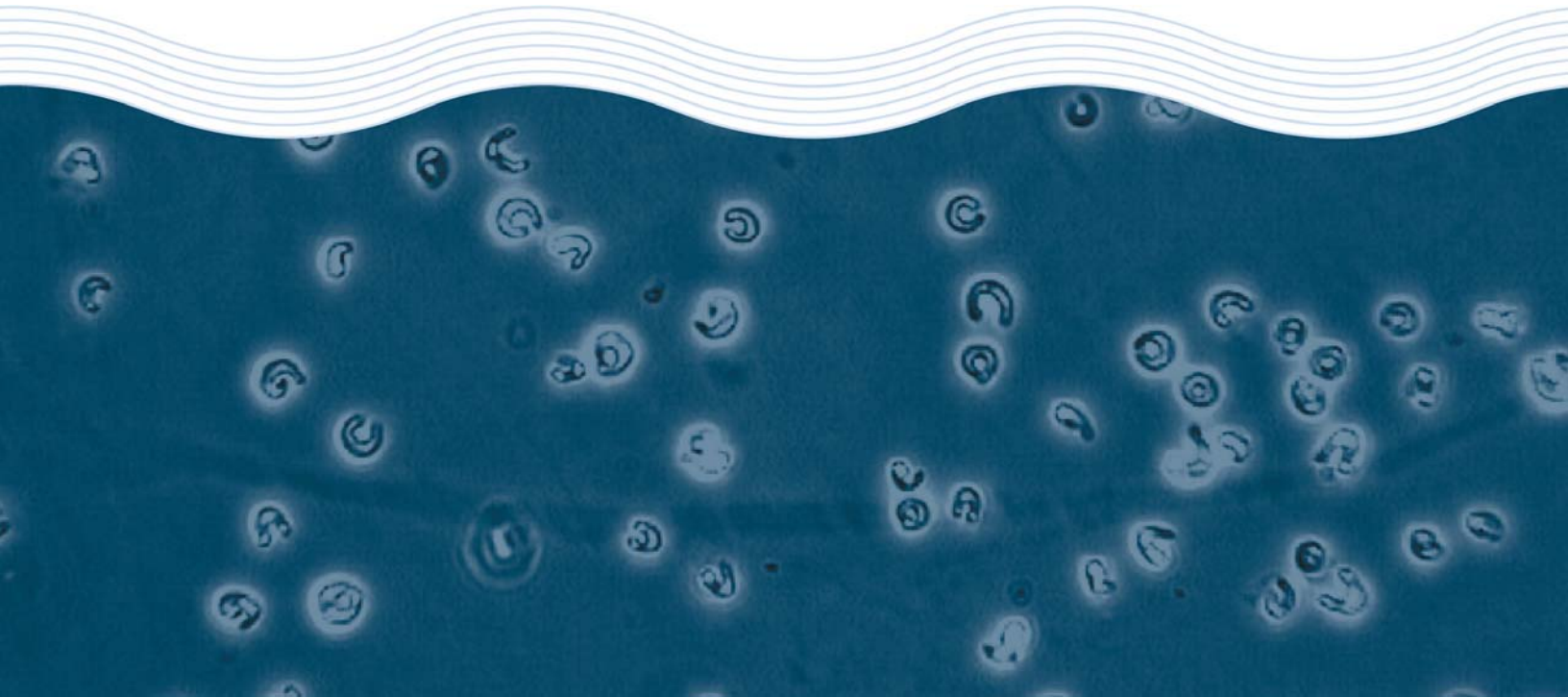
ecotox
SERVICES AUSTRALASIA

Toxicity Assessment of Two Phoslock™ Formulations to the Eastern Rainbowfish

Hydrobiology Pty Ltd for Phoslock Water Solutions Pty Ltd

Test Report

March 2006



Toxicity Assessment of Two Phoslock™ Formulations to the Eastern Rainbowfish

Hydrobiology Pty Ltd for Phoslock Water Solutions Pty Ltd

Test Report

March 2006

ECOTOX Services Australasia Pty Ltd ABN>45 094 714 904
unit 27/2 chaplin drive lane cove nsw 2066 T>61 2 9420 9481 F>61 2 9420 9484 W>www.ecotox.com.au

ecotox
SERVICES AUSTRALASIA

Statistical Analyses of Toxicity Test Data

Toxicity Test Report: TR0224/1

Client:	Hydrobiology Pty Ltd PO Box 2050 Milton QLD 4064	**ESA Job #:** **Date Sampled:** **Date Received:**	PR0224 Not given 3 February 2006
Attention:	Mr Dustin Hobbs	**Sampled By:**	Client
Contract #:		**Quote #:**	PL0224_q01

