

PERMIT ATTACHMENT B
FORESTVILLE WATER DISTRICT
WASTE DISCHARGE REQUIREMENTS ORDER NO. R1-2004-0027
CTR CRITERION FOR COPPER, LEAD AND ZINC
INTERIM EFFLUENT LIMITATIONS FOR COPPER AND LEAD

Based on Effluent Limitations in Prior Permit - WDR Order No. 95-54

Hardness as CaCO ₃	Aquatic Life CCC 1-Hour Average			Aquatic Life CMC 4-Day Average		
	Copper ug/l	Lead ug/l	Zinc ug/l	Copper ug/l	Lead ug/l	Zinc ug/l
5	1.05	1.80	9.24	0.91	0.07	9.24
10	2.02	4.35	16.63	1.65	0.17	16.63
15	2.97	7.30	23.45	2.34	0.28	23.45
20	3.89	10.52	29.92	2.99	0.41	29.92
25	4.80	13.98	36.15	3.62	0.54	36.15
30	5.70	17.63	42.19	4.23	0.69	42.19
35	6.59	21.46	48.08	4.82	0.84	48.08
40	7.48	25.43	53.84	5.40	0.99	53.84
45	8.35	29.54	59.49	5.98	1.15	59.49
50	9.22	33.78	65.04	6.54	1.32	65.04
55	10.09	38.14	70.51	7.09	1.49	70.51
60	10.95	42.61	75.91	7.64	1.66	75.91
65	11.81	47.18	81.24	8.18	1.84	81.24
70	12.67	51.85	86.50	8.72	2.02	86.50
75	13.52	56.61	91.71	9.25	2.21	91.71
80	14.36	61.46	96.86	9.77	2.39	96.86
85	15.21	66.39	101.97	10.29	2.59	101.97
90	16.05	71.40	107.03	10.81	2.78	107.03
95	16.89	76.48	112.04	11.32	2.98	112.04
100	17.73	81.65	117.02	11.82	3.18	117.02
105	18.56	86.88	121.96	12.33	3.39	121.96
110	19.39	92.18	126.86	12.83	3.59	126.86
115	20.22	97.54	131.73	13.32	3.80	131.73
120	21.05	102.97	136.57	13.82	4.01	136.57
125	21.87	108.47	141.38	14.31	4.23	141.38
130	22.70	114.02	146.15	14.80	4.44	146.15
135	23.52	119.63	150.90	15.28	4.66	150.90
140	24.34	125.30	155.63	15.76	4.88	155.63
145	25.16	131.02	160.32	16.24	5.11	160.32
150	25.97	136.80	164.99	16.72	5.33	164.99
155	26.79	142.63	169.64	17.19	5.56	169.64
160	27.60	148.52	174.27	17.67	5.79	174.27
165	28.41	154.45	178.87	18.14	6.02	178.87
170	29.22	160.43	183.45	18.61	6.25	183.45
175	30.03	166.46	188.02	19.07	6.49	188.02
180	30.84	172.54	192.56	19.54	6.72	192.56
185	31.65	178.67	197.08	20.00	6.96	197.08
190	32.45	184.83	201.58	20.46	7.20	201.58
195	33.26	191.05	206.07	20.92	7.44	206.07
200	34.06	197.31	210.54	21.38	7.69	210.54
205	34.86	203.61	214.99	21.83	7.93	214.99
210	35.66	209.95	219.42	22.29	8.18	219.42
215	36.46	216.33	223.84	22.74	8.43	223.84
220	37.26	222.76	228.25	23.19	8.68	228.25
225	38.06	229.22	232.63	23.64	8.93	232.63
230	38.85	235.73	237.01	24.09	9.19	237.01
235	39.65	242.27	241.36	24.54	9.44	241.36
240	40.44	248.85	245.71	24.98	9.70	245.71
245	41.23	255.47	250.04	25.43	9.96	250.04
250	42.03	262.12	254.36	25.87	10.21	254.36
255	42.82	268.82	258.66	26.31	10.48	258.66
260	43.61	275.54	262.95	26.75	10.74	262.95
265	44.40	282.31	267.23	27.19	11.00	267.23
270	45.19	289.11	271.49	27.63	11.27	271.49
275	45.98	295.94	275.75	28.07	11.53	275.75
280	46.76	302.80	279.99	28.50	11.80	279.99
285	47.55	309.70	284.22	28.94	12.07	284.22
290	48.34	316.64	288.44	29.37	12.34	288.44
295	49.12	323.60	292.65	29.80	12.61	292.65
300	49.90	330.60	296.85	30.23	12.88	296.85
310	51.47	344.69	305.21	31.09	13.43	305.21
320	53.03	358.91	313.53	31.95	13.99	313.53
330	54.59	373.25	321.81	32.80	14.54	321.81
340	56.15	387.71	330.06	33.64	15.11	330.06
350	57.71	402.28	338.26	34.49	15.68	338.26
360	59.26	416.97	346.44	35.33	16.25	346.44
370	60.81	431.77	354.57	36.16	16.83	354.57
380	62.35	446.68	362.67	37.00	17.41	362.67
390	63.90	461.70	370.75	37.83	17.99	370.75
400	65.44	476.82	378.78	38.66	18.58	378.78

