Western Copper Corporation

Project Proposal

Carmacks Copper Project
Yukon Territory

Appendix F1

Operational Treatment System
(August 2006)

Western Copper Corporation

CARMACKS COPPER PROJECT

OPERATIONAL TREATMENT SYSTEM

August 2006

Operational Treatment System

The contingency water treatment system proposed for the Carmacks Copper project during its operational phase utilizes conventional lime precipitation of metals within the emergency containment pond. For operational treatment purposes, the sediment control pond located down gradient of the events pond will serve as the emergency containment pond. To facilitate this use, the sediment control pond would be lined with a single HDPE liner. Metals precipitation is the process by which dissolved metals are made insoluble, usually as metals hydroxides. This water treatment system is commonly referred to as pond treatment. This treatment entails adding a lime slurry (or caustic soda) into a mixing tank along with the heap effluent or pond overflow solution and allowing the precipitates formed to settle in the lined emergency containment pond. Once the sludge settles in the containment pond, the decant or treated solution can be pumped from the pond for discharge to the receiving environment. Pond treatment systems are chosen for their simplicity. In the case of Carmacks Copper, there is an unlikely need for emergency treatment of process solution during the operating period. Therefore the use of conventional lime treatment technology using a pond treatment approach within the containment pond is an appropriate and proven system. This system is not appropriate for continuous duty and long-term treatment requirements. Pond treatment systems are appropriate for high flow design criteria as may be experienced during a possible short-term condition at Carmacks Copper.

Treatment Chemistry

Precipitation of copper and other metals from the low pH heap solution is standard best practice technology. The basis of lime precipitation for metals removal is based on the insolubility of heavy metals in an alkaline solution. The precipitation of metals using lime precipitation is expressed by the following chemical reaction:

$CaO + H_2O = Ca(OH)_2$

$Ca(OH)_2 + Cu^{2+} = Ca^{2+} + Cu(OH)_2$

Copper is used in the precipitation reaction as it represents the highest metal concentration in the Carmacks system. The above equation shows the reaction of

hydrated lime with the metal of concern, resulting in the precipitation of a metal hydroxide. Typically, lime is either delivered in the form of quicklime (CaO) or hydrated lime ($Ca(OH)_2$. The process of converting quicklime (CaO) to hydrated lime $Ca(OH)_2$ is referred to as slaking. The slaking process produces a concentrated lime slurry mixture. Slaking systems generally produce a lime to water ratio on the order of 1 to 5. Lime slaking systems are highly exothermic and employee safety is a critical issue to consider. Because of the limited treatment potential for Carmacks Copper and the increased safety and process issues associated with a slaking system, the proposed treatment system will not utilize a slaking system but instead will either be a lower concentration of hydrated lime ($Ca(OH)_2$) slurry or caustic soda.

Treatability Test Results

To demonstrate the effectiveness of lime precipitation for a treatment system at Carmacks Copper, bench scale treatability studies were completed at the laboratory of Canadian Environmental & Metallurgical. The test results report from CEMI is included as Attachment A. The test results demonstrate the technical feasibility of producing direct discharge quality solution from the pregnant leach solution (PLS) and raffinate solutions expected from the Carmacks Copper process. The solution tested was obtained from the large scale column tests presently being conducted at the laboratory of Process Research Associates. The PLS and raffinate obtained from the large scale column tests is expected to be representative of the actual heap solutions at Carmacks Copper.

Based on the standard neutralization procedure and test work, all metal concentrations fall within the allowable limits when compared to the Metal Mining Effluent Regulations (MMER) for the raffinate and PLS. The exception is copper from the PLS, which just falls outside of the allowable limits. In this test work, the PLS neutralized to pH 8.5 exceeds the limit for copper and when neutralized to pH 9.5 marginally exceeds the limit. Given that the same solution neutralized to pH 7.5 meets the limits for copper, it is likely that any discharge of solution to the water management system can be made to meet MMER limits by a suitable monitoring of the neutralization process.

Toxicity testing (Daphnia Magna) has been completed on the treated PLS and raffinate solutions. These results are included in Attachment B. Although acute lethality was noted in the toxicity test work, it must be noted that the samples had not benefited from any settling or holding time and provide an indication of relative toxicity in relation to treatability test work. It is fully expected that a non toxic effluent will be produced from the treatment system.