Lab ID No.:	**Sample Name:**	**Sample Description:**
1434	Phoslock "3.5% VDM4" IMT2102	Brown granules and powder, clay like
1435	Phoslock "Euereka" IMT2101	Elongated and slender brown granules

Test Performed:	96-hr larval fish imbalance test using Eastern Rainbowfish *Melanotaenia splendida*
Test Protocol:	ESA SOP 117, based on OECD Method 203 (1992)
Deviations from Protocol:	Nil. TCLP leachate was prepared by mixing 50g of test material with 1 litre dilution water for 18-h in a rotary tumbler (without light). This leachate was allowed to settle overnight prior to use. The TCLP leachate was 100% sample, and was used in the preparation of test treatments.
Source of Test Organisms:	Hatchery reared larvae, 8-12 mm in length
Test Initiated:	17 March 2006 at 1300h

Sample 1434: *3.5% VDM4*		Sample 1435: *Eureka*		*Vacant*
Concentration (%)	**% unaffected (Mean ± SD)**	**Concentration (%)**	**% unaffected (Mean ± SD)**	
Control	100.0 ± 0.0	Control	100.0 ± 0.0	
6.25	100.0 ± 0.0	6.25	100.0 ± 0.0	
12.5	100.0 ± 0.0	12.5	100.0 ± 0.0	
25	100.0 ± 0.0	25	100.0 ± 0.0	
50	100.0 ± 0.0	50	100.0 ± 0.0	
100	100.0 ± 0.0	100	85.0 ± 19.2	
96 h EC50 (imbalance)= >100%		**96 h EC50 (imbalance)= >100%**		
NOEC = 100%		**NOEC = 100%**		
LOEC 100%		**LOEC 100%**		

There was no significant reduction in the number of unaffected fish compared with the control treatment (Steels Many-one Rank Test, 1-tailed)

QA/QC Parameter	**Criterion**	**This Test**	**Criterion met?**
Control minimum % survival	>90%	100	Yes
Test Temperature limits	25.0 ± 1°C	25.0-26.0 °C	Yes

Test Report Authorised by: Dr Rick Krassoi, Director on 7 October 2005

Larval Fish Growth and Survival Test-96 Hr Survival

Start Date:	17/03/2006 13:00	Test ID:	PR224/1	Sample ID:	3.5% VDM4
End Date:	21/03/2006 13:00	Lab ID:	1434	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	117-ESA SOP117	Test Species:	MX-Melanotaenia splendida
Comments:	TCLP- 50g phoslock per L diluent, rolled for 18-h				

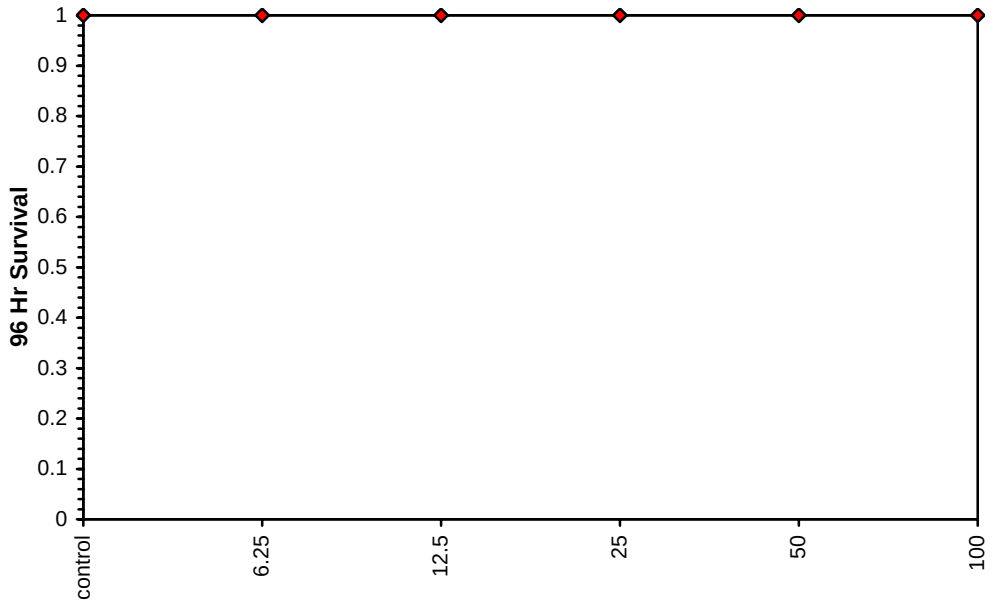
Conc-%	1	2	3	4
control	1.0000	1.0000	1.0000	1.0000
6.25	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4		
6.25	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
12.5	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
25	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
50	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
100	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00

