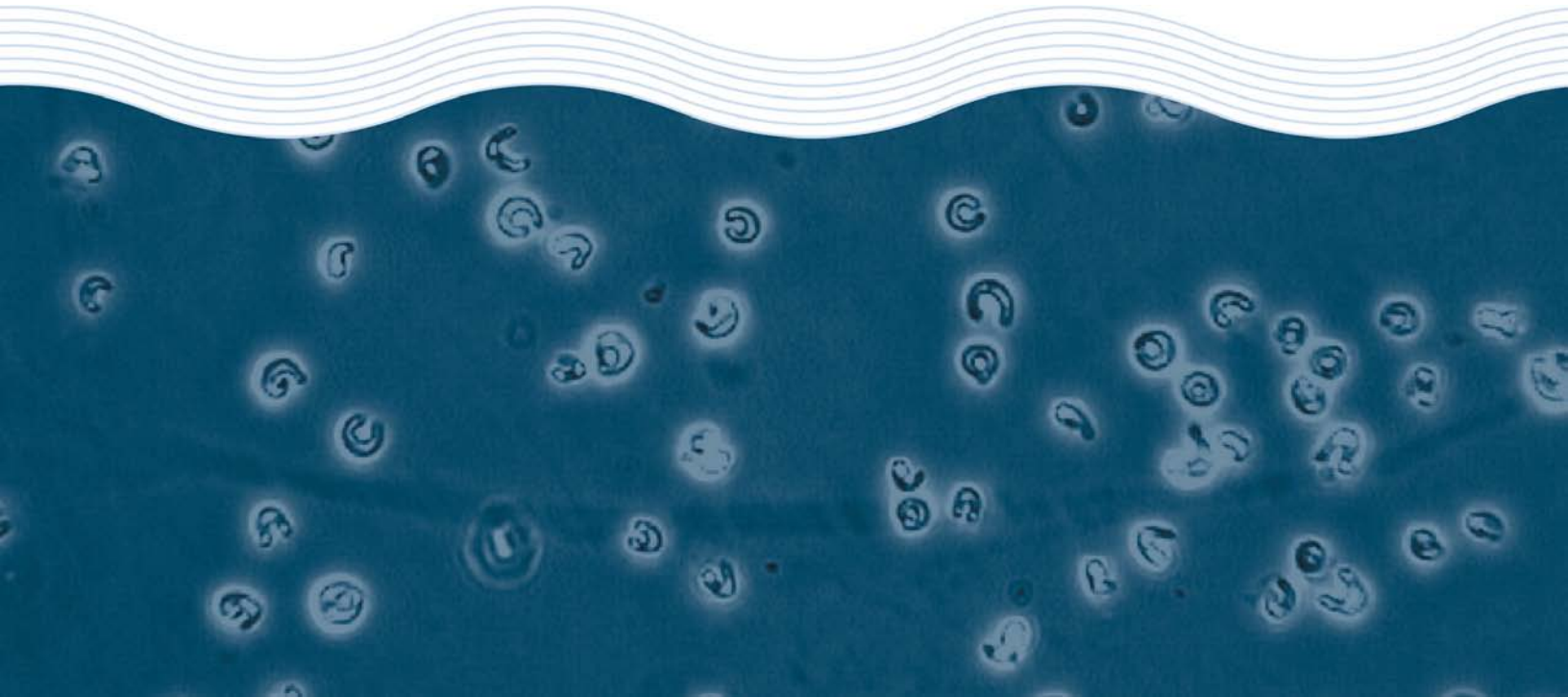
Toxicity Assessment of Oil Spill Eater II

CMTA

Test Report

August 2013



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CMTA

Test Report

August 2013

ECOTOX Services Australasia Pty Ltd ABN>45 094 714 904
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Toxicity Test Report: TR1083/1

This document is issued in accordance with NATA's accreditation requirements

Client:	CMTA 158 Garretts Rd Longford VIC 3851	**ESA Job #:** **Date Sampled:** **Date Received:**	PR1083 Not supplied 19 August 2013
Attention:	Joel Farhadian	**Sampled By:**	Client
Client Ref:	Not supplied	**ESA Quote #:**	PL1083_q01

Lab ID No.:	**Sample Name:**	**Sample Description:**
6232	Oil Spill Eater II	Chemical received at room temperature in apparent good condition

Test Performed:	48-hr larval development test using the milky oyster *Saccostrea echinata*
Test Protocol:	ESA SOP 106 (ESA 2011), based on APHA (1998) and Krassoi (1995)
Test Temperature:	The test was performed at 29±1°C.
Deviations from Protocol:	Nil
Comments on Solution Preparation:	The highest test concentration of 20mg/L was prepared by adding a weighed aliquot of sample 6232 'Oil Spill Eater II' into filtered seawater (FSW). The remaining test concentrations were achieved by serially diluting the highest test concentration with FSW. A FSW control was tested concurrently with the prepared sample.
Source of Test Organisms:	Field collected from Mackay, QLD.
Test Initiated:	20 August 2013 at 1800h

Sample 6232: *Oil Spill Eater II* **Concentration (mg/L)**	**% Normal larvae (Mean ± SD)**	*Vacant*	*Vacant*
FSW Control	72.0 ± 2.2		
1.3	73.3 ± 4.6		
2.5	73.8 ± 2.1		
5.0	74.0 ± 3.7		
10.0	72.0 ± 4.3		
20.0	23.3 ± 16.7 *		
48-hr IC10 = 11.0 (10.0-11.9)mg/L **48-hr EC50 = 16.5 (16.0-17.1)mg/L** **NOEC = 10.0mg/L** **LOEC = 20.0mg/L**			

*Significantly lower percentage of normal larvae compared with the FSW Control (Steel's Many-One Rank Test, 1-tailed, P=0.05)

Toxicity Test Report: TR1083/1

QA/QC Parameter	Criterion	This Test	Criterion met?
FSW Control mean % normal	≥70%	72.0%	Yes
Reference Toxicant within cusum chart limits	13.1-18.8µg Cu/L	15.2µg Cu/L	Yes

Test Report Authorised by:  Dr Rick Krassoi, Director on 3 September 2013

Results are based on the samples in the condition as received by ESA.

NATA Accredited Laboratory Number: 14709

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Citations:

APHA (1998) Standard Methods for the Examination of Water and Wastewater. 20th Ed. American Public Health Association, American Water Works Association and the Water Environment Federation, Washington, DC.

ESA (2011) SOP 106 – *Bivalve Larval Development Test*. Issue No. 10. Ecotox Services Australasia, Sydney, NSW.

Krassoi, R (1995) Salinity adjustment of effluents for use with marine bioassays: effects on the larvae of the doughboy scallop Chlamys asperrimus and the Sydney rock oyster *Saccostrea commercialis*. *Australasian Journal of Ecotoxicology*, 1: 143-148.