Treatment Process Flowsheet

The proposed treatment process utilizes a pond treatment system. This system includes a lime or caustic solution feed system, a mixing or reaction tank and the emergency containment pond for sludge settling and containment. A simplified flowsheet is attached as Figure 1. There are advantages and disadvantages to using either lime slurry or caustic soda as the alkali addition. The metal hydroxide precipitants produced with the use of lime have much faster settling rates because of co-precipitation of calcium solids. Further, the settled sludge from lime treatment is higher in solids content and much more amenable to dewatering. On the other hand, lime takes longer to react in the neutralizer than caustic soda, has a more complicated feed system and, most significantly, it generates a considerably higher mass of sludge solids. For the purposes of the proposed treatment system, lime slurry is planned but the flexibility of using caustic soda should be maintained.

Solution from the heap can be directly diverted into the mixing tank where lime slurry or caustic solution is added. Solution already contained in the emergency containment pond as a result of an upset or high precipitation condition can be removed and pumped back into the mixing tank. A reagent holding tank provides storage for the lime slurry or caustic solution. Flocculent can be added to the reagent mixing tank to promote particle growth and enhanced precipitation in the containment pond. Flow and pH measurements will be available on the discharge of the mixing tank to provide sufficient process control.

Sludge Volumes

Clearwater Consultants has predicted a range of possible overflow volumes into the emergency containment pond between 0 – 155,000 m^3 during the operational period of Carmacks Copper. Details of these estimates can be found in Clearwater Consultants Memo CCL-CC7 Carmacks Copper Updated Water Balance. The estimated range of volumes that may require treatment and release during the operational period is summarized in Table 1. For the purpose of the treatment system, the most conservative (wet years) estimate is presented in Table 1.

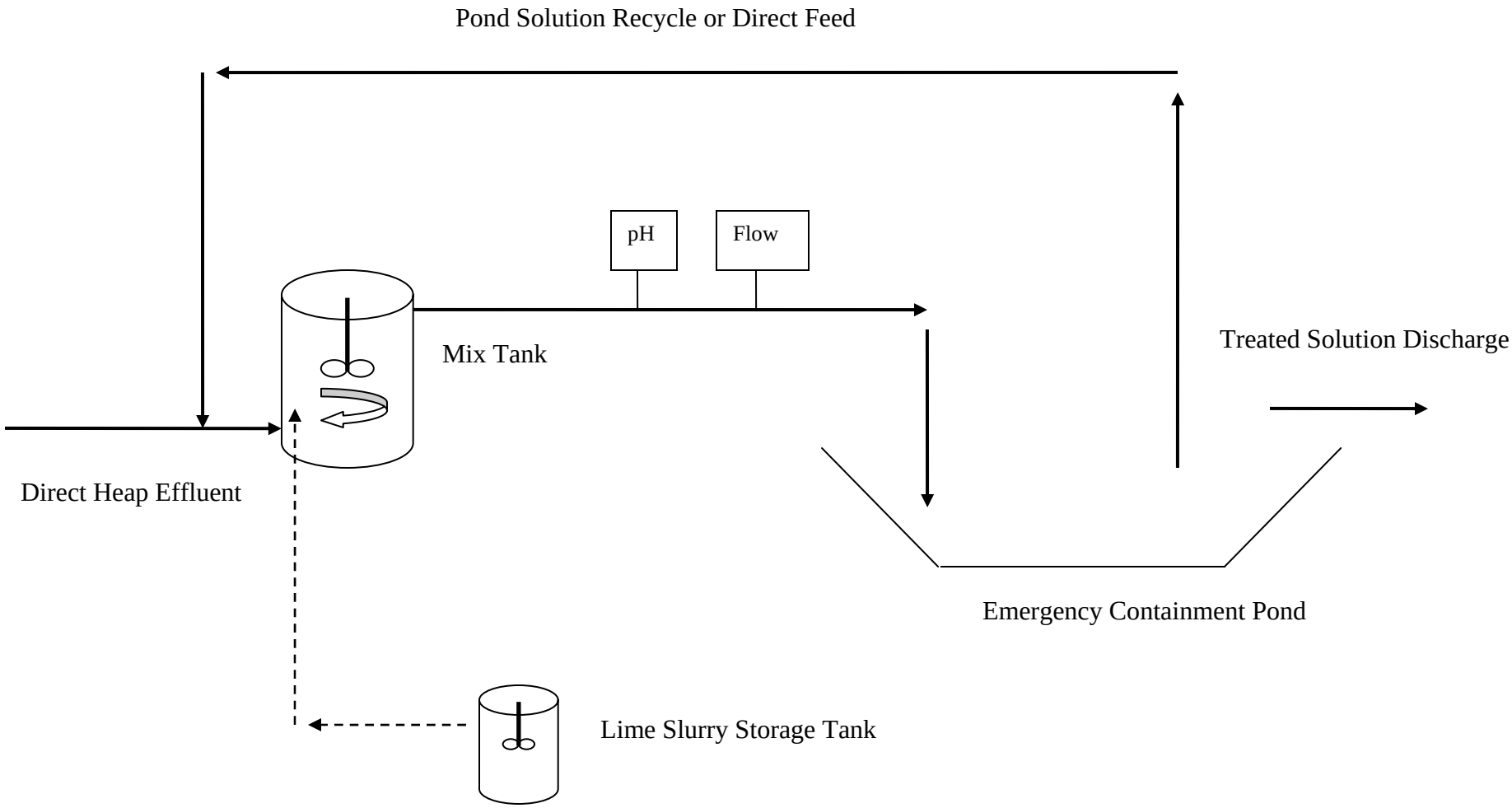
Table 1 - Estimated Treat and Release Volumes (m^3/year)

