

Jennifer Cline

From: Jennifer Cline <jcline@cityofmolalla.com>
Sent: Wednesday, May 18, 2016 8:23 AM
To: COLE David; 'HEINS Pat'
Cc: 'YELTON-BRAM Tiffany'; Jason Clifford
Subject: Molalla Priority Pollutant Test Results
Attachments: 2016-0517_CL.pdf; Q1761 Report 4-13-2016.pdf; Molalla B3509-April.pdf

Hello,

Please find attached a letter from Jason Clifford and electronic copies of the Priority Pollutant and Bioassay effluent reports. As Jason mentions in his letter, there will be one (1) more test session to complete the City's four (4) test requirements per the NPDES permit. A hard copy will follow this email.

Please let Jason 503-793-5283 or myself know if you have any questions.

Jennifer Cline, P.E. | Public Works Director

Licensed in OR, WA

[City of Molalla](#)

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O: 503.759.0218 | F: 503.829.3676

May 17, 2016

Priority Pollutants & Bioassay reports

City of Molalla WWTP permit 101514

Dave & Pat,

The City of Molalla is submitting the April Priority Pollutants and Bioassay effluent results per NPDES permit #101514, file #57613. The city's final effluent passed all required testing. There will be (1) more priority pollutant and bioassay test session which will complete the city's (4) test requirement for this permit cycle. If you have any questions, please do not hesitate to contact me at 503-793-5283 or jclifford@cityofmolalla.com.

Respectfully,



Jason Clifford

Lead Operator

City of Molalla WWTP



Analytical Report for

Molalla, City of - VOC

12424 S. Toliver Road
Molalla, OR 97038

ASL Report #: Q1761

Project ID: 921133.OTC

Attn: Jason Clifford

Authorized and Released By:

Laboratory Project Manager
Doug Hardy
(541) 758-0235 ext.23107
May 04, 2016

All analyses performed by CH2M HILL are clearly indicated. Any subcontracted analyses are included as appended reports as received from the subcontracted laboratory. The results included in this report only relate to the samples listed on the following Sample Cross-Reference page. This report shall not be reproduced except in full, without the written approval of the laboratory.

Any unusual difficulties encountered during the analysis of your samples are discussed in the attached case narratives.



Accredited in accordance with NELAP:
Oregon (100022)
Louisiana (05031)



ASL Report #: Q1761

Sample Receipt Comments

We certify that the test results meet all NELAP requirements.

Sample Cross-Reference

ASL Sample ID	Client Sample ID	Date/Time Collected	Date Received
Q176101	Final Effluent - DMS	04/13/16 08:25	04/13/16
Q176102	Travel Blanks	04/13/16 08:00	04/13/16

CASE NARRATIVE GC/MS VOLATILES ANALYSIS

Lab Name: CH2M ASL

ASL SDG#: Q1761

Project: Molalla, City of

Project #: 921133.OTC

With the exceptions noted as flags, footnotes, or detailed in the section below; standard operating procedures were followed in the analysis of the samples and no problems were encountered or anomalies observed.

All laboratory quality control samples were within established control limits, with any exceptions noted below, or in the associated QC summary forms.

Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. For diluted samples, the reporting limits are adjusted for the dilution required.

Calculations are performed before rounding to minimize errors in calculated values.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the section below, or in the sample receipt documentation.

Method(s):

E624: SW5030

CH2M ASL

Client Information	Lab Information
Client Sample ID: Final Effluent - DMS	Lab Sample ID: Q176101
Project Name: Molalla, City of	Date Received: 04/13/16
Sample Date: 04/13/16	Dilution Factor: 1
Sample Time: 08:25	Report Revision No.: 0
Type: Composite	
Matrix: Water	

Analyte	CAS#	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC/MS Volatiles								
Dichlorodifluoromethane	75-71-8	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Chloromethane	74-87-3	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Vinyl Chloride	75-01-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Bromomethane	74-83-9	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Chloroethane	75-00-3	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Trichlorofluoromethane	75-69-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Acrolein	107-02-8	0.50	5.00	0.50	U	ug/L	E624	04/15/16
1,1-Dichloroethene	75-35-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Acrylonitrile	107-13-1	0.50	5.00	0.50	U	ug/L	E624	04/15/16
Methylene chloride	75-09-2	0.15	0.50	0.15	U	ug/L	E624	04/15/16
trans-1,2-Dichloroethene	156-60-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,1-Dichloroethane	75-34-3	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Chloroform	67-66-3	0.15	0.50	0.21	J	ug/L	E624	04/15/16
1,2-Dichloroethane	107-06-2	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,1,1-Trichloroethane	71-55-6	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Carbon tetrachloride	56-23-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Benzene	71-43-2	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,2-Dichloropropane	78-87-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Trichloroethene (TCE)	79-01-6	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Bromodichloromethane	75-27-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
2-Chloroethylvinyl ether	110-75-8	0.50	2.00	0.50	U	ug/L	E624	04/15/16
cis-1,3-Dichloropropene	10061-01-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
trans-1,3-Dichloropropene	10061-02-6	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,1,2-Trichloroethane	79-00-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Toluene	108-88-3	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Dibromochloromethane	124-48-1	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Tetrachloroethene (PCE)	127-18-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Chlorobenzene	108-90-7	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Ethylbenzene	100-41-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Bromoform	75-25-2	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,1,2,2-Tetrachloroethane	79-34-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16

U=Not detected and reported as less than detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M ASL

Client Information				Lab Information			
Client Sample ID: Final Effluent - DMS				Lab Sample ID: Q176101			
Project Name: Molalla, City of				Date Received: 04/13/16			
Sample Date: 04/13/16				Dilution Factor: 1			
Sample Time: 08:25				Report Revision No.: 0			
Type: Composite							
Matrix: Water							

Analyte	CAS#	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC/MS Volatiles								

Surrogate	% Recovery	Control Limits	Qualifier
Dibromofluoromethane	98	70-130	
1,2-Dichloroethane-d4	102	70-130	
Toluene-d8	95	70-130	
4-Bromofluorobenzene	94	70-130	

U=Not detected and reported as less than detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M ASL

Client Information	Lab Information
Client Sample ID: Travel Blanks	Lab Sample ID: Q176102
Project Name: Molalla, City of	Date Received: 04/13/16
Sample Date: 04/13/16	Dilution Factor: 1
Sample Time: 08:00	Report Revision No.: 0
Type: Grab	
Matrix: Water	

Analyte	CAS#	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC/MS Volatiles								
Dichlorodifluoromethane	75-71-8	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Chloromethane	74-87-3	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Vinyl Chloride	75-01-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Bromomethane	74-83-9	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Chloroethane	75-00-3	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Trichlorofluoromethane	75-69-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Acrolein	107-02-8	0.50	5.00	0.50	U	ug/L	E624	04/15/16
1,1-Dichloroethene	75-35-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Acrylonitrile	107-13-1	0.50	5.00	0.50	U	ug/L	E624	04/15/16
Methylene chloride	75-09-2	0.15	0.50	0.15	U	ug/L	E624	04/15/16
trans-1,2-Dichloroethene	156-60-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,1-Dichloroethane	75-34-3	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Chloroform	67-66-3	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,2-Dichloroethane	107-06-2	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,1,1-Trichloroethane	71-55-6	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Carbon tetrachloride	56-23-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Benzene	71-43-2	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,2-Dichloropropane	78-87-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Trichloroethene (TCE)	79-01-6	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Bromodichloromethane	75-27-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
2-Chloroethylvinyl ether	110-75-8	0.50	2.00	0.50	U	ug/L	E624	04/15/16
cis-1,3-Dichloropropene	10061-01-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
trans-1,3-Dichloropropene	10061-02-6	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,1,2-Trichloroethane	79-00-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Toluene	108-88-3	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Dibromochloromethane	124-48-1	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Tetrachloroethene (PCE)	127-18-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Chlorobenzene	108-90-7	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Ethylbenzene	100-41-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Bromoform	75-25-2	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,1,2,2-Tetrachloroethane	79-34-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16

U=Not detected and reported as less than detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M ASL

Client Information				Lab Information			
Client Sample ID: Travel Blanks				Lab Sample ID: Q176102			
Project Name: Molalla, City of				Date Received: 04/13/16			
Sample Date: 04/13/16				Dilution Factor: 1			
Sample Time: 08:00				Report Revision No.: 0			
Type: Grab							
Matrix: Water							

Analyte	CAS#	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC/MS Volatiles								

Surrogate	% Recovery	Control Limits	Qualifier
Dibromofluoromethane	95	70-130	
1,2-Dichloroethane-d4	97	70-130	
Toluene-d8	94	70-130	
4-Bromofluorobenzene	94	70-130	

U=Not detected and reported as less than detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M ASL

Client Information	Lab Information
Client Sample ID: WB1-0415	Lab Sample ID: WB1-0415
Project Name: Molalla, City of	Date Received: N/A
Sample Date: N/A	Dilution Factor: 1
Sample Time: N/A	Report Revision No.: 0
Type: QC	
Matrix: Water	

Analyte	CAS#	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC/MS Volatiles								
Dichlorodifluoromethane	75-71-8	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Chloromethane	74-87-3	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Vinyl Chloride	75-01-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Bromomethane	74-83-9	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Chloroethane	75-00-3	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Trichlorofluoromethane	75-69-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Acrolein	107-02-8	0.50	5.00	0.50	U	ug/L	E624	04/15/16
1,1-Dichloroethene	75-35-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Acrylonitrile	107-13-1	0.50	5.00	0.50	U	ug/L	E624	04/15/16
Methylene chloride	75-09-2	0.15	0.50	0.15	U	ug/L	E624	04/15/16
trans-1,2-Dichloroethene	156-60-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,1-Dichloroethane	75-34-3	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Chloroform	67-66-3	0.15	0.50	0.21	J	ug/L	E624	04/15/16
1,2-Dichloroethane	107-06-2	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,1,1-Trichloroethane	71-55-6	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Carbon tetrachloride	56-23-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Benzene	71-43-2	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,2-Dichloropropane	78-87-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Trichloroethene (TCE)	79-01-6	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Bromodichloromethane	75-27-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
2-Chloroethylvinyl ether	110-75-8	0.50	2.00	0.50	U	ug/L	E624	04/15/16
cis-1,3-Dichloropropene	10061-01-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
trans-1,3-Dichloropropene	10061-02-6	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,1,2-Trichloroethane	79-00-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Toluene	108-88-3	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Dibromochloromethane	124-48-1	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Tetrachloroethene (PCE)	127-18-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Chlorobenzene	108-90-7	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Ethylbenzene	100-41-4	0.15	0.50	0.15	U	ug/L	E624	04/15/16
Bromoform	75-25-2	0.15	0.50	0.15	U	ug/L	E624	04/15/16
1,1,2,2-Tetrachloroethane	79-34-5	0.15	0.50	0.15	U	ug/L	E624	04/15/16

U=Not detected and reported as less than detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M ASL

Client Information				Lab Information			
Client Sample ID: WB1-0415				Lab Sample ID: WB1-0415			
Project Name: Molalla, City of				Date Received: N/A			
Sample Date: N/A				Dilution Factor: 1			
Sample Time: N/A				Report Revision No.: 0			
Type: QC							
Matrix: Water							
Basis: As Received							

Analyte	CAS#	DL	RL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC/MS Volatiles								

Surrogate	% Recovery	Control Limits	Qualifier
Dibromofluoromethane	98	70-130	
1,2-Dichloroethane-d4	95	70-130	
Toluene-d8	96	70-130	
4-Bromofluorobenzene	93	70-130	

U=Not detected and reported as less than detection limit

J=Estimated value below reporting limit

E=Estimated value above calibration range

*=See case narrative

CH2M ASL

Client Information	Lab Information
Project Name: Molalla, City of	LCS ID: BS1W0415
Type: QC	Report Revision No.: 0
Matrix: Water	Dilution Factor: 1

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
GC/MS Volatiles							
Dichlorodifluoromethane	75-71-8	20.0	18.3	ug/L	91	E624	04/15/16
Chloromethane	74-87-3	20.0	22.1	ug/L	110	E624	04/15/16
Vinyl Chloride	75-01-4	20.0	22.2	ug/L	111	E624	04/15/16
Bromomethane	74-83-9	20.0	20.9	ug/L	104	E624	04/15/16
Chloroethane	75-00-3	20.0	21.2	ug/L	106	E624	04/15/16
Trichlorofluoromethane	75-69-4	20.0	19.2	ug/L	96	E624	04/15/16
Acrolein	107-02-8	20.0	21.8	ug/L	109	E624	04/15/16
1,1-Dichloroethene	75-35-4	20.0	18.3	ug/L	91	E624	04/15/16
Acrylonitrile	107-13-1	20.0	22.4	ug/L	112	E624	04/15/16
Methylene chloride	75-09-2	20.0	18.8	ug/L	94	E624	04/15/16
trans-1,2-Dichloroethene	156-60-5	20.0	17.7	ug/L	88	E624	04/15/16
1,1-Dichloroethane	75-34-3	20.0	18.1	ug/L	90	E624	04/15/16
Chloroform	67-66-3	20.0	18.8	ug/L	94	E624	04/15/16
1,2-Dichloroethane	107-06-2	20.0	18.9	ug/L	95	E624	04/15/16
1,1,1-Trichloroethane	71-55-6	20.0	18.8	ug/L	94	E624	04/15/16
Carbon tetrachloride	56-23-5	20.0	19.6	ug/L	98	E624	04/15/16
Benzene	71-43-2	20.0	19.0	ug/L	95	E624	04/15/16
1,2-Dichloropropane	78-87-5	20.0	19.1	ug/L	95	E624	04/15/16
Trichloroethene (TCE)	79-01-6	20.0	20.0	ug/L	100	E624	04/15/16
Bromodichloromethane	75-27-4	20.0	19.4	ug/L	97	E624	04/15/16
2-Chloroethylvinyl ether	110-75-8	20.0	20.3	ug/L	102	E624	04/15/16
cis-1,3-Dichloropropene	10061-01-5	20.0	21.5	ug/L	108	E624	04/15/16
trans-1,3-Dichloropropene	10061-02-6	20.0	20.2	ug/L	101	E624	04/15/16
1,1,2-Trichloroethane	79-00-5	20.0	19.7	ug/L	98	E624	04/15/16
Toluene	108-88-3	20.0	19.3	ug/L	96	E624	04/15/16
Dibromochloromethane	124-48-1	20.0	21.1	ug/L	105	E624	04/15/16
Tetrachloroethene (PCE)	127-18-4	20.0	19.0	ug/L	95	E624	04/15/16
Chlorobenzene	108-90-7	20.0	19.1	ug/L	96	E624	04/15/16
Ethylbenzene	100-41-4	20.0	18.8	ug/L	94	E624	04/15/16
Bromoform	75-25-2	20.0	21.1	ug/L	106	E624	04/15/16
1,1,2,2-Tetrachloroethane	79-34-5	20.0	19.5	ug/L	97	E624	04/15/16

U=Not detected and reported as less than detection limit
 J=Estimated value below reporting limit
 E=Estimated value above calibration range
 *=See case narrative

CH2M ASL

Client Information	Lab Information
Project Name: Molalla, City of Type: QC Matrix: Water	LCS ID: BS1W0415 Report Revision No.: 0 Dilution Factor: 1

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
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GC/MS Volatiles

Surrogate	% Recovery	Control Limits	Qualifier
Dibromofluoromethane	93	70-130	
1,2-Dichloroethane-d4	90	70-130	
Toluene-d8	94	70-130	
4-Bromofluorobenzene	97	70-130	

U=Not detected and reported as less than detection limit

J=Estimated value below reporting limit

E=Estimated value above calibration range

*=See case narrative

Chain of Custody Record

Client Contact		Analysis Turnaround Time				Preservation Used			
Project Name: <u>City of Molalla VOC</u>		TAT is Calendar days				Analysis Requested			
Project # or PO #: <u>Wastewater</u>		TAT if different from below				Sample Specific Notes:			
Company Name: <u>City of Molalla</u>		<input type="checkbox"/> 21 days (STD)	<input type="checkbox"/> 14 days *	<input type="checkbox"/> 7 days *	<input type="checkbox"/> 5 days *	<input type="checkbox"/> 3 day *	<input type="checkbox"/> 2 days *	<input type="checkbox"/> 1 day *	Lab ID:
Address: <u>12424 S. Toliver Road</u>		* (Surcharges will apply)				Sample Specific Notes:			
City/State/Zip: <u>Molalla OR 97038</u>		Sample Date	Sample Time	Sample Type (C-Comp, G-Grab)	Matrix (W-W, S-Sol, A-Air)	Total # of Cont.	Lab ID:		
Project Manager: <u>Jessan Clifford</u>		<u>4-13-16</u>	<u>0825</u>	<u>C</u>		<u>6</u>	<u>1</u>		
Phone #: <u>503-793-5183</u>		<u>Final Effluent - DMS</u>				<u>2</u>	<u>2</u>		
Report to email: <u>clifford@cityofmolalla.com</u>		<u>Travel Blanks</u>							

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4= HNO3; 5= NaOH; 6= Other

Possible Hazard Identification:
 Are samples hazardous? Yes No
 If yes, select hazard(s): Listed Ignitable Corrosive Reactive Toxic

If YES or NO is not checked above, samples will be assumed hazardous and hazardous disposal fees will be applied.

Sampled By: Jessan Clifford Date/Time: 4-13-16
 Received by: Jessan Clifford Date/Time: 4-13-16
 Relinquished by: Jessan Clifford Date/Time: 4-13-16
 Relinquished by: Jessan Clifford Date/Time: 4-13-16
 Shipped Via: UPS Fed-Ex USPS Other
 Tracking #: 1100



SDG ID: Q1761

Date Received: 4/13/16

Client/Project: City of Molalla

Received By: PC

Were custody seals intact and on the outside of the cooler?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
Shipping Record:	<input checked="" type="checkbox"/> Hand Delivered	<input type="checkbox"/> On File	<input type="checkbox"/> COC	
Radiological Screening for DoD	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
Packing Material:	<input checked="" type="checkbox"/> Hand Delivered	<input type="checkbox"/> Ice	<input type="checkbox"/> Blue Ice	<input type="checkbox"/> Box
Temp OK? (<6C) Therm ID: TH173 Exp. 4/15/16	4.1°C	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Was a Chain of Custody (CoC) Provided?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
Was the CoC correctly filled out (If No, document below)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
Did sample labels agree with COC? (If No, document below)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
Did the CoC list a correct bottle count and the preservative types (No=Correct on CoC)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
Were the sample containers in good condition (broken or leaking)?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
Was enough sample volume provided for analysis? (If No, document below)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
Containers supplied by ASL?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
Any sample with < 1/2 holding time remaining? If so contact LPM	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A	
Samples have multi-phase? If yes, document on SRER	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A	
All water VOCs free of air bubbles? No, document on SRER	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A	
pH of all samples met criteria on receipt? If "No", preserve and document below.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
Dissolved/Soluble metals filtered in the field?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
Dissolved/Soluble metals have sediment in bottom of container? If so document below.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	

Preservation Adjustment

Sample ID	Reagent	Reagent Lot Number	Volume Added	Initials/Time	24 hour pH check Initials/Time

Did pH of all metals samples preserved upon receipt meet criteria 24 hours after preservation? Yes No

Sample Exception Report (The following exceptions were noted)

1. One sample vial Q176101-VOC6) has air bubble >6mm. (Client ID: Final Effluent - DMS)

Client was notified on: _____ Client contact: _____

Resolution to Exception:

**BIOASSAY REPORT
CHRONIC AND ACUTE
BIOASSAYS CONDUCTED
April 5 through 12, 2016**

Prepared for

CITY OF MOLALLA
MOLALLA, OREGON

Prepared by



Applied Sciences Laboratory (ASL)

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541-768-3160

NELAC #OR100022

State of Washington Department of Ecology (WDOE), Lab ID C1233

Report Date: April 19, 2016
Lab I.D. No. B3509

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INTRODUCTION

CH2M Applied Sciences Laboratory (CH2M-ASL) conducted chronic bioassay testing from April 5 through 12, 2016, on samples provided by the City of Molalla, Molalla, Oregon. The tests were conducted using the water flea (*Ceriodaphnia dubia*), the fathead minnow (*Pimephales promelas*), and algae (*Raphidocelis subcapitata*, formerly known as *Selenastrum capricornutum*).