CCC = Criteria Continuous Concentration
CMC = Criteria Maximum Concentration

1-HOUR AVERAGE Copper limitation = $e^{0.9422H - 1.464}$

4-DAY AVERAGE Copper Limitation = $e^{0.8545H - 1.465}$

1-HOUR AVERAGE Lead limitation = $e^{1.273H - 1.460}$

4-DAY AVERAGE Lead Limitation = $e^{1.273H - 4.705}$

1-HOUR AVERAGE Zinc limitation = $e^{0.8473H + 0.8604}$

4-DAY AVERAGE Zinc Limitation = $e^{0.8473H + 0.7614}$

**PERMIT ATTACHMENT C
FORESTVILLE WATER DISTRICT
WASTE DISCHARGE REQUIREMENTS ORDER NO. R1-2004-0027
FINAL COPPER EFFLUENT LIMITATIONS**

Hardness-Dependent Effluent Limitations for Copper

Total Recoverable Copper (in ug/l)

Hardness mg/l as CaCO ₃	Copper Concentration Limitations				CV = 1.02
	CCC 4-Day Ave. (ug/l)	CMC 1-Hour Ave. (ug/l)	AMEL (ug/l)	MDEL (ug/l)	
5	0.7	0.8	0.3	0.8	
10	1.3	1.6	0.6	1.6	
15	1.8	2.3	0.9	2.3	
20	2.4	3.1	1.2	3.1	
25	2.9	3.8	1.5	3.8	CCC = Criteria Continuous Concentration {0.8545[ln(hardness)] - 1.702} = e
30	3.3	4.5	1.8	4.5	
35	3.8	5.2	2.0	5.2	
40	4.3	5.9	2.3	5.9	
45	4.7	6.6	2.6	6.6	CMC = Criteria Maximum Concentration {0.9422[ln(hardness)] - 1.700} = e
50	5.2	7.3	2.9	7.3	
55	5.6	8.0	3.1	8.0	
60	6.0	8.7	3.4	8.6	
65	6.5	9.3	3.7	9.3	AMEL = Average Monthly Effluent Limitation = 1.96[min(0.367CCC,0.200CMC)]
70	6.9	10.0	3.9	10.0	
75	7.3	10.7	4.2	10.7	
80	7.7	11.3	4.4	11.3	
85	8.1	12.0	4.7	12.0	MDEL = Maximum Daily Effluent Limitation = 4.99[min(0.367CCC,0.200CMC)]
90	8.5	12.7	5.0	12.7	
95	8.9	13.3	5.2	13.3	
100	9.3	14.0	5.5	14.0	
105	9.7	14.7	5.7	14.6	Hardness – hardness of the receiving water at the time the discharge is sampled.
110	10.1	15.3	6.0	15.3	
115	10.5	16.0	6.3	15.9	
120	10.9	16.6	6.5	16.6	
125	11.3	17.3	6.8	17.2	
130	11.7	17.9	7.0	17.9	
135	12.1	18.6	7.3	18.5	
140	12.4	19.2	7.5	19.2	
145	12.8	19.9	7.8	19.8	
150	13.2	20.5	8.0	20.5	
155	13.6	21.2	8.3	21.1	
160	13.9	21.8	8.5	21.8	
165	14.3	22.4	8.8	22.4	
170	14.7	23.1	9.0	23.0	
175	15.0	23.7	9.3	23.7	
180	15.4	24.4	9.5	24.3	
185	15.8	25.0	9.8	24.9	
190	16.1	25.6	10.0	25.6	
195	16.5	26.3	10.3	26.2	
200	16.9	26.9	10.5	26.8	
205	17.2	27.5	10.8	27.5	
210	17.6	28.2	11.0	28.1	
215	17.9	28.8	11.3	28.7	
220	18.3	29.4	11.5	29.4	
225	18.7	30.1	11.8	30.0	
230	19.0	30.7	12.0	30.6	
235	19.4	31.3	12.3	31.3	
240	19.7	31.9	12.5	31.9	
245	20.1	32.6	12.8	32.5	
250	20.4	33.2	13.0	33.1	
255	20.8	33.8	13.3	33.7	
260	21.1	34.4	13.5	34.4	
265	21.5	35.1	13.7	35.0	
270	21.8	35.7	14.0	35.6	
275	22.1	36.3	14.2	36.2	
280	22.5	36.9	14.5	36.9	
285	22.8	37.6	14.7	37.5	
290	23.2	38.2	15.0	38.1	
295	23.5	38.8	15.2	38.7	
300	23.9	39.4	15.5	39.3	
310	24.5	40.6	15.9	40.6	
320	25.2	41.9	16.4	41.8	
330	25.9	43.1	16.9	43.0	
340	26.5	44.3	17.4	44.3	
350	27.2	45.6	17.9	45.5	
360	27.9	46.8	18.3	46.7	
370	28.5	48.0	18.8	47.9	
380	29.2	49.2	19.3	49.1	
400	30.5	51.7	20.3	51.6	
>400	30.5	51.7	20.3	51.6	