Wet Years

YEARS 1-3	YEARS 4-7	YEARS 8-9
0	8,000 – 31,000	133,000 – 155,000

Typical high density sludge processes which produce a dense sludge generate approximately 0.01 - 0.05% sludge volume per volume of solution treated and can produce sludge that is approximately 35% solids. The use of the emergency containment pond for settling will not be as effective in generating dense precipitate as a high density sludge (HDS) system and is expected to generate sludge that is approximately 10 times less dense as a HDS sludge. Therefore the anticipated sludge volume generated is estimated at 0.5% of the total volume treated. Based on the worse case treatment volume of 155,000 m^3 during the operational period, approximately 775 m^3 of sludge would be potentially generated if an upset condition occurred that required lime treatment of the entire volume. Given the low sludge volume and low likelihood that treatment of this magnitude will occur, any sludge generated in the bottom of the containment pond will be left in place and managed during the closure period of the mine. Options for sludge management at the end of the mine include removing from the pond bottom and depositing into the leach pad after closure and rinsing of the heap is complete. The leach pad is an ideal location for final disposal and storage of the sludge product due to its lined containment and leak detection system. In addition, after the heap is rinsed, neutral pH conditions will ensure sludge stability is maintained.

Figure 1 - Treatment Process Flowsheet



ATTACHMENT A
TREATABILITY TEST RESULTS

CARMACKS COPPER PROJECT
CARMACKS, YUKON

NEUTRALIZATION TEST WORK
on
PROCESS SOLUTIONS

Prepared By:

CEMI
Canadian Environmental & Metallurgical Inc.
6927 Antrim Avenue
Burnaby, BC

June 2006

1.0 INTRODUCTION

Two pails (approximately 10L each) containing samples of PLS and raffinate were sent to Canadian Environmental & Metallurgical Inc. (CEMI) laboratory for neutralization test work. The samples were obtained from ongoing large column leach test work being performed at PRA laboratories on samples of ore from the Carmacks Copper project in the Yukon. The main objective of the test work was to assess the technical ability to treat PLS and raffinate to acceptable discharge standards should circumstances require the plant to release excess solution (due to heavy snow melt for example) into the water management system.

The head sample was analyzed for ICP at Maxxam Analytics in Vancouver, British Columbia. The acidic solutions were neutralized to different set pH points (7.5, 8.5 and 9.5) and reacted for 60 minutes. After 60 minutes of reaction, a portion of the neutralized solution was submitted for the same analysis as the head sample solution and the remainder sent for further testing as requested by the client.

The neutralized solutions were then sent to Vizon Scitec Inc to perform LC50 tests using Daphnia magna. The results of these tests are reported elsewhere.

2.0 RESULTS

A 2.0 L sample of PLS and raffinate solution was neutralized to different pH set points. Hydrated lime at 10% was used as a neutralizing agent with a reaction time of 60 minutes. Table 2.1 shows the target and actual test pH with the hydrated lime consumptions.

Table 2.1: Neutralization Test Results

Test #	Initial pH	Target pH	Test pH	Lime (mL)	Lime Consumption (g/L)
PLS 1	3.84	7.50	7.67	212	10.6
PLS 2		8.50	8.49	248	12.4
PLS 3		9.50	9.61	292	14.6
RAFF 1	1.12	7.50	7.48	265	13.3
RAFF 2		8.50	8.47	320	16.0
RAFF 3		9.50	9.61	423	21.2

Neutralized solution was filtered, and submitted for metal analysis. The chemistry results are shown in the Table 2.2 and Table 2.3 below.