Toxicity Test Report: TR1083/2

This document is issued in accordance with NATA's accreditation requirements

Client:	CMTA	**ESA Job #:**	PR1083
	158 Garretts Rd	**Date Sampled:**	Not supplied
	Longford VIC 3851	**Date Received:**	19 August 2013
Attention:	Joel Farhadian	**Sampled By:**	Client
Client Ref:	Not supplied	**ESA Quote #:**	PL1083_q01

Lab ID No.:	**Sample Name:**	**Sample Description:**
6232	Oil Spill Eater II	Chemical received at room temperature in apparent good condition

Test Performed:	48-hr larval development test using the mussel *Mytilus galloprovincialis*
Test Protocol:	ESA SOP 106 (ESA 2011), based on APHA (1998) and USEPA (1996)
Test Temperature:	The test was performed at 20±1°C.
Deviations from Protocol:	The test was extended to 72 hours.
Comments on Solution Preparation:	The highest test concentration of 20mg/L was prepared by adding a weighed aliquot of sample 6232 'Oil Spill Eater II' into filtered seawater (FSW). The remaining test concentrations were achieved by serially diluting the highest test concentration with FSW. A FSW control was tested concurrently with the prepared sample.
Source of Test Organisms:	Farm-reared, Mercury Passage, TAS
Test Initiated:	26 August 2013 at 1545h

Sample 6232: *Oil Spill Eater II* **Concentration (mg/L)**	**% Normal larvae (Mean ± SD)**	*Vacant*	*Vacant*
FSW Control	75.8 ± 4.4		
1.3	72.5 ± 1.3		
2.5	77.8 ± 7.0		
5.0	75.3 ± 5.8		
10.0	77.8 ± 5.0		
20.0	75.3 ± 5.3		
72-hr EC10 = >20.0mg/L			
72-hr EC50 = >20.0mg/L			
NOEC = 20.0mg/L			
LOEC = >20.0mg/L			

Toxicity Test Report: TR1083/2

QA/QC Parameter	Criterion	This Test	Criterion met?
FSW Control mean % normal	≥70%	75.8%	Yes
Reference Toxicant within cusum chart limits	7.3-17.2µg Cu/L	7.5µg Cu/L	Yes

Test Report Authorised by:  Dr Rick Krassoi, Director on 3 September 2013

Results are based on the samples in the condition as received by ESA.

NATA Accredited Laboratory Number: 14709

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Citations:

APHA (1998) *Standard Methods for the Examination of Water and Wastewate*r. 20th Ed. American Public Health Association, American Water Works Association and the Water Environment Federation, Washington, DC, USA.

ESA (2011) *Bivalve Larval Development Test*. Issue No. 10. Ecotox Services Australasia, Sydney, NSW

USEPA (1996) *Bivalve acute toxicity test (embryo larval) OPPTS 850.1055. Ecological Effects Test Guidelines.* United States Environmental Protection Agency. Prevention, Pesticides and Toxic Substances. EPA/712/C-96/137.

Toxicity Test Report: TR1083/3

Client:	CMTA	**ESA Job #:**	PR1083
	158 Garretts Rd	**Date Sampled:**	Not supplied
	Longford VIC 3851	**Date Received:**	19 August 2013
Attention:	Joel Farhadian	**Sampled By:**	Client
Client Ref:	Not supplied	**ESA Quote #:**	PL1083_q01

Lab ID No.:	**Sample Name:**	**Sample Description:**
6232	Oil Spill Eater II	Chemical received at room temperature in apparent good condition

Test Performed:	48-hr acute survival test using the copepod *Parvocalanus crassirostris*
Test Protocol:	ESA SOP 124 (2012)
Test Temperature:	The test was performed at 27±1°C.
Deviations from Protocol:	Nil
Comments on Solution Preparation:	The highest test concentration of 20mg/L was prepared by adding a weighed aliquot of sample 6232 'Oil Spill Eater II' into filtered seawater (FSW). The remaining test concentrations were achieved by serially diluting the highest test concentration with FSW. A FSW control was tested concurrently with the prepared sample.
Source of Test Organisms:	In house culture
Age of Test Organisms:	<7 days old
Test Initiated:	14 November 2013 at 1300h

Sample 6232: *Oil Spill Eater II*	*Vacant*	*Vacant*
Concentration (mg/L) / **% Survival (Mean ± SD)**		
FSW Control: 95.0 ± 10.0		
1.3: 95.0 ± 10.0		
2.5: 100 ± 0.0		
5.0: 90.0 ± 11.6		
10.0: 95.0 ± 10.0		
20.0: 90.0 ± 11.6		
48-hr IC10 = >20.0mg/L **48-hr EC50 = >20.0mg/L** **NOEC = 20.0mg/L** **LOEC = >20.0mg/L**		

QA/QC Parameter	**Criterion**	**This Test**	**Criterion met?**
Control mean % survival	≥80.0%	95.0%	Yes
Reference Toxicant within cusum chart limits	4.4-30.5µg Cu/L	10.0µg Cu/L	Yes

Toxicity Test Report: TR1083/3

Test Report Authorised by:  Dr Rick Krassoi, Director on 25 November 2013

Results are based on the samples in the condition as received by ESA. This document shall not be reproduced except in full.

Citations:

ESA (2012) *SOP 124 – Acute toxicity test using the copepod Gladioferens imparipes*. Issue No. 1. Ecotox Services Australasia, Sydney, New South Wales.

Toxicity Test Report: TR1083/4

This document is issued in accordance with NATA's accreditation requirements

Client:	CMTA 158 Garretts Rd Longford VIC 3851	**ESA Job #:** **Date Sampled:** **Date Received:**	PR1083 Not supplied 19 August 2013
Attention:	Joel Farhadian	**Sampled By:**	Client
Client Ref:	Not supplied	**ESA Quote #:**	PL1083_q01

Lab ID No.:	**Sample Name:**	**Sample Description:**
6232	Oil Spill Eater II	Chemical received at room temperature in apparent good condition

Test Performed:	96-hr acute toxicity test using the amphipod *Melita plumulosa*
Test Protocol:	ESA SOP 108 (ESA 2011), based on USEPA (2002) and Department of Transport and Communications (1990)
Test Temperature:	The test was performed at 20±1°C.
Deviations from Protocol:	Nil
Comments on Solution Preparation:	The highest test concentration of 20mg/L was prepared by adding a weighed aliquot of sample 6232 'Oil Spill Eater II' into filtered seawater (FSW). The remaining test concentrations were achieved by serially diluting the highest test concentration with FSW. A FSW control was tested concurrently with the prepared sample.
Source of Test Organisms:	In-house culture, originally sourced from Hawkesbury River, NSW
Test Initiated:	14 November 2013 at 1230h

Sample 6232: *Oil Spill Eater II* **Concentration (mg/L)**	**% Unaffected (Mean ± SD)**	*Vacant*	*Vacant*
FSW Control	95.0 ± 10.0		
1.3	95.0 ± 10.0		
2.5	100 ± 0.0		
5.0	90.0 ± 11.6		
10.0	100 ± 0.0		
20.0	100 ± 0.0		
96-hr EC10 = >20.0mg/L **96-hr EC50 = >20.0mg/L** **NOEC = 20.0mg/L** **LOEC = >20.0mg/L**			

Toxicity Test Report: TR1083/4

QA/QC Parameter	Criterion	This Test	Criterion met?
Control mean % unaffected	≥90.0%	95.0%	Yes
Reference Toxicant within cusum chart limits	69.6-456.4µg Cu/L	140.8µg Cu/L	Yes

Test Report Authorised by:  Dr Rick Krassoi, Director on 25 November 2013

Results are based on the samples in the condition as received by ESA.

NATA Accredited Laboratory Number: 14709

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Citations:

Department of Transport and Communications (1990) Guidelines for Acceptance of Oil Spill Dispersants in Australian Waters. Pollution Prevention Section, Department of Transport and Communications, Canberra ACT.

ESA (2011) SOP 108 – *Amphipod Acute Toxicity Test*. Issue No 8. Ecotox Services Australasia, Sydney, NSW.

USEPA (2002) Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms. Fifth Edition. United States Environmental Protection Agency, Office of Research and Development, Washington DC, EPA/600/4-90/027F.

