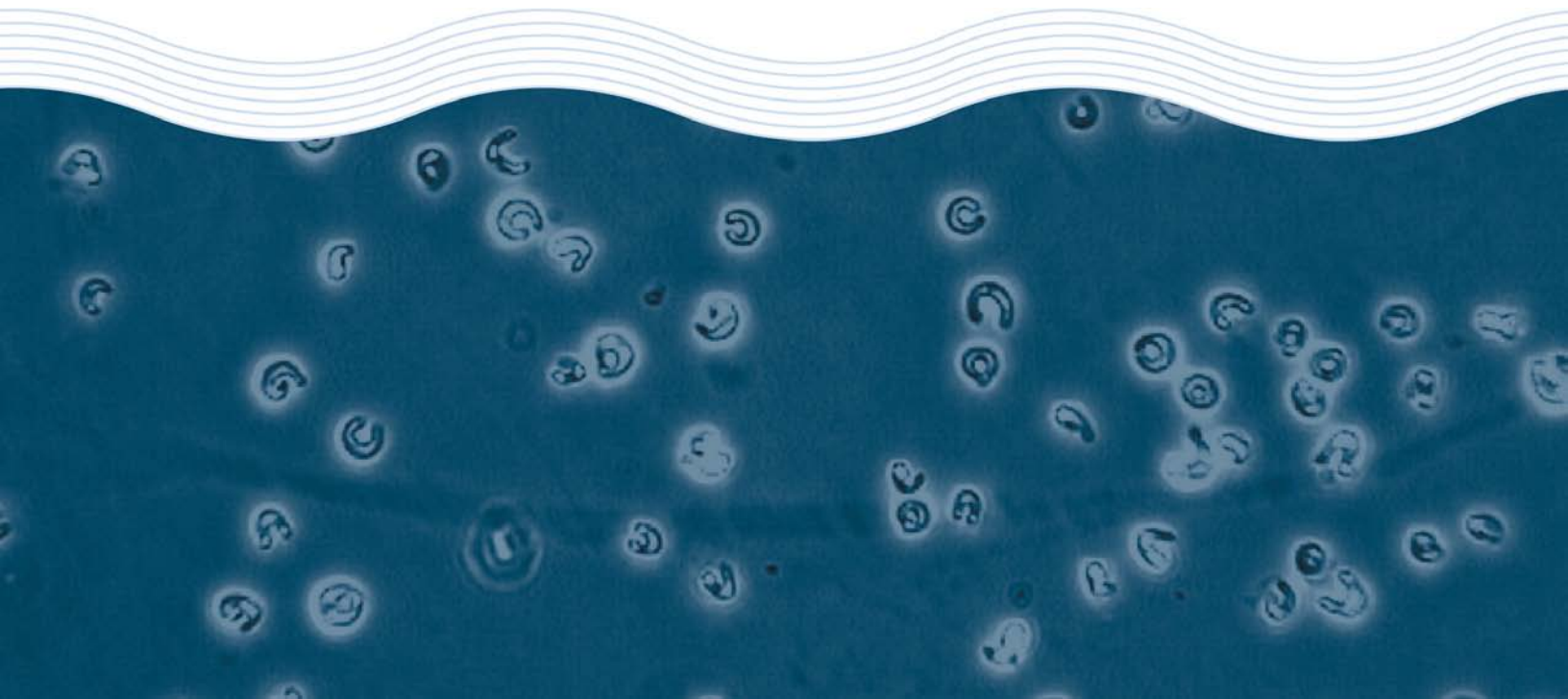


Toxicity Assessment of an Outfall Sample from the Adelaide Desalination Plant

Adelaide Aqua

Test Report

October 2011



Toxicity Assessment of an Outfall Sample from the Adelaide Desalination Plant

Adelaide Aqua

Test Report

October 2011

Toxicity Test Report: TR0686/1

(page 1 of 2)

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

Client:	Adelaide Aqua 16 Chrysler Rd Lonsdale SA 5160	ESA Job #:	PR0686
Attention:	Vanessa Ayala	Date Sampled:	12 October 2011
Client Ref:	Not supplied	Date Received:	13 October 2011
		Sampled By:	Client
		ESA Quote #:	PL0686_q01

Lab ID No.:	Sample Name:	Sample Description:
5001	Outfall	Aqueous sample, pH 8.0, salinity 62.4‰, total ammonia <2.0mg/L*. Sample received at 19.5°C in apparent good condition
5002	Pre-screened seawater	Aqueous sample, pH 8.1, salinity 36.6‰, total ammonia <2.0mg/L*. Sample received at room temperature in apparent good condition

*Ammonia analysis is not covered by Ecotox Services Australasia's scope of accreditation

Test Performed:	48-hr larval development test using the mussel <i>Mytilus galloprovincialis</i>
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-h
Comments on Solution Preparation:	The sample 5001 'Outfall' was serially diluted with sample 5002 'Pre-screened seawater' (Diluent) to achieve the test concentrations. A filtered seawater (FSW) control and a diluent control (pre-screened seawater) were tested concurrently with the sample.
Source of Test Organisms:	Gulf of St Vincent, SA
Test Initiated:	18 October 2011 at 1800h

Sample 5001: <i>Outfall</i>		<i>Vacant</i>	<i>Vacant</i>
Concentration (%)	% Normal larvae (Mean ± SD)		
FSW Control	81.8 ± 2.2		
Diluent Control	81.3 ± 2.8		
6.3	82.5 ± 2.4		
12.5	82.8 ± 2.8		
25	0.0 ± 0.0		
50	0.0 ± 0.0		
100	0.0 ± 0.0		
72-hr IC10 = 12.9 (12.8-12.9)%			
72-hr EC50 = 17.7 (12.5-25)%			
NOEC = 12.5%			
LOEC = 25%			

Toxicity Test Report: TR0686/1

(page 2 of 2)

QA/QC Parameter	Criterion	This Test	Criterion met?
FSW Control mean % normal	≥70%	81.8%	Yes
Reference Toxicant within cusum chart limits	5.5-18.2µg Cu/L	8.9µg Cu/L	Yes



Test Report Authorised by:

Dr Rick Krassoi, Director on 9 November 2011

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

NATA Accredited Laboratory Number: 14709

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA is a signatory to the APLAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports. This document shall not be reproduced except in full.