Based on testing in December of 2015 that showed pathogenic effects in the fathead minnow chronic test, this testing used the WDOE Fathead Minnow Survival and Growth (alternate version for samples having pathogens) test method.

OVERVIEW OF REGULATORY GUIDANCE

The following provides an overview and excerpts of applicable permit specifics, regulatory guidance, and other relevant information. This is intended only as a helpful guide, from a laboratory perspective, for understanding test outcomes. The final responsibility for interpretation of results remains with the client and/or regulatory agency.

The following guidance is taken from CH2M's reading of the NPDES permit for the City of Molalla STP facility (permit #OR00101514, effective Jun 1, 2014, to Jun 1, 2019).

Acute Toxicity:

- *Acute Permit Limit:* "An acute WET test will be considered to show toxicity if there is a statistically significant difference in survival between the control and 10% effluent reported as the NOEC \leq 10 percent effluent."
- Please note: There is an apparent conflict within the above quote (taken from Section 10.b.iv. of the permit)
 - Statistical fact: In a test where the NOEC value is exactly equal to 10%, no statistically significant difference between the control and 10% effluent exists.
 - Using the first portion of the quote, referencing 'a statistically significant difference', would infer that toxicity was not shown.
 - Using the last portion of the quote, referencing 'NOEC \leq 10%', would infer that toxicity was shown.
 - ASL's believes that this conflict is the result of what likely is a typographic error in the permit and that a "< 10" was intended rather than the " \leq 10" as written. However, this should be referred to OR DEQ for clarification.
- Acute toxicity data may be obtained as Dual End-Point Tests.

Chronic toxicity:

- *Chronic Permit Limit:* "A chronic WET test will be considered to show toxicity if the IC₂₅ ... occurs at dilutions equal to or less than the dilution known to occur at the edge of the mixing zone, that is, IC₂₅ \leq 4%"

Evaluation of Causes and Exceedances:

- “If any test exhibits toxicity ... another test ... shall be conducted within two weeks”.
- “If two consecutive WET tests indicate acute and/or chronic toxicity ... the permittee shall immediately notify the Department of the results.”

SUMMARY OF TEST RESULTS

EXHIBIT 1

Summary of Acute Dual-Endpoint Test Results

Species	NOEC (%)	LOEC (%)	LC ₅₀ (%)
<i>C. dubia</i>	100	> 100	> 100
<i>P. promelas</i>	100	> 100	> 100

Note: acronyms are as defined below Exhibit 2.

From the NPDES permit: “ An acute WET test will be considered to show toxicity if there is a statistically significant difference in survival between the control and 10% effluent reported as the NOEC \leq 10 percent effluent.”

More detailed information is provided in the Results and Discussion section.

Exhibit 2 provides a summary of the final test results.

EXHIBIT 2

Summary of Chronic Test Results

Species	NOEC (%)	LOEC (%)	IC ₂₅ (%)
<i>C. dubia</i>	40	100	> 100
<i>P. promelas</i>	100	> 100	> 100
<i>R. subcapitata</i>	< 2.0	2.0	44.5

Note: acronyms are as defined below.

From the NPDES permit: “A chronic WET test will be considered to show toxicity if the IC₂₅ ... occurs at dilutions equal to or less than the dilution known to occur at the edge of the mixing zone, that is, IC₂₅ \leq 4%”.

More detailed information is provided in the Results and Discussion section.

ACRONYM DEFINITIONS (from EPA guidance):

NOEC = No Observed Effect Concentration: The highest test concentration that causes no observable adverse effects on the test organisms (i.e. no statistically significant reduction from the control).

LOEC = Low Observed Effect Concentration: The lowest test concentration that does cause an observable adverse effect on the test organisms (i.e. is statistically significant reduction from the control).

IC₂₅ = Inhibition Concentration (25%): A point estimate of the test concentration that would cause a 25 percent reduction of a non-quantal biological measurement (i.e. growth, reproduction, etc.) for the test population.

METHODS AND MATERIALS

TEST METHODS

The chronic test methods were performed according to:

- *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition, (EPA 2002), EPA-821-R-02-013.
- *Understanding and Accounting for Method Variability in Whole Effluent Toxicity Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, Washington State Department of Ecology (revised 2008) Pub# WQ-R-95-80.

Additional guidance was provided by:

- *Reasonable Potential Analysis for Toxic Pollutants, Internal Management Directive*, Oregon Department of Environmental Quality (April 2005).

DEVIATIONS FROM PROTOCOLS

Deviations from required procedures in the test methods:

- None noted.

Deviations from recommended procedures in the test methods:

- None noted.

TEST DESIGN

The following summarizes the conditions used for both overall testing and the specifics for each test (observations and notations can be found on the datasheets in Appendix A):

Overall Test Design:

- Chronic tests: 2, 4, 10, 40, and 100 percent sample + dilution water for the control.

Test Organism Conditions:

- All organisms tested were fed and maintained during culturing, acclimation, and testing as prescribed by the EPA (2002).
- The test organisms appeared vigorous and in good condition prior to testing.

C. dubia chronic test:

- Source: CH2M's in-house cultures
- Age: Less than 24 hours old and within an 8-hour age range, with blocking by known parentage
- Design: Ten test vessels per concentration, one organism per vessel
- Test Solution Renewal: Daily
- Monitoring:
 - Daily: Survival and neonate production (with brood determination)
 - Daily: DO and pH in pre and post-renewal solutions, all concentrations
 - Daily: Temperature in pre-renewal solutions, all concentrations
 - With each new sample: Conductivity in post-renewal solutions, control and highest sample concentration
- Termination: When 60%+ of surviving control organisms produce a 3rd brood.
- Endpoints: Survival (at termination) and Reproduction (through first 3 broods)
- Acute Dual-Endpoint: 48 hour Survival (from the 2 day chronic exposure data)

P. promelas chronic test (WDOE Alternate version):

- Source: Aquatox Inc., Hot Springs, Arkansas
- Age: Less than 48 hours old and within an 24 hour age range
- Design: Ten test vessels per concentration, two organisms per vessel
- Test Solution Renewal: Daily
- Monitoring:
 - Daily: Survival
 - Daily: DO and pH in pre and post-renewal solutions, all concentrations
 - Daily: Temperature in pre-renewal solutions, all concentrations
 - With each new sample: Conductivity in post-renewal solutions, control and highest sample concentration
- Termination: 7 days after test initiation.
- Endpoints: Survival and Growth (average dry weight per organism added @ initiation)
- Acute Dual-Endpoint: 96 hour Survival (from the 4 day chronic exposure data)

R. subcapitata chronic test:

- Source: CH2M's in-house cultures
- Age: Culture acclimated to test conditions for 4 to 7 days.
- Design: Four test vessels per concentration, 10,000 cells/ml density at initiation
- Test Solution Renewal: None (static)
- Monitoring:
 - Initiation: DO, pH, Temperature, and Conductivity, all concentrations
 - Initiation: Hardness and Alkalinity, control + low, middle and high sample concentrations
 - Initiation: Light Intensity and Cell Density confirming counts, in triplicate
 - Daily: Temperature and pH, all concentrations
- Termination: 96 hours.
- Endpoints: Cell Density (at termination)

DILUTION WATER

The dilution water used was the standard culture water used by CH2M-ASL:

- Reconstituted, moderately hard water (as per EPA protocol) with a total hardness of 80 to 100 mg/L as CaCO₃ and an alkalinity of 60 to 70 mg/L as CaCO₃.
- For the *R. subcapitata* test: Reconstituted, moderately hard water with nutrients added, including EDTA, that was passed through a 0.45 micron filter prior to use.

SAMPLE COLLECTION AND STORAGE

Samples were collected by City of Molalla personnel. The samples were accepted as scheduled by CH2M's Applied Sciences Laboratory. Chain of Custody and Sample Receipt Records are provided in Appendix C.

- All samples were received within the EPA recommended 0 to 6 °C range.
- All samples were initially used for test initiation or test solution renewal within the EPA recommended maximum holding time of 36 hours of sample collection.
- All subsequent uses of a sample occurred within the EPA recommended maximum holding time of 72 hours past the time of initial use of that sample.
- Following receipt, the samples were stored in the dark at 0 to 6 °C until test solutions were prepared and tested.

SAMPLE PREPARATION

Samples used during these tests were:

- Temperature adjusted prior to test initiation and each daily renewal.
- Filtered through a 60 µm net upon arrival.
- The subsample used for the *R. subcapitata* test had nutrients, including EDTA, added, and was 0.45 micron filtered prior to use.

DATA ANALYSIS

The statistical analyses performed for the acute tests were those outlined in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, USEPA Office of Water, Fifth Edition (2002), EPA-821-R-02-012, using CETIS.

The statistical analyses performed for the chronic tests were those outlined in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, USEPA Office of Water, Fourth Edition (EPA 2002), EPA-821-R-02-013, CETIS.

Additional guidance on the WDOE FHM alternate method was provided by *Understanding and Accounting for Method Variability in Whole Effluent Toxicity Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, Washington State Department of Ecology (revised 2008) Pub# WQ-R-95-80.

- The specific statistical analysis and CETIS version used for each endpoint evaluation is listed with the statistical outputs included with each test in Appendix A.
- If any additional analysis methods were also used, an explanation of the rationale and reference to the source method is included with the presentation of those results below.

RESULTS AND DISCUSSION

The raw data sheets for all tests are presented in Appendix A.

ACUTE BIOASSAYS

Table 1 summarizes the survival data for the *C. dubia* acute dual-endpoint test.

Table 1 Summary of Acute Dual-Endpoint Results <i>C. dubia</i>	
Sample Concentration (%)	Percent Survival (at 96 hours)
Control	100
2.0	100
4.0	100
10.0	100
40.0	100
100	100

Statistical analysis in accordance with the EPA protocol and WDOE guidance results in:

- NOEC = 100 %
- LOEC > 100 %
- LC₅₀ > 100 %

From the NPDES permit: “An acute WET test will be considered to show toxicity if there is a statistically significant difference in survival between the control and 10% effluent reported as the NOEC \leq 10 percent effluent.”

Dissolved oxygen concentrations remained at 4.0 mg/L or greater throughout the test period. Test temperatures remained in the range of 20 \pm 1°C.

The *C. dubia* acute test meets Test Acceptability Criteria (TAC) of a minimum 90 percent control survival. Unless referenced above, the tests proceeded without any noted deviations or interruptions that could have affected test results. The testing should be considered “valid”.

Table 2 summarizes the survival data for the *P. promelas* acute dual-endpoint test.

Table 2 Summary of Acute Dual-Endpoint Results <i>P. promelas</i>	
Sample Concentration (%)	Percent Survival (at 96 hours)
Control	100
2.0	100
4.0	95
10.0	100
40.0	100
100	100

Statistical analysis in accordance with the EPA protocol and WDOE guidance results in:

- NOEC = 100 %
- LOEC > 100 %
- LC₅₀ > 100 %

From the NPDES permit: “An acute WET test will be considered to show toxicity if there is a statistically significant difference in survival between the control and 10% effluent reported as the NOEC \leq 10 percent effluent.”

The *P. promelas* acute test meets Test Acceptability Criteria (TAC) of a minimum 90 percent control survival. Unless referenced above, the tests proceeded without any noted deviations or interruptions that could have affected test results. The testing should be considered “valid”.

CHRONIC BIOASSAYS

Table 3 summarizes the survival and reproduction data for the *C. dubia* chronic test.

Sample Concentration (%)	Percent Survival	Mean Number of Young Per Adult
Control	100	35.8
2.0	100	35.6
4.0	100	37.0
10	100	36.1
40	100	31.5 ^a
100	100	29.5 ^a

^a Indicates a statistically significant difference from the control at alpha = 0.05.

Statistical analysis in accordance with the EPA protocol and WDOE guidance results in:

- NOEC = 10 %
- LOEC = 40 %
- IC₂₅ > 100 %

However, additional guidance in EPA-821-R-02-013 (section 10.2.8.2.5) states “a test concentration shall not be considered toxic (i.e. significantly different from the control) if the relative difference from the control is less than the lower PMSD bounds.” The EPA lower percent minimum significant difference (PMSD) bounds for *P. promelas* growth is 12 percent. The reduction at the 40 percent sample concentration was 12.0 percent and therefore should not be considered statistically significant. As a result, test results should be reported as:

- NOEC = 40 %
- LOEC = 100 %
- IC₂₅ > 100 %

From the NPDES permit: “A chronic WET test will be considered to show toxicity if the IC₂₅ ... occurs at dilutions equal to or less than the dilution known to occur at the edge of the mixing zone, that is, IC₂₅ ≤ 4%”.

The dissolved oxygen levels in the chronic tests remained above 4.0 mg/L. Test temperatures remained at 25±1°C.

The *C. dubia* test meets Test Acceptability Criteria (TAC) for a minimum 80 percent control survival and a minimum 15 young produced per surviving control adult. Unless referenced above, the tests proceeded without any noted deviations or interruptions that could have affected test results. The testing should be considered “valid”.

Table 4 summarizes the survival and growth data for the *P. promelas* chronic test.

Table 4 Summary of Chronic Results <i>P. promelas</i>		
Sample Concentration (%)	Percent Survival	Mean Dry Weight Per Organism Added (mg)
Control	100	0.615
2.0	95.0	0.591
4.0	95.0	0.558
10	100	0.638
40	100	0.596
100	100	0.565

Statistical analysis in accordance with the EPA protocol results in:

- NOEC = 100 %
- LOEC > 100 %
- IC₂₅ > 100 %

From the NPDES permit: “A chronic WET test will be considered to show toxicity if the IC₂₅ ... occurs at dilutions equal to or less than the dilution known to occur at the edge of the mixing zone, that is, IC₂₅ ≤ 4%”.

The dissolved oxygen levels in the chronic tests remained above 4.0 mg/L. Test temperatures remained at 25±1°C.

The *P. promelas* test meets Test Acceptability Criteria (TAC) for a minimum 80 percent control survival and a minimum weight of 0.250 mg per surviving control organism. Unless referenced above, the tests proceeded without any noted deviations or interruptions that could have affected test results. The testing should be considered “valid”.

Table 5 summarizes the algae growth data for the *R. subcapitata* chronic test.

Table 5 Summary of Chronic Results <i>R. subcapitata</i>	
Sample Concentration (%)	Growth (Cells/ml x 10⁶)
Control	3.324
2.0	2.773 ^a
4.0	2.643 ^a
10	2.506 ^a
40	2.629 ^a
100	1.922 ^a

^a Indicates a statistically significant difference from the control at alpha = 0.05.

Statistical analysis in accordance with the EPA protocol results in:

- NOEC < 2.0 %
- LOEC = 2.0 %
- IC₂₅ = 44.5 %

From the NPDES permit: “A chronic WET test will be considered to show toxicity if the IC₂₅ ... occurs at dilutions equal to or less than the dilution known to occur at the edge of the mixing zone, that is, IC₂₅ ≤ 4%”.

The dissolved oxygen levels in the chronic tests remained above 4.0 mg/L. Test temperatures remained at 25±1°C.

The *R. subcapitata* chronic test meets Test Acceptability Criteria (TAC) for a minimum 1.0 x 10⁶ cells/ml control growth and a maximum coefficient of variance (CV%) of 20% in the controls. Unless referenced above, the tests proceeded without any noted deviations or interruptions that could have affected test results. The testing should be considered “valid”.

REFERENCE TOXICANT TESTS

Reference toxicant (reftox) testing is performed to document both initial and ongoing laboratory performance of the test method(s). While the health of the test organisms is primarily evaluated by the performance of the laboratory control, reftox test results also may be used to assess the health and sensitivity of the test organisms. Reftox test results within their respective cumulative summary (Cusum) chart limits are indicative of consistent laboratory performance and normal test organism sensitivity.

The results of the reftox tests indicate that the test organisms were within their respective cusum chart limits based on EPA guidelines. This demonstrates ongoing laboratory proficiency of the test methods and suggests normal test organism sensitivity in the associated client testing.

The *C. dubia*, *P. promelas*, and *R. subcapitata* reftox tests were conducted using sodium chloride. The data sheets for the reference toxicant tests are provided in Appendix B.

Table 6 summarizes the reference toxicant test results and Cusum chart limits.

Species	IC₂₅	Cusum Chart Limits
<i>C. dubia</i> (survival)	2.097	0.69 to 2.100
<i>C. dubia</i> (reproduction)	1.06	0.22 to 1.08
<i>P. promelas</i> (survival)	2.3	1.3 to 3.9
<i>P. promelas</i> (growth)	1.6	1.1 to 3.4
<i>R. subcapitata</i> (growth)	1.71	0.68 to 1.85

APPENDIX A
RAW DATA SHEETS

Client City of Molalla

Sample Designation (SDG): B 3509

Rec'd NC 4-4-16

Test Species Information	Cd # <u>3169</u> <i>Ceriodaphnia dubia</i> Chronic	FHM # <u>1867</u> <i>Pimephales promelas</i> Chronic	Rs # <u>803</u> <i>Raphidocelis subcapitata</i> Chronic	Cd # <u>3169</u> <i>Ceriodaphnia dubia</i> Acute	FHM # <u>1867</u> <i>Pimephales promelas</i> Acute
Organism Age at Initiation	<24 hrs, all within an 8 hr window	<48 hrs, all within a 24 hour window	na	<24 hrs	Days
Test Container Size	30 ml	30 ml	125 ml	30 ml	400 ml
Test Volume	15 ml	20 ml	50 ml	25 ml	250 ml
Feeding: Type and Amount	0.10 ml Algae and 0.10 ml YCT daily	0.03 ml <i>Artemia</i> , 2 x Daily	1 ml/L Nutrients, incl. EDTA, added	Algae and YCT during acclimation	0.15 ml <i>Artemia</i> , @ 48 hrs
Aeration:	<input checked="" type="checkbox"/> None <input type="checkbox"/> Prior to use	<input checked="" type="checkbox"/> None <input type="checkbox"/> Prior to use	<input checked="" type="checkbox"/> None <input type="checkbox"/> Prior to use	<input type="checkbox"/> None <input type="checkbox"/> Prior to use	<input type="checkbox"/> None <input type="checkbox"/> Prior to use
In Test Chambers via Slow Bubble :		<input type="checkbox"/> @ _____ hrs			<input type="checkbox"/> @ _____ hrs
Acclimation Period	<24 hrs	<24 hrs	<u>4</u> Days	<24 hrs	<24 hrs
Organism Source	In-House	<u>Aquatox</u>	In-House	In-House	
Size	-	-	-	-	-
Loading Rate	-	-	-	-	-

Dissolved Oxygen aeration justifications (in test chambers):

Test(s): All _____

Date:

Comments:

Test Solution Preparation and Dilution Record

Client: City of Molalla

Note: Indicates task not done, Indicates task was done. Temp adj. = Temperature adjusted to ambient or test temp
 Ditto marks (' ') indicate that the same SDG, batch of dilution water, or food as the previous day's entry was used.