Toxicity Test Report: TR1083/5

Client:	CMTA	**ESA Job #:**	PR1083
	158 Garretts Rd	**Date Sampled:**	Not supplied
	Longford VIC 3851	**Date Received:**	19 August 2013
Attention:	Joel Farhadian	**Sampled By:**	Client
Client Ref:	Not supplied	**ESA Quote #:**	PL1083_q01

Lab ID No.:	**Sample Name:**	**Sample Description:**
6232	Oil Spill Eater II	Chemical received at room temperature in apparent good condition

Test Performed:	96-hr fish imbalance toxicity test using barramundi *Lates calcarifer*
Test Protocol:	ESA SOP 117 (ESA 2012), based on USEPA (2002)
Test Temperature:	The test was performed at 25±2°C.
Deviations from Protocol:	Nil
Comments on Solution Preparation:	The highest test concentration of 20mg/L was prepared by adding a weighed aliquot of sample 6232 'Oil Spill Eater II' into filtered seawater (FSW). The remaining test concentrations were achieved by serially diluting the highest test concentration with FSW. A FSW control was tested concurrently with the prepared sample.
Source of Test Organisms:	Hatchery reared, SA
Test Initiated:	14 November 2013 at 1500h

Sample 6232: *Oil Spill Eater II*	*Vacant*	*Vacant*
Concentration (mg/L) / **% Unaffected (Mean ± SD)**		
FSW Control: 95.0 ± 10.0		
1.3: 100 ± 0.0		
2.5: 85.0 ± 19.2		
5.0: 100 ± 0.0		
10.0: 90.0 ± 11.6		
20.0: 95.0 ± 10.0		
96-hr EC10 = >20.0mg/L **96-hr EC50 = >20.0mg/L** **NOEC = 20.0mg/L** **LOEC = >20.0mg/L**		

Toxicity Test Report: TR1083/5

QA/QC Parameter	Criterion	This Test	Criterion met?
Control mean % unaffected	≥80.0%	95.0%	Yes

Test Report Authorised by: Dr Rick Krassoi, Director on 25 November 2013

Results are based on the samples in the condition as received by ESA. This document shall not be reproduced except in full.

Citations:

ESA (2012) SOP 117 –*Freshwater and Marine Fish Imbalance Test*. Issue No 9. Ecotox Services Australasia, Sydney, NSW

USEPA (2002) Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms. Fifth edition EPA-821-R-02-012. United States Environmental Protection Agency, Office of Research and Development, Washington FC, USA

Toxicity Test Report: TR1083/6

Client:	CMTA	**ESA Job #:**	PR1083
	158 Garretts Rd	**Date Sampled:**	Not supplied
	Longford VIC 3851	**Date Received:**	19 August 2013
Attention:	Joel Farhadian	**Sampled By:**	Client
Client Ref:	Not supplied	**ESA Quote #:**	PL1083_q01

Lab ID No.:	**Sample Name:**	**Sample Description:**
6232	Oil Spill Eater II	Chemical received at room temperature in apparent good condition

Test Performed:	96-hr fish imbalance toxicity test using Australian Bass *Macquaria Novemaculeata*
Test Protocol:	ESA SOP 117 (ESA 2012), based on USEPA (2002)
Test Temperature:	The test was performed at 20±2°C.
Deviations from Protocol:	Nil
Comments on Solution Preparation:	The highest test concentration of 20mg/L was prepared by adding a weighed aliquot of sample 6232 'Oil Spill Eater II' into filtered seawater (FSW). The remaining test concentrations were achieved by serially diluting the highest test concentration with FSW. A FSW control was tested concurrently with the prepared sample.
Source of Test Organisms:	Hatchery reared, SA
Test Initiated:	8 November 2013 at 1200h

Sample 6232: *Oil Spill Eater II*		*Vacant*	*Vacant*
Concentration (mg/L)	**% Unaffected (Mean ± SD)**		
FSW Control	95.0 ± 10.0		
1.3	93.3 ± 11.6		
2.5	100 ± 0.0		
5.0	100 ± 0.0		
10.0	95.0 ± 10.0		
20.0	80.0 ± 20.0		
96-hr IC10 = 15.7mg/L*			
96-hr EC50 = >20.0mg/L			
NOEC = 20.0mg/L			
LOEC = >20.0mg/L			

*95%confidence limits are not reliable

Toxicity Test Report: TR1083/6

QA/QC Parameter	Criterion	This Test	Criterion met?
Control mean % unaffected	≥80.0%	95.0%	Yes
Reference Toxicant within cusum chart limits	58.3-3473.8µg Cu/L	347.6µg Cu/L	Yes

Test Report Authorised by: Dr Rick Krassoi, Director on 25 November 2013

Results are based on the samples in the condition as received by ESA. This document shall not be reproduced except in full.

Citations:

ESA (2012) SOP 117 –*Freshwater and Marine Fish Imbalance Test*. Issue No 9. Ecotox Services Australasia, Sydney, NSW

USEPA (2002) Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms. Fifth edition EPA-821-R-02-012. United States Environmental Protection Agency, Office of Research and Development, Washington FC, USA

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Statistical Printouts for the Milky Oyster Larval Development Tests

Bivalve Larval Development Test-Proportion Normal

Start Date:	20/08/2013 18:00	Test ID:	PR1083/01	Sample ID:	Oil Spill Eater II
End Date:	22/08/2013 18:00	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 106	Test Species:	SE-Saccostrea echinata
Comments:					

Conc-mg/L	1	2	3	4
FSW Control	0.7200	0.7400	0.6900	0.7300
1.3	0.7200	0.7900	0.6800	0.7400
2.5	0.7600	0.7200	0.7500	0.7200
5	0.7600	0.7000	0.7800	0.7200
10	0.7800	0.7200	0.6800	0.7000
20	0.4600	0.1900	0.2200	0.0600

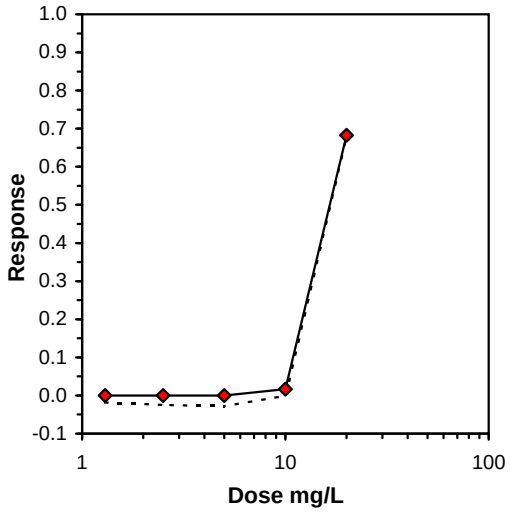
			Transform: Arcsin Square Root					Rank	1-Tailed	Isotonic	
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
FSW Control	0.7200	1.0000	1.0134	0.9803	1.0357	2.359	4			0.7325	1.0000
1.3	0.7325	1.0174	1.0283	0.9695	1.0948	5.070	4	19.00	10.00	0.7325	1.0000
2.5	0.7375	1.0243	1.0331	1.0132	1.0588	2.272	4	21.00	10.00	0.7325	1.0000
5	0.7400	1.0278	1.0364	0.9912	1.0826	4.025	4	20.50	10.00	0.7325	1.0000
10	0.7200	1.0000	1.0141	0.9695	1.0826	4.832	4	16.50	10.00	0.7200	0.9829
*20	0.2325	0.3229	0.4830	0.2475	0.7454	42.321	4	10.00	10.00	0.2325	0.3174

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.791823	0.916	0.475743	7.130866
Bartlett's Test indicates unequal variances (p = 1.05E-03)	20.41248	15.08627		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	10	20	14.14214	
Treatments vs FSW Control				

Log-Logit Interpolation (200 Resamples)