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, 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: TR0686/2

(page 1 of 2)

Client:	Adelaide Aqua 16 Chrysler Rd Lonsdale SA 5160	ESA Job #:	PR0686
Attention:	Vanessa Ayala	Date Sampled:	12 October 2011
Client Ref:	Not supplied	Date Received:	13 October 2011
		Sampled By:	Client
		ESA Quote #:	PL0686_q01

Lab ID No.:	Sample Name:	Sample Description:
5001	Outfall	Aqueous sample, pH 8.0, salinity 62.4‰, total ammonia <2.0mg/L*. Sample received at 19.5°C in apparent good condition
5002	Pre-screened seawater	Aqueous sample, pH 8.1, salinity 36.6‰, total ammonia <2.0mg/L*. Sample received at room temperature in apparent good condition

Test Performed:	14-day polychaete growth and survival toxicity test using <i>Diopatra asciculata</i>
Test Protocol:	Not applicable
Test Temperature:	The test was performed at 25±2°C.
Deviations from Protocol:	The 96-h toxicity test was extended to 14-d to assess growth and survival endpoints. Test organisms were acclimated at 37±1‰ for five days prior to testing.
Comments on Solution Preparation:	The sample 5001 'Outfall' was serially diluted with sample 5002 'Pre-screened seawater' (Diluent) to achieve the test concentrations. A filtered seawater (FSW) control and a diluent control (pre-screened seawater) were tested concurrently with the sample.
Source of Test Organisms:	Hatchery reared, NSW
Test Initiated:	20 October 2011 at 1200h

Sample 5001: <i>Outfall</i>		Sample 5001: <i>Outfall</i>	
Concentration (%)	% Survival (Mean ± SD)	Concentration (%)	Biomass, mg (Mean ± SD)
FSW Control	100 ± 0.0	FSW Control	1.2 ± 0.7
Diluent Control	100 ± 0.0	Diluent Control	1.4 ± 0.4
6.3	100 ± 0.0	6.3	2.1 ± 0.8
12.5	100 ± 0.0	12.5	2.2 ± 1.0
25	100 ± 0.0	25	1.5 ± 0.2
50	85.0 ± 19.2	50	1.5 ± 0.7
100	0.0 ± 0.0	100	0.0 ± 0.0
14 day IC10 (survival) = 47.9 (42.8-75.5)% 14 day EC50 (survival) = 63.7 (57.1-71.2)% NOEC = 50% LOEC = 100%		14 day IC10 (biomass) = 19.5%* 14 day IC50 (biomass) = 67.6 (34.8-79.4)% NOEC = 50% LOEC = 100%	

*95% confidence limits are not reliable

QA/QC Parameter	Criterion	This Test	Criterion met?
Control mean % survival	>80.0%	100%	Yes



Test Report Authorised by:

Dr Rick Krassoi, Director on 9 November 2011

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

Chain-of-Custody Documentation

Sample Receipt Notification

Attention : Vaness Ayala

Client : Adelaide Aqua
16 Chrysler Rd
Lonsdale SA 5160

Email : Vanesa.Ayala@acciona.com.au
Telephone : 0400 827 816
Facsimile :

Date : 13/10/2011

Re : Receipt of samples

Pages :

ESA Project : PR0686

For Review

Additional Documentation Required - Please Respond

Sample Delivery Details

Completed Chain of Custody accompanied samples: YES

Samples received in apparent good condition and correctly bottled: YES

Security seals on sample bottles and esky intact: YES

Date samples received : 13/10/2011

Time samples received : 10:00

No. of samples received : 1

Sample matrix : aqueous

Sample temperature : 16-20°C

Comments : Includes 4 x 2.5L Outfall (ESA ID# 5001) and 1 x 25L Pre-screened Seawater (ESA ID# 5002)

Contact Details

Customer Services Officer : Tina Micevska

Telephone : 61 2 9420 9481

Facsimile : 61 2 9420 9484

Email : tmicevska@ecotox.com.au

Please contact customer services officer for all queries or issues regarding samples

Note that the chain-of-custody provides definitive information on the tests to be performed

Ecotox Services Australia

ABN 45 094 714 904

Unit 27, 2 Chaplin Drive

Lane Cove NSW 2066 Australia

Phone : 61 2 9420 9481

Fax : 61 2 9420 9484

Email : info@ecotox.com.au

Datasheet ID: 601.1
Last Revised: 17 February 2011

Chain-of-Custody / Service Request Form



Customer: ACCI JAWA
 Contact Name: VANESA AYALA
 Attention: T.M. JUCIERSKE
 Ship To: 27/2 Chaplin Drive
 Phone: 0400 827 816 Email: vanesa-ayala.ecotox.com.au
 (please provide an email address for sample receipt notification)
 ECOTX One Care NSW
 2066 Australia
 Sampled by: Chetan Patel

Sample Date (day/month/year)	Sample Time	Sample Name (exactly as written on the sample vessel)	Sample Method (eg. Grab, composite etc.)	Number and Volume of Containers (eg 2 x 1L)	Tests Requested (See reverse for guidance)				Comments / Instructions
12/10/11	2:15	Outfall	Discrete	4 x 2.5L					<p>Note that testing will be delayed if an incomplete chain of custody is received</p> <ul style="list-style-type: none"> • Additional treatment of samples (i.e. spiking) • Sub-contracted services (i.e. chemical analyses) • Dilutions required (if different than 100% down to 6.25%) • Sample holding time restriction (if applicable) • Sample used for litigation (if applicable) <p>Note: An MSDS must be attached if Available</p> <p>ESA Project Number: PR 06870</p>
		Pre-screened seawater		1 x 2.5L					

1) Released By: Vanessa Ayala Date: 12/10/11 Time: 15:00

2) Received By: Tina Date: 13/10/11 Time: 10:00

3) Released By: _____ Date: _____ Time: _____

4) Received By: _____ Date: _____ Time: _____

Of: Adelaide Of: ESA

Note that the chain-of-custody documentation will provide definitive information on the tests to be performed.