Ceriodaphnia dubia - Chronic

Test Concentration (%)	Sample Volume (mls)	Final Volume (mls)
Control	0.00	→ 200
2.0	4.00	→ 200
4.0	8.00	→ 200
10	20.0	→ 200
40	80.0	→ 200
100	200	→ 200

Total Sample volume needed per day = 312 mls

Test Day	Sample ID Used	Daily Sample Preparation (prior to dilution)	Dilution Water Used	YCT ID Used	Algae ID Used	Date	Time	Initials
0 (Initiation)	B3509-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID# 4337	#1090	#1089	4/5/2016	07:00	DW
1	B - 01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID# 4337	#1090	#1089	4/6/2016	07:40	DW
2	B - 02	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID# 4337	#1090	#1089	4/7/2016	08:35	MC
3	B - 02	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID# 4337	#1090	#1089	4/8/2016	07:00	DW
4	B - 03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID# 4337	#1090	#1089	4/9/2016	09:15	DW
5	B - 03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID# 4337	#1090	#1089	4/10/2016	07:20	DW
6	B -	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID#	#	#	1/20	:	
7	B -	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID#	#	#	1/20	:	

Fathead minnow - Chronic

Test Concentration (%)	Sample Volume (mls)	Final Volume (mls)
Control	0.00	→ 250
2.0	5.00	→ 250
4.0	10.0	→ 250
10	25.0	→ 250
40	100	→ 250
100	250	→ 250

Total Sample volume needed per day = 390 mls

Test Day	Sample ID Used	Daily Sample Preparation (prior to dilution)	Dilution Water Used	Date	Time	Initials
0 (Initiation)	B3509-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID# 4333	4/5/2016	07:00	DW
1	B - 01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID# 4337	4/6/2016	07:40	DW
2	B - 02	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID# 4337	4/7/2016	08:40	MC
3	B - 02	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID# 4337	4/8/2016	07:00	DW
4	B - 03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID# 4337	4/9/2016	07:15	DW
5	B - 03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID# 4337	4/10/2016	07:20	DW
6	B - 03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID# 4339	4/11/2016	07:55	MC

Algae - Chronic

Test Concentration (%)	Sample Volume (mls)	Final Volume (mls)
Control	0.00	→ 500
2.0	10.0	→ 500
4.0	20.0	→ 500
10	50.0	→ 500
40	200	→ 500
100	500	→ 500

Test Day	Sample ID Used	Daily Sample Preparation (prior to dilution)	Dilution Water Used	Date	Time	Initials
0 (Initiation)	B3509-01	<input checked="" type="checkbox"/> Temperature adjusted <input type="checkbox"/> Aerated	ID# 4333	4/5/2016	10:20	3-

Nutrients added (incl. EDTA)
 0.45 um filtered Lot# T50163
 1.60 um filtered (WDOE clients only)

Total Sample volume needed = 630 mls



Ceriodaphnia dubia
Survival and Reproduction
Test Data Summary

Client City of Molalla Test Start Date 4-5-16
 Sample Description _____ Initial Sample ID# B 3509
 Data summarized by DW

Percent or Concentration	Total Live Young Produced in First 3 Broods per Replicate										# Alive Adults	Total Live Young
	A	B	C	D	E	F	G	H	I	J		
Control	39	34	32	32	38	37	32	38	41	35	10	358
	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?		
2.0 %	35	33	38	39	31	34	37	39	33	37	10	356
	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?		
4.0 %	47	31	39	40	36	32	35	37	35	38	10	370
	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?		
10 %	43	36	41	28	31	31	36	40	39	36	10	361
	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?		
40 %	26	36	29	30	30	32	32	29	30	41	10	315
	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?		
100 %	16	28	28	34	33	28	29	32	34	33	10	295
	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?		

Test Organism Mortality (Adult dead) = AD? ✓ # of Alive Adults = Number of test organism alive at termination
 Test Organism identified as Male = AD? M Total Live Young = Total neonates produced in first 3 broods
 Test Organism Injured during test = AD? I

Footnote: As per EPA-600-4-91-002 and EPA-821-R-02-013, *Ceriodaphnia dubia* test should be terminated when 60% of the surviving control organisms have produced their third brood, or at the end of eight days, whichever occurs first.

Also as per EPA-821-R-02-013 (13.10.9.1), "In this three-brood test, offspring from fourth or higher broods should not be counted and should not be included in the total number of neonates produced during the test."

CERIODAPHNIA CHRONIC SURVIVAL AND REPRODUCTION DATA

Neo's obtained from	A	B	C	D	E	F	G	H	I	J
Culture Board ID:	L	L	L	L	L	L	M	M	M	M
Slot #:	13	14	22	24	47	48	17	19	23	33

Incubator Used: # 6
 Random Template Used: 6 conc # 12

Client: City of Molalla Test Initiation Date: 4/15/2016 Time: 08:45

Sample Description: _____ Initial Sample ID # B3509 - 01 → 03 Termination Date: 4/11/2016 Time: 09:45

Technician Day 0 DW Day 1 DW Day 2 MC Day 3 DW Day 4 2 Day 5 3 Day 6 MC Day 7 _____ Day 8 _____
 Time Day 0 0845 Day 1 0855 Day 2 1315 Day 3 0855 Day 4 1315 Day 5 1020 Day 6 0945 Day 7 _____ Day 8 _____
 Cerio ID: Cd 3119

Percent	Day	Daily Number of Live Young for each Replicate										No. Live Adults	Daily Total Live Young
		A	B	C	D	E	F	G	H	I	J		
Control	1	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	0	10	0
	3	5	6	6	5	6	6	5	5	6	6	10	56
	4	11	12	12	13	11	13	11	13	14	10	10	117 (119)
	5	0	16	14	14	0	18	16	20	0	0	10	98
	6	23	0	0	0	22	0	0	0	21	19	10	85
	7												
	8												
2.0 %	1	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	0	10	0
	3	5	5	5	6	5	6	6	6	5	6	10	55
	4	11	11	13	14	8	11	13	12	11	13	10	117
	5	19	17	20	19	18	17	18	21	17	0	10	156
	6	0	0	0	0	0	20	0	0	0	18	10	18
	7												
	8												
4.0 %	1	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	0	10	0
	3	6	5	6	6	5	6	5	6	6	6	10	57
	4	15	9	6	13	12	15	12	11	12	12	10	110
	5	0	17	0	21	19	0	0	0	18	0	10	75
	6	26	0	23	0	0	20	18	21	0	20	10	128
	7												
	8												
10 %	1	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	0	10	0
	3	5	5	6	5	5	7	5	5	6	5	10	54
	4	16	11	13	8	10	8	12	15	12	13	10	118
	5	0	0	22	15	16	16	19	20	0	0	10	98 (108)
	6	22	20	0	0	0	15	17	0	21	18	10	81
	7												
	8												
40 %	1	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	0	10	0
	3	6	6	5	6	5	5	6	5	5	6	10	55
	4	7	11	8	9	9	10	9	7	11	16	10	98
	5	3	0	16	15	16	17	17	17	13	0	10	124
	6	0	19	0	0	0	0	0	0	0	19	10	38
	7												
	8												
100 %	1	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	0	10	0
	3	4	4	5	4	0	5	4	5	4	5	10	40
	4	12	9	7	10	4	6	11	9	12	11	10	91
	5	0	0	16	20	12	17	14	18	18	0	10	115
	6	0	15	0	0	17	0	0	0	0	17	10	49
	7												
	8												

"AD" = Adult Dead, "AY" = Aborted young, "M" = male organism, "F" = Female, "R" = Adult releasing young, "/" = split brood (carry-over brood / current day brood),
 "Inj" = Adult Injured during test solution renewal, replicate removed from analysis. "AM" = Adult missing, remove from analysis. A circled neonate count = 4th brood
 Footnote: As per EPA, C. dubia tests should be terminated when 60% of the surviving control organisms have produced their third brood, or at eight days, whichever occurs first.



CERIODAPHNIA WATER QUALITY DATA

Client: City of Molalla
 Initiated: Date 4/5/2016 Time 08:45
 Initial Sample ID #: B 3509
 Adults Isolated Date: 4/17/2016 Time: 08:50
 Neo's Collected Date: 4/14/2016 Time: 11:00

Tech: Day 0 DW Day 1 DW Day 2 MC Day 3 DW Day 4 2 Day 5 2 Day 6 MC Day 7 MC Day 8 MC
 Time: Day 0 08:45 Day 1 08:55 Day 2 14:30 Day 3 08:55 Day 4 13:15 Day 5 11:28 Day 6 10:55 Day 7 10:55 Day 8 10:55
 Therm. Day 0 # 186 Day 1 # 186 Day 2 # 186 Day 3 # 186 Day 4 # 186 Day 5 # 186 Day 6 # 186 Day 7 # 186 Day 8 # 186

%	Dissolved Oxygen (mg/l)								pH								Temperature (°C) / Conductivity (µS) (1 st use of each sample only)										
	0	1	2	3	4	5	6	7	8	0	1	2	3	4	5	6	7	8	0	1	2	3	4	5	6	7	8
Control	7.9	7.9	7.9	7.9	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	25.3	25.8	24.9	25.7	24.9	25.7	25.7	25.7	25.7
2.0%	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	25.7	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6
4.0%	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	25.7	25.7	25.5	25.6	25.6	25.6	25.6	25.6	25.6
10%	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	25.3	25.8	25.9	25.9	25.9	25.9	25.9	25.9	25.9
40%	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.4	7.4	7.4	7.4	7.4	25.4	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
100%	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	7.4	7.4	7.4	7.4	7.3	7.3	7.3	7.3	7.3	25.3	25.9	24.7	25.8	24.8	25.3	25.0	25.0	25.0
																			218	225	225	225	225	225	225	225	225

COMMENTS: Temperatures taken just prior to test solution renewals. DO, pH, and Conductivity taken following organism transfer.

Note: All Day 0 data represents conditions at initiation. All other days: numerator represents pre-renewal conditions, denominator represents post-renewal conditions.

23.8 = Temp out of recom. range

CETIS Summary Report

Report Date: 15 Apr-16 10:37 (p 1 of 2)
 Test Code: B350901cdc | 04-1442-3340

Ceriodaphnia 7-d Survival and Reproduction Test

CH2M HILL - ASL

Batch ID: 18-2530-8236	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 05 Apr-16 08:45	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 11 Apr-16 09:20	Species: Ceriodaphnia dubia	Brine:
Duration: 6d 1h	Source: In-House Culture	Age:

Sample ID: 06-3741-7840	Code: B3509-01	Client:
Sample Date: 04 Apr-16 08:30	Material: Unknown	Project:
Receive Date: 04 Apr-16 10:10	Source: Molalla, city of (OR0101514)	
Sample Age: 24h (5.8 °C)	Station:	

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
20-4421-7207	2d Survival Rate	100	>100	N/A	N/A	1	Fisher Exact/Bonferroni-Holm Test
08-6504-5511	6d Survival Rate	100	>100	N/A	N/A	1	Fisher Exact/Bonferroni-Holm Test
19-8621-1993	Reproduction	40 10	40 100	20	11.8%	10	Bonferroni Adj t Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
07-1115-1581	2d Survival Rate	EC50	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
08-4409-0438	Reproduction	IC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
08-4409-0438	Reproduction	Control Resp	35.8	15 - NL	Yes	Passes Acceptability Criteria
19-8621-1993	Reproduction	Control Resp	35.8	15 - NL	Yes	Passes Acceptability Criteria
19-8621-1993	Reproduction	PMSD	0.1182	0.13 - 0.47	Yes	Below Acceptability Criteria

2d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
2		10	1	1	1	1	1	0	0	0.0%	0.0%
4		10	1	1	1	1	1	0	0	0.0%	0.0%
10		10	1	1	1	1	1	0	0	0.0%	0.0%
40		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

6d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
2		10	1	1	1	1	1	0	0	0.0%	0.0%
4		10	1	1	1	1	1	0	0	0.0%	0.0%
10		10	1	1	1	1	1	0	0	0.0%	0.0%
40		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

Reproduction Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	35.8	34.58	37.02	32	41	1.031	3.259	9.1%	0.0%
2		10	35.6	34.56	36.64	31	39	0.8844	2.797	7.86%	0.56%
4		10	37	35.31	38.69	31	47	1.43	4.522	12.22%	-3.35%
10		10	36.1	34.28	37.92	28	43	1.538	4.864	13.47%	-0.84%
40		10	31.5	29.92	33.08	26	41	1.335	4.223	13.41%	12.01%
100		10	29.5	27.49	31.51	16	34	1.701	5.38	18.24%	17.6%

*Below EPA lower bound.
 report NOEL as 40*

CETIS Summary Report

Report Date: 15 Apr-16 10:37 (p 2 of 2)
 Test Code: B350901cdc | 04-1442-3340

Ceriodaphnia 7-d Survival and Reproduction Test

CH2M HILL - ASL

2d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
2		1	1	1	1	1	1	1	1	1	1
4		1	1	1	1	1	1	1	1	1	1
10		1	1	1	1	1	1	1	1	1	1
40		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

6d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
2		1	1	1	1	1	1	1	1	1	1
4		1	1	1	1	1	1	1	1	1	1
10		1	1	1	1	1	1	1	1	1	1
40		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

Reproduction Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	39	34	32	32	38	37	32	38	41	35
2		35	33	38	39	31	34	37	39	33	37
4		47	31	39	40	36	32	35	37	35	38
10		43	36	41	28	31	31	36	40	39	36
40		26	36	29	30	30	32	32	29	30	41
100		16	28	28	34	33	28	29	32	34	33

CETIS Analytical Report

Report Date: 15 Apr-16 10:37 (p 2 of 2)
 Test Code: B350901cdc | 04-1442-3340

Ceriodaphnia 7-d Survival and Reproduction Test **CH2M HILL - ASL**

Analysis ID: 07-1115-1581 Endpoint: 2d Survival Rate CETIS Version: CETISv1.8.1
 Analyzed: 15 Apr-16 10:37 Analysis: Linear Interpolation (ICPIN) Official Results: Yes

Batch ID: 18-2530-8236 Test Type: Reproduction-Survival (7d) Analyst:
 Start Date: 05 Apr-16 08:45 Protocol: EPA/821/R-02-013 (2002) Diluent: Mod-Hard Synthetic Water
 Ending Date: 11 Apr-16 09:20 Species: Ceriodaphnia dubia Brine:
 Duration: 6d 1h Source: In-House Culture Age:

Sample ID: 06-3741-7840 Code: B3509-01 Client:
 Sample Date: 04 Apr-16 08:30 Material: Unknown Project:
 Receive Date: 04 Apr-16 10:10 Source: Molalla, city of (OR0101514)
 Sample Age: 24h (5.8 °C) Station:

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1.549E+09	200	Yes	Two-Point Interpolation

Point Estimates

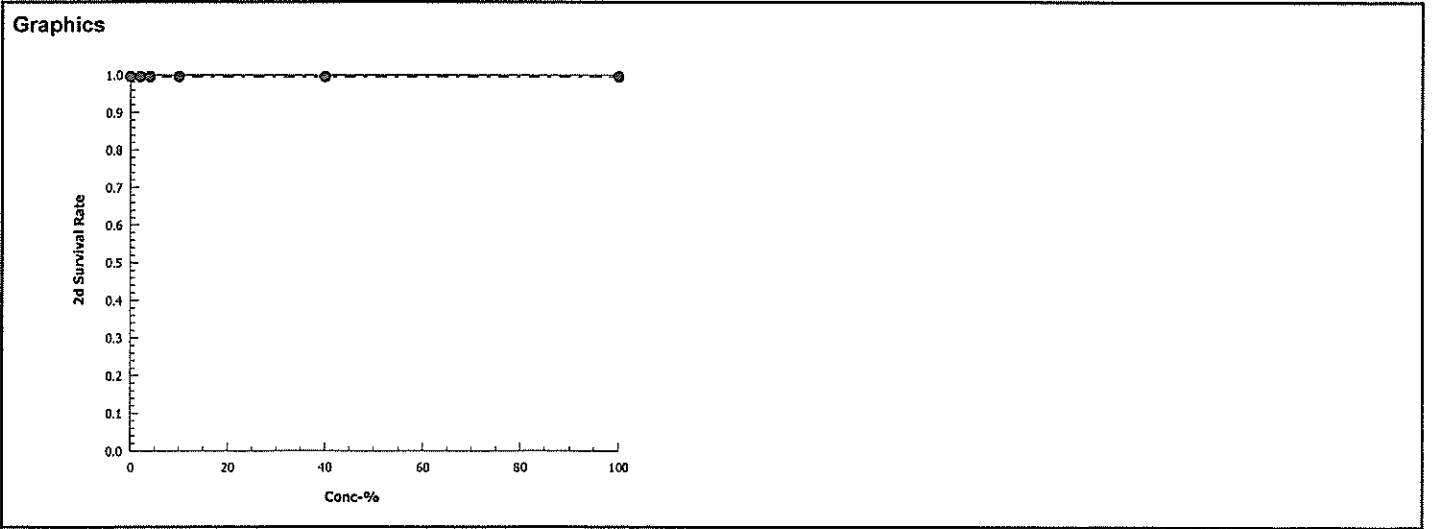
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	N/A	N/A	<1	N/A	N/A

2d Survival Rate Summary Calculated Variate(A/B)

Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	10	1	1	1	0	0	0.0%	0.0%	10	10
2		10	1	1	1	0	0	0.0%	0.0%	10	10
4		10	1	1	1	0	0	0.0%	0.0%	10	10
10		10	1	1	1	0	0	0.0%	0.0%	10	10
40		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

2d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
2		1	1	1	1	1	1	1	1	1	1
4		1	1	1	1	1	1	1	1	1	1
10		1	1	1	1	1	1	1	1	1	1
40		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1



CETIS Analytical Report

Report Date: 15 Apr-16 10:37 (p 2 of 2)
 Test Code: B350901cdc | 04-1442-3340

Ceriodaphnia 7-d Survival and Reproduction Test **CH2M HILL - ASL**

Analysis ID: 20-4421-7207 Endpoint: 2d Survival Rate CETIS Version: CETISv1.8.1
 Analyzed: 15 Apr-16 10:37 Analysis: STP 2x2 Contingency Tables Official Results: Yes