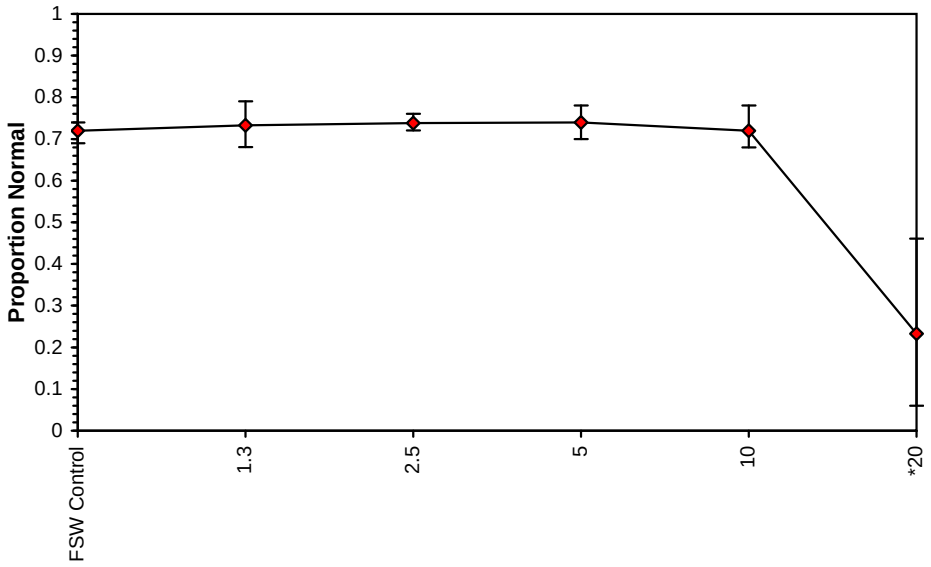
Point	mg/L	SD	95% CL(Exp)		Skew
IC05	10.395	0.623	6.739	10.906	-2.2999
IC10	10.988	0.303	10.037	11.886	0.3357
IC15	11.579	0.389	10.443	12.867	0.7568
IC20	12.176	0.507	10.793	14.080	0.9655
IC25	12.784	0.647	11.168	15.266	1.0823
IC40	14.752				
IC50	16.275				



Bivalve Larval Development Test-Proportion Normal

Start Date:	20/08/2013 18:00	Test ID:	PR1083/01	Sample ID:	Oil Spill Eater II
End Date:	22/08/2013 18:00	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 106	Test Species:	SE-Saccostrea echinata
Comments:					

Dose-Response Plot



Bivalve Larval Development Test-Proportion Normal

Start Date:	20/08/2013 18:00	Test ID:	PR1083/01	Sample ID:	Oil Spill Eater II
End Date:	22/08/2013 18:00	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 106	Test Species:	SE-Saccostrea echinata
Comments:					

Auxiliary Data Summary

Conc-mg/L	Parameter	Mean	Min	Max	SD	CV%	N
FSW Control	% Normal	72.00	69.00	74.00	2.16	2.04	4
1.3		73.25	68.00	79.00	4.57	2.92	4
2.5		73.75	72.00	76.00	2.06	1.95	4
5		74.00	70.00	78.00	3.65	2.58	4
10		72.00	68.00	78.00	4.32	2.89	4
20		23.25	6.00	46.00	16.68	17.57	4
FSW Control	pH	8.30	8.30	8.30	0.00	0.00	1
1.3		8.10	8.10	8.10	0.00	0.00	1
2.5		8.10	8.10	8.10	0.00	0.00	1
5		8.10	8.10	8.10	0.00	0.00	1
10		8.10	8.10	8.10	0.00	0.00	1
20		8.10	8.10	8.10	0.00	0.00	1
FSW Control	Salinity ppt	34.80	34.80	34.80	0.00	0.00	1
1.3		34.30	34.30	34.30	0.00	0.00	1
2.5		34.40	34.40	34.40	0.00	0.00	1
5		34.50	34.50	34.50	0.00	0.00	1
10		34.50	34.50	34.50	0.00	0.00	1
20		34.50	34.50	34.50	0.00	0.00	1
FSW Control	DO %	99.30	99.30	99.30	0.00	0.00	1
1.3		98.70	98.70	98.70	0.00	0.00	1
2.5		97.50	97.50	97.50	0.00	0.00	1
5		97.20	97.20	97.20	0.00	0.00	1
10		96.80	96.80	96.80	0.00	0.00	1
20		97.20	97.20	97.20	0.00	0.00	1

Bivalve Larval Development Test-Proportion Normal

Start Date:	20/08/2013 18:00	Test ID:	PR1083/01	Sample ID:	Oil Spill Eater II
End Date:	22/08/2013 18:00	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 106	Test Species:	SE-Saccostrea echinata
Comments:					

Conc-mg/L	1	2	3	4
FSW Control	0.7200	0.7400	0.6900	0.7300
1.3	0.7200	0.7900	0.6800	0.7400
2.5	0.7600	0.7200	0.7500	0.7200
5	0.7600	0.7000	0.7800	0.7200
10	0.7800	0.7200	0.6800	0.7000
20	0.4600	0.1900	0.2200	0.0600

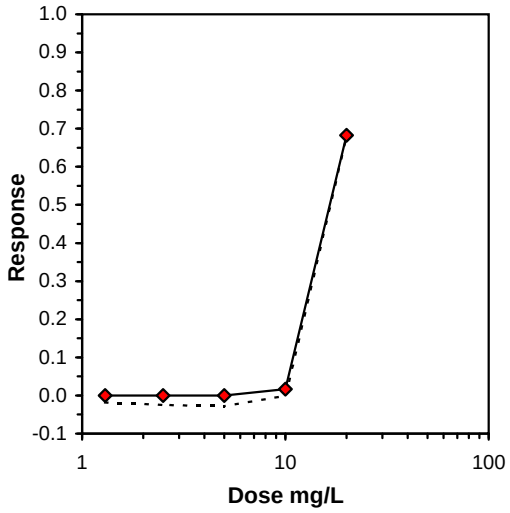
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
FSW Control	0.7200	1.0000	1.0134	0.9803	1.0357	2.359	4			112	400
1.3	0.7325	1.0174	1.0283	0.9695	1.0948	5.070	4	19.00	10.00	107	400
2.5	0.7375	1.0243	1.0331	1.0132	1.0588	2.272	4	21.00	10.00	105	400
5	0.7400	1.0278	1.0364	0.9912	1.0826	4.025	4	20.50	10.00	104	400
10	0.7200	1.0000	1.0141	0.9695	1.0826	4.832	4	16.50	10.00	112	400
*20	0.2325	0.3229	0.4830	0.2475	0.7454	42.321	4	10.00	10.00	307	400

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.791823	0.916	0.475743	7.130866
Bartlett's Test indicates unequal variances (p = 1.05E-03)	20.41248	15.08627		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	10	20	14.14214	
Treatments vs FSW Control				

Trimmed Spearman-Karber

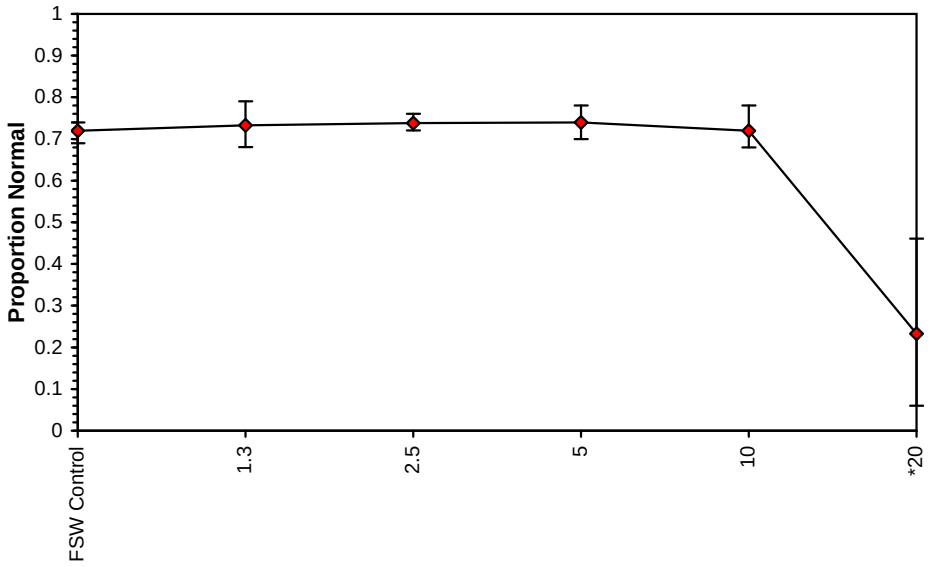
Trim Level	EC50	95% CL	
0.0%			
5.0%			
10.0%			
20.0%			
Auto-31.7%	16.536	15.962	17.132