5001
5002
room temp

Statistical Printouts for the Mussel Toxicity Tests

Bivalve Larval Development Test-Proportion Normal

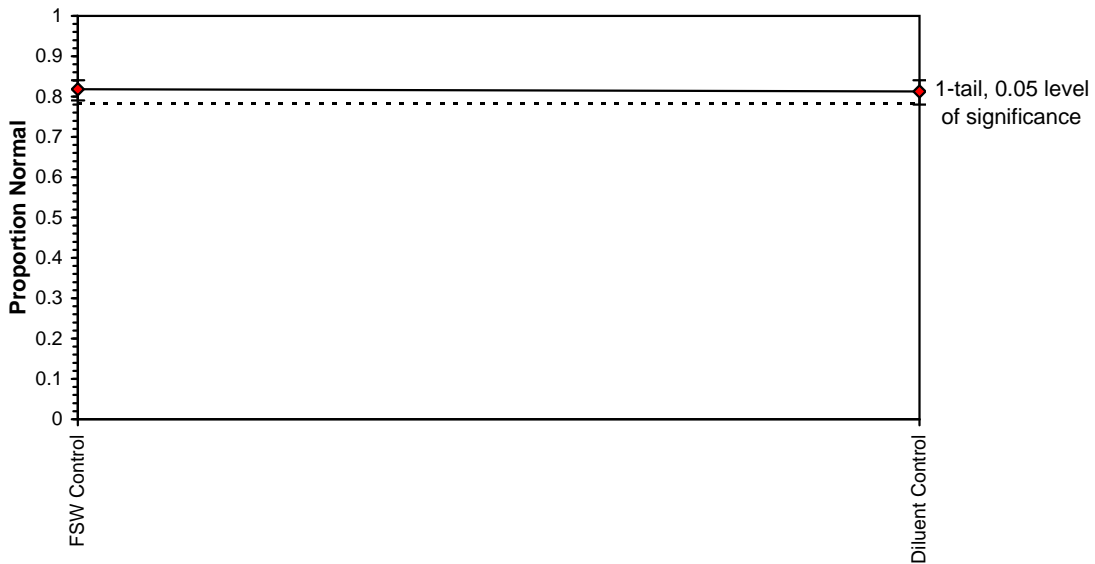
Start Date:	18/10/2011 12:00	Test ID:	PR0686/06	Sample ID:	Controls
End Date:	21/11/2011 12:00	Lab ID:	5002	Sample Type:	Controls
Sample Date:		Protocol:	ESA 106	Test Species:	MG-Mytilus galloprovincialis
Comments:	Sample 5002 used as Diluent Control				

Conc-	1	2	3	4
FSW Control	0.8300	0.8400	0.8100	0.7900
Diluent Control	0.8000	0.8300	0.8400	0.7800

Conc-	Mean	N-Mean	Transform: Arcsin Square Root					t-Stat	1-Tailed Critical	MSD
			Mean	Min	Max	CV%	N			
FSW Control	0.8175	1.0000	1.1299	1.0948	1.1593	2.531	4	0.273	1.943	0.0441
Diluent Control	0.8125	0.9939	1.1237	1.0826	1.1593	3.133	4			

Auxiliary Tests	Statistic	Critical	Skew	Kurt		
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.911956	0.818	-0.24233	-1.76125		
F-Test indicates equal variances ($p = 0.74$)	1.515619	47.46723				
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences Treatments vs FSW Control	0.035206	0.043045	7.68E-05	0.001029	0.793789	1, 6

Dose-Response Plot



Bivalve Larval Development Test-Proportion Normal

Start Date: 18/10/2011 12:00 Test ID: PR0686/06 Sample ID: Controls
End Date: 21/11/2011 12:00 Lab ID: 5002 Sample Type: Controls
Sample Date: Protocol: ESA 106 Test Species: MG-Mytilus galloprovincialis
Comments: Sample 5002 used as Diluent Control

Auxiliary Data Summary

Conc-	Parameter	Mean	Min	Max	SD	CV%	N
FSW Control	% Normal	81.75	79.00	84.00	2.22	1.82	4
Diluent Control		81.25	78.00	84.00	2.75	2.04	4
FSW Control	pH	8.10	8.10	8.10	0.00	0.00	1
Diluent Control		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
Diluent Control		36.60	36.60	36.60	0.00	0.00	1
FSW Control	DO %	96.80	96.80	96.80	0.00	0.00	1
Diluent Control		94.50	94.50	94.50	0.00	0.00	1

Bivalve Larval Development Test-Proportion Normal

Start Date:	18/10/2011 12:00	Test ID:	PR0686/07	Sample ID:	Outfall
End Date:	21/11/2011 12:00	Lab ID:	5001	Sample Type:	AQ-Aqueous
Sample Date:		Protocol:	ESA 106	Test Species:	MG-Mytilus galloprovincialis
Comments:	Sample 5002 used as Diluent Control				

Conc-%	1	2	3	4
Diluent Control	0.8000	0.8300	0.8400	0.7800
6.3	0.8400	0.8500	0.8000	0.8100
12.5	0.8600	0.8000	0.8100	0.8400
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

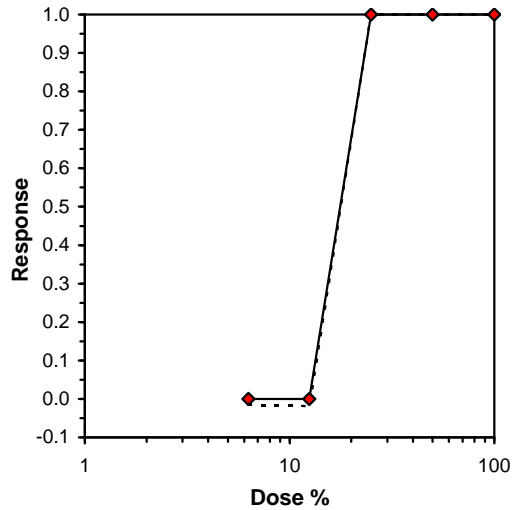
Conc-%	Transform: Arcsin Square Root							t-Stat	1-Tailed Critical	MSD	Number Resp	Total Number
	Mean	N-Mean	Mean	Min	Max	CV%	N					
Diluent Control	0.8125	1.0000	1.1237	1.0826	1.1593	3.133	4				75	400
6.3	0.8250	1.0154	1.1398	1.1071	1.1731	2.754	4	-0.660	2.180	0.0532	70	400
12.5	0.8275	1.0185	1.1434	1.1071	1.1873	3.214	4	-0.806	2.180	0.0532	69	400
25	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	4				400	400
50	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	4				400	400
100	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	4				400	400

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.891503	0.859	0.039762	-1.83527						
Bartlett's Test indicates equal variances ($p = 0.97$)	0.067869	9.21034								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	12.5	25	17.67767	8	0.043185	0.053113	0.000439	0.001192	0.701587	2, 9