Batch ID: 18-2530-8236 Test Type: Reproduction-Survival (7d) Analyst:
 Start Date: 05 Apr-16 08:45 Protocol: EPA/821/R-02-013 (2002) Diluent: Mod-Hard Synthetic Water
 Ending Date: 11 Apr-16 09:20 Species: Ceriodaphnia dubia Brine:
 Duration: 6d 1h Source: In-House Culture Age:

Sample ID: 06-3741-7840 Code: B3509-01 Client:
 Sample Date: 04 Apr-16 08:30 Material: Unknown Project:
 Receive Date: 04 Apr-16 10:10 Source: Molalla, city of (OR0101514)
 Sample Age: 24h (5.8 °C) Station:

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU
Untransformed		C > T	Not Run	100	>100	N/A	1

Fisher Exact/Bonferroni-Holm Test

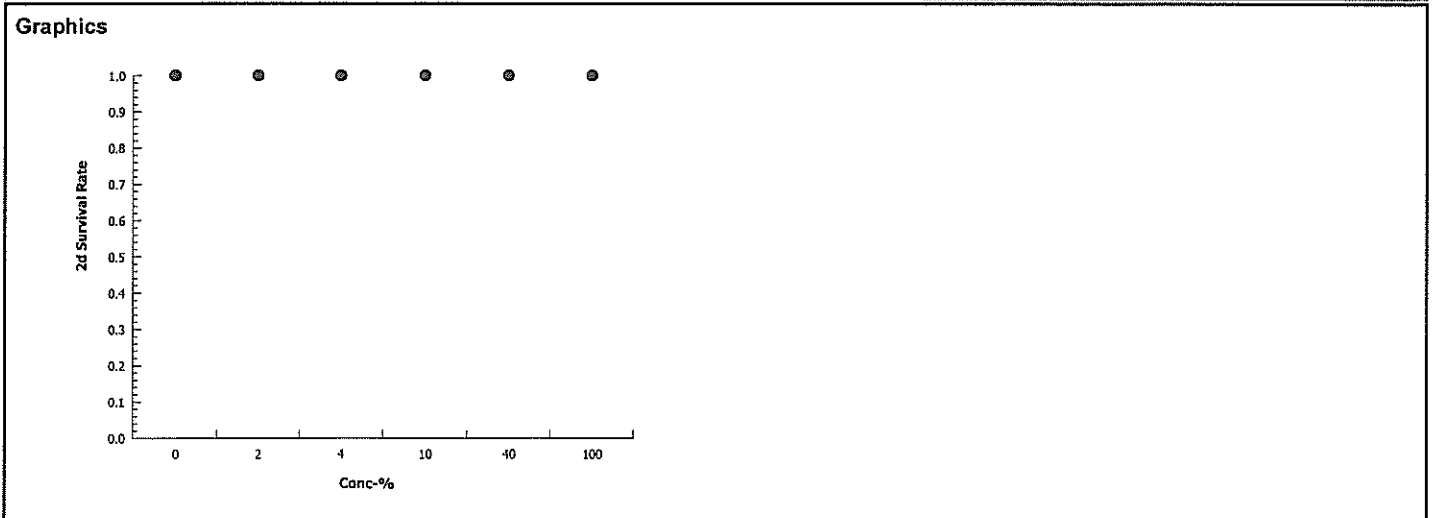
Control	vs	Conc-%	Test Stat	P-Value	Decision(0.05)
Dilution Water		2	1	1.0000	Non-Significant Effect
		4	1	1.0000	Non-Significant Effect
		10	1	1.0000	Non-Significant Effect
		40	1	1.0000	Non-Significant Effect
		100	1	1.0000	Non-Significant Effect

Data Summary

Conc-%	Control Type	No-Resp	Resp	Total
0	Dilution Water	10	0	10
2		10	0	10
4		10	0	10
10		10	0	10
40		10	0	10
100		10	0	10

2d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
2		1	1	1	1	1	1	1	1	1	1
4		1	1	1	1	1	1	1	1	1	1
10		1	1	1	1	1	1	1	1	1	1
40		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1



CETIS Analytical Report

Report Date: 15 Apr-16 10:37 (p 1 of 2)
 Test Code: B350901cdc | 04-1442-3340

Ceriodaphnia 7-d Survival and Reproduction Test **CH2M HILL - ASL**

Analysis ID: 08-6504-5511 Endpoint: 6d Survival Rate CETIS Version: CETISv1.8.1
 Analyzed: 15 Apr-16 10:37 Analysis: STP 2x2 Contingency Tables Official Results: Yes

Batch ID: 18-2530-8236 Test Type: Reproduction-Survival (7d) Analyst:
 Start Date: 05 Apr-16 08:45 Protocol: EPA/821/R-02-013 (2002) Diluent: Mod-Hard Synthetic Water
 Ending Date: 11 Apr-16 09:20 Species: Ceriodaphnia dubia Brine:
 Duration: 6d 1h Source: In-House Culture Age:

Sample ID: 06-3741-7840 Code: B3509-01 Client:
 Sample Date: 04 Apr-16 08:30 Material: Unknown Project:
 Receive Date: 04 Apr-16 10:10 Source: Molalla, city of (OR0101514)
 Sample Age: 24h (5.8 °C) Station:

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU
Untransformed		C > T	Not Run	100	>100	N/A	1

Fisher Exact/Bonferroni-Holm Test

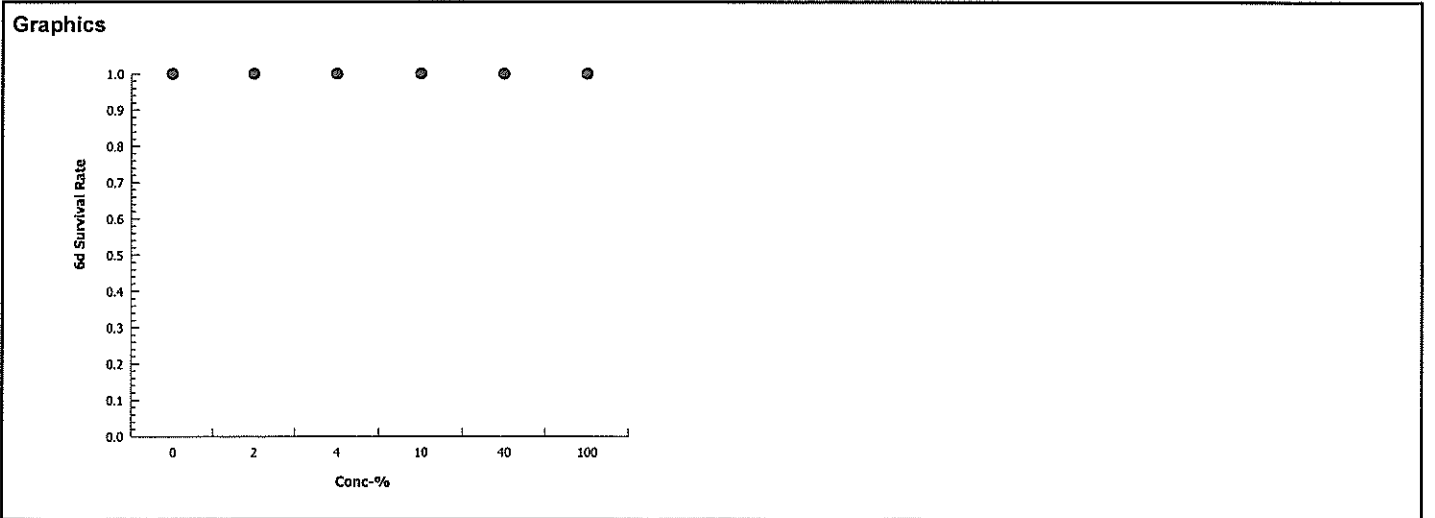
Control	vs	Conc-%	Test Stat	P-Value	Decision(0.05)
Dilution Water		2	1	1.0000	Non-Significant Effect
		4	1	1.0000	Non-Significant Effect
		10	1	1.0000	Non-Significant Effect
		40	1	1.0000	Non-Significant Effect
		100	1	1.0000	Non-Significant Effect

Data Summary

Conc-%	Control Type	No-Resp	Resp	Total
0	Dilution Water	10	0	10
2		10	0	10
4		10	0	10
10		10	0	10
40		10	0	10
100		10	0	10

6d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
2		1	1	1	1	1	1	1	1	1	1
4		1	1	1	1	1	1	1	1	1	1
10		1	1	1	1	1	1	1	1	1	1
40		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1



CETIS Analytical Report

Report Date: 15 Apr-16 10:37 (p 1 of 2)
 Test Code: B350901cdc | 04-1442-3340

Ceriodaphnia 7-d Survival and Reproduction Test CH2M HILL - ASL

Analysis ID: 19-8621-1993	Endpoint: Reproduction	CETIS Version: CETISv1.8.1
Analyzed: 15 Apr-16 10:37	Analysis: Parametric-Multiple Comparison	Official Results: Yes

Batch ID: 18-2530-8236	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 05 Apr-16 08:45	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 11 Apr-16 09:20	Species: Ceriodaphnia dubia	Brine:
Duration: 6d 1h	Source: In-House Culture	Age:

Sample ID: 06-3741-7840	Code: B3509-01	Client:
Sample Date: 04 Apr-16 08:30	Material: Unknown	Project:
Receive Date: 04 Apr-16 10:10	Source: Molalla, city of (OR0101514)	
Sample Age: 24h (5.8 °C)	Station:	

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run	10	40	20	10	11.8%

Control	vs	Conc-%	Test Stat	Critical	DF	MSD	P-Value	Decision(α:5%)
Dilution Water		2	0.1165	2.399	18	4.119	1.0000	Non-Significant Effect
		4	-0.6988	2.399	18	4.119	1.0000	Non-Significant Effect
		10	-0.1747	2.399	18	4.119	1.0000	Non-Significant Effect
		40*	2.504	2.399	18	4.119	0.0385	Significant Effect
		100*	2.721	2.399	17	4.232	0.0220	Significant Effect

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	317.1424	63.42847	5	4.302	0.0023	Significant Effect
Error	781.4	14.7434	53			
Total	1098.542	78.17187	58			

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.194	15.09	0.3926	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9812	0.9451	0.4919	Normal Distribution

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	35.8	34.56	37.04	32	41	1.031	3.259	9.1%	0.0%
2		10	35.6	34.54	36.66	31	39	0.8844	2.797	7.86%	0.56%
4		10	37	35.28	38.72	31	47	1.43	4.522	12.22%	-3.35%
10		10	36.1	34.25	37.95	28	43	1.538	4.864	13.47%	-0.84%
40		10	31.5	29.89	33.11	26	41	1.335	4.223	13.41%	12.01%
100		9	31	29.98	32.02	28	34	0.8975	2.693	8.69%	13.41%

40% reproduction of a 12.0% reduction is below the PMSD of 13.0% and therefore should not be considered statistically significant!

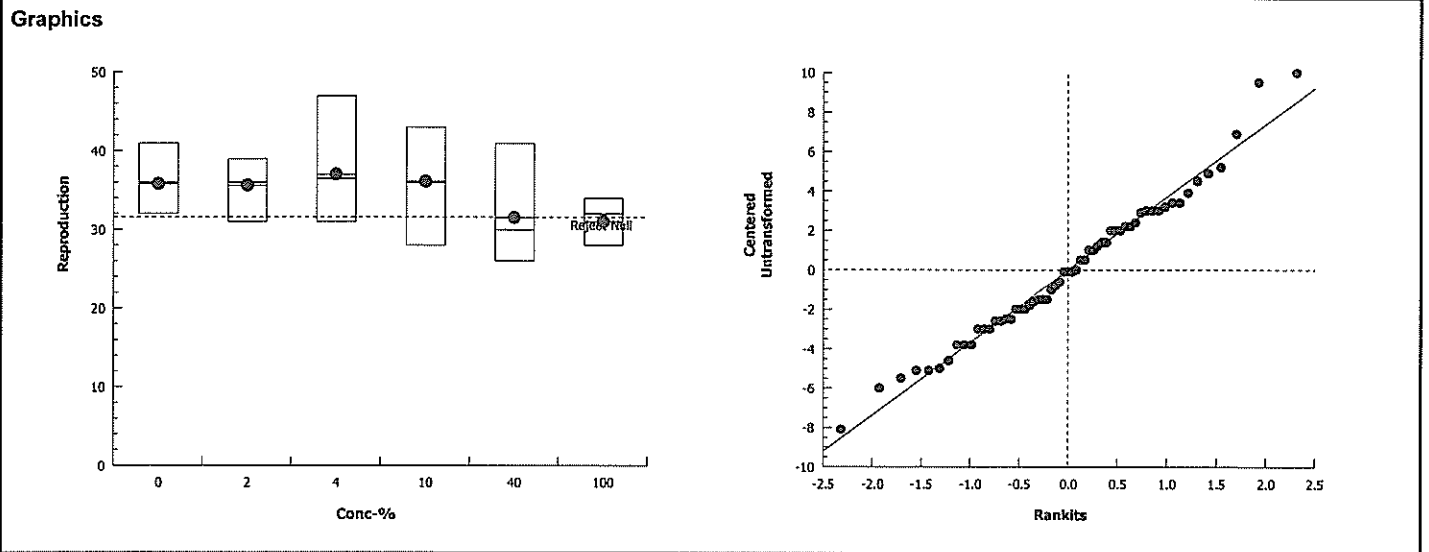
CETIS Analytical Report

Report Date: 15 Apr-16 10:37 (p 2 of 2)
 Test Code: B350901cdc | 04-1442-3340

Ceriodaphnia 7-d Survival and Reproduction Test **CH2M HILL - ASL**

Analysis ID: 19-8621-1993 Endpoint: Reproduction CETIS Version: CETISv1.8.1
 Analyzed: 15 Apr-16 10:37 Analysis: Parametric-Multiple Comparison Official Results: Yes

Reproduction Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	39	34	32	32	38	37	32	38	41	35
2		35	33	38	39	31	34	37	39	33	37
4		47	31	39	40	36	32	35	37	35	38
10		43	36	41	28	31	31	36	40	39	36
40		26	36	29	30	30	32	32	29	30	41
100	Outlier	28	28	34	33	28	29	32	34	33	33



CETIS Analytical Report

Report Date: 15 Apr-16 10:37 (p 1 of 2)
 Test Code: B350901cdc | 04-1442-3340

Ceriodaphnia 7-d Survival and Reproduction Test **CH2M HILL - ASL**

Analysis ID: 08-4409-0438 Endpoint: Reproduction CETIS Version: CETISv1.8.1
 Analyzed: 15 Apr-16 10:37 Analysis: Linear Interpolation (ICPIN) Official Results: Yes

Batch ID: 18-2530-8236 Test Type: Reproduction-Survival (7d) Analyst:
 Start Date: 05 Apr-16 08:45 Protocol: EPA/821/R-02-013 (2002) Diluent: Mod-Hard Synthetic Water
 Ending Date: 11 Apr-16 09:20 Species: Ceriodaphnia dubia Brine:
 Duration: 6d 1h Source: In-House Culture Age:

Sample ID: 06-3741-7840 Code: B3509-01 Client:
 Sample Date: 04 Apr-16 08:30 Material: Unknown Project:
 Receive Date: 04 Apr-16 10:10 Source: Molalla, city of (OR0101514)
 Sample Age: 24h (5.8 °C) Station:

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	206503092	200	Yes	Two-Point Interpolation

Point Estimates

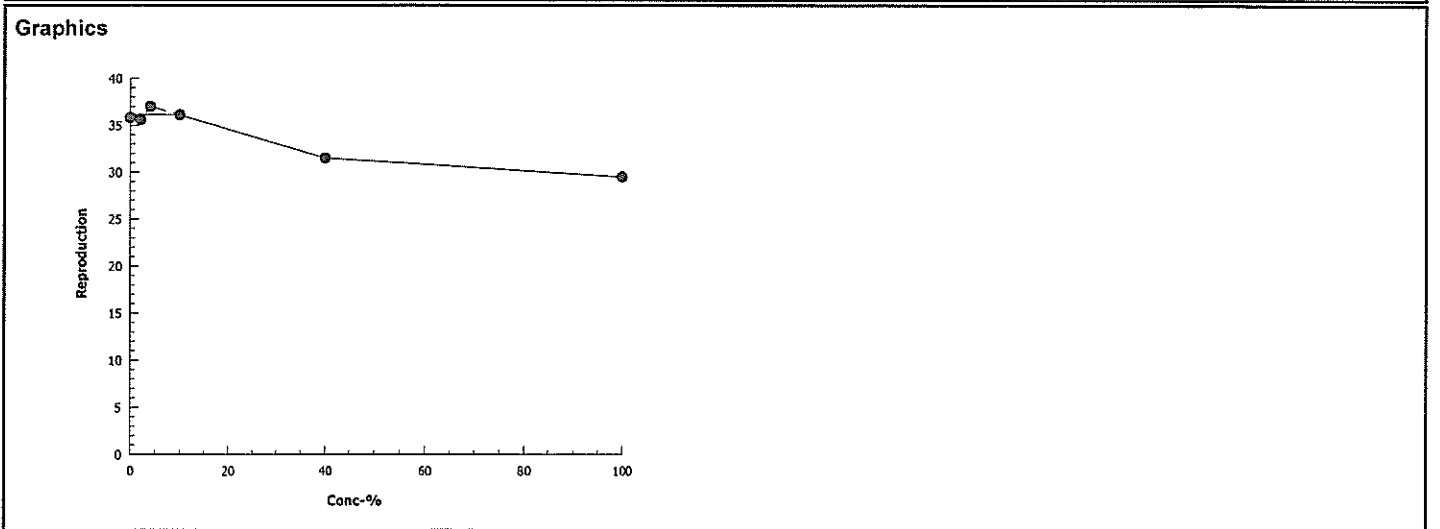
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC25	>100	N/A	N/A	<1	N/A	N/A

Reproduction Summary **Calculated Variate**

Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	35.8	32	41	1.031	3.259	9.1%	0.0%
2		10	35.6	31	39	0.8844	2.797	7.86%	0.56%
4		10	37	31	47	1.43	4.522	12.22%	-3.35%
10		10	36.1	28	43	1.538	4.864	13.47%	-0.84%
40		10	31.5	26	41	1.335	4.223	13.41%	12.01%
100		10	29.5	16	34	1.701	5.38	18.24%	17.6%

Reproduction Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	39	34	32	32	38	37	32	38	41	35
2		35	33	38	39	31	34	37	39	33	37
4		47	31	39	40	36	32	35	37	35	38
10		43	36	41	28	31	31	36	40	39	36
40		26	36	29	30	30	32	32	29	30	41
100		16	28	28	34	33	28	29	32	34	33



FATHEAD MINNOW 7-DAY SURVIVAL AND WATER QUALITY DATA

Dom Template Used: Cerio board # 5 Waterbath/incubator Used: _____ Date Initiated 4/5/2016 Time 10:15
 Initial sample ID B3509 - 01 → 03 # 7 Date Terminated 4/12/2016 Time 09:30
 Client City of Molalla Sample Description _____