Auxiliary Tests	Statistic	Critical	Skew
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	1	0.884	
Equality of variance cannot be confirmed			

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1

Dose-Response Plot



Larval Fish Growth and Survival Test-96 Hr Survival

Start Date:	17/03/2006 13:00	Test ID:	PR224/1	Sample ID:	3.5% VDM4
End Date:	21/03/2006 13:00	Lab ID:	1434	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	117-ESA SOP117	Test Species:	MX-Melanotaenia splendida
Comments:	TCLP- 50g phoslock per L diluent, rolled for 18-h				

Auxiliary Data Summary

Conc-%	Parameter	Mean	Min	Max	SD	CV%	N
control	% Balanced	100.00	100.00	100.00	0.00	0.00	4
6.25		100.00	100.00	100.00	0.00	0.00	4
12.5		100.00	100.00	100.00	0.00	0.00	4
25		100.00	100.00	100.00	0.00	0.00	4
50		100.00	100.00	100.00	0.00	0.00	4
100		100.00	100.00	100.00	0.00	0.00	4
control	Temp C	25.00	25.00	25.00	0.00	0.00	1
6.25		25.00	25.00	25.00	0.00	0.00	1
12.5		25.00	25.00	25.00	0.00	0.00	1
25		25.00	25.00	25.00	0.00	0.00	1
50		25.00	25.00	25.00	0.00	0.00	1
100		25.00	25.00	25.00	0.00	0.00	1
control	pH	7.90	7.90	7.90	0.00	0.00	1
6.25		7.90	7.90	7.90	0.00	0.00	1
12.5		7.90	7.90	7.90	0.00	0.00	1
25		7.90	7.90	7.90	0.00	0.00	1
50		7.70	7.70	7.70	0.00	0.00	1
100		7.20	7.20	7.20	0.00	0.00	1
control	Cond uS/cm	172.00	172.00	172.00	0.00	0.00	1
6.25		225.00	225.00	225.00	0.00	0.00	1
12.5		336.00	336.00	336.00	0.00	0.00	1
25		501.00	501.00	501.00	0.00	0.00	1
50		819.00	819.00	819.00	0.00	0.00	1
100		1456.00	1456.00	1456.00	0.00	0.00	1
control	DO %sat	101.00	101.00	101.00	0.00	0.00	1
6.25		102.90	102.90	102.90	0.00	0.00	1
12.5		101.80	101.80	101.80	0.00	0.00	1
25		102.70	102.70	102.70	0.00	0.00	1
50		103.00	103.00	103.00	0.00	0.00	1
100		106.00	106.00	106.00	0.00	0.00	1

Larval Fish Growth and Survival Test-96 Hr Survival

Start Date:	17/03/2006 13:00	Test ID:	PR224/2	Sample ID:	Phoslock Eureka
End Date:	21/03/2006 13:00	Lab ID:	1435	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	117-ESA SOP117	Test Species:	MX-Melanotaenia splendida
Comments:	TCLP- 50g phoslock per L diluent, rolled for 18-h				