Treatments vs Diluent Control

Graphical Method

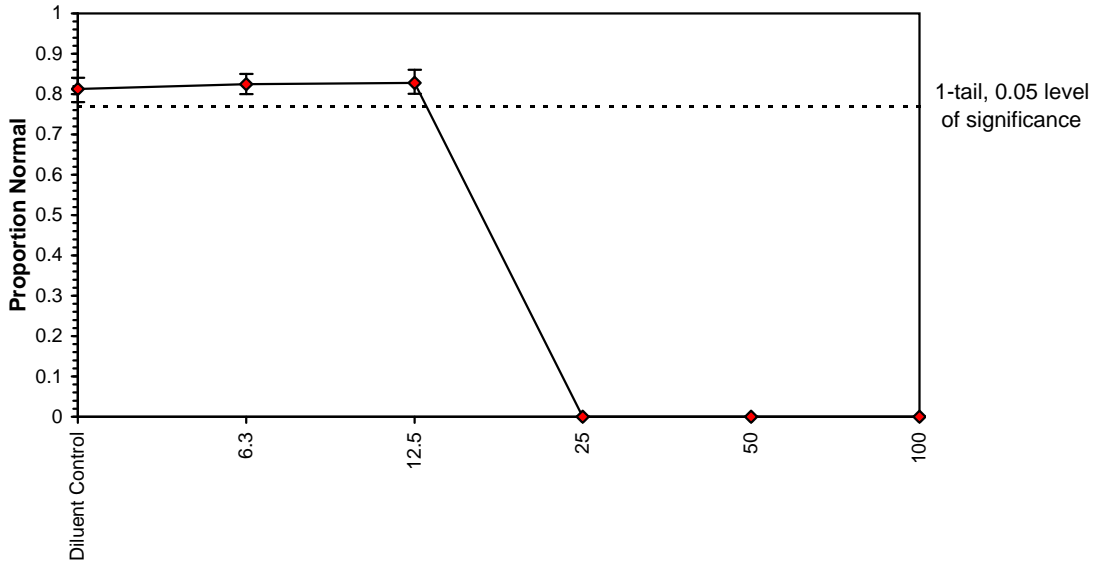
Trim Level	EC50
0.0%	17.678
	17.678



Bivalve Larval Development Test-Proportion Normal

Start Date: 18/10/2011 12:00 Test ID: PR0686/07 Sample ID: Outfall
End Date: 21/11/2011 12:00 Lab ID: 5001 Sample Type: AQ-Aqueous
Sample Date: Protocol: ESA 106 Test Species: MG-Mytilus galloprovincialis
Comments: Sample 5002 used as Diluent Control

Dose-Response Plot



Bivalve Larval Development Test-Proportion Normal

Start Date: 18/10/2011 12:00 Test ID: PR0686/07 Sample ID: Outfall
 End Date: 21/11/2011 12:00 Lab ID: 5001 Sample Type: AQ-Aqueous
 Sample Date: Protocol: ESA 106 Test Species: MG-Mytilus galloprovincialis
 Comments: Sample 5002 used as Diluent Control

Auxiliary Data Summary

Conc-%	Parameter	Mean	Min	Max	SD	CV%	N
Diluent Control	% Normal	81.25	78.00	84.00	2.75	2.04	4
6.3		82.50	80.00	85.00	2.38	1.87	4
12.5		82.75	80.00	86.00	2.75	2.01	4
25		0.00	0.00	0.00	0.00		4
50		0.00	0.00	0.00	0.00		4
100		0.00	0.00	0.00	0.00		4
Diluent Control	pH	8.10	8.10	8.10	0.00	0.00	1
6.3		8.10	8.10	8.10	0.00	0.00	1
12.5		8.10	8.10	8.10	0.00	0.00	1
25		8.10	8.10	8.10	0.00	0.00	1
50		8.00	8.00	8.00	0.00	0.00	1
100		8.00	8.00	8.00	0.00	0.00	1
Diluent Control	Salinity ppt	36.60	36.60	36.60	0.00	0.00	1
6.3		38.70	38.70	38.70	0.00	0.00	1
12.5		40.50	40.50	40.50	0.00	0.00	1
25		43.40	43.40	43.40	0.00	0.00	1
50		49.70	49.70	49.70	0.00	0.00	1
100		62.40	62.40	62.40	0.00	0.00	1
Diluent Control	DO %	94.50	94.50	94.50	0.00	0.00	1
6.3		104.50	104.50	104.50	0.00	0.00	1
12.5		108.80	108.80	108.80	0.00	0.00	1
25		109.40	109.40	109.40	0.00	0.00	1
50		107.70	107.70	107.70	0.00	0.00	1
100		101.10	101.10	101.10	0.00	0.00	1

Bivalve Larval Development Test-Proportion Normal

Start Date:	18/10/2011 12:00	Test ID:	PR0686/07	Sample ID:	Outfall
End Date:	21/11/2011 12:00	Lab ID:	5001	Sample Type:	AQ-Aqueous
Sample Date:		Protocol:	ESA 106	Test Species:	MG-Mytilus galloprovincialis
Comments:	Sample 5002 used as Diluent Control				

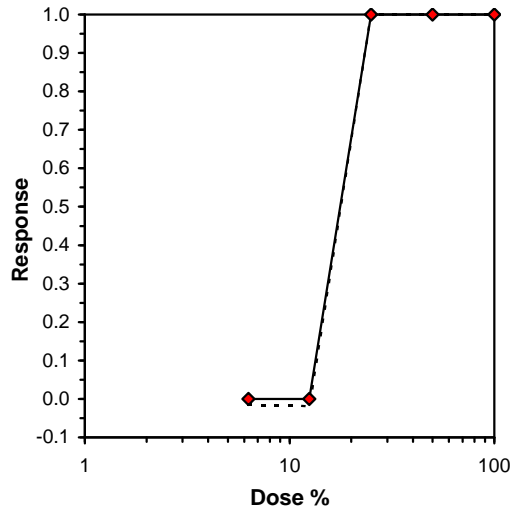
Conc-%	1	2	3	4
Diluent Control	0.8000	0.8300	0.8400	0.7800
6.3	0.8400	0.8500	0.8000	0.8100
12.5	0.8600	0.8000	0.8100	0.8400
25	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

Conc-%	Transform: Arcsin Square Root							t-Stat	1-Tailed Critical	MSD	Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N				Mean	N-Mean
Diluent Control	0.8125	1.0000	1.1237	1.0826	1.1593	3.133	4				0.8217	1.0000
6.3	0.8250	1.0154	1.1398	1.1071	1.1731	2.754	4	-0.660	2.180	0.0532	0.8217	1.0000
12.5	0.8275	1.0185	1.1434	1.1071	1.1873	3.214	4	-0.806	2.180	0.0532	0.8217	1.0000
25	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	4				0.0000	0.0000
50	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	4				0.0000	0.0000
100	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	4				0.0000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.891503	0.859	0.039762	-1.83527
Bartlett's Test indicates equal variances ($p = 0.97$)	0.067869	9.21034		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	12.5	25	17.67767	8	0.043185	0.053113	0.000439	0.001192	0.701587	2, 9