Tech: Day 0 DL Day 1 BW Day 2 BW Day 3 MC Day 4 JW Day 5 JW Day 6 BW Day 7 JW
 Time Day 0 10:15 Day 1 12:30 Day 2 12:30 Day 3 10:15 Day 4 11:50 Day 5 09:50 Day 6 11:30 Day 7 09:30

Conc. or Percent	Day	Number of Live Organisms										Dissolved O ₂ (mg/l)		pH		Temp. (°C)	Therm. ID #	Conductivity (µS)
		A	B	C	D	E	F	G	H	I	J	Pre	Post	Pre	Post			
Control	0	2	2	2	2	2	2	2	2	2	2		8.1		7.9	Post: 25.5	186	297
	1	2	2	2	2	2	2	2	2	2	2	6.6	8.2	7.4	8.1	24.4	213	
	2	2	2	2	2	2	2	2	2	2	2	4.8	8.5	7.0	7.7	25.0	181	292
	3	2	2	2	2	2	2	2	2	2	2	6.9	8.3	7.4	7.9	24.3	213	
	4	2	2	2	2	2	2	2	2	2	2	6.7	7.8	7.1	7.7	24.7	184	225
	5	2	2	2	2	2	2	2	2	2	2	*5-76.1	7.8	*7.76.7	7.9	24.6	184	
	6	2	2	2	2	2	2	2	2	2	2	6.6	8.2	7.4	8.0	25.3	181	
	7	2	2	2	2	2	2	2	2	2	2	x		x		25.1	171	
2.0 %	0	2	2	2	2	2	2	2	2	2	2		8.1		7.9	Post: 25.5		
	1	2	2	2	2	2	2	2	2	2	2	6.3	8.0	7.4	8.1	24.2		
	2	2	2	2	2	2	2	2	2	2	2	4.5	8.3	6.9	7.8	25.3		
	3	2	2	2	2	2	2	2	2	2	2	6.9	8.3	7.4	7.9	24.3		
	4	2	2	2	2	2	2	2	2	2	2	6.4	7.7	7.1	7.9	24.8		
	5	2	2	2	2	2	1	2	2	2	2	5.8	8.0	6.8	7.6	24.8		
	6	2	2	2	2	2	1	2	2	2	2	6.7	8.2	7.4	8.0	25.3		
	7	2	2	2	2	2	1	2	2	2	2	x		x		25.1		
4.0 %	0	2	2	2	2	2	2	2	2	2	2		8.1		7.9	Post: 25.6		
	1	2	2	1	2	2	2	2	2	2	2	6.8	8.1	7.4	8.0	24.3		
	2	2	2	1	2	2	2	2	2	2	2	4.5	8.3	7.0	7.7	25.2		
	3	2	2	1	2	2	2	2	2	2	2	6.9	8.3	7.4	7.8	24.2		
	4	2	2	1	2	2	2	2	2	2	2	6.7	7.7	7.1	8.0	24.8		
	5	2	2	1	2	2	2	2	2	2	2	5.9	8.0	6.8	7.7	25.0		
	6	2	2	1	2	2	2	2	2	2	2	6.5	8.2	7.3	7.9	25.3		
	7	2	2	1	2	2	2	2	2	2	2	x		x		25.0		
10 %	0	2	2	2	2	2	2	2	2	2	2		8.1		7.8	Post: 25.6		
	1	2	2	2	2	2	2	2	2	2	2	6.7	8.1	7.5	8.0	24.1		
	2	2	2	2	2	2	2	2	2	2	2	4.7	8.3	7.0	7.7	24.9		
	3	2	2	2	2	2	2	2	2	2	2	7.2	8.3	7.4	7.8	24.1		
	4	2	2	2	2	2	2	2	2	2	2	6.7	7.9	7.1	8.0	24.7		
	5	2	2	2	2	2	2	2	2	2	2	5.4	8.0	6.8	7.6	24.9		
	6	2	2	2	2	2	2	2	2	2	2	6.4	8.2	7.3	7.9	25.3		
	7	2	2	2	2	2	2	2	2	2	2	x		x		25.1		
40 %	0	2	2	2	2	2	2	2	2	2	2		8.2		7.5	Post: 25.6		
	1	2	2	2	2	2	2	2	2	2	2	6.4	8.3	7.5	7.7	24.0		
	2	2	2	2	2	2	2	2	2	2	2	5.0	8.3	7.0	7.9	25.0		
	3	2	2	2	2	2	2	2	2	2	2	6.9	8.3	7.5	7.4	24.2		
	4	2	2	2	2	2	2	2	2	2	2	6.6	7.9	7.2	7.8	24.8		
	5	2	2	2	2	2	2	2	2	2	2	5.4	8.0	6.8	7.4	25.0		
	6	2	2	2	2	2	2	2	2	2	2	6.4	8.2	7.4	7.6	25.2		
	7	2	2	2	2	2	2	2	2	2	2	x		x		25.1		
100 %	0	2	2	2	2	2	2	2	2	2	2		8.3		7.2	Post: 25.6		220
	1	2	2	2	2	2	2	2	2	2	2	6.4	8.3	7.4	7.4	24.1		
	2	2	2	2	2	2	2	2	2	2	2	4.5	8.3	7.0	7.6	25.2		222
	3	2	2	2	2	2	2	2	2	2	2	7.0	8.4	7.4	7.0	24.2		
	4	2	2	2	2	2	2	2	2	2	2	6.5	8.0	7.3	7.2	24.8		227
	5	2	2	2	2	2	2	2	2	2	2	5.9	8.1	6.8	6.9	25.1		
	6	2	2	2	2	2	2	2	2	2	2	6.3	8.1	7.4	7.1	25.1		
	7	2	2	2	2	2	2	2	2	2	2	x		x		25.1		

✓ Indicates one organism inadvertently poured off during solution renewal, replaced into container. Pre = Pre-renewal solutions. Post = Post-renewal solutions.
 "M" = organism missing, start count reduced. "Inj" = organism injured, remove from stats. Day 0 Temperatures = Post-renewals
 "F" = fungus noted on dead organisms. Therm ID# = Thermometer ID used for all measurements that day.
 Aeration in test chambers begun @ _____ (Note observations on Test Organism Info sheet) (23.8) = Temp. out of recommended range

* Day 5 Control ROB JW 4/9/16
 * Day 5 Control ROB JW 4/14/16
 * Day 5 Control ROB JW 4/14/17
 Molalla (has a history of fungus).xism Doc Control ID: ASL916-0711

FATHEAD MINNOW 7-DAY GROWTH DATA

Client City of Molalla Tins Labeled As: MOLALLA (4/5)
 Lab ID: B3509 Start Date 4/5/2016

Sample Description: _____

Technician:	<u>MC</u>	<u>KJ</u>
Date:	<u>4/15/2016</u>	<u>3/18/2016</u>
Balance Serial #:	<u>B328543647</u>	<u>B328543647</u>

Percent	Replicate	Total Weight (mg)	Tare Weight (mg)	No. of Fish
Control	A	1143.15	1141.97	2
	B	1152.90	1151.67	2
	C	1147.16	1145.70	2
	D	1153.33	1152.00	2
	E	1163.45	1162.25	2
	F	1136.49	1135.53	2
	G	1159.81	1158.48	2
	H	1153.57	1152.18	2
	I	1168.64	1167.72	2
	J	1154.95	1153.66	2
2.0%	A	1145.18	1144.17	2
	B	1164.30	1163.55	2
	C	1144.99	1143.70	2
	D	1151.89	1150.76	2
	E	1144.71	1143.30	2
	F	1147.21	1146.20	1
	G	1164.08	1162.68	2
	H	1157.69	1156.53	2
	I	1147.41	1146.31	2
	J	1155.24	1153.68	2
4.0%	A	1172.51	1171.35	2
	B	1157.55	1156.63	2
	C	1164.88	1164.23	1
	D	1147.28	1146.18	2
	E	1155.67	1154.32	2
	F	1151.87	1150.87	2
	G	1152.01	1150.88	2
	H	1158.38	1157.04	2
	I	1158.82	1157.67	2
	J	1152.87	1151.52	2

weigh to 0.01 mg

FATHEAD MINNOW 7-DAY GROWTH DATA

Client City of Molalla Tins Labeled As: MOLALLA (4/5)
 Lab ID: B3509 Start Date 4/5/2016

Sample Description: _____

Technician:	<u>MC</u>	<u>KJ</u>
Date:	<u>4/15/2016</u>	<u>3/18/2016</u>
Balance Serial #:	<u>50309851</u>	<u>50309851</u>

Percent	Replicate	Total Weight (mg)	Tare Weight (mg)	No. of Fish
10%	A	1159.94	1158.67	2
	B	1164.37	1163.29	2
	C	1139.81	1138.49	2
	D	1161.77	1160.73	2
	E	1162.74	1161.58	2
	F	1163.37	1161.54	2
	G	1152.70	1151.26	2
	H	1147.48	1146.30	2
	I	1150.37	1149.35	2
	J	1146.81	1145.40	2
40%	A	1150.37	1149.13	2
	B	1149.11	1147.82	2
	C	1141.33	1140.32	2
	D	1156.65	1155.38	2
	E	1152.50	1151.22	2
	F	1151.16	1150.05	2
	G	1148.62	1147.20	2
	H	1150.01	1149.19	2
	I	1157.54	1156.29	2
	J	1146.31	1145.09	2
100%	A	1138.49	1137.29	2
	B	1166.53	1165.36	2
	C	1170.02	1168.97	2
	D	1146.61	1145.51	2
	E	1162.03	1160.97	2
	F	1157.34	1156.24	2
	G	1155.98	1154.72	2
	H	1150.92	1149.78	2
	I	1167.46	1166.33	2
	J	1158.09	1157.00	2

weigh to 0.01 mg

FATHEAD MINNOW 7-DAY GROWTH DATA

Client City of Molalla Tins Labeled As: MOLALLA (4/5)
 Lab ID: B 3509 Start Date 4/5/2016

Sample Description: _____

Technician: _____ KJ
 Date: 3/18/2016
 Balance Serial #: B328543647 B328543647

Percent	Replicate	Total Weight (mg)	Tare Weight (mg)	No. of Fish
Control	A		1141.97	2
	B		1151.67	2
	C		1145.70	2
	D		1152.00	2
	E		1162.25	2
	F		1135.53	2
	G		1158.48	2
	H		1152.18	2
	I		1167.72	2
	J		1153.66	2
2.0%	A		1144.17	2
	B		1163.55	2
	C		1143.70	2
	D		1150.76	2
	E		1143.30	2
	F		1146.20	1
	G		1162.68	2
	H		1156.53	2
	I		1146.31	2
	J		1153.68	2
4.0%	A		1171.35	2
	B		1156.63	2
	C		1164.23	1
	D		1146.18	2
	E		1154.32	2
	F		1150.87	2
	G		1150.88	2
	H		1157.04	2
	I		1157.67	2
	J		1151.52	2

weigh to 0.01 mg

FATHEAD MINNOW 7-DAY GROWTH DATA

Client City of Molalla Tins Labeled As: MOLALLA (4/5)
 Lab ID: B 3509 Start Date 4/5/2016

Sample Description: _____

Technician:	_____	KJ
Date:	_____	3/18/2016
Balance Serial #:	50309851	50309851

Percent	Replicate	Total Weight (mg)	Tare Weight (mg)	No. of Fish
10%	A		1158.67	2
	B		1163.29	2
	C		1138.49	2
	D		1160.73	2
	E		1161.58	2
	F		1161.54	2
	G		1151.26	2
	H		1146.30	2
	I		1149.35	2
	J		1145.40	2
40%	A		1149.13	2
	B		1147.82	2
	C		1140.32	2
	D		1155.38	2
	E		1151.22	2
	F		1150.05	2
	G		1147.20	2
	H		1149.19	2
	I		1156.29	2
	J		1145.09	2
100%	A		1137.29	2
	B		1165.36	2
	C		1168.97	2
	D		1145.51	2
	E		1160.97	2
	F		1156.24	2
	G		1154.72	2
	H		1149.78	2
	I		1166.33	2
	J		1157.00	2

weigh to 0.01 mg

CETIS Summary Report

Report Date: 15 Apr-16 10:57 (p 1 of 2)
 Test Code: B350901ppc | 02-7329-8983

Fathead Minnow 7-d Larval Survival and Growth Test

CH2M HILL - ASL

Batch ID: 09-3575-9620	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 05 Apr-16 10:15	Protocol: EPA/821/R-02-013 (2002)	Diluent:
Ending Date: 12 Apr-16 09:30	Species: Pimephales promelas	Brine:
Duration: 6d 23h	Source: Aquatox, AR	Age: <48h

Sample ID: 06-3741-7840	Code: B3509-01	Client:
Sample Date: 04 Apr-16 08:30	Material: Unknown	Project:
Receive Date: 04 Apr-16 10:10	Source: Molalla, city of (OR0101514)	
Sample Age: 26h (5.8 °C)	Station:	

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
18-6810-0556	4d Survival Rate	100	>100	N/A	12.5%	1	Wilcoxon/Bonferroni Adj Test
20-4688-1336	7d Survival Rate	100	>100	N/A	16.7%	1	Wilcoxon/Bonferroni Adj Test
15-2803-5996	Mean Dry Biomass-mg	100	>100	N/A	16.2%	1	Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
18-6823-5055	4d Survival Rate	EC50	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
02-2921-7865	Mean Dry Biomass-mg	IC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
20-4688-1336	7d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
02-2921-7865	Mean Dry Biomass-mg	Control Resp	0.6145	0.25 - NL	Yes	Passes Acceptability Criteria
15-2803-5996	Mean Dry Biomass-mg	Control Resp	0.6145	0.25 - NL	Yes	Passes Acceptability Criteria
15-2803-5996	Mean Dry Biomass-mg	PMSD	0.1623	0.12 - 0.3	Yes	Passes Acceptability Criteria

4d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
2		10	1	1	1	1	1	0	0	0.0%	0.0%
4		10	0.95	0.891	1	0.5	1	0.05	0.1581	16.64%	5.0%
10		10	1	1	1	1	1	0	0	0.0%	0.0%
40		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

7d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
2		10	0.95	0.891	1	0.5	1	0.05	0.1581	16.64%	5.0%
4		10	0.95	0.891	1	0.5	1	0.05	0.1581	16.64%	5.0%
10		10	1	1	1	1	1	0	0	0.0%	0.0%
40		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

Mean Dry Biomass-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	0.6145	0.5819	0.6471	0.46	0.73	0.02761	0.08732	14.21%	0.0%
2		10	0.591	0.5466	0.6354	0.375	0.78	0.03763	0.119	20.13%	3.83%
4		10	0.5575	0.5166	0.5984	0.325	0.675	0.03465	0.1096	19.65%	9.28%
10		10	0.6375	0.5919	0.6831	0.51	0.915	0.03859	0.122	19.14%	-3.74%
40		10	0.5955	0.5638	0.6273	0.41	0.71	0.02688	0.085	14.27%	3.09%
100		10	0.565	0.5528	0.5772	0.525	0.63	0.0103	0.03257	5.77%	8.05%

CETIS Summary Report

Report Date: 15 Apr-16 10:57 (p 2 of 2)
 Test Code: B350901ppc | 02-7329-8983

Fathead Minnow 7-d Larval Survival and Growth Test

CH2M HILL - ASL

4d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
2		1	1	1	1	1	1	1	1	1	1
4		1	1	0.5	1	1	1	1	1	1	1
10		1	1	1	1	1	1	1	1	1	1
40		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

7d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
2		1	1	1	1	1	0.5	1	1	1	1
4		1	1	0.5	1	1	1	1	1	1	1
10		1	1	1	1	1	1	1	1	1	1
40		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	0.59	0.615	0.73	0.665	0.6	0.48	0.665	0.6949	0.46	0.645
2		0.505	0.375	0.645	0.565	0.705	0.505	0.7	0.58	0.55	0.78
4		0.58	0.46	0.325	0.55	0.675	0.5	0.565	0.67	0.575	0.675
10		0.6349	0.54	0.66	0.52	0.58	0.915	0.72	0.59	0.51	0.705
40		0.62	0.645	0.505	0.635	0.64	0.555	0.71	0.41	0.625	0.61
100		0.6	0.585	0.525	0.55	0.53	0.55	0.63	0.57	0.565	0.545

CETIS Analytical Report

Report Date: 15 Apr-16 10:57 (p 5 of 6)
 Test Code: B350901ppc | 02-7329-8983

Fathead Minnow 7-d Larval Survival and Growth Test **CH2M HILL - ASL**

Analysis ID: 18-6810-0556 Endpoint: 4d Survival Rate CETIS Version: CETISv1.8.1
 Analyzed: 15 Apr-16 10:56 Analysis: Nonparametric-Multiple Comparison Official Results: Yes

Batch ID: 09-3575-9620 Test Type: Growth-Survival (7d) Analyst:
 Start Date: 05 Apr-16 10:15 Protocol: EPA/821/R-02-013 (2002) Diluent:
 Ending Date: 12 Apr-16 09:30 Species: Pimephales promelas Brine:
 Duration: 6d 23h Source: Aquatox, AR Age: <48h

Sample ID: 06-3741-7840 Code: B3509-01 Client:
 Sample Date: 04 Apr-16 08:30 Material: Unknown Project:
 Receive Date: 04 Apr-16 10:10 Source: Molalla, city of (OR0101514)
 Sample Age: 26h (5.8 °C) Station:

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run	100	>100	N/A	1	12.5%

Wilcoxon/Bonferroni Adj Test

Control	vs	Conc-%	Test Stat	Critical	DF	Ties	P-Value	Decision(α:5%)
Dilution Water		2	105		18	1	1.0000	Non-Significant Effect
		4	90		17	1	1.0000	Non-Significant Effect
		10	105		18	1	1.0000	Non-Significant Effect
		40	105		18	1	1.0000	Non-Significant Effect
		100	105		18	1	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	5	0	1.0000	Non-Significant Effect
Error	2.842171E-14	5.362587E-16	53			
Total	2.842171E-14	5.362587E-16	58			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.186	15.09	0.9462	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.4305	0.9451	<0.0001	Non-normal Distribution

4d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
2		10	1	1	1	1	1	0	0	0.0%	0.0%
4		9	1	1	1	1	1	0	0	0.0%	0.0%
10		10	1	1	1	1	1	0	0	0.0%	0.0%
40		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1.209	1.209	1.209	1.209	1.209	0	0	0.0%	0.0%
2		10	1.209	1.209	1.209	1.209	1.209	0	0	0.0%	0.0%
4		9	1.209	1.209	1.209	1.209	1.209	0	0	0.0%	0.0%
10		10	1.209	1.209	1.209	1.209	1.209	0	0	0.0%	0.0%
40		10	1.209	1.209	1.209	1.209	1.209	0	0	0.0%	0.0%
100		10	1.209	1.209	1.209	1.209	1.209	0	0	0.0%	0.0%