Also shown in these tables are the monthly mean concentrations for Metal Mining Effluent Regulations. It can be seen that when using this standard neutralization procedure, with the exception of copper from the PLS, all other metal concentrations fall within the allowable limits. In this test work, the PLS neutralized to pH 8.5 exceeds the limit for copper and when neutralized to pH 9.5 marginally exceeds the limit. Given that the same solution neutralized to pH 7.5 meets the limits for copper, it is likely that any discharge of solution to the water management system can be made to meet MMER limits by a suitable monitoring of the neutralization process.

Table 2.2 : PLS Neutralization Results

		PLS				MMER
	Units	Feed	pH 7.5	pH 8.5	pH 9.5	
Aluminum (Al)	mg/L	1070	0.149	0.098	0.018	
Antimony (Sb)	mg/L	< 0.01	< 0.001	< 0.001	< 0.001	
Arsenic (As)	mg/L	< 0.01	0.004	0.005	0.002	0.5
Barium (Ba)	mg/L	< 0.05	0.04	0.04	0.04	
Beryllium (Be)	mg/L	0.09	< 0.002	< 0.002	< 0.002	
Bismuth (Bi)	mg/L	<3	<0.5	<0.5	<0.5	
Boron (B)	mg/L	<0.4	<0.08	<0.08	<0.08	
Cadmium (Cd)	mg/L	0.598	0.0225	0.0062	0.0017	
Calcium (Ca)	mg/L	506	489	499	538	
Chromium (Cr)	mg/L	0.169	< 0.001	< 0.001	< 0.001	
Cobalt (Co)	mg/L	13.7	0.0405	0.0065	0.0013	
Copper (Cu)	mg/L	5820	0.244	0.652	0.319	0.3
Iron (Fe)	mg/L	158	<0.05	<0.05	<0.05	
Lead (Pb)	mg/L	0.005	0.0006	<0.0005	<0.0005	0.2
Lithium (Li)	mg/L	0.407	0.317	0.289	0.24	
Magnesium (Mg)	mg/L	2800	2280	1780	1030	
Manganese (Mn)	mg/L	506	158	24.1	1.05	
Mercury (Hg)	ug/L	0.91	0.24	0.23	0.16	
Molybdenum (Mo)	mg/L	<0.3	<0.05	<0.05	<0.05	
Nickel (Ni)	mg/L	11.2	<0.08	<0.08	<0.08	0.5
Phosphorus (P)	mg/L	<5	<1	<1	<1	
Potassium (K)	mg/L	84	110	108	107	
Selenium (Se)	mg/L	0.247	0.108	0.101	0.085	
Silicon (Si)	mg/L	32	1.5	1.2	0.7	
Silver (Ag)	mg/L	0.01	0.0049	0.0031	0.0033	
Sodium (Na)	mg/L	79	72.7	72.5	71.1	
Strontium (Sr)	mg/L	0.63	0.56	0.58	0.59	
Sulphur (S)	mg/L	8540	3310	2650	1770	
Thallium (Tl)	mg/L	< 0.001	0.0004	0.0003	0.0006	
Tin (Sn)	mg/L	<1	<0.2	<0.2	<0.2	
Titanium (Ti)	mg/L	0.2	<0.03	<0.03	<0.03	
Uranium (U)	mg/L	0.212	0.0004	0.0003	<0.0001	
Vanadium (V)	mg/L	<0.3	<0.05	<0.05	<0.05	
Zinc (Zn)	mg/L	36.4	<0.05	<0.05	<0.05	0.5
Zirconium (Zr)	mg/L	<0.3	<0.05	<0.05	<0.05	

