	NS	NS	NS
28	BDL	0.365	NS	NS	BDL	BDL
35	BDL	0.000	BDL	BDL	0.067	BDL
42	BDL	8.840	ND	0.063	BDL	BDL
49	ND	48.350	ND	0.061	0.078	BDL
56	ND	2.968	BDL	0.137	0.072	BDL
63	ND	2.406	BDL	0.083	0.070	BDL
70	ND	2.105	0.128	BDL	0.068	BDL
77	ND	2.135	ND	0.122	BDL	BDL
84	BDL	5.930	ND	0.107	BDL	BDL
91	ND	2.351	ND	0.110	BDL	BDL
98	ND	0.053	ND	0.483	ND	0.059
105	BDL	5.096	ND	0.887	BDL	0.057
112	BDL	3.994	ND	0.145	ND	BDL
119	BDL	3.940	ND	0.128	ND	BDL
126	ND	4.855	ND	BDL	ND	BDL
133	BDL	4.343	ND	BDL	ND	BDL
139	ND	1.955	ND	ND	ND	BDL
149	BDL	2.335	ND	0.301	ND	BDL
159	BDL	2.587	BDL	0.088	BDL	BDL
169	BDL	3.196	BDL	0.137	BDL	0.059
180	BDL	2.498	BDL	0.125	ND	BDL
Average	0.01	6.32	0.01	0.16	0.02	0.04
Minimum	0.00	0.00	0.00	0.00	0.00	0.01
Maximum	0.04	48.35	0.13	0.89	0.08	0.13

ND = Not detected

NS = No Sample Available

BDL = Below Detection Limit (Cu = 0.05 mg/L)

Biography

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