Bivalve Larval Development Test-Proportion Normal

Start Date:	20/08/2013 18:00	Test ID:	PR1083/01	Sample ID:	Oil Spill Eater II
End Date:	22/08/2013 18:00	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 106	Test Species:	SE-Saccostrea echinata
Comments:					

Dose-Response Plot



Bivalve Larval Development Test-Proportion Normal

Start Date:	20/08/2013 18:00	Test ID:	PR1083/01	Sample ID:	Oil Spill Eater II
End Date:	22/08/2013 18:00	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 106	Test Species:	SE-Saccostrea echinata
Comments:					

Auxiliary Data Summary

Conc-mg/L	Parameter	Mean	Min	Max	SD	CV%	N
FSW Control	% Normal	72.00	69.00	74.00	2.16	2.04	4
1.3		73.25	68.00	79.00	4.57	2.92	4
2.5		73.75	72.00	76.00	2.06	1.95	4
5		74.00	70.00	78.00	3.65	2.58	4
10		72.00	68.00	78.00	4.32	2.89	4
20		23.25	6.00	46.00	16.68	17.57	4
FSW Control	pH	8.30	8.30	8.30	0.00	0.00	1
1.3		8.10	8.10	8.10	0.00	0.00	1
2.5		8.10	8.10	8.10	0.00	0.00	1
5		8.10	8.10	8.10	0.00	0.00	1
10		8.10	8.10	8.10	0.00	0.00	1
20		8.10	8.10	8.10	0.00	0.00	1
FSW Control	Salinity ppt	34.80	34.80	34.80	0.00	0.00	1
1.3		34.30	34.30	34.30	0.00	0.00	1
2.5		34.40	34.40	34.40	0.00	0.00	1
5		34.50	34.50	34.50	0.00	0.00	1
10		34.50	34.50	34.50	0.00	0.00	1
20		34.50	34.50	34.50	0.00	0.00	1
FSW Control	DO %	99.30	99.30	99.30	0.00	0.00	1
1.3		98.70	98.70	98.70	0.00	0.00	1
2.5		97.50	97.50	97.50	0.00	0.00	1
5		97.20	97.20	97.20	0.00	0.00	1
10		96.80	96.80	96.80	0.00	0.00	1
20		97.20	97.20	97.20	0.00	0.00	1

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Statistical Printouts for the Mussel Toxicity Tests

Bivalve Larval Development Test-Proportion Normal

Start Date:	26/08/2013 15:45	Test ID:	PR1083/01	Sample ID:	Oil Spill Eater II
End Date:	29/08/2013 15:45	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 106	Test Species:	MG-Mytilus galloprovincialis
Comments:					

Conc-mg/L	1	2	3	4
FSW Control	0.8200	0.7400	0.7200	0.7500
1.3	0.7300	0.7200	0.7400	0.7100
2.5	0.8500	0.7400	0.8200	0.7000
5	0.8300	0.6900	0.7400	0.7500
10	0.7800	0.7900	0.8300	0.7100
20	0.7300	0.7400	0.8300	0.7100

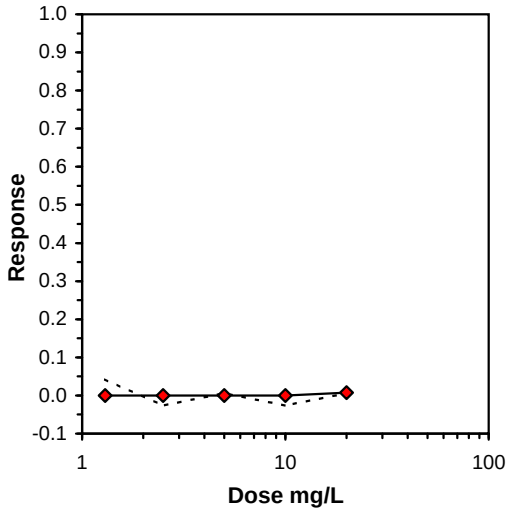
			Transform: Arcsin Square Root					1-Tailed			Isotonic	
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
FSW Control	0.7575	1.0000	1.0572	1.0132	1.1326	4.942	4				0.7580	1.0000
1.3	0.7250	0.9571	1.0189	1.0021	1.0357	1.419	4	0.887	2.410	0.1041	0.7580	1.0000
2.5	0.7775	1.0264	1.0832	0.9912	1.1731	7.771	4	-0.601	2.410	0.1041	0.7580	1.0000
5	0.7525	0.9934	1.0523	0.9803	1.1458	6.545	4	0.114	2.410	0.1041	0.7580	1.0000
10	0.7775	1.0264	1.0813	1.0021	1.1458	5.501	4	-0.558	2.410	0.1041	0.7580	1.0000
20	0.7525	0.9934	1.0520	1.0021	1.1458	6.090	4	0.120	2.410	0.1041	0.7525	0.9927

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.942211	0.916	0.356552	-0.59913
Bartlett's Test indicates equal variances (p = 0.30)	6.045919	15.08627		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	20	>20			0.094079	0.124016	0.002221	0.003735	0.704366	5, 18
Treatments vs FSW Control										

Log-Logit Interpolation (200 Resamples)

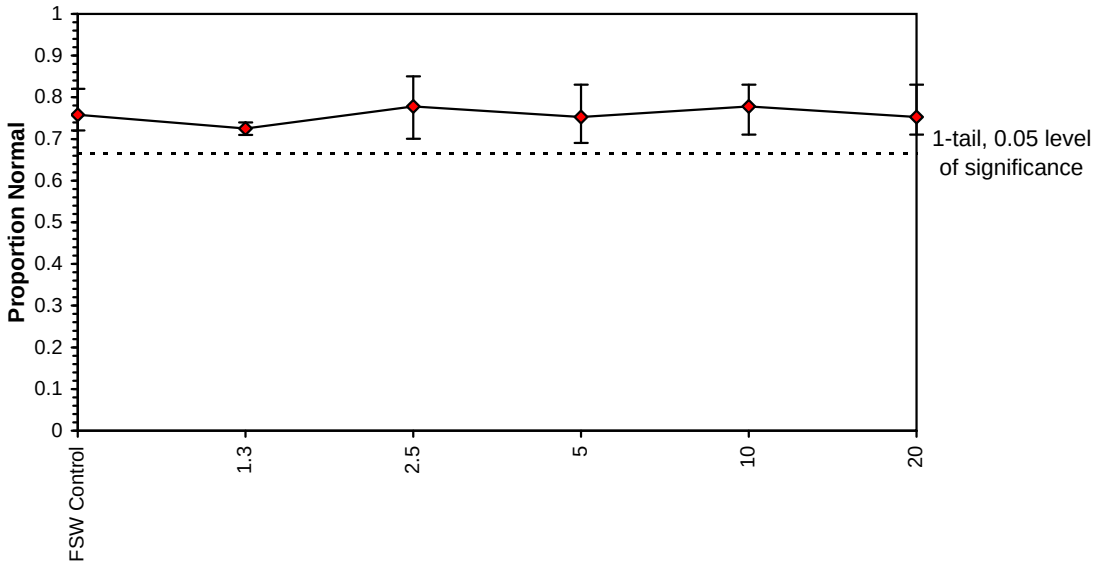
Point	mg/L	SD	95% CL(Exp)	Skew
IC05	>20			
IC10	>20			
IC15	>20			
IC20	>20			
IC25	>20			
IC40	>20			
IC50	>20			