Table 2.3 : Raffinate Neutralization Results

		RAFFINATE				MMER
	Units	**Feed**	**pH 7.5**	**pH 8.5**	**pH 9.5**	
Aluminum (Al)	mg/L	1040	0.339	0.826	0.357	
Antimony (Sb)	mg/L	< 0.01	< 0.001	< 0.001	< 0.001	
Arsenic (As)	mg/L	< 0.01	0.008	0.004	0.003	0.5
Barium (Ba)	mg/L	0.03	0.04	0.04	0.048	
Beryllium (Be)	mg/L	0.094	<0.002	<0.002	<0.0002	
Bismuth (Bi)	mg/L	<0.5	<0.5	<0.5	<0.05	
Boron (B)	mg/L	<0.08	<0.08	<0.08	0.013	
Cadmium (Cd)	mg/L	0.63	0.052	0.006	0.0003	
Calcium (Ca)	mg/L	527	496	507	623	
Chromium (Cr)	mg/L	0.168	0.003	0.005	0.008	
Cobalt (Co)	mg/L	12.8	0.128	0.0027	<0.0005	
Copper (Cu)	mg/L	379	0.233	0.125	0.0745	0.3
Iron (Fe)	mg/L	175	<0.05	<0.05	0.013	
Lead (Pb)	mg/L	0.015	<0.0005	0.0006	<0.0005	0.2
Lithium (Li)	mg/L	0.439	0.343	0.165	0.238	
Magnesium (Mg)	mg/L	3100	2630	1560	35.8	
Manganese (Mn)	mg/L	586	234	12.1	0.106	
Mercury (Hg)	ug/L	0.96	0.5	0.37	0.18	
Molybdenum (Mo)	mg/L	0.19	0.07	0.06	0.037	
Nickel (Ni)	mg/L	11.7	<0.08	<0.08	<0.008	0.5
Phosphorus (P)	mg/L	<1	<1	<1	<0.1	
Potassium (K)	mg/L	121	110	105	96	
Selenium (Se)	mg/L	0.22	0.137	0.118	0.074	
Silicon (Si)	mg/L	34.8	1	0.7	0.74	
Silver (Ag)	mg/L	0.009	0.0058	0.0042	0.0025	
Sodium (Na)	mg/L	81.1	71.6	69.5	64.5	
Strontium (Sr)	mg/L	0.66	0.53	0.56	0.535	
Sulphur (S)	mg/L	10300	3760	2380	639	
Thallium (Tl)	mg/L	< 0.001	0.0004	0.0003	0.0002	
Tin (Sn)	mg/L	<0.2	<0.2	<0.2	<0.02	
Titanium (Ti)	mg/L	<0.03	<0.03	<0.03	<0.003	
Uranium (U)	mg/L	0.226	0.0015	0.0015	0.0002	
Vanadium (V)	mg/L	<0.05	<0.05	<0.05	<0.005	
Zinc (Zn)	mg/L	41.3	<0.05	<0.05	<0.005	0.5
Zirconium (Zr)	mg/L	<0.05	<0.05	<0.05	0.008	

ATTACHMENT B

TOXICITY TESTWORK RESULTS

VIZON SCITEC

Date: August 14, 2006

Our File: 2-11-200/263

Mr. Jonathan Glegg
Western Copper Corporation
Suite 2050-1111 W. Georgia Street
Vancouver, BC
V6E 4M3

Mr. Jonathan Glegg:

Please find enclosed copies of tables which outline the procedures and results concerning the toxicity to daphnids (48-h LC50 value) of your effluent samples received at Vizon SciTec Inc. on Jun. 9, 2006. Our invoice to cover the cost of these tests for $1200 is enclosed.

Once again it has been a pleasure to have been of service to you. Should you have any questions regarding this report, or if we can be of further service in any way, please contact me at any time.

Sincerely,

Janet Pickard

Janet Pickard, B.Sc.
Manager, Bioassay Program
Toxicology Group

Encl.

Vizon SciTec Inc.
3650 Wesbrook Mall
Vancouver, BC
Canada V6S 2L2

Tel:
(604) 224-4331

Fax:
(604) 224-0540

Email:
info@vizonscitec.com

Web:
www.vizonscitec.com

Western Copper Corporation

25426 - PLS pH 7.5

Daphnia magna Bioassay

48-h LC50 %v/v: 31.48 (22.51, 43.91)

Vizon SciTec Inc.

3650 Wesbrook Mall
Vancouver, BC
Canada V6S 2L2
tel: (604) 224-4331
fax: (604) 224-0540
web: http://vizonscitec.com

Vizon Sample # : 060609H-01			Report # : 2-11-263-145-06-001
Sample Taken:	N/A	Sample pH:	7.2
Sample Collected By:		Sample Dissolved Oxygen:	11.1 mg/L
Sample Received:	Jun. 9, 2006	Sample Temperature:	20.8 °C
Start Date/Time:	Jun. 12, 2006 5:40 PM	Sample Conductance:	9340 µmho/cm
End Date/Time:	Jun. 14, 2006 4:45 PM	Sample Hardness:	9360 mg $CaCO_3$/L

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	Percent Mortality 48 hr
0	317	20.4	20.8	8.0	7.9	9.2	8.8	0	0
10	1660	20.7	21.0	7.8	7.6	8.9	8.8	0	10
18	2526	20.8	21.1	7.7	7.6	8.8	8.7	0	10
32	3776	20.8	21.1	7.7	7.6	8.8	8.7	0	60
56	5660	20.8	21.1	7.6	7.5	8.8	8.7	0	70
100	9450	20.8	21.2	7.4	7.3	8.8	8.6	100	100