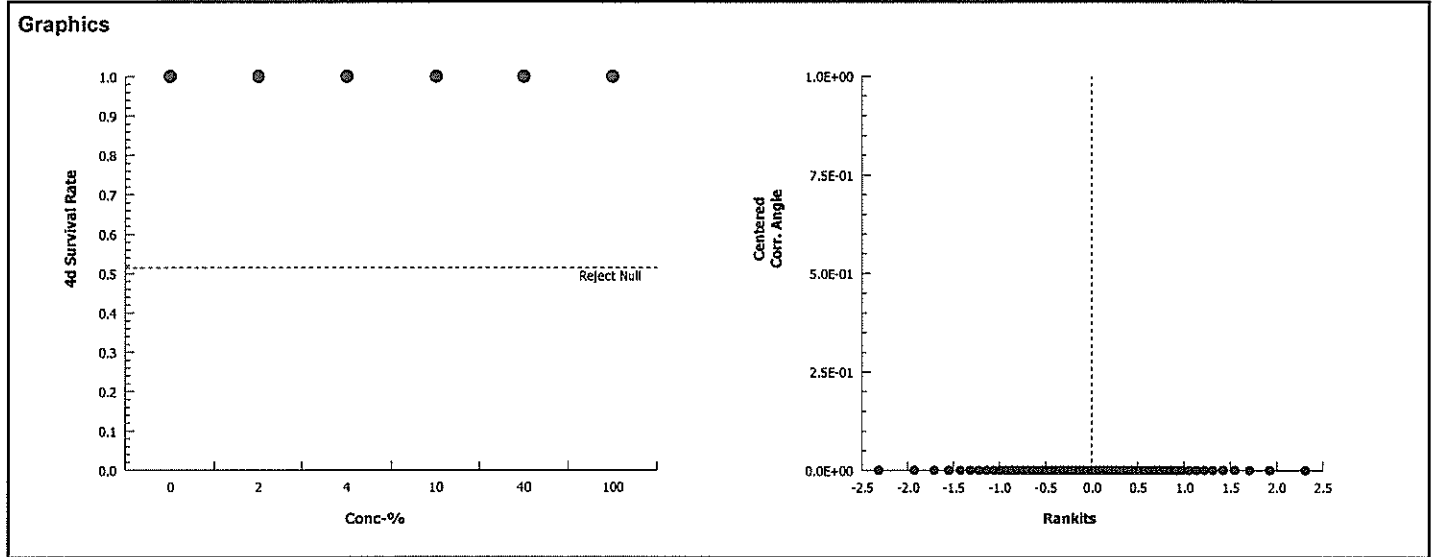
CETIS Analytical Report

Report Date: 15 Apr-16 10:57 (p 6 of 6)
 Test Code: B350901ppc | 02-7329-8983

Fathead Minnow 7-d Larval Survival and Growth Test **CH2M HILL - ASL**

Analysis ID: 18-6810-0556 Endpoint: 4d Survival Rate CETIS Version: CETISv1.8.1
 Analyzed: 15 Apr-16 10:56 Analysis: Nonparametric-Multiple Comparison Official Results: Yes

4d Survival Rate Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
2		1	1	1	1	1	1	1	1	1	1
4		1	1	Outlier	1	1	1	1	1	1	1
10		1	1	1	1	1	1	1	1	1	1
40		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1



CETIS Analytical Report

Report Date: 15 Apr-16 10:57 (p 3 of 3)
 Test Code: B350901ppc | 02-7329-8983

Fathead Minnow 7-d Larval Survival and Growth Test **CH2M HILL - ASL**

Analysis ID: 18-6823-5055 Endpoint: 4d Survival Rate CETIS Version: CETISv1.8.1
 Analyzed: 15 Apr-16 10:57 Analysis: Linear Interpolation (ICPIN) Official Results: Yes

Batch ID: 09-3575-9620 Test Type: Growth-Survival (7d) Analyst:
 Start Date: 05 Apr-16 10:15 Protocol: EPA/821/R-02-013 (2002) Diluent:
 Ending Date: 12 Apr-16 09:30 Species: Pimephales promelas Brine:
 Duration: 6d 23h Source: Aquatox, AR Age: <48h

Sample ID: 06-3741-7840 Code: B3509-01 Client:
 Sample Date: 04 Apr-16 08:30 Material: Unknown Project:
 Receive Date: 04 Apr-16 10:10 Source: Molalla, city of (OR0101514)
 Sample Age: 26h (5.8 °C) Station:

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	687519423	200	Yes	Two-Point Interpolation

Point Estimates

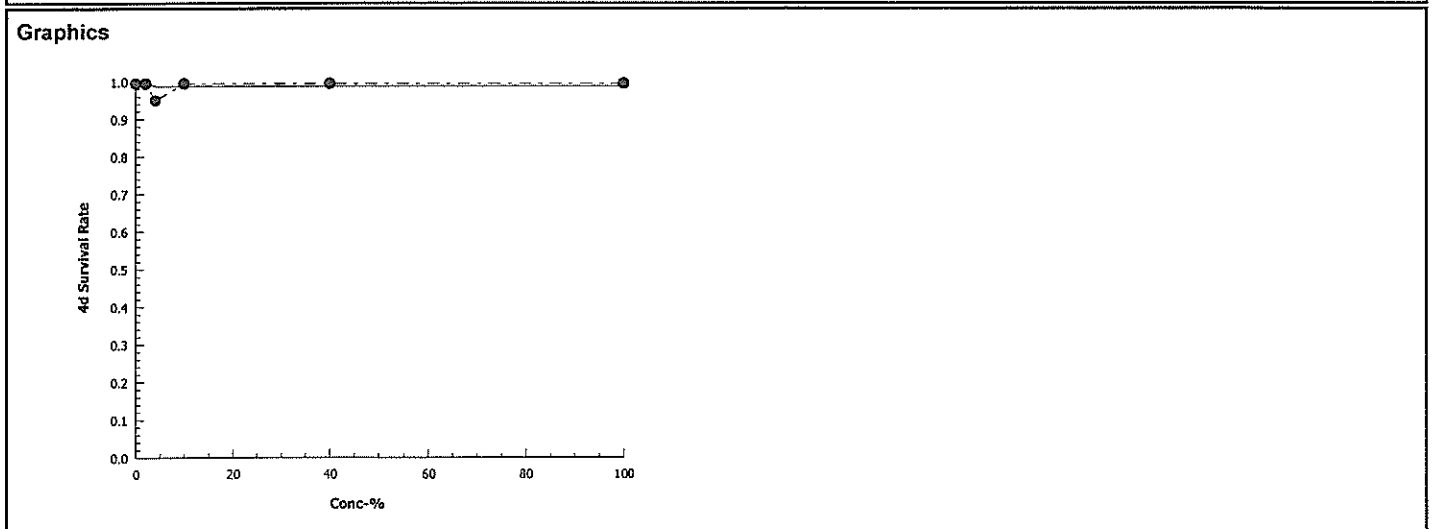
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	N/A	N/A	<1	N/A	N/A

4d Survival Rate Summary

Conc-%	Control Type	Count	Calculated Variate(A/B)								
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	10	1	1	1	0	0	0.0%	0.0%	20	20
2		10	1	1	1	0	0	0.0%	0.0%	20	20
4		10	0.95	0.5	1	0.05	0.1581	16.64%	5.0%	19	20
10		10	1	1	1	0	0	0.0%	0.0%	20	20
40		10	1	1	1	0	0	0.0%	0.0%	20	20
100		10	1	1	1	0	0	0.0%	0.0%	20	20

4d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
2		1	1	1	1	1	1	1	1	1	1
4		1	1	0.5	1	1	1	1	1	1	1
10		1	1	1	1	1	1	1	1	1	1
40		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1



CETIS Analytical Report

Report Date: 15 Apr-16 10:57 (p 3 of 6)
 Test Code: B350901ppc | 02-7329-8983

Fathead Minnow 7-d Larval Survival and Growth Test **CH2M HILL - ASL**

Analysis ID: 20-4688-1336	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.8.1
Analyzed: 15 Apr-16 10:57	Analysis: Nonparametric-Multiple Comparison	Official Results: Yes

Batch ID: 09-3575-9620	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 05 Apr-16 10:15	Protocol: EPA/821/R-02-013 (2002)	Diluent:
Ending Date: 12 Apr-16 09:30	Species: Pimephales promelas	Brine:
Duration: 6d 23h	Source: Aquatox, AR	Age: <48h

Sample ID: 06-3741-7840	Code: B3509-01	Client:
Sample Date: 04 Apr-16 08:30	Material: Unknown	Project:
Receive Date: 04 Apr-16 10:10	Source: Molalla, city of (OR0101514)	
Sample Age: 26h (5.8 °C)	Station:	

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run	100	>100	N/A	1	16.7%

Wilcoxon/Bonferroni Adj Test

Control	vs	Conc-%	Test Stat	Critical	DF	Ties	P-Value	Decision(α:5%)
Dilution Water		2	90		17	1	1.0000	Non-Significant Effect
		4	100		18	1	1.0000	Non-Significant Effect
		10	105		18	1	1.0000	Non-Significant Effect
		40	105		18	1	1.0000	Non-Significant Effect
		100	105		18	1	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01493273	0.002986547	5	0.9782	0.4397	Non-Significant Effect
Error	0.1618221	0.003053247	53			
Total	0.1767548	0.006039794	58			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1233	15.09	<0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.2548	0.9451	<0.0001	Non-normal Distribution

7d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
2		9	1	1	1	1	1	0	0	0.0%	0.0%
4		10	0.95	0.8899	1	0.5	1	0.05	0.1581	16.64%	5.0%
10		10	1	1	1	1	1	0	0	0.0%	0.0%
40		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1.209	1.209	1.209	1.209	1.209	0	0	0.0%	0.0%
2		9	1.209	1.209	1.209	1.209	1.209	0	0	0.0%	0.0%
4		10	1.167	1.116	1.218	0.7854	1.209	0.0424	0.1341	11.49%	3.51%
10		10	1.209	1.209	1.209	1.209	1.209	0	0	0.0%	0.0%
40		10	1.209	1.209	1.209	1.209	1.209	0	0	0.0%	0.0%
100		10	1.209	1.209	1.209	1.209	1.209	0	0	0.0%	0.0%

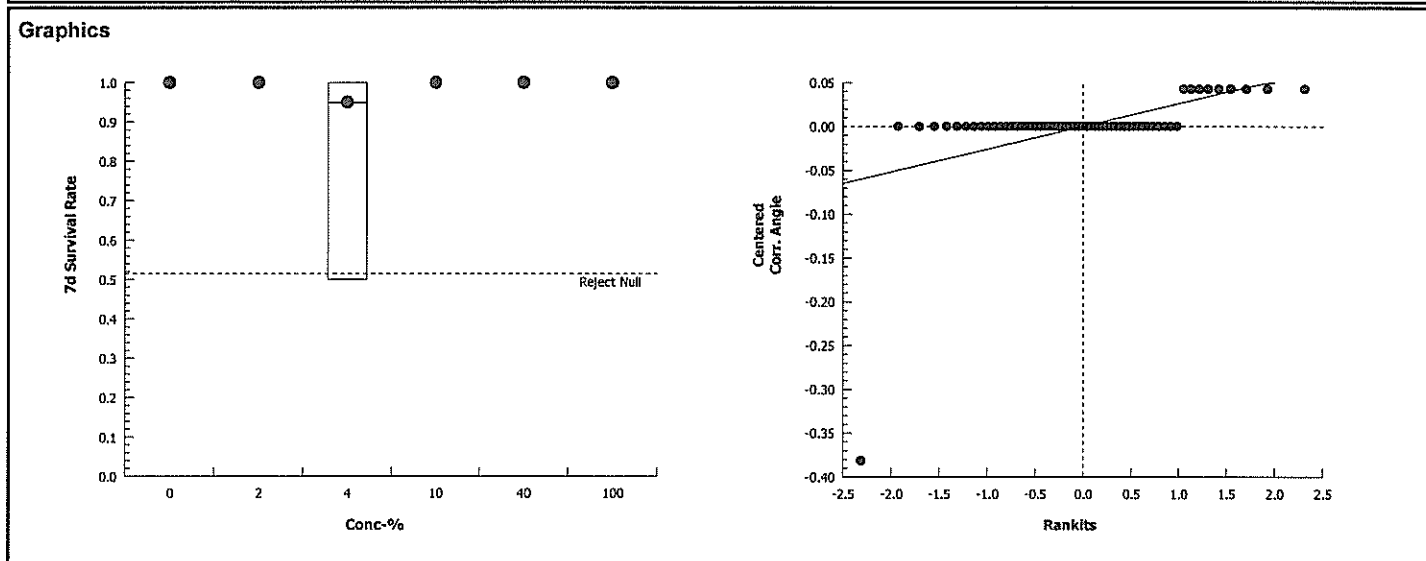
CETIS Analytical Report

Report Date: 15 Apr-16 10:57 (p 4 of 6)
 Test Code: B350901ppc | 02-7329-8983

Fathead Minnow 7-d Larval Survival and Growth Test **CH2M HILL - ASL**

Analysis ID: 20-4688-1336 Endpoint: 7d Survival Rate CETIS Version: CETISv1.8.1
 Analyzed: 15 Apr-16 10:57 Analysis: Nonparametric-Multiple Comparison Official Results: Yes

7d Survival Rate Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
2		1	1	1	1	1	Outlier	1	1	1	1
4		1	1	0.5	1	1	1	1	1	1	1
10		1	1	1	1	1	1	1	1	1	1
40		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1



CETIS Analytical Report

Report Date: 15 Apr-16 10:57 (p 1 of 6)
 Test Code: B350901ppc | 02-7329-8983

Fathead Minnow 7-d Larval Survival and Growth Test **CH2M HILL - ASL**

Analysis ID: 15-2803-5996	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.8.1
Analyzed: 15 Apr-16 10:57	Analysis: Parametric-Control vs Treatments	Official Results: Yes

Batch ID: 09-3575-9620	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 05 Apr-16 10:15	Protocol: EPA/821/R-02-013 (2002)	Diluent:
Ending Date: 12 Apr-16 09:30	Species: Pimephales promelas	Brine:
Duration: 6d 23h	Source: Aquatox, AR	Age: <48h

Sample ID: 06-3741-7840	Code: B3509-01	Client:
Sample Date: 04 Apr-16 08:30	Material: Unknown	Project:
Receive Date: 04 Apr-16 10:10	Source: Molalla, city of (OR0101514)	
Sample Age: 26h (5.8 °C)	Station:	

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run	100	>100	N/A	1	16.2%

Control	vs	Conc-%	Test Stat	Critical	DF	MSD	P-Value	Decision(α:5%)
Dilution Water		2	0.5396	2.289	18	0.09975	0.6284	Non-Significant Effect
		4	1.308	2.289	18	0.09975	0.2862	Non-Significant Effect
		10	-0.5278	2.289	18	0.09975	0.9446	Non-Significant Effect
		40	0.4356	2.289	18	0.09975	0.6738	Non-Significant Effect
		100	1.136	2.289	18	0.09975	0.3567	Non-Significant Effect

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	0	2.977	3.2	0.1212	No Outliers Detected

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.04494692	0.008989384	5	0.9469	0.4585	Non-Significant Effect
Error	0.5126517	0.00949355	54			
Total	0.5575987	0.01848293	59			

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	13.8	15.09	0.0169	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9789	0.9459	0.3824	Normal Distribution

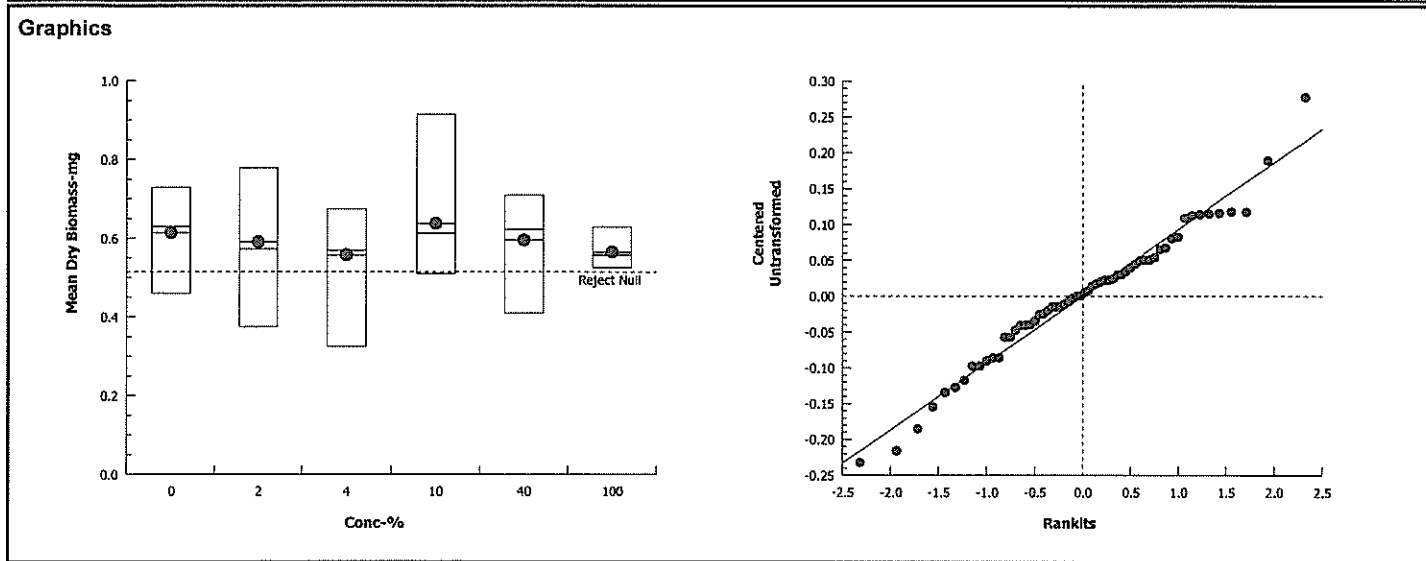
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	0.6145	0.5813	0.6477	0.46	0.73	0.02761	0.08732	14.21%	0.0%
2		10	0.591	0.5457	0.6362	0.375	0.78	0.03763	0.119	20.13%	3.83%
4		10	0.5575	0.5158	0.5992	0.325	0.675	0.03465	0.1096	19.65%	9.28%
10		10	0.6375	0.5911	0.6839	0.51	0.915	0.03859	0.122	19.14%	-3.74%
40		10	0.5955	0.5632	0.6278	0.41	0.71	0.02688	0.085	14.27%	3.09%
100		10	0.565	0.5526	0.5774	0.525	0.63	0.0103	0.03257	5.77%	8.05%

CETIS Analytical Report

Report Date: 15 Apr-16 10:57 (p 2 of 6)
 Test Code: B350901ppc | 02-7329-8983

Fathead Minnow 7-d Larval Survival and Growth Test				CH2M HILL - ASL			
Analysis ID: 15-2803-5996	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.8.1					
Analyzed: 15 Apr-16 10:57	Analysis: Parametric-Control vs Treatments	Official Results: Yes					

Mean Dry Biomass-mg Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	0.59	0.615	0.73	0.665	0.6	0.48	0.665	0.6949	0.46	0.645
2		0.505	0.375	0.645	0.565	0.705	0.505	0.7	0.58	0.55	0.78
4		0.58	0.46	0.325	0.55	0.675	0.5	0.565	0.67	0.575	0.675
10		0.6349	0.54	0.66	0.52	0.58	0.915	0.72	0.59	0.51	0.705
40		0.62	0.645	0.505	0.635	0.64	0.555	0.71	0.41	0.625	0.61
100		0.6	0.585	0.525	0.55	0.53	0.55	0.63	0.57	0.565	0.545