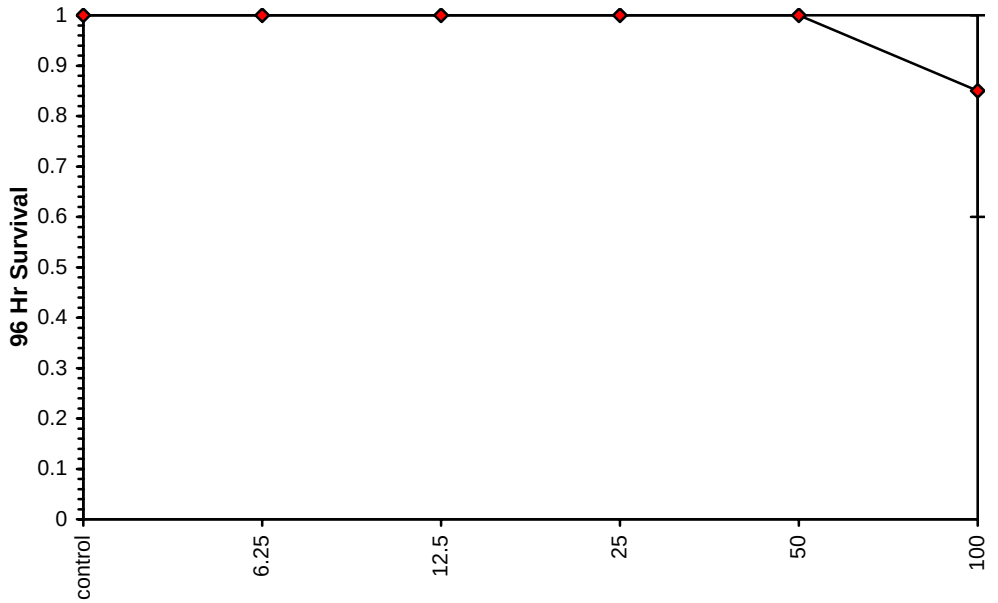
Conc-%	1	2	3	4
control	1.0000	1.0000	1.0000	1.0000
6.25	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000
100	0.8000	1.0000	0.6000	1.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4		
6.25	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
12.5	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
25	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
50	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
100	0.8500	0.8500	1.1709	0.8861	1.3453	18.840	4	14.00	10.00

Auxiliary Tests	Statistic	Critical	Skew
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.537325	0.884	-1.19849
Equality of variance cannot be confirmed			

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1

Dose-Response Plot



Larval Fish Growth and Survival Test-96 Hr Survival

Start Date:	17/03/2006 13:00	Test ID:	PR224/2	Sample ID:	Phoslock Eureka
End Date:	21/03/2006 13:00	Lab ID:	1435	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	117-ESA SOP117	Test Species:	MX-Melanotaenia splendida
Comments:	TCLP- 50g phoslock per L diluent, rolled for 18-h				

Auxiliary Data Summary

Conc-%	Parameter	Mean	Min	Max	SD	CV%	N
control	% Balanced	100.00	100.00	100.00	0.00	0.00	4
6.25		100.00	100.00	100.00	0.00	0.00	4
12.5		100.00	100.00	100.00	0.00	0.00	4
25		100.00	100.00	100.00	0.00	0.00	4
50		100.00	100.00	100.00	0.00	0.00	4
100		85.00	60.00	100.00	19.15	5.15	4
control	Temp C	25.00	25.00	25.00	0.00	0.00	1
6.25		25.00	25.00	25.00	0.00	0.00	1
12.5		25.00	25.00	25.00	0.00	0.00	1
25		25.00	25.00	25.00	0.00	0.00	1
50		25.00	25.00	25.00	0.00	0.00	1
100		25.00	25.00	25.00	0.00	0.00	1
control	pH	7.90	7.90	7.90	0.00	0.00	1
6.25		7.90	7.90	7.90	0.00	0.00	1
12.5		7.90	7.90	7.90	0.00	0.00	1
25		7.90	7.90	7.90	0.00	0.00	1
50		7.80	7.80	7.80	0.00	0.00	1
100		7.50	7.50	7.50	0.00	0.00	1
control	Cond uS/cm	172.00	172.00	172.00	0.00	0.00	1
6.25		234.00	234.00	234.00	0.00	0.00	1
12.5		289.00	289.00	289.00	0.00	0.00	1
25		402.00	402.00	402.00	0.00	0.00	1
50		649.00	649.00	649.00	0.00	0.00	1
100		1104.00	1104.00	1104.00	0.00	0.00	1
control	DO %sat	101.00	101.00	101.00	0.00	0.00	1
6.25		101.50	101.50	101.50	0.00	0.00	1
12.5		101.70	101.70	101.70	0.00	0.00	1
25		103.60	103.60	103.60	0.00	0.00	1
50		105.20	105.20	105.20	0.00	0.00	1
100		105.70	105.70	105.70	0.00	0.00	1