Comments:
Two neonates in the 18% and 2 in the 56% concentrations were immobilised. All other surviving neonates appeared and behaved normally. The LC50 value was determined using the Probit method.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	200 ml	Rate of Aeration:	25-50 ml/min/L
Loading Density:	20 ml/Daphnia	Test Hardness Adjusted:	No

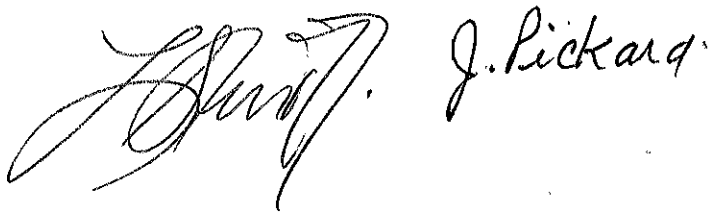
Test Organism: Neonates from *Daphnia magna* less than 24 hours old.

Reference Toxicant: Zinc
Test was conducted on 06/13/2006
Test gave a 48-h LC50 of 0.78 (0.46, 1.45) mg/L

Dilution Water: EPA Reconstituted Water
EDTA Hardness : 100 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna, EPS 1/RM/14, Second Edition, December 2000.

Analyst **Verified By**



Western Copper Corporation
25427 - PLS pH 8.5

Daphnia magna Bioassay
48-h LC50 %v/v: 22.21 (16.43, 29.36)

Vizon SciTec Inc.
3650 Wesbrook Mall
Vancouver, BC
Canada V6S 2L2
tel: (604) 224-4331
fax: (604) 224-0540
web: http://vizonscitec.com

Vizon Sample # : 060609H-02 Report # : 2-11-263-145-06-002

Sample Taken:	N/A	Sample pH:	7.3
Sample Collected By:		Sample Dissolved Oxygen:	11.4 mg/L
Sample Received:	Jun. 9, 2006	Sample Temperature:	21.0 °C
Start Date/Time:	Jun. 12, 2006 5:43 PM	Sample Conductance:	8000 µmho/cm
End Date/Time:	Jun. 14, 2006 4:49 PM	Sample Hardness:	7900 mg $CaCO_3$/L

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	Percent Mortality 48 hr
0	317	20.4	21.2	8.0	8.0	9.2	8.9	0	0
10	1826	20.9	21.2	7.9	7.8	8.8	8.7	0	10
18	2348	20.9	21.3	7.8	7.8	8.8	8.7	0	30
32	3404	20.9	21.3	7.7	7.7	8.8	8.7	0	70
56	5090	20.9	21.3	7.6	7.6	8.7	8.7	100	100
100	8050	20.9	21.3	7.4	7.4	8.7	8.5	100	100

Comments:
One neonate in the 10%, 4 in the 18% and 3 in the 32% concentrations were immobilised. All other surviving neonates appeared and behaved normally. The LC50 value was determined using the Probit method.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	200 ml	Rate of Aeration:	25-50 ml/min/L
Loading Density:	20 ml/Daphnia	Test Hardness Adjusted:	No

Test Organism: Neonates from *Daphnia magna* less than 24 hours old.

Reference Toxicant: Zinc
Test was conducted on 06/13/2006
Test gave a 48-h LC50 of 0.78 (0.46, 1.45) mg/L

Dilution Water: EPA Reconstituted Water
EDTA Hardness : 100 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna, EPS 1/RM/14, Second Edition, December 2000.

Analyst **Verified By**

Western Copper Corporation

25428 - PLS pH 9.5

Daphnia magna Bioassay

48-h LC50 %v/v: 71.32 (55.69, 96.25)

Vizon SciTec Inc.