PERMIT ATTACHMENT D
FORESTVILLE WATER DISTRICT
WASTE DISCHARGE REQUIREMENTS ORDER NO. R1-2004-0027
FINAL LEAD EFFLUENT LIMITATIONS

Hardness-Dependent Effluent Limitations for Lead
Total Recoverable Lead (ug/l)

Hardness mg/l as CaCO3	CCC 4-Day Ave. (ug/l)	CMC 1-Hour Ave. (ug/l)	AMEL (ug/l)	MDEL (ug/l)	CV=0.60
5	0.1	1.8	0.1	0.1	
10	0.2	4.4	0.1	0.3	
15	0.3	7.3	0.2	0.5	
20	0.4	10.5	0.3	0.7	
25	0.5	14.0	0.4	0.9	CCC = Criteria Continuous Concentration {0.8545[ln(hardness)] - 1.702} = e
30	0.7	17.6	0.6	1.1	
35	0.8	21.5	0.7	1.4	
40	1.0	25.4	0.8	1.6	
45	1.2	29.5	0.9	1.9	CMC = Criteria Maximum Concentration {0.9422[ln(hardness)] - 1.700} = e
50	1.3	33.8	1.1	2.2	
55	1.5	38.1	1.2	2.4	
60	1.7	42.6	1.4	2.7	
65	1.8	47.2	1.5	3.0	AMEL = Average Monthly Effluent Limitation = 1.55[min(0.527CCC,0.321CMC)]
70	2.0	51.8	1.7	3.3	
75	2.2	56.6	1.8	3.6	
80	2.4	61.5	2.0	3.9	
85	2.6	66.4	2.1	4.2	MDEL = Maximum Daily Effluent Limitation = 3.11[min(0.527CCC,0.321CMC)]
90	2.8	71.4	2.3	4.6	
95	3.0	76.5	2.4	4.9	
100	3.2	81.6	2.6	5.2	
105	3.4	86.9	2.8	5.5	Hardness - the hardness of the receiving water at the time the discharge is sampled.
110	3.6	92.2	2.9	5.9	
115	3.8	97.5	3.1	6.2	
120	4.0	103.0	3.3	6.6	
125	4.2	108.5	3.5	6.9	
130	4.4	114.0	3.6	7.3	
135	4.7	119.6	3.8	7.6	
140	4.9	125.3	4.0	8.0	
145	5.1	131.0	4.2	8.4	
150	5.3	136.8	4.4	8.7	
155	5.6	142.6	4.5	9.1	
160	5.8	148.5	4.7	9.5	
165	6.0	154.4	4.9	9.9	
170	6.3	160.4	5.1	10.2	
175	6.5	166.5	5.3	10.6	
180	6.7	172.5	5.5	11.0	
185	7.0	178.7	5.7	11.4	
190	7.2	184.8	5.9	11.8	
195	7.4	191.0	6.1	12.2	
200	7.7	197.3	6.3	12.6	
205	7.9	203.6	6.5	13.0	
210	8.2	209.9	6.7	13.4	
215	8.4	216.3	6.9	13.8	
220	8.7	222.8	7.1	14.2	
225	8.9	229.2	7.3	14.6	
230	9.2	235.7	7.5	15.1	
235	9.4	242.3	7.7	15.5	
240	9.7	248.9	7.9	15.9	
245	10.0	255.5	8.1	16.3	
250	10.2	262.1	8.3	16.7	
255	10.5	268.8	8.6	17.2	
260	10.7	275.5	8.8	17.6	
265	11.0	282.3	9.0	18.0	
270	11.3	289.1	9.2	18.5	
275	11.5	295.9	9.4	18.9	
280	11.8	302.8	9.6	19.3	
285	12.1	309.7	9.9	19.8	
290	12.3	316.6	10.1	20.2	
295	12.6	323.6	10.3	20.7	
300	12.9	330.6	10.5	21.1	
310	13.4	344.7	11.0	22.0	
320	14.0	358.9	11.4	22.9	
330	14.5	373.2	11.9	23.8	
340	15.1	387.7	12.3	24.8	
350	15.7	402.3	12.8	25.7	
360	16.2	417.0	13.3	26.6	
370	16.8	431.8	13.7	27.6	
380	17.4	446.7	14.2	28.5	
390	18.0	461.7	14.7	29.5	
400	18.6	476.8	15.2	30.5	
>400	18.6	476.8	15.2	30.5	