Bivalve Larval Development Test-Proportion Normal

Start Date:	26/08/2013 15:45	Test ID:	PR1083/01	Sample ID:	Oil Spill Eater II
End Date:	29/08/2013 15:45	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 106	Test Species:	MG-Mytilus galloprovincialis
Comments:					

Dose-Response Plot



Bivalve Larval Development Test-Proportion Normal

Start Date:	26/08/2013 15:45	Test ID:	PR1083/01	Sample ID:	Oil Spill Eater II
End Date:	29/08/2013 15:45	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 106	Test Species:	MG-Mytilus galloprovincialis
Comments:					

Auxiliary Data Summary

Conc-mg/L	Parameter	Mean	Min	Max	SD	CV%	N
FSW Control	% Normal	75.75	72.00	82.00	4.35	2.75	4
1.3		72.50	71.00	74.00	1.29	1.57	4
2.5		77.75	70.00	85.00	6.95	3.39	4
5		75.25	69.00	83.00	5.80	3.20	4
10		77.75	71.00	83.00	4.99	2.87	4
20		75.25	71.00	83.00	5.32	3.06	4
FSW Control	pH	8.20	8.20	8.20	0.00	0.00	1
1.3		8.20	8.20	8.20	0.00	0.00	1
2.5		8.20	8.20	8.20	0.00	0.00	1
5		8.20	8.20	8.20	0.00	0.00	1
10		8.20	8.20	8.20	0.00	0.00	1
20		8.20	8.20	8.20	0.00	0.00	1
FSW Control	Salinity ppt	34.20	34.20	34.20	0.00	0.00	1
1.3		34.30	34.30	34.30	0.00	0.00	1
2.5		34.30	34.30	34.30	0.00	0.00	1
5		34.30	34.30	34.30	0.00	0.00	1
10		34.40	34.40	34.40	0.00	0.00	1
20		34.30	34.30	34.30	0.00	0.00	1
FSW Control	DO %	99.00	99.00	99.00	0.00	0.00	1
1.3		99.90	99.90	99.90	0.00	0.00	1
2.5		99.70	99.70	99.70	0.00	0.00	1
5		99.70	99.70	99.70	0.00	0.00	1
10		99.40	99.40	99.40	0.00	0.00	1
20		99.20	99.20	99.20	0.00	0.00	1

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Statistical Printouts for the Juvenile Copepod Tests

Marine Copepod Acute Test-48-hr Survival

Start Date:	14/11/2013 13:00	Test ID:	PR1083/25	Sample ID:	Oil Spill Eater II
End Date:	16/11/2013 12:10	Lab ID:	6232	Sample Type:	AQ-Aqueous
Sample Date:		Protocol:	ESA 124	Test Species:	PC- Parvocalanus crassirostris
Comments:					

Conc-mg/L	1	2	3	4
FSW Control	1.0000	0.8000	1.0000	1.0000
1.3	1.0000	1.0000	1.0000	0.8000
2.5	1.0000	1.0000	1.0000	1.0000
5	0.8000	0.8000	1.0000	1.0000
10	1.0000	0.8000	1.0000	1.0000
20	0.8000	1.0000	0.8000	1.0000

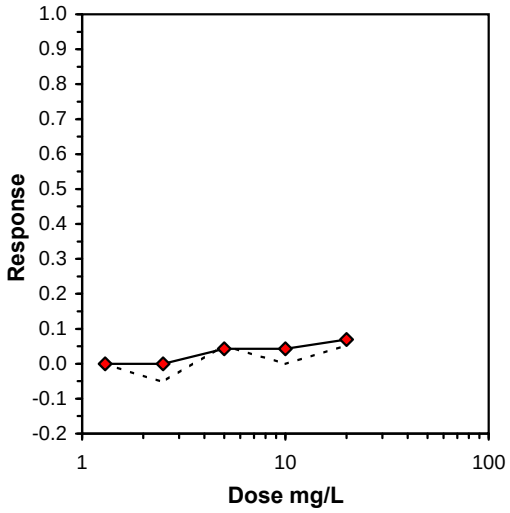
			Transform: Arcsin Square Root					Rank	1-Tailed	Isotonic	
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
FSW Control	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4			0.9667	1.0000
1.3	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	18.00	10.00	0.9667	1.0000
2.5	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	20.00	10.00	0.9667	1.0000
5	0.9000	0.9474	1.2262	1.1071	1.3453	11.212	4	16.00	10.00	0.9250	0.9569
10	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	18.00	10.00	0.9250	0.9569
20	0.9000	0.9474	1.2262	1.1071	1.3453	11.212	4	16.00	10.00	0.9000	0.9310

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.840894	0.916	-0.67177	-0.98034
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	20	>20		
Treatments vs FSW Control				

Log-Logit Interpolation (200 Resamples)

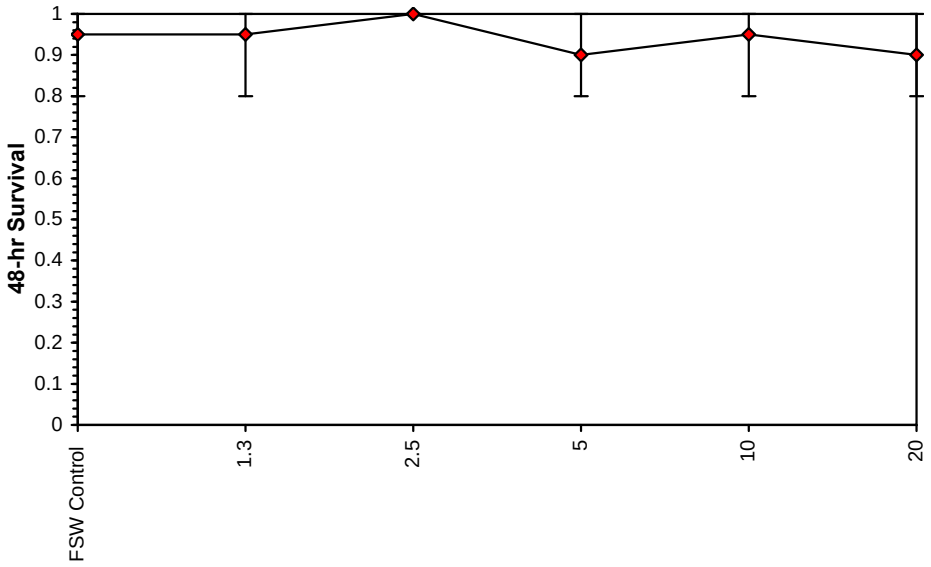
Point	mg/L	SD	95% CL(Exp)	Skew
IC05	12.297			
IC10	>20			
IC15	>20			
IC20	>20			
IC25	>20			
IC40	>20			
IC50	>20			



Marine Copepod Acute Test-48-hr Survival

Start Date:	14/11/2013 13:00	Test ID:	PR1083/25	Sample ID:	Oil Spill Eater II
End Date:	16/11/2013 12:10	Lab ID:	6232	Sample Type:	AQ-Aqueous
Sample Date:		Protocol:	ESA 124	Test Species:	PC- Parvocalanus crassirostris
Comments:					