CETIS Analytical Report

Report Date: 15 Apr-16 10:57 (p 1 of 3)
 Test Code: B350901ppc | 02-7329-8983

Fathead Minnow 7-d Larval Survival and Growth Test **CH2M HILL - ASL**

Analysis ID: 02-2921-7865 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.8.1
 Analyzed: 15 Apr-16 10:57 Analysis: Linear Interpolation (ICPIN) Official Results: Yes

Batch ID: 09-3575-9620 Test Type: Growth-Survival (7d) Analyst:
 Start Date: 05 Apr-16 10:15 Protocol: EPA/821/R-02-013 (2002) Diluent:
 Ending Date: 12 Apr-16 09:30 Species: Pimephales promelas Brine:
 Duration: 6d 23h Source: Aquatox, AR Age: <48h

Sample ID: 06-3741-7840 Code: B3509-01 Client:
 Sample Date: 04 Apr-16 08:30 Material: Unknown Project:
 Receive Date: 04 Apr-16 10:10 Source: Molalla, city of (OR0101514)
 Sample Age: 26h (5.8 °C) Station:

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	784568769	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value	2.977	3.2	0.1212	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC25	>100	N/A	N/A	<1	N/A	N/A

Mean Dry Biomass-mg Summary **Calculated Variate**

Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	0.6145	0.46	0.73	0.02761	0.08732	14.21%	0.0%
2		10	0.591	0.375	0.78	0.03763	0.119	20.13%	3.83%
4		10	0.5575	0.325	0.675	0.03465	0.1096	19.65%	9.28%
10		10	0.6375	0.51	0.915	0.03859	0.122	19.14%	-3.74%
40		10	0.5955	0.41	0.71	0.02688	0.085	14.27%	3.09%
100		10	0.565	0.525	0.63	0.0103	0.03257	5.77%	8.05%

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	0.59	0.615	0.73	0.665	0.6	0.48	0.665	0.6949	0.46	0.645
2		0.505	0.375	0.645	0.565	0.705	0.505	0.7	0.58	0.55	0.78
4		0.58	0.46	0.325	0.55	0.675	0.5	0.565	0.67	0.575	0.675
10		0.6349	0.54	0.66	0.52	0.58	0.915	0.72	0.59	0.51	0.705
40		0.62	0.645	0.505	0.635	0.64	0.555	0.71	0.41	0.625	0.61
100		0.6	0.585	0.525	0.55	0.53	0.55	0.63	0.57	0.565	0.545

CETIS Analytical Report

Report Date: 15 Apr-16 10:57 (p 2 of 3)
Test Code: B350901ppc | 02-7329-8983

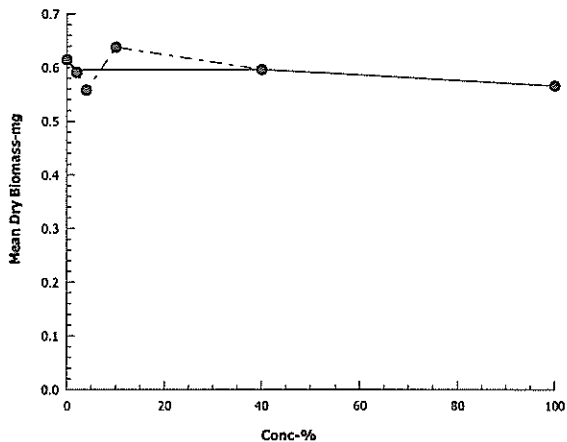
Fathead Minnow 7-d Larval Survival and Growth Test

CH2M HILL - ASL

Analysis ID: 02-2921-7865 Endpoint: Mean Dry Biomass-mg
Analyzed: 15 Apr-16 10:57 Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.1
Official Results: Yes

Graphics



Raphidocelis subcapitata (formerly *Selenastrum capricornutum*) TEST CONDITIONS

Client: City of Molalla

Sample Description: _____

Sample ID: B3509 - 01

Test Start Date: 4 / 5 / 2016

Time: 13:30

Initials: JW/JS

Test End Date: 4 / 9 / 2016

Time: 15:10

Initials: JW

TEST CONDITIONS AT INITIATION:

Species ID#: RS 803

Culturing period: 4 days

Incubator ID#: 2

INOCULUM (Axenic Culture)		Culture Density = Mean # of Cells/Field x 250,000	
# Cells	# Fields		Culture Density
480	250		
MEAN	1.92	x250,000 =	480,000

Filtration	0.45 um filter	
	1.6 um filter	X

Test Vol. / Replicate	50 mls
No. of Reps	4
Nutrient Dosage	1 ml per L

Test Start Density x Test Volume / Culture Density = Inoculum Volume
 10,000 x 50 ml / 480,000 = 1.04 ml

Confirming Counts			
	# Cells	# Fields	Cell Conc. x10 ⁶
Flask #1	7	250	0.007
Flask #2	12	250	0.012
Flask #3	9	250	0.009

Light Intensity at Test Initiation (foot-candles)		
Location #1	Location #2	Location #3
265	399	431

Technician	0 hr	<u>JS</u>	24 hr	<u>JS</u>	48 hr	<u>JS</u>	72 hr	<u>JW</u>	96 hr	<u>JS</u>
Time	0 hr	<u>13:30</u>	24 hr	<u>14:30</u>	48 hr	<u>14:40</u>	72 hr	<u>10:35</u>	96 hr	<u>15:10</u>
Therm. ID#	0 hr	<u>#159</u>	24 hr	<u>#159</u>	48 hr	<u>#159</u>	72 hr	<u>#159</u>	96 hr	<u>#159</u>

Test Concn.	D.O. (mg/L)	pH					Temperature (°C)					Conductivity (umohs/cm)	Hard.	Alk.
		0 hr	24	48	72	96	0 hr	24	48	72	96			
Control	7.6	7.8	7.9	7.6	8.0	8.4	24.7	25.6	25.5	25.5	25.3	295	106	74
2.0 %	7.6	8.0	7.8	7.7	8.0	8.3	24.7	25.5	25.5	25.3	25.4	354	95	72
4.0 %	7.7	8.1	7.8	7.7	8.0	8.3	24.7	25.5	25.5	25.3	25.5	381		
10 %	7.9	8.1	7.8	7.8	7.9	8.2	24.8	25.4	25.4	25.1	25.5	387	97	73
40 %	7.9	8.1	7.9	7.8	7.9	8.2	24.8	25.3	25.3	25.0	25.4	390		
100 %	8.0	8.1	7.8	7.8	7.9	8.1	24.8	25.2	25.3	24.9	25.3	393	59	79

Comments: _____

(23.8) = Temp. out of recommended range

Raphidocelis subcapitata HEMOCYTOMETER WORKSHEET

Client City of Molalla

Sample Description _____

Lab ID B3509-01

Test Start Date 4/5/2016

Test Count Date 4/15/2016 Initials MJO

Minimum counts: at least 400 cells in each of the Control replicate
For each concentration thereafter, count a minimum of 400 cells or the same number of fields used in the Control rep with the highest number of fields counted. Whichever is reached first.
(This results in either the 400 minimum count needed for a $\pm 10\%$ confidence, or the same volume of solution as assessed in the Control)

Dilution factor (DF) Default value: 1 (i.e no dilution)
If a primary dilution is used, the DF needs to be changed to reflect this. A 1ml of sample + 9 ml of DI = a DF of 10

COMMENTS

TEST CONCENTRATION		Control		
	DF	# Cells	# Fields	Cell Conc. x10*6
Rep A	1	400	30	3.333
Rep B	1	412	32	3.219
Rep C	1	420	30	3.500
Rep D	1	402	31	3.242
Concentration Average		Cell Conc. x10*6 =		3.324
		CV % =		3.8%

TEST CONCENTRATION		2.0 %		
	DF	# Cells	# Fields	Cell Conc. x10*6
Rep A	1	353	32	2.758
Rep B	1	316	32	2.469
Rep C	1	366	32	2.859
Rep D	1	385	32	3.008
Concentration Average		Cell Conc. x10*6 =		2.773
		CV % =		8.2%

TEST CONCENTRATION		4.0 %		
	DF	# Cells	# Fields	Cell Conc. x10*6
Rep A	1	312	32	2.438
Rep B	1	338	32	2.641
Rep C	1	332	32	2.594
Rep D	1	371	32	2.898
Concentration Average		Cell Conc. x10*6 =		2.643
		CV % =		7.2%

TEST CONCENTRATION		10 %		
	DF	# Cells	# Fields	Cell Conc. x10*6
Rep A	1	332	32	2.594
Rep B	1	287	32	2.242
Rep C	1	322	32	2.516
Rep D	1	342	32	2.672
Concentration Average		Cell Conc. x10*6 =		2.506
		CV % =		7.5%

TEST CONCENTRATION		40 %		
	DF	# Cells	# Fields	Cell Conc. x10*6
Rep A	1	310	32	2.422
Rep B	1	316	32	2.469
Rep C	1	366	32	2.859
Rep D	1	354	32	2.766
Concentration Average		Cell Conc. x10*6 =		2.629
		CV % =		8.2%

TEST CONCENTRATION		100 %		
	DF	# Cells	# Fields	Cell Conc. x10*6
Rep A	1	257	32	2.008
Rep B	1	212	32	1.656
Rep C	1	262	32	2.047
Rep D	1	253	32	1.977
Concentration Average		Cell Conc. x10*6 =		1.922
		CV % =		9.3%

Raphidocelis subcapitata HEMOCYTOMETER WORKSHEET

Client City of Molalla

Sample Description _____

TEST CONCENTRATION		Control		
	DF	# Cells	# Fields	Cell Conc. x10 ⁶
Rep A	1	400	30	
Rep B	1	412	32	
Rep C	1	420	30	
Rep D	1	402	32	
Concentration Average		Cell Conc. x10 ⁶ =		
		CV % =		

Lab ID B3509-01

Test Start Date 4/5/2016

Test Count Date 4/15/2016 Initials MJO

TEST CONCENTRATION		2.0 %		
	DF	# Cells	# Fields	Cell Conc. x10 ⁶
Rep A	1	353	32	
Rep B	1	316	32	
Rep C	1	366	32	
Rep D	1	385	32	
Concentration Average		Cell Conc. x10 ⁶ =		
		CV % =		

Minimum counts: at least 400 cells in each of the Control replicate
For each concentration thereafter, count a minimum of 400 cells or the same number of fields used in the Control rep with the highest number of fields counted. Whichever is reached first. (This results in either the 400 minimum count needed for a ± 10% confidence, or the same volume of solution as assessed in the Control)

TEST CONCENTRATION		4.0 %		
	DF	# Cells	# Fields	Cell Conc. x10 ⁶
Rep A	1	312	32	
Rep B	1	338	32	
Rep C	1	332	32	
Rep D	1	371	32	
Concentration Average		Cell Conc. x10 ⁶ =		
		CV % =		

Dilution factor (DF) Default value: 1 (i.e no dilution)
If a primary dilution is used, the DF needs to be changed to reflect this. A 1ml of sample + 9 ml of DI = a DF of 10

COMMENTS

TEST CONCENTRATION		10 %		
	DF	# Cells	# Fields	Cell Conc. x10 ⁶
Rep A	1	332	32	
Rep B	1	287	32	
Rep C	1	322	32	
Rep D	1	342	32	
Concentration Average		Cell Conc. x10 ⁶ =		
		CV % =		

TEST CONCENTRATION		40 %		
	DF	# Cells	# Fields	Cell Conc. x10 ⁶
Rep A	1	310	32	
Rep B	1	316	32	
Rep C	1	366	32	
Rep D	1	384	32	
Concentration Average		Cell Conc. x10 ⁶ =		
		CV % =		

TEST CONCENTRATION		100 %		
	DF	# Cells	# Fields	Cell Conc. x10 ⁶
Rep A	1	257	32	
Rep B	1	212	32	
Rep C	1	262	32	
Rep D	1	253	32	
Concentration Average		Cell Conc. x10 ⁶ =		
		CV % =		

CETIS Summary Report

Report Date: 18 Apr-16 15:15 (p 1 of 1)
 Test Code: B350901rsc | 15-8912-6668

Raphidocelis Growth Test				CH2M HILL - ASL			
Batch ID:	17-9344-8340	Test Type:	Cell Growth	Analyst:	Brett Muckey		
Start Date:	05 Apr-16 13:30	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Mod-Hard Synthetic Water		
Ending Date:	09 Apr-16 15:10	Species:	Raphidocelis subcapitata	Brine:			
Duration:	4d 2h	Source:	In-House Culture	Age:			
Sample ID:	06-3741-7840	Code:	B3509-01	Client:			
Sample Date:	04 Apr-16 08:30	Material:	Unknown	Project:			
Receive Date:	04 Apr-16 10:10	Source:	Molalla, city of (OR0101514)				
Sample Age:	29h (5.8 °C)	Station:					

Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
19-6281-7461	Cell Density	<2	2	NA	9.78%	>50	Dunnett Multiple Comparison Test

Point Estimate Summary							
Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
15-1442-4072	Cell Density	IC25	44.51	N/A	55.82	2.247	Linear Interpolation (ICPIN)

Test Acceptability						
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
15-1442-4072	Cell Density	Control CV	0.0384	NL - 0.2	Yes	Passes Acceptability Criteria
19-6281-7461	Cell Density	Control CV	0.0384	NL - 0.2	Yes	Passes Acceptability Criteria
15-1442-4072	Cell Density	Control Resp	3.32E+6	1.00E+6 - NL	Yes	Passes Acceptability Criteria
19-6281-7461	Cell Density	Control Resp	3.32E+6	1.00E+6 - NL	Yes	Passes Acceptability Criteria
19-6281-7461	Cell Density	PMSD	0.09777	0.091 - 0.29	Yes	Passes Acceptability Criteria

Cell Density Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	3.324E+6	3.120E+6	3.527E+6	3.219E+6	3.500E+6	6.382E+4	1.276E+5	3.84%	0.0%
2		4	2.773E+6	2.411E+6	3.136E+6	2.469E+6	3.008E+6	1.138E+5	2.276E+5	8.21%	16.55%
4		4	2.643E+6	2.338E+6	2.947E+6	2.438E+6	2.898E+6	9.570E+4	1.914E+5	7.24%	20.49%
10		4	2.506E+6	2.208E+6	2.803E+6	2.242E+6	2.672E+6	9.350E+4	1.870E+5	7.46%	24.6%
40		4	2.629E+6	2.285E+6	2.973E+6	2.422E+6	2.859E+6	1.081E+5	2.163E+5	8.23%	20.9%
100		4	1.922E+6	1.636E+6	2.207E+6	1.656E+6	2.047E+6	8.970E+4	1.794E+5	9.34%	42.17%

Cell Density Detail						
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	
0	Dilution Water	3.333E+6	3.219E+6	3.500E+6	3.242E+6	
2		2.758E+6	2.469E+6	2.859E+6	3.008E+6	
4		2.438E+6	2.641E+6	2.594E+6	2.898E+6	
10		2.594E+6	2.242E+6	2.516E+6	2.672E+6	
40		2.422E+6	2.469E+6	2.859E+6	2.766E+6	
100		2.008E+6	1.656E+6	2.047E+6	1.977E+6	

CETIS Analytical Report

Report Date: 18 Apr-16 15:14 (p 1 of 2)
 Test Code: B350901rsc | 15-8912-6668

Raphidocelis Growth Test

CH2M HILL - ASL

Analysis ID: 19-6281-7461	Endpoint: Cell Density	CETIS Version: CETISv1.8.8
Analyzed: 18 Apr-16 15:05	Analysis: Parametric-Control vs Treatments	Official Results: Yes
Batch ID: 17-9344-8340	Test Type: Cell Growth	Analyst: Brett Muckey
Start Date: 05 Apr-16 13:30	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 09 Apr-16 15:10	Species: Raphidocelis subcapitata	Brine:
Duration: 4d 2h	Source: In-House Culture	Age:
Sample ID: 06-3741-7840	Code: B3509-01	Client:
Sample Date: 04 Apr-16 08:30	Material: Unknown	Project:
Receive Date: 04 Apr-16 10:10	Source: Molalla, city of (OR0101514)	
Sample Age: 29h (5.8 °C)	Station:	

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	9.78%	<2	2	NA	>50

Dunnnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		2*	4.075	2.407	3E+05	6	0.0016	CDF	Significant Effect
		4*	5.044	2.407	3E+05	6	0.0002	CDF	Significant Effect
		10*	6.057	2.407	3E+05	6	<0.0001	CDF	Significant Effect
		40*	5.146	2.407	3E+05	6	0.0002	CDF	Significant Effect
		100*	10.38	2.407	3E+05	6	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value	1.804	2.802	1.0000	No Outliers Detected
Control Trend	Mann-Kendall Trend	1.804		1.0000	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.073963E+12	8.147927E+11	5	22.36	<0.0001	Significant Effect
Error	6.559602E+11	36442230000	18			
Total	4.729923E+12		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	0.9668	15.09	0.9652	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9528	0.884	0.3105	Normal Distribution

Cell Density Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	3.324E+6	3.120E+6	3.527E+6	3288000	3.219E+6	3.500E+6	6.382E+4	3.84%	0.0%
2		4	2.773E+6	2.411E+6	3.136E+6	2809000	2.469E+6	3.008E+6	1.138E+5	8.21%	16.55%
4		4	2.643E+6	2.338E+6	2.947E+6	2617000	2.438E+6	2.898E+6	9.570E+4	7.24%	20.49%
10		4	2.506E+6	2.208E+6	2.803E+6	2555000	2.242E+6	2.672E+6	9.350E+4	7.46%	24.6%
40		4	2.629E+6	2.285E+6	2.973E+6	2617000	2.422E+6	2.859E+6	1.081E+5	8.23%	20.9%
100		4	1.922E+6	1.636E+6	2.207E+6	1992000	1.656E+6	2.047E+6	8.970E+4	9.34%	42.17%

Cell Density Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	3.333E+6	3.219E+6	3.500E+6	3.242E+6
2		2.758E+6	2.469E+6	2.859E+6	3.008E+6
4		2.438E+6	2.641E+6	2.594E+6	2.898E+6
10		2.594E+6	2.242E+6	2.516E+6	2.672E+6
40		2.422E+6	2.469E+6	2.859E+6	2.766E+6
100		2.008E+6	1.656E+6	2.047E+6	1.977E+6