PERMIT ATTACHMENT E
FORESTVILLE WATER DISTRICT
WASTE DISCHARGE REQUIREMENTS ORDER NO. R1-2004-0027
FINAL ZINC EFFLUENT LIMITATIONS

Hardness-Dependent Effluent Limitations for Zinc
Total Recoverable Zinc (ug/l)

Hardness mg/l as CaCO ₃	CCC 4-Day Ave. (ug/l)	CMC 1-Hour Ave. (ug/l)	AMEL (ug/l)	MDEL (ug/l)	CV=0.57
5	9.5	9.5	4.8	9.4	
10	17.0	17.0	8.7	17.0	
15	24.0	24.0	12.2	24.0	
20	30.6	30.6	15.6	30.6	
25	37.0	37.0	18.8	37.0	CCC = Criteria Continuous Concentration
30	43.2	43.2	22.0	43.1	{0.8545[ln(hardness)] - 1.702}
35	49.2	49.2	25.1	49.1	= e
40	55.1	55.1	28.1	55.0	
45	60.9	60.9	31.0	60.8	CMC = Criteria Maximum Concentration
50	66.6	66.6	33.9	66.5	{0.9422[ln(hardness)] - 1.700}
55	72.2	72.2	36.8	72.1	= e
60	77.7	77.7	39.6	77.6	
65	83.2	83.2	42.4	83.0	AMEL = Average Monthly Effluent Limitation
70	88.6	88.6	45.1	88.4	= 1.52[min(0.542CCC,0.3335CMC)]
75	93.9	93.9	47.8	93.7	
80	99.2	99.2	50.5	99.0	MDEL = Maximum Daily Effluent Limitation
85	104.4	104.4	53.2	104.2	= 2.98[min(0.542CCC,0.335CMC)]
90	109.6	109.6	55.8	109.4	
95	114.7	114.7	58.4	114.5	Hardness - hardness of the receiving water
100	119.8	119.8	61.0	119.6	at the time the discharge is sampled.
105	124.9	124.9	63.6	124.7	
110	129.9	129.9	66.1	129.7	
115	134.9	134.9	68.7	134.7	
120	139.8	139.8	71.2	139.6	
125	144.8	144.8	73.7	144.5	
130	149.6	149.6	76.2	149.4	
135	154.5	154.5	78.7	154.2	
140	159.3	159.3	81.1	159.1	
145	164.2	164.2	83.6	163.9	
150	168.9	168.9	86.0	168.6	
155	173.7	173.7	88.4	173.4	
160	178.4	178.4	90.9	178.1	
165	183.1	183.1	93.3	182.8	
170	187.8	187.8	95.6	187.5	
175	192.5	192.5	98.0	192.2	
180	197.2	197.2	100.4	196.8	
185	201.8	201.8	102.7	201.4	
190	206.4	206.4	105.1	206.0	
195	211.0	211.0	107.4	210.6	
200	215.6	215.6	109.8	215.2	
205	220.1	220.1	112.1	219.7	
210	224.7	224.7	114.4	224.3	
215	229.2	229.2	116.7	228.8	
220	233.7	233.7	119.0	233.3	
225	238.2	238.2	121.3	237.8	
230	242.7	242.7	123.6	242.3	
235	247.1	247.1	125.8	246.7	
240	251.6	251.6	128.1	251.1	
245	256.0	256.0	130.4	255.6	
250	260.4	260.4	132.6	260.0	
255	264.8	264.8	134.9	264.4	
260	269.2	269.2	137.1	268.8	
265	273.6	273.6	139.3	273.1	
270	278.0	278.0	141.5	277.5	
275	282.3	282.3	143.8	281.9	
280	286.7	286.7	146.0	286.2	
285	291.0	291.0	148.2	290.5	
290	295.3	295.3	150.4	294.8	
295	299.6	299.6	152.6	299.1	
300	303.9	303.9	154.8	303.4	
310	312.5	312.5	159.1	312.0	
320	321.0	321.0	163.5	320.5	
330	329.5	329.5	167.8	328.9	
340	337.9	337.9	172.1	337.4	
350	346.3	346.3	176.4	345.8	
360	354.7	354.7	180.6	354.1	
370	363.0	363.0	184.9	362.4	
380	371.3	371.3	189.1	370.7	
390	379.6	379.6	193.3	379.0	
400	387.8	387.8	197.5	387.2	
>400	387.8	387.8	197.5	387.2	