Dose-Response Plot



Marine Copepod Acute Test-48-hr Survival

Start Date:	14/11/2013 13:00	Test ID:	PR1083/25	Sample ID:	Oil Spill Eater II
End Date:	16/11/2013 12:10	Lab ID:	6232	Sample Type:	AQ-Aqueous
Sample Date:		Protocol:	ESA 124	Test Species:	PC- Parvocalanus crassirostris
Comments:					

Auxiliary Data Summary

Conc-mg/L	Parameter	Mean	Min	Max	SD	CV%	N
FSW Control	% Survival	95.00	80.00	100.00	10.00	3.33	4
1.3		95.00	80.00	100.00	10.00	3.33	4
2.5		100.00	100.00	100.00	0.00	0.00	4
5		90.00	80.00	100.00	11.55	3.78	4
10		95.00	80.00	100.00	10.00	3.33	4
20		90.00	80.00	100.00	11.55	3.78	4
FSW Control	pH	8.30	8.30	8.30	0.00	0.00	1
1.3		8.30	8.30	8.30	0.00	0.00	1
2.5		8.30	8.30	8.30	0.00	0.00	1
5		8.30	8.30	8.30	0.00	0.00	1
10		8.30	8.30	8.30	0.00	0.00	1
20		8.40	8.40	8.40	0.00	0.00	1
FSW Control	DO %	110.60	110.60	110.60	0.00	0.00	1
1.3		101.10	101.10	101.10	0.00	0.00	1
2.5		101.40	101.40	101.40	0.00	0.00	1
5		101.50	101.50	101.50	0.00	0.00	1
10		101.10	101.10	101.10	0.00	0.00	1
20		101.30	101.30	101.30	0.00	0.00	1
FSW Control	Salinity ppt	35.50	35.50	35.50	0.00	0.00	1
1.3		35.50	35.50	35.50	0.00	0.00	1
2.5		35.50	35.50	35.50	0.00	0.00	1
5		35.50	35.50	35.50	0.00	0.00	1
10		35.50	35.50	35.50	0.00	0.00	1
20		35.60	35.60	35.60	0.00	0.00	1

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Statistical Printouts for the Juvenile *Melita plumulosa* Tests

Amphipod Acute Toxicity Test-96 hr survival

Start Date:	14/11/2013 12:30	Test ID:	PR1083/22	Sample ID:	Oils Spill Eater II
End Date:	18/11/2013 13:00	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 108	Test Species:	ML-Melita Plumulosa
Comments:					

Conc-mg/L	1	2	3	4
FSW Control	1.0000	1.0000	0.8000	1.0000
1.3	0.8000	1.0000	1.0000	1.0000
2.5	1.0000	1.0000	1.0000	1.0000
5	1.0000	0.8000	1.0000	0.8000
10	1.0000	1.0000	1.0000	1.0000
20	1.0000	1.0000	1.0000	1.0000

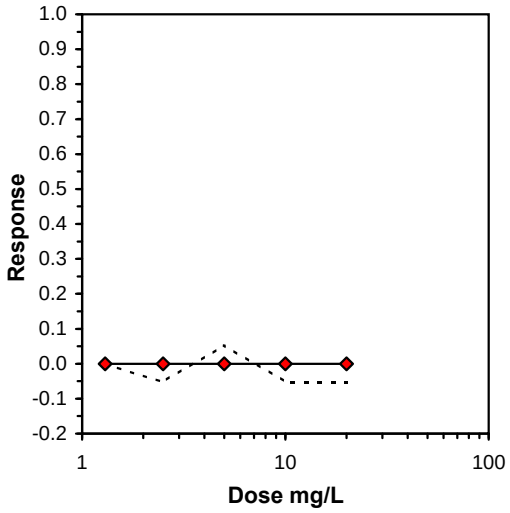
			Transform: Arcsin Square Root					Rank	1-Tailed	Isotonic	
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
FSW Control	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4			0.9667	1.0000
1.3	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	18.00	10.00	0.9667	1.0000
2.5	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	20.00	10.00	0.9667	1.0000
5	0.9000	0.9474	1.2262	1.1071	1.3453	11.212	4	16.00	10.00	0.9667	1.0000
10	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	20.00	10.00	0.9667	1.0000
20	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	20.00	10.00	0.9667	1.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.829814	0.916	-0.99267	0.896104
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	20	>20		
Treatments vs FSW Control				

Log-Logit Interpolation (200 Resamples)

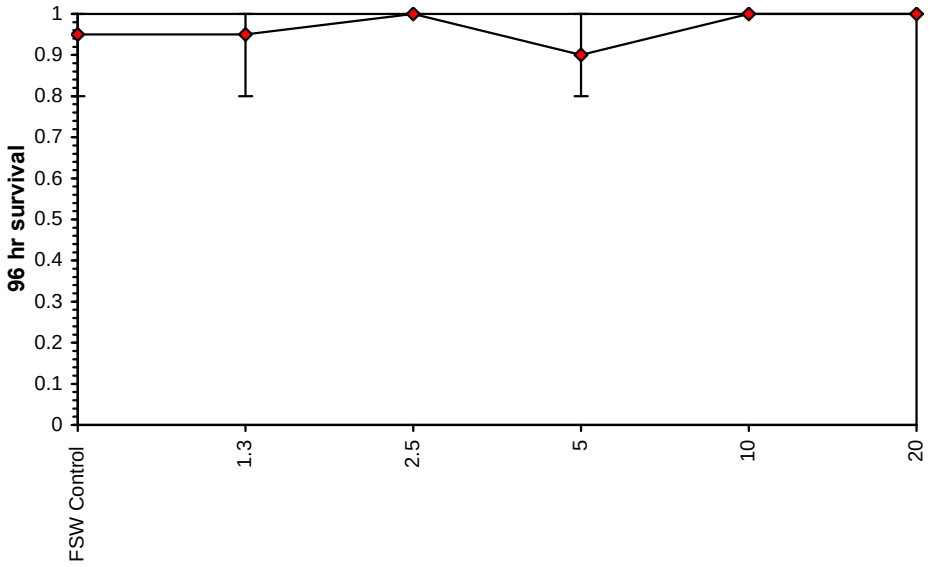
Point	mg/L	SD	95% CL(Exp)	Skew
IC05	>20			
IC10	>20			
IC15	>20			
IC20	>20			
IC25	>20			
IC40	>20			
IC50	>20			



Amphipod Acute Toxicity Test-96 hr survival

Start Date:	14/11/2013 12:30	Test ID:	PR1083/22	Sample ID:	Oils Spill Eater II
End Date:	18/11/2013 13:00	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 108	Test Species:	ML-Melita Plumulosa
Comments:					

Dose-Response Plot



Amphipod Acute Toxicity Test-96 hr survival

Start Date:	14/11/2013 12:30	Test ID:	PR1083/22	Sample ID:	Oils Spill Eater II
End Date:	18/11/2013 13:00	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 108	Test Species:	ML-Melita Plumulosa
Comments:					