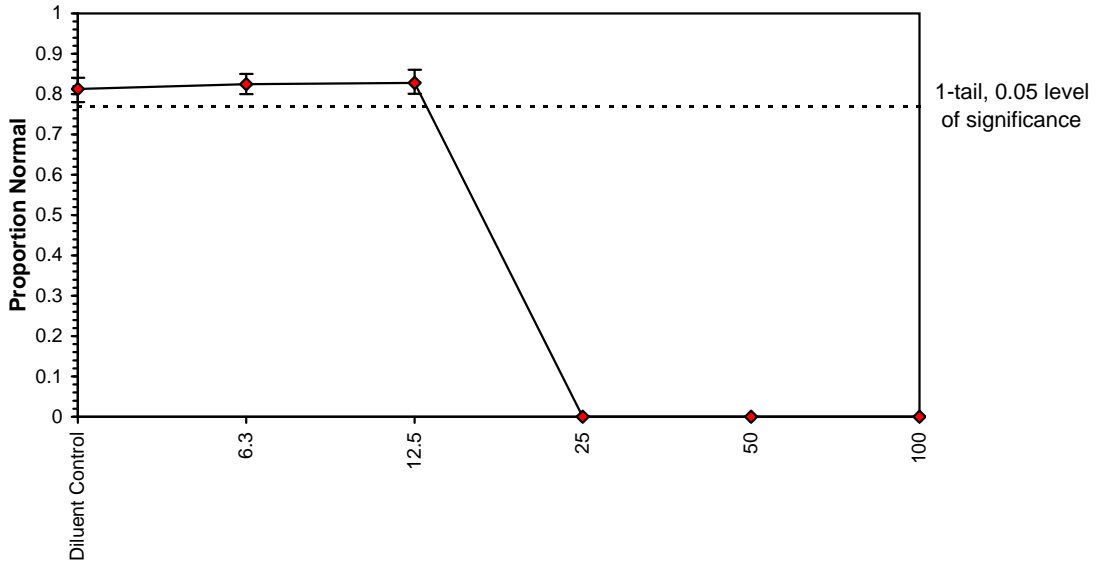
Log-Logit Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)		Skew
IC05	12.715	0.029	12.550	12.735	-2.0476
IC10	12.905	0.028	12.750	12.938	-1.7589
IC15	13.079	0.028	12.932	13.121	-1.4730
IC20	13.242	0.028	13.101	13.291	-1.2337
IC25	13.397	0.029	13.261	13.452	-1.0436
IC40	13.845	0.029	13.719	13.910	-0.6827
IC50	14.149	0.029	14.028	14.218	-0.5464



Bivalve Larval Development Test-Proportion Normal

Start Date: 18/10/2011 12:00 Test ID: PR0686/07 Sample ID: Outfall
End Date: 21/11/2011 12:00 Lab ID: 5001 Sample Type: AQ-Aqueous
Sample Date: Protocol: ESA 106 Test Species: MG-Mytilus galloprovincialis
Comments: Sample 5002 used as Diluent Control

Dose-Response Plot



Bivalve Larval Development Test-Proportion Normal

Start Date: 18/10/2011 12:00 Test ID: PR0686/07 Sample ID: Outfall
 End Date: 21/11/2011 12:00 Lab ID: 5001 Sample Type: AQ-Aqueous
 Sample Date: Protocol: ESA 106 Test Species: MG-Mytilus galloprovincialis
 Comments: Sample 5002 used as Diluent Control

Auxiliary Data Summary

Conc-%	Parameter	Mean	Min	Max	SD	CV%	N
Diluent Control	% Normal	81.25	78.00	84.00	2.75	2.04	4
6.3		82.50	80.00	85.00	2.38	1.87	4
12.5		82.75	80.00	86.00	2.75	2.01	4
25		0.00	0.00	0.00	0.00		4
50		0.00	0.00	0.00	0.00		4
100		0.00	0.00	0.00	0.00		4
Diluent Control	pH	8.10	8.10	8.10	0.00	0.00	1
6.3		8.10	8.10	8.10	0.00	0.00	1
12.5		8.10	8.10	8.10	0.00	0.00	1
25		8.10	8.10	8.10	0.00	0.00	1
50		8.00	8.00	8.00	0.00	0.00	1
100		8.00	8.00	8.00	0.00	0.00	1
Diluent Control	Salinity ppt	36.60	36.60	36.60	0.00	0.00	1
6.3		38.70	38.70	38.70	0.00	0.00	1
12.5		40.50	40.50	40.50	0.00	0.00	1
25		43.40	43.40	43.40	0.00	0.00	1
50		49.70	49.70	49.70	0.00	0.00	1
100		62.40	62.40	62.40	0.00	0.00	1
Diluent Control	DO %	94.50	94.50	94.50	0.00	0.00	1
6.3		104.50	104.50	104.50	0.00	0.00	1
12.5		108.80	108.80	108.80	0.00	0.00	1
25		109.40	109.40	109.40	0.00	0.00	1
50		107.70	107.70	107.70	0.00	0.00	1
100		101.10	101.10	101.10	0.00	0.00	1

Statistical Printouts for the 14-d Polychaete Worm Toxicity Test

Polychaete Survival and Growth Test-Survival

Start Date:	20/10/2011 12:00	Test ID:	PR0686/01	Sample ID:	Outfall
End Date:	3/11/2011 12:00	Lab ID:	5001	Sample Type:	AQ-Aqueous
Sample Date:		Protocol:		Test Species:	DD-Diopatra asciculata
Comments:	Sample 5002 used as Diluent Control				

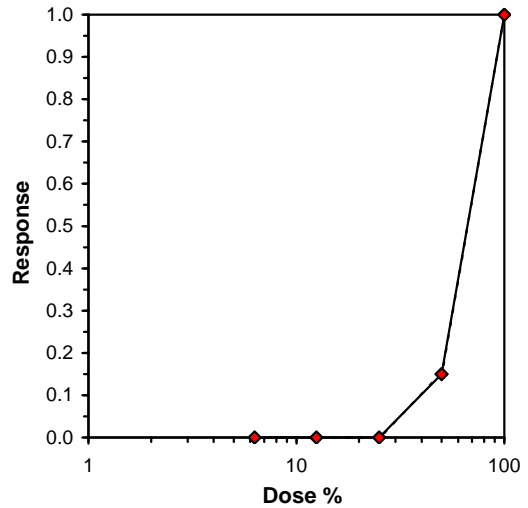
Conc-%	1	2	3	4
FSW Control	1.0000	1.0000	1.0000	1.0000
Diluent Control	1.0000	1.0000	1.0000	1.0000
6.3	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000	1.0000
50	0.6000	0.8000	1.0000	1.0000
100	0.0000	0.0000	0.0000	0.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				Rank Sum	1-Tailed Critical	Number Resp	Total Number
			Mean	Min	Max	CV%				
FSW Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4			
Diluent Control	1.0000	1.0000	1.3503	1.3453	1.3652	0.739	4	*	0	21
6.3	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	16.00	10.00	0
12.5	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	16.00	10.00	0
25	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	16.00	10.00	0
50	0.8500	0.8500	1.1709	0.8861	1.3453	18.840	4	13.00	10.00	3
100	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4			20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.618638	0.905	-1.10582	6.755077
Equality of variance cannot be confirmed				
The control means are not significantly different (p = 0.36)	1	2.446912		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	50	100	70.71068	2
Treatments vs Diluent Control				