3650 Wesbrook Mall
Vancouver, BC
Canada V6S 2L2
tel: (604) 224-4331
fax: (604) 224-0540
web: http://vizonscitec.com

Vizon Sample # : 060609H-03 Report # : 2-11-263-145-06-003

Sample Taken:	N/A	Sample pH:	7.3
Sample Collected By:		Sample Dissolved Oxygen:	11.3 mg/L
Sample Received:	Jun. 9, 2006	Sample Temperature:	20.9 °C
Start Date/Time:	Jun. 12, 2006 5:46 PM	Sample Conductance:	5840 µmho/cm
End Date/Time:	Jun. 14, 2006 4:54 PM	Sample Hardness:	5600 mg $CaCO_3$/L

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	Percent Mortality 48 hr
0	317	20.4	21.3	8.0	8.0	9.2	8.8	0	0
10	1448	21.0	21.3	7.9	7.8	8.8	8.7	0	0
18	2092	21.0	21.4	7.8	7.7	8.7	8.6	0	0
32	2611	21.0	21.4	7.7	7.7	8.7	8.6	0	0
56	3728	20.9	21.4	7.6	7.6	8.7	8.5	0	30
100	5800	21.0	21.4	7.5	7.4	8.7	8.1	0	80

Comments:
Three neonates in the 18%, 3 in the 32%, 5 in the 56% and 1 in the 100% concentrations were immobilised. All other surviving neonates appeared and behaved normally. The LC50 value was determined using the Probit method.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	200 ml	Rate of Aeration:	25-50 ml/min/L
Loading Density:	20 ml/Daphnia	Test Hardness Adjusted:	No

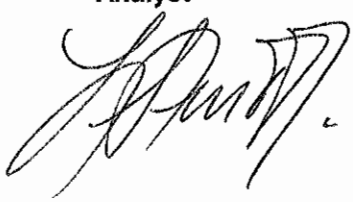
Test Organism: Neonates from *Daphnia magna* less than 24 hours old.

Reference Toxicant: Zinc
Test was conducted on 06/13/2006
Test gave a 48-h LC50 of 0.78 (0.46, 1.45) mg/L

Dilution Water: EPA Reconstituted Water
EDTA Hardness : 100 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna, EPS 1/RM/14, Second Edition, December 2000.

Analyst **Verified By**



J. Pickard

Western Copper Corporation
25429 - RAFF pH 7.5

Daphnia magna Bioassay
48-h LC50 %v/v: 55.1 (42.54, 72.96)

Vizon SciTec Inc.
3650 Wesbrook Mall
Vancouver, BC
Canada V6S 2L2
tel: (604) 224-4331
fax: (604) 224-0540
web: http://vizonscitec.com

Vizon Sample # : 060609H-04 Report # : 2-11-263-145-06-004

Sample Taken:	N/A	Sample pH:	7.1
Sample Collected By:		Sample Dissolved Oxygen:	10.2 mg/L
Sample Received:	Jun. 9, 2006	Sample Temperature:	21.0 °C
Start Date/Time:	Jun. 12, 2006 5:51 PM	Sample Conductance:	10220 µmho/cm
End Date/Time:	Jun. 14, 2006 4:59 PM	Sample Hardness:	11900 mg $CaCO_3$/L

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	Percent Mortality 48 hr
0	317	20.4	21.4	8.0	8.0	9.2	8.8	0	0
10	1795	20.6	21.4	7.7	7.6	8.7	8.6	0	0
18	2789	20.8	21.5	7.6	7.6	8.6	8.6	0	0
32	4214	20.8	21.5	7.5	7.6	8.7	8.5	20	20
56	6180	20.8	21.5	7.4	7.5	8.7	8.5	30	30
100	10270	20.8	21.6	7.3	7.4	8.7	8.7	100	100

Comments:
Two neonates in the 18%, 1 in the 32% and 5 in the 56% concentrations were immobilised. All other surviving neonates appeared and behaved normally. The LC50 value was determined using the Probit method.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	200 ml	Rate of Aeration:	25-50 ml/min/L
Loading Density:	20 ml/Daphnia	Test Hardness Adjusted:	No

Test Organism: Neonates from *Daphnia magna* less than 24 hours old.

Reference Toxicant: Zinc
Test was conducted on 06/13/2006
Test gave a 48-h LC50 of 0.78 (0.46, 1.45) mg/L

Dilution Water: EPA Reconstituted Water
EDTA Hardness : 100 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna, EPS 1/RM/14, Second Edition, December 2000.