Auxiliary Data Summary

Conc-mg/L	Parameter	Mean	Min	Max	SD	CV%	N
FSW Control	% Non-immobilised	95.00	80.00	100.00	10.00	3.33	4
1.3		95.00	80.00	100.00	10.00	3.33	4
2.5		100.00	100.00	100.00	0.00	0.00	4
5		90.00	80.00	100.00	11.55	3.78	4
10		100.00	100.00	100.00	0.00	0.00	4
20		100.00	100.00	100.00	0.00	0.00	4
FSW Control	pH	8.30	8.30	8.30	0.00	0.00	1
1.3		8.30	8.30	8.30	0.00	0.00	1
2.5		8.30	8.30	8.30	0.00	0.00	1
5		8.30	8.30	8.30	0.00	0.00	1
10		8.30	8.30	8.30	0.00	0.00	1
20		8.40	8.40	8.40	0.00	0.00	1
FSW Control	DO %	110.60	110.60	110.60	0.00	0.00	1
1.3		101.10	101.10	101.10	0.00	0.00	1
2.5		101.40	101.40	101.40	0.00	0.00	1
5		101.50	101.50	101.50	0.00	0.00	1
10		101.10	101.10	101.10	0.00	0.00	1
20		101.30	101.30	101.30	0.00	0.00	1
FSW Control	Salinity ppt	35.50	35.50	35.50	0.00	0.00	1
1.3		35.50	35.50	35.50	0.00	0.00	1
2.5		35.50	35.50	35.50	0.00	0.00	1
5		35.50	35.50	35.50	0.00	0.00	1
10		35.50	35.50	35.50	0.00	0.00	1
20		35.60	35.60	35.60	0.00	0.00	1

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Statistical Printouts for the Fish Imbalance Tests

Fish Imbalance Test-96 hr Imbalance

Start Date:	14/11/2013 15:00	Test ID:	PR1083/20	Sample ID:	Oils Spill Eater II
End Date:	18/11/2013 16:30	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 117	Test Species:	LT-Lates calcarifer
Comments:					

Conc-%	1	2	3	4
FSW Control	1.0000	1.0000	0.8000	1.0000
1.3	1.0000	1.0000	1.0000	1.0000
2.5	1.0000	0.8000	0.6000	1.0000
5	1.0000	1.0000	1.0000	1.0000
10	0.8000	1.0000	1.0000	0.8000
20	1.0000	1.0000	0.8000	1.0000

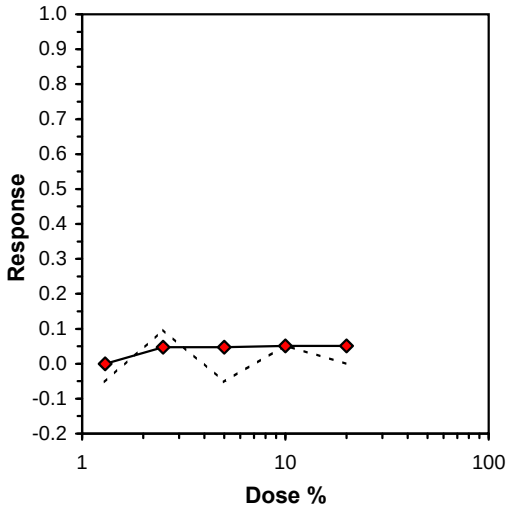
			Transform: Arcsin Square Root					Rank	1-Tailed	Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
FSW Control	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4			0.9750	1.0000
1.3	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	20.00	10.00	0.9750	1.0000
2.5	0.8500	0.8947	1.1759	0.8861	1.3652	19.221	4	17.00	10.00	0.9286	0.9524
5	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	20.00	10.00	0.9286	0.9524
10	0.9000	0.9474	1.2262	1.1071	1.3453	11.212	4	16.00	10.00	0.9250	0.9487
20	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	18.00	10.00	0.9250	0.9487

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.926986	0.916	-0.75635	0.717947
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	20	>20		5
Treatments vs FSW Control				

Log-Logit Interpolation (200 Resamples)

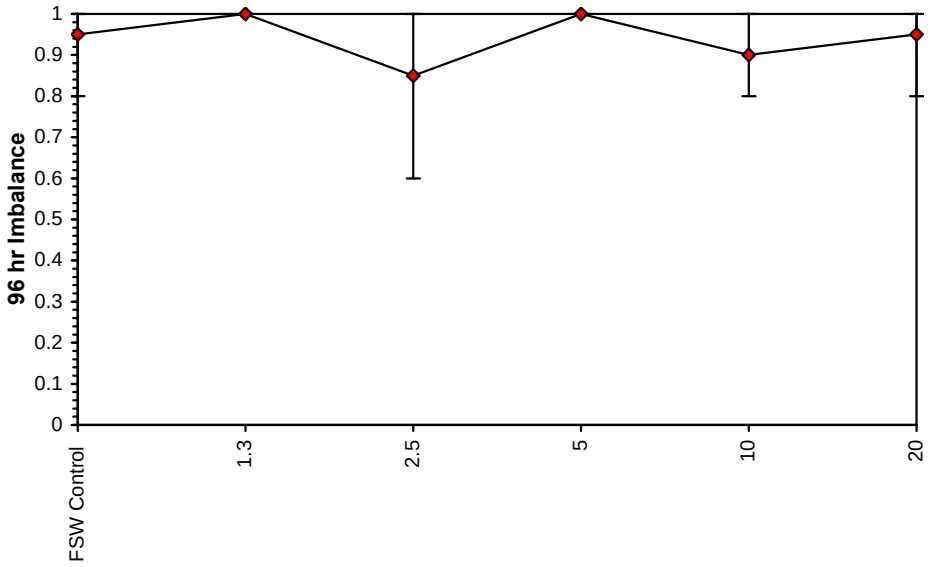
Point	%	SD	95% CL(Exp)	Skew
IC05	7.9248			
IC10	>20			
IC15	>20			
IC20	>20			
IC25	>20			
IC40	>20			
IC50	>20			



Fish Imbalance Test-96 hr Imbalance

Start Date:	14/11/2013 15:00	Test ID:	PR1083/20	Sample ID:	Oils Spill Eater II
End Date:	18/11/2013 16:30	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 117	Test Species:	LT-Lates calcarifer
Comments:					

Dose-Response Plot



Fish Imbalance Test-96 hr Imbalance

Start Date:	14/11/2013 15:00	Test ID:	PR1083/20	Sample ID:	Oils Spill Eater II
End Date:	18/11/2013 16:30	Lab ID:	6232	Sample Type:	CP-Chemical product
Sample Date:		Protocol:	ESA 117	Test Species:	LT-Lates calcarifer
Comments:					

Auxiliary Data Summary

Conc-%	Parameter	Mean	Min	Max	SD	CV%	N
FSW Control	% Un-affected	95.00	80.00	100.00	10.00	3.33	4
1.3		100.00	100.00	100.00	0.00	0.00	4
2.5		85.00	60.00	100.00	19.15	5.15	4
5		100.00	100.00	100.00	0.00	0.00	4
10		90.00	80.00	100.00	11.55	3.78	4
20		95.00	80.00	100.00	10.00	3.33	4
FSW Control	pH	8.30	8.30	8.30	0.00	0.00	1
1.3		8.30	8.30	8.30	0.00	0.00	1
2.5		8.30	8.30	8.30	0.00	0.00	1
5		8.30	8.30	8.30	0.00	0.00	1
10		8.30	8.30	8.30	0.00	0.00	1
20		8.40	8.40	8.40	0.00	0.00	1
FSW Control	Salinity ppt	35.50	35.50	35.50	0.00	0.00	1
1.3		35.50	35.50	35.50	0.00	0.00	1
2.5		35.50	35.50	35.50	0.00	0.00	1
5		35.50	35.50	35.50	0.00	0.00	1
10		35.50	35.50	35.50	0.00	0.00	1
20		35.60	35.60	35.60	0.00	0.00	1
FSW Control	DO %	110.60	110.60	110.60	0.00	0.00	1
1.3		101.10	101.10	101.10	0.00	0.00	1
2.5		101.40	101.40	101.40	0.00	0.00	1
5		101.50	101.50	101.50	0.00	0.00	1
10		101.10	101.10	101.10	0.00	0.00	1
20		101.30	101.30	101.30	0.00	0.00	1