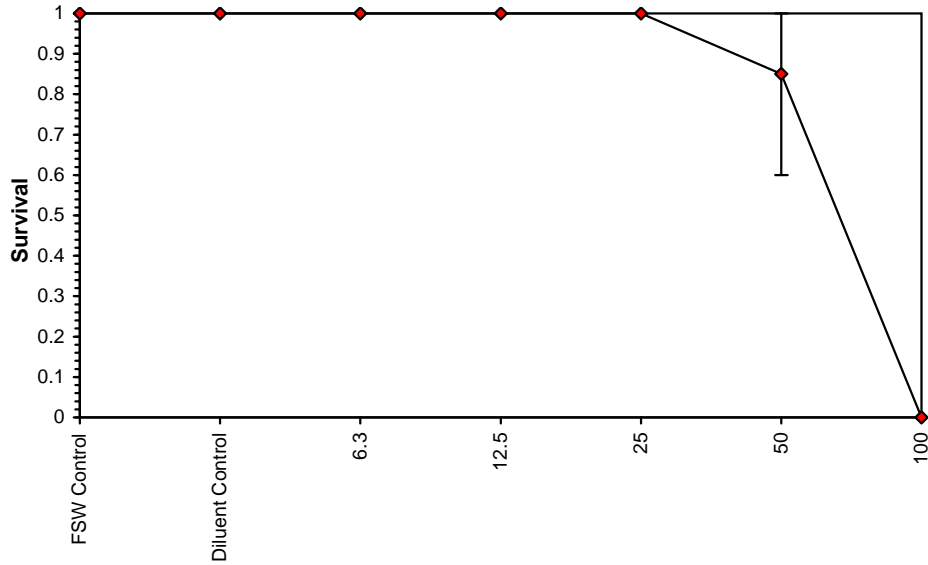
Trimmed Spearman-Kärber			
Trim Level	EC50	95% CL	
0.0%	63.728	57.051	71.187
5.0%	65.124	57.208	74.136
10.0%	66.121	55.888	78.229
20.0%	66.516	61.611	71.811
Auto-0.0%	63.728	57.051	71.187



Polychaete Survival and Growth Test-Survival

Start Date: 20/10/2011 12:00 Test ID: PR0686/01 Sample ID: Outfall
End Date: 3/11/2011 12:00 Lab ID: 5001 Sample Type: AQ-Aqueous
Sample Date: Protocol: Test Species: DD-Diopatra asciculata
Comments: Sample 5002 used as Diluent Control

Dose-Response Plot



Polychaete Survival and Growth Test-Survival

Start Date: 20/10/2011 12:00 Test ID: PR0686/01 Sample ID: Outfall
 End Date: 3/11/2011 12:00 Lab ID: 5001 Sample Type: AQ-Aqueous
 Sample Date: Protocol: Test Species: DD-Diopatra asciculata
 Comments: Sample 5002 used as Diluent Control

Auxiliary Data Summary

Conc-%	Parameter	Mean	Min	Max	SD	CV%	N
FSW Control	% Survival	100.00	100.00	100.00	0.00	0.00	4
Diluent Control		100.00	100.00	100.00	0.00	0.00	4
6.3		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		85.00	60.00	100.00	19.15	5.15	4
100		0.00	0.00	0.00	0.00		4
FSW Control	pH	8.10	8.10	8.10	0.00	0.00	1
Diluent Control		8.10	8.10	8.10	0.00	0.00	1
6.3		8.10	8.10	8.10	0.00	0.00	1
12.5		8.10	8.10	8.10	0.00	0.00	1
25		8.10	8.10	8.10	0.00	0.00	1
50		8.00	8.00	8.00	0.00	0.00	1
100		8.00	8.00	8.00	0.00	0.00	1
FSW Control	Salinity ppt	34.90	34.90	34.90	0.00	0.00	1
Diluent Control		36.70	36.70	36.70	0.00	0.00	1
6.3		38.50	38.50	38.50	0.00	0.00	1
12.5		40.10	40.10	40.10	0.00	0.00	1
25		43.20	43.20	43.20	0.00	0.00	1
50		49.70	49.70	49.70	0.00	0.00	1
100		62.30	62.30	62.30	0.00	0.00	1
FSW Control	DO % Sat	98.10	98.10	98.10	0.00	0.00	1
Diluent Control		97.30	97.30	97.30	0.00	0.00	1
6.3		105.90	105.90	105.90	0.00	0.00	1
12.5		106.70	106.70	106.70	0.00	0.00	1
25		106.60	106.60	106.60	0.00	0.00	1
50		106.90	106.90	106.90	0.00	0.00	1
100		105.40	105.40	105.40	0.00	0.00	1

Polychaete Survival and Growth Test-Survival

Start Date:	20/10/2011 12:00	Test ID:	PR0686/04	Sample ID:	OUTFALL
End Date:	3/11/2011 12:00	Lab ID:	5001	Sample Type:	AQ-Aqueous
Sample Date:		Protocol:		Test Species:	DA-Diopatra asciculata
Comments:	Sample 5002 used as Diluent Control				

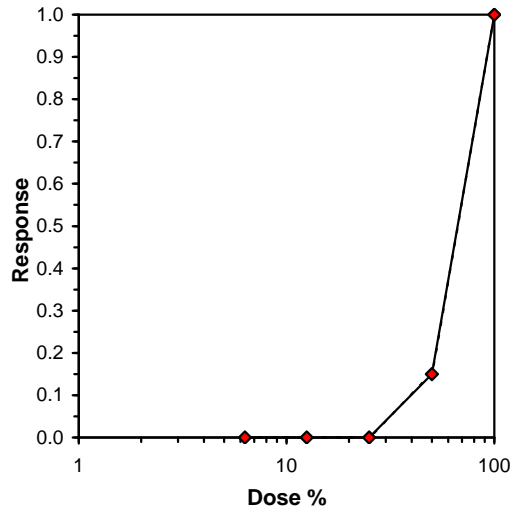
Conc-%	1	2	3	4
FSW Control	1.0000	1.0000	1.0000	1.0000
Diluent Control	1.0000	1.0000	1.0000	1.0000
6.3	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000	1.0000
50	0.6000	0.8000	1.0000	1.0000
100	0.0000	0.0000	0.0000	0.0000

Conc-%	Transform: Arcsin Square Root							Rank Sum	1-Tailed Critical	Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N			Mean	N-Mean
FSW Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4				
Diluent Control	1.0000	1.0000	1.3503	1.3453	1.3652	0.739	4	*		1.0000	1.0000
6.3	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	16.00	10.00	1.0000	1.0000
12.5	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	16.00	10.00	1.0000	1.0000
25	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	16.00	10.00	1.0000	1.0000
50	0.8500	0.8500	1.1709	0.8861	1.3453	18.840	4	13.00	10.00	0.8500	0.8500
100	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4			0.0000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.618638	0.905	-1.10582	6.755077
Equality of variance cannot be confirmed				
The control means are not significantly different (p = 0.36)	1	2.446912		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	50	100	70.71068	2
Treatments vs Diluent Control				