Analyst **Verified By**

Western Copper Corporation
25430 - RAFF pH 8.5

Daphnia magna Bioassay
48-h LC50 %v/v: 83.32 (56, 100)

Vizon SciTec Inc.
3650 Wesbrook Mall
Vancouver, BC
Canada V6S 2L2
tel: (604) 224-4331
fax: (604) 224-0540
web: http://vizonscitec.com

Vizon Sample # : 060609H-05 Report # : 2-11-263-145-06-005

Sample Taken:	N/A	Sample pH:	7.7
Sample Collected By:		Sample Dissolved Oxygen:	10.0 mg/L
Sample Received:	Jun. 9, 2006	Sample Temperature:	21.2 °C
Start Date/Time:	Jun. 12, 2006 5:54 PM	Sample Conductance:	7670 µmho/cm
End Date/Time:	Jun. 14, 2006 5:11 PM	Sample Hardness:	7500 mg $CaCO_3$/L

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	Percent Mortality 48 hr
0	317	20.4	21.4	8.0	8.1	9.2	8.8	0	0
10	1741	20.9	21.4	7.8	7.9	8.7	8.6	0	0
18	2248	20.9	21.4	7.8	7.8	8.8	8.6	0	0
32	3049	20.9	21.5	7.7	7.8	8.8	8.6	0	0
56	4522	20.9	21.4	7.6	7.7	8.7	8.5	0	0
100	7450	20.9	21.5	7.6	7.6	8.7	8.5	0	80

Comments:
Two neonates in the 100% concentration were immobilised. All other surviving neonates appeared and behaved normally. The LC50 value was determined using the Binomial method.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	200 ml	Rate of Aeration:	25-50 ml/min/L
Loading Density:	20 ml/Daphnia	Test Hardness Adjusted:	No

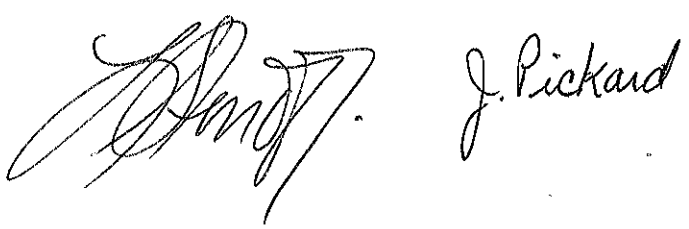
Test Organism: Neonates from *Daphnia magna* less than 24 hours old.

Reference Toxicant: Zinc
Test was conducted on 06/13/2006
Test gave a 48-h LC50 of 0.78 (0.46, 1.45) mg/L

Dilution Water: EPA Reconstituted Water
EDTA Hardness : 100 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna, EPS 1/RM/14, Second Edition, December 2000.

Analyst **Verified By**



Western Copper Corporation
25431 - RAFF pH 9.5

Daphnia magna Bioassay
48-h LC50 %v/v: 74.83 (56, 100)

Vizon SciTec Inc.
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tel: (604) 224-4331
fax: (604) 224-0540
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Vizon Sample # : 060609H-06 Report # : 2-11-263-145-06-006

Sample Taken:	N/A	Sample pH:	8.5
Sample Collected By:		Sample Dissolved Oxygen:	9.9 mg/L
Sample Received:	Jun. 9, 2006	Sample Temperature:	21.2 °C
Start Date/Time:	Jun. 12, 2006 5:57 PM	Sample Conductance:	2987 µmho/cm
End Date/Time:	Jun. 14, 2006 5:16 PM	Sample Hardness:	1900 mg $CaCO_3$/L

Conc. (%v/v)	Cond. (µmho/cm)	Temp. Initial (°C)	Temp. Final (°C)	pH Initial	pH Final	D.O. Initial (mg/L)	D.O. Final (mg/L)	Percent Mortality 24 hr	Percent Mortality 48 hr
0	317	20.4	21.4	8.0	8.1	9.2	8.6	0	0
10	895	21.0	21.4	7.9	7.9	8.7	8.5	0	0
18	1006	21.0	21.4	7.9	7.9	8.7	8.6	0	0
32	1366	21.0	21.4	7.8	7.8	8.7	8.6	0	0
56	1833	21.0	21.5	7.7	7.7	8.7	8.5	0	0
100	2706	21.1	21.5	7.7	7.6	8.7	8.4	0	100

Comments:
One neonate in the 32% was immobilised. All other surviving neonates appeared and behaved normally. The LC50 value was determined using the Binomial method.

Test Conditions:

Organisms per Replicate:	10	Preaeration Time:	30 min.
Test Volume:	200 ml	Rate of Aeration:	25-50 ml/min/L
Loading Density:	20 ml/Daphnia	Test Hardness Adjusted:	No

Test Organism: Neonates from *Daphnia magna* less than 24 hours old.

Reference Toxicant: Zinc
Test was conducted on 06/13/2006
Test gave a 48-h LC50 of 0.78 (0.46, 1.45) mg/L

Dilution Water: EPA Reconstituted Water
EDTA Hardness : 100 mg $CaCO_3$/L Other parameters available on request

Test Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna, EPS 1/RM/14, Second Edition, December 2000.

Analyst **Verified By**