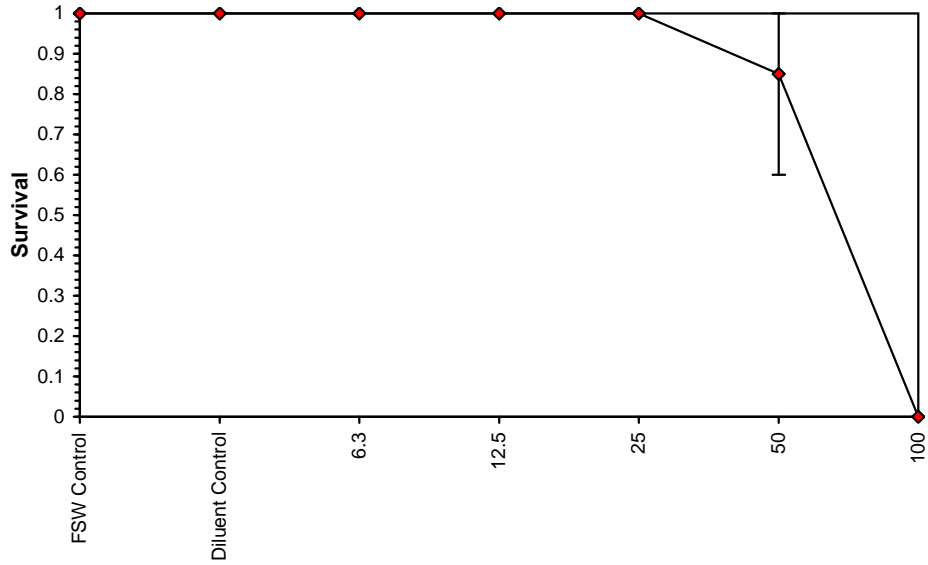
Log-Logit Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)		Skew
IC05	44.732	4.720	40.476	74.512	2.6707
IC10	47.917	4.460	42.841	75.494	2.5112
IC15	50.000	4.259	44.371	76.077	2.5633
IC20	51.121	4.129	45.860	76.804	2.6458
IC25	52.066	4.044	47.125	77.408	2.6962
IC40	54.412	3.898	49.839	78.871	2.7069
IC50	55.833	3.813	51.335	79.733	2.6974



Polychaete Survival and Growth Test-Survival

Start Date: 20/10/2011 12:00 Test ID: PR0686/04 Sample ID: OUTFALL
End Date: 3/11/2011 12:00 Lab ID: 5001 Sample Type: AQ-Aqueous
Sample Date: Protocol: Test Species: DA-Diopatra asciculata
Comments: Sample 5002 used as Diluent Control

Dose-Response Plot



Polychaete Survival and Growth Test-Survival

Start Date: 20/10/2011 12:00 Test ID: PR0686/04 Sample ID: OUTFALL
 End Date: 3/11/2011 12:00 Lab ID: 5001 Sample Type: AQ-Aqueous
 Sample Date: Protocol: Test Species: DA-Diopatra asciculata
 Comments: Sample 5002 used as Diluent Control

Auxiliary Data Summary

Conc-%	Parameter	Mean	Min	Max	SD	CV%	N
FSW Control	Survival %	100.00	100.00	100.00	0.00	0.00	4
Diluent Control		100.00	100.00	100.00	0.00	0.00	4
6.3		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		85.00	60.00	100.00	19.15	5.15	4
100		0.00	0.00	0.00	0.00		4
FSW Control	pH	8.10	8.10	8.10	0.00	0.00	1
Diluent Control		8.10	8.10	8.10	0.00	0.00	1
6.3		8.10	8.10	8.10	0.00	0.00	1
12.5		8.10	8.10	8.10	0.00	0.00	1
25		8.10	8.10	8.10	0.00	0.00	1
50		8.00	8.00	8.00	0.00	0.00	1
100		8.00	8.00	8.00	0.00	0.00	1
FSW Control	Salinity ppt	34.90	34.90	34.90	0.00	0.00	1
Diluent Control		36.70	36.70	36.70	0.00	0.00	1
6.3		38.50	38.50	38.50	0.00	0.00	1
12.5		40.10	40.10	40.10	0.00	0.00	1
25		43.20	43.20	43.20	0.00	0.00	1
50		49.70	49.70	49.70	0.00	0.00	1
100		62.30	62.30	62.30	0.00	0.00	1
FSW Control	DO % Sat	98.10	98.10	98.10	0.00	0.00	1
Diluent Control		97.30	97.30	97.30	0.00	0.00	1
6.3		105.90	105.90	105.90	0.00	0.00	1
12.5		106.70	106.70	106.70	0.00	0.00	1
25		106.60	106.60	106.60	0.00	0.00	1
50		106.90	106.90	106.90	0.00	0.00	1
100		105.40	105.40	105.40	0.00	0.00	1

Polychaete Survival and Growth Test-Weight

Start Date:	20/10/2011 12:00	Test ID:	PR0686/03	Sample ID:	OUTFALL
End Date:	3/11/2011 12:00	Lab ID:	5001	Sample Type:	AQ-Aqueous
Sample Date:		Protocol:		Test Species:	DA-Diopatra asciculata
Comments:	Sample 5002 used as Diluent Control				

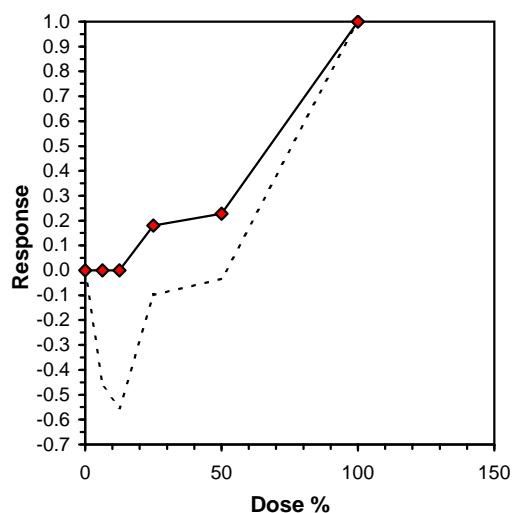
Conc-%	1	2	3	4
FSW Control	2.2400	0.8000	0.7000	1.1000
Diluent Control	1.2500	0.8600	1.6200	1.8600
6.3	0.9800	2.8800	1.9200	2.4000
12.5	3.2800	2.6000	1.9200	0.8800
25	1.5800	1.3800	1.4400	1.7400
50	2.3800	0.9800	0.9200	1.5000
100	0.0000	0.0000	0.0000	0.0000

Conc-%	Transform: Untransformed							t-Stat	1-Tailed Critical	MSD	Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N				Mean	N-Mean
FSW Control	1.2100	0.8658	1.2100	0.7000	2.2400	58.462	4					
Diluent Control	1.3975	1.0000	1.3975	0.8600	1.8600	31.302	4	*			1.8708	1.0000
6.3	2.0450	1.4633	2.0450	0.9800	2.8800	39.657	4	-1.328	2.360	1.1511	1.8708	1.0000
12.5	2.1700	1.5528	2.1700	0.8800	3.2800	47.173	4	-1.584	2.360	1.1511	1.8708	1.0000
25	1.5350	1.0984	1.5350	1.3800	1.7400	10.444	4	-0.282	2.360	1.1511	1.5350	0.8205
50	1.4450	1.0340	1.4450	0.9200	2.3800	46.751	4	-0.097	2.360	1.1511	1.4450	0.7724
100	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4				0.0000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.977113	0.905	-0.19566	0.114114
Bartlett's Test indicates equal variances ($p = 0.12$)	7.299992	13.2767		
The control means are not significantly different ($p = 0.67$)	0.450873	2.446912		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	50	100	70.71068	2	1.151088	0.823676	0.52197	0.475798	0.393658	4, 15
Treatments vs Diluent Control										

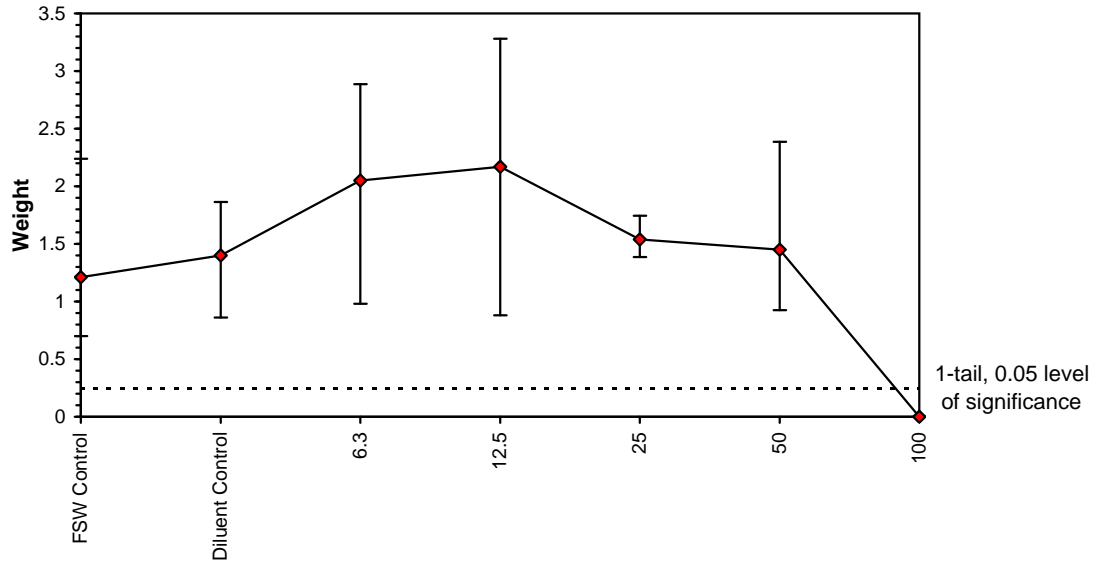
Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)		Skew
IC05	15.982	10.932	2.501	74.411	2.1902
IC10	19.463	12.521	2.422	76.322	1.5310
IC15	22.945	14.460	3.699	78.233	0.7081
IC20	35.648	14.998	0.000	74.611	0.2046
IC25	51.449	14.672	3.441	69.131	-0.2050
IC40	61.159	8.842	23.814	75.304	-0.7299
IC50	67.633	7.255	34.839	79.420	-0.7830



Polychaete Survival and Growth Test-Weight

Start Date: 20/10/2011 12:00 Test ID: PR0686/03 Sample ID: OUTFALL
End Date: 3/11/2011 12:00 Lab ID: 5001 Sample Type: AQ-Aqueous
Sample Date: Protocol: Test Species: DA-Diopatra asciculata
Comments: Sample 5002 used as Diluent Control

Dose-Response Plot



Polychaete Survival and Growth Test-Weight

Start Date: 20/10/2011 12:00 Test ID: PR0686/03 Sample ID: OUTFALL
 End Date: 3/11/2011 12:00 Lab ID: 5001 Sample Type: AQ-Aqueous
 Sample Date: Protocol: Test Species: DA-Diopatra asciculata
 Comments: Sample 5002 used as Diluent Control

Auxiliary Data Summary

Conc-%	Parameter	Mean	Min	Max	SD	CV%	N
FSW Control	Weight mg	1.21	0.70	2.24	0.71	69.51	4
Diluent Control		1.40	0.86	1.86	0.44	47.33	4
6.3		2.05	0.98	2.88	0.81	44.04	4
12.5		2.17	0.88	3.28	1.02	46.62	4
25		1.54	1.38	1.74	0.16	26.08	4
50		1.45	0.92	2.38	0.68	56.88	4
100		0.00	0.00	0.00	0.00		4
FSW Control	pH	8.10	8.10	8.10	0.00	0.00	1
Diluent Control		8.10	8.10	8.10	0.00	0.00	1
6.3		8.10	8.10	8.10	0.00	0.00	1
12.5		8.10	8.10	8.10	0.00	0.00	1
25		8.10	8.10	8.10	0.00	0.00	1
50		8.00	8.00	8.00	0.00	0.00	1
100		8.00	8.00	8.00	0.00	0.00	1
FSW Control	Salinity ppt	34.90	34.90	34.90	0.00	0.00	1
Diluent Control		36.70	36.70	36.70	0.00	0.00	1
6.3		38.50	38.50	38.50	0.00	0.00	1
12.5		40.10	40.10	40.10	0.00	0.00	1
25		43.20	43.20	43.20	0.00	0.00	1
50		49.70	49.70	49.70	0.00	0.00	1
100		62.30	62.30	62.30	0.00	0.00	1
FSW Control	DO % Sat	98.10	98.10	98.10	0.00	0.00	1
Diluent Control		97.30	97.30	97.30	0.00	0.00	1
6.3		105.90	105.90	105.90	0.00	0.00	1
12.5		106.70	106.70	106.70	0.00	0.00	1
25		106.60	106.60	106.60	0.00	0.00	1
50		106.90	106.90	106.90	0.00	0.00	1
100		105.40	105.40	105.40	0.00	0.00	1