CETIS Analytical Report

Report Date: 18 Apr-16 15:14 (p 2 of 2)
Test Code: B350901rsc | 15-8912-6668

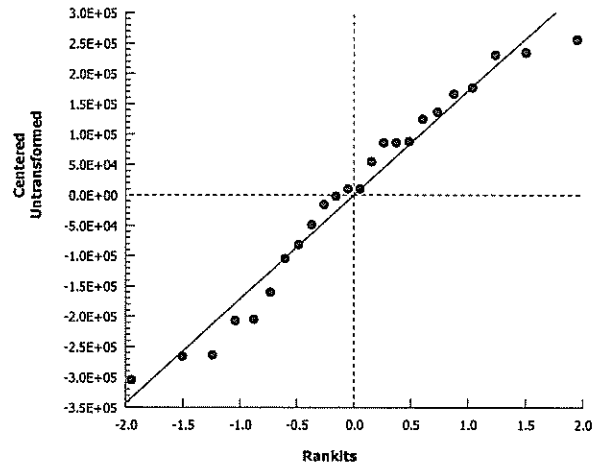
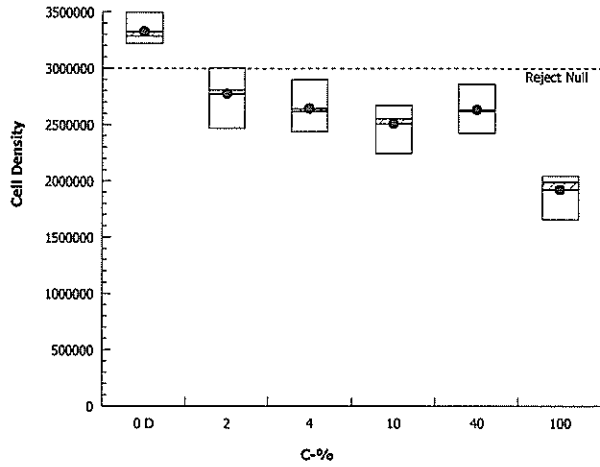
Raphidocelis Growth Test

CH2M HILL - ASL

Analysis ID: 19-6281-7461 Endpoint: Cell Density
Analyzed: 18 Apr-16 15:05 Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.8.8
Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 18 Apr-16 15:15 (p 1 of 2)
 Test Code: B350901rsc | 15-8912-6668

Raphidocelis Growth Test CH2M HILL - ASL

Analysis ID: 15-1442-4072	Endpoint: Cell Density	CETIS Version: CETISv1.8.8
Analyzed: 18 Apr-16 15:05	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes
Batch ID: 17-9344-8340	Test Type: Cell Growth	Analyst: Brett Muckey
Start Date: 05 Apr-16 13:30	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 09 Apr-16 15:10	Species: Raphidocelis subcapitata	Brine:
Duration: 4d 2h	Source: In-House Culture	Age:
Sample ID: 06-3741-7840	Code: B3509-01	Client:
Sample Date: 04 Apr-16 08:30	Material: Unknown	Project:
Receive Date: 04 Apr-16 10:10	Source: Molalla, city of (OR0101514)	
Sample Age: 29h (5.8 °C)	Station:	

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2000998	200	Yes	Two-Point Interpolation

Residual Analysis						
Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)	
Extreme Value	Grubbs Extreme Value	1.804	2.802	1.0000	No Outliers Detected	
Control Trend	Mann-Kendall Trend	1.804		1.0000	Non-significant Trend in Controls	

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC25	44.51	N/A	55.82	2.247	1.792	NA

Cell Density Summary			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	3.324E+6	3.219E+6	3.500E+6	6.382E+4	1.276E+5	3.84%	0.0%
2		4	2.773E+6	2.469E+6	3.008E+6	1.138E+5	2.276E+5	8.21%	16.55%
4		4	2.643E+6	2.438E+6	2.898E+6	9.570E+4	1.914E+5	7.24%	20.49%
10		4	2.506E+6	2.242E+6	2.672E+6	9.350E+4	1.870E+5	7.46%	24.6%
40		4	2.629E+6	2.422E+6	2.859E+6	1.081E+5	2.163E+5	8.23%	20.9%
100		4	1.922E+6	1.656E+6	2.047E+6	8.970E+4	1.794E+5	9.34%	42.17%

Cell Density Detail					
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	3.333E+6	3.219E+6	3.500E+6	3.242E+6
2		2.758E+6	2.469E+6	2.859E+6	3.008E+6
4		2.438E+6	2.641E+6	2.594E+6	2.898E+6
10		2.594E+6	2.242E+6	2.516E+6	2.672E+6
40		2.422E+6	2.469E+6	2.859E+6	2.766E+6
100		2.008E+6	1.656E+6	2.047E+6	1.977E+6

CETIS Analytical Report

Report Date: 18 Apr-16 15:15 (p 2 of 2)
Test Code: B350901rsc | 15-8912-6668

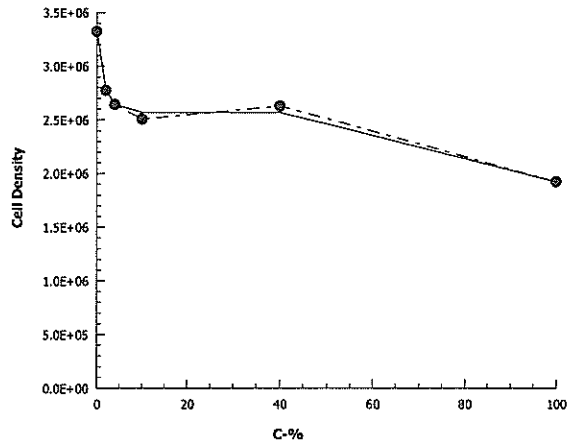
Raphidocelis Growth Test

CH2M HILL - ASL

Analysis ID: 15-1442-4072 Endpoint: Cell Density
Analyzed: 18 Apr-16 15:05 Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.8
Official Results: Yes

Graphics



APPENDIX B
REFERENCE TOXICANT DATA SHEETS



Ceriodaphnia dubia
Survival and Reproduction
Test Data Summary

Client QA/QC

Test Start Date 4-5-2016

Sample Description NaCl

Initial Sample ID# 2B057-08

Data summarized by BW

Percent or Concentration	Total Live Young Produced in First 3 Broods per Replicate										# Alive Adults	Total Live Young		
	A	B	C	D	E	F	G	H	I	J				
Control	35	35	36	32	39	36	35	35	39	39	10	361		
	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?				
0.25 g/L	37	41	34	32	37	37	36	36	24	38	10	352		
	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?				
0.50 g/L	27	31	35	28	33	35	21	28	35	38	10	311		
	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?				
1.0 g/L	35	30	29	29	28	31	30	29	13	33	9	287		
	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	✓			
1.5 g/L	25	27	21	19	0	23	26	18	10	4	9	173		
	AD?	AD?	AD?	AD?	AD?	✓	AD?	AD?	AD?	AD?				
2.0 g/L	4	0	2	0	2	12	0	0	10	0	8	30		
	AD?	AD?	AD?	AD?	✓	AD?	AD?	AD?	AD?	AD?	AD?	✓		
4.0 g/L	0	0	0	0	0	0	0	0	0	0	0	0		
	AD?	✓	AD?	✓	AD?	✓	AD?	✓	AD?	✓	AD?	✓	AD?	✓

Test Organism Mortality (Adult dead) = AD? ✓

of Alive Adults = Number of test organism alive at termination

Test Organism identified as Male = AD? M

Total Live Young = Total neonates produced in first 3 broods

Test Organism Injured during test = AD? I

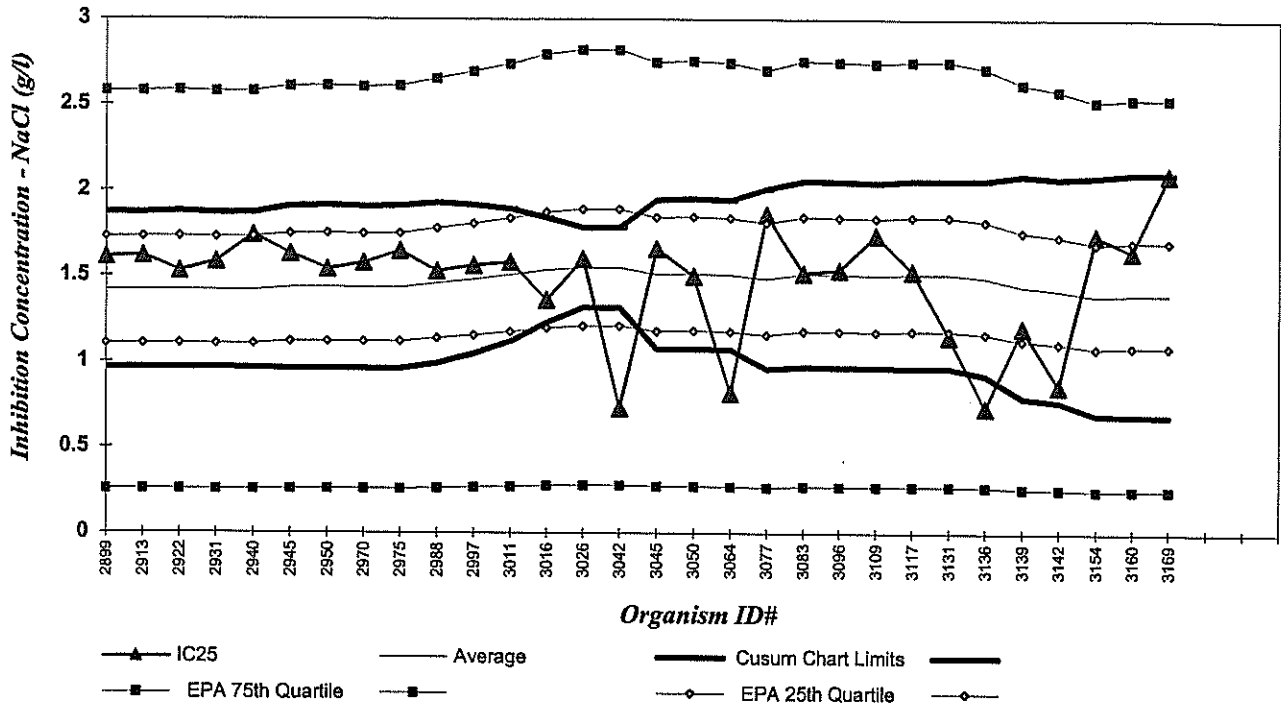
Footnote: As per EPA-600-4-91-002 and EPA-821-R-02-013, *Ceriodaphnia dubia* test should be terminated when 60% of the surviving control organisms have produced their third brood, or at the end of eight days, whichever occurs first.

Also as per EPA-821-R-02-013 (13.10.9.1), "In this three-brood test, offspring from fourth or higher broods should not be counted and should not be included in the total number of neonates produced during the test."

Endpoint IC25 Cusum Chart Limits
 Survival 2.097 0.69 to 2.100
 Reproduction 1.06 0.22 to 1.08

Task Manager [Signature]
 Project Manager [Signature]
 QA Officer [Signature]

REFERENCE TOXICANT CUMULATIVE SUMMARY (CUSUM) CHART
Ceriodaphnia dubia Chronic Survival - IC25 Values



***Ceriodaphnia dubia* - Chronic (EPA Test Method 1002.0)**

SODIUM CHLORIDE (g/L)

Endpoint: Chronic Survival

Stats Method: Linear Interpolation

Test Conditions: Recon MH, 25 oC

From EPA 833-R-00-003:

10th Quartile CV (*control limit*) = 0.07

25th Quartile CV (*warning limit*) = 0.11

75th Quartile CV (*warning limit*) = 0.41

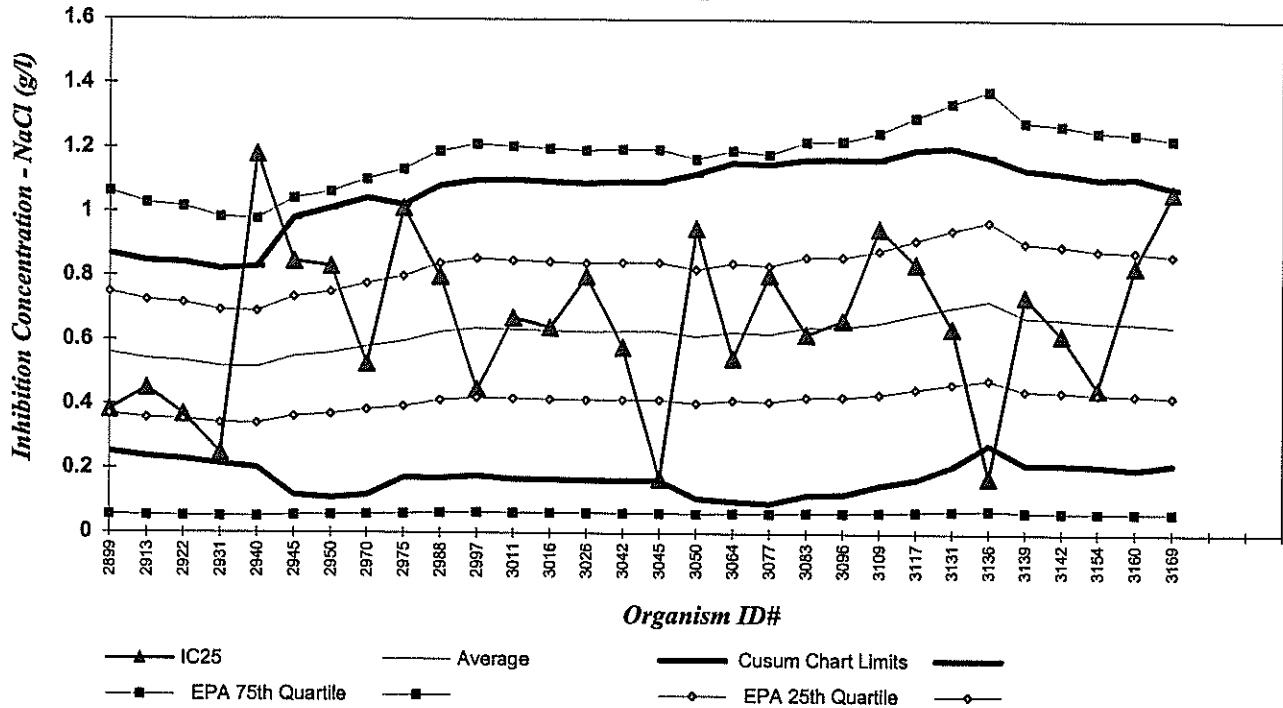
90th Quartile CV (*control limit*) = 0.81

Intralab CV is compared to EPA Warning limits (25th and 75th CV's) and Control limits (10th and 90th CV's).

If lab CV is outside EPA Control limits, the EPA Control limits are used to set Cusum chart limits.

Event #	Cerio ID #	Test Start Date	IC25	Running Average	Running SD	Cusum Chart Limits		Intralab CV
						AVG-2SD	AVG+2SD	
292	3109	09/09/15	1.74	1.51	0.27	0.97	2.05	0.18
293	3117	10/06/15	1.53	1.51	0.27	0.96	2.06	0.18
294	3131	11/17/15	1.15	1.51	0.27	0.96	2.06	0.19
295	3136	12/03/15	0.73	1.49	0.28	0.92	2.06	0.23
296	3139	12/15/15	1.20	1.44	0.32	0.79	2.09	0.23
297	3142	01/05/16	0.86	1.42	0.33	0.77	2.07	0.25
298	3154	02/09/16	1.74	1.38	0.35	0.69	2.08	0.25
299	3160	03/08/16	1.64	1.39	0.35	0.69	2.10	0.25
300	3169	04/05/16	2.097	1.39	0.35	0.69	2.100	0.27
301								
302								
303								

REFERENCE TOXICANT CUMULATIVE SUMMARY (CUSUM) CHART
***Ceriodaphnia dubia* Chronic Reproduction - IC25 Values**



***Ceriodaphnia dubia* - Chronic (EPA Test Method 1002.0)**

SODIUM CHLORIDE (g/L)

Endpoint: Chronic Reproduction
 Stats Method: Linear Interpolation
 Test Conditions: Recon MH, 25 °C

From EPA 833-R-00-003:

- 10th Quartile CV (control limit) = 0.08
- 25th Quartile CV (warning limit) = 0.17
- 75th Quartile CV (warning limit) = 0.45
- 90th Quartile CV (control limit) = 0.62

*Intralab CV is compared to EPA Warning limits (25th and 75th CV's) and Control limits (10th and 90th CV's).
 If lab CV is outside EPA Control limits, the EPA Control limits are used to set Cusum chart limits.*

Event #	Cerio ID #	Test Start Date	IC25	Running Average	Running SD	Cusum Chart Limits		Intralab CV
						AVG-2SD	AVG+2SD	
292	3109	9/9/2015	0.95	0.66	0.25	0.15	1.17	0.38
293	3117	10/6/2015	0.84	0.68	0.26	0.17	1.20	0.35
294	3131	11/17/2015	0.64	0.71	0.25	0.21	1.20	0.31
295	3136	12/3/2015	0.18	0.73	0.22	0.28	1.17	0.34
296	3139	12/15/2015	0.74	0.68	0.23	0.22	1.14	0.34
297	3142	1/5/2016	0.62	0.67	0.23	0.22	1.12	0.34
298	3154	2/9/2016	0.45	0.66	0.22	0.21	1.11	0.35
299	3160	3/8/2016	0.83	0.66	0.23	0.20	1.11	0.33
300	3169	4/5/2016	1.06	0.65	0.22	0.22	1.08	0.35
301								
302								
303								

Random Template Used: 6 conc. x 4 reps. # 8
 Stock Sol. ID 2B 057-08
 Organism ID: FHM 1867

Waterbath/incubator Used: # 7

Date Initiated 4/15/2016 Time 12:55
 Date Terminated 4/12/2016 Time 08:30

Test Container Size: 800 ml Solution Volume / rep: 500 ml

Client QA/QC - RefTox

Sample Description NaCl (50 g/L stock)

Tech: Day 0 MC Day 1 SN Day 2 SN Day 3 MC Day 4 SN Day 5 SN Day 6 SN Day 7 0
 Time Day 0 1255 Day 1 150 Day 2 10:40 Day 3 0900 Day 4 1440 Day 5 1150 Day 6 1240 Day 7 0830

Conc. or Percent	Day	Number of Live Organisms				Dissolved O ₂ (mg/l)		pH		Temp. (°C)	Therm. ID #	Conductivity (µS)
		A	B	C	D	Pre	Post	Pre	Post	Pre		Post (daily)
Control	0	10	10	10	10		8.2		7.01	24.5	213	296
	1	10	9	10	10	7.0	8.2	7.4	8.2	*		281
	2	10	9	10	10	6.8	8.1	7.2	8.3	24.9	184	282
	3	10	9	10	10	7.1	8.1	6.4	8.2	24.3	213	296
	4	10	9	10	10	7.2	7.6	7.5	8.0	24.5	184	292
	5	10	9	10	10	7.6	8.0	7.3	8.3	24.7	184	
	6	10	9	10	10	7.3	8.1	7.3	8.2	24.3	184	300
0.3 g/L	0	10	10	10	10		8.2		8.1	24.3	184	856
	1	10	10	10	10	7.1	8.1	7.6	8.3	*		860
	2	10	10	10	10	6.7	8.1	7.2	8.2	25.0		845
	3	10	10	9	10	7.2	8.1	7.2	8.2	24.3		829
	4	10	10	9	10	7.1	7.5	7.4	8.1	24.5		800
	5	10	10	9	10	7.3	7.6	7.3	8.3	24.6		
	6	10	10	9	10	7.1	8.2	7.3	8.1	24.6		853
1.0 g/L	0	10	10	10	10		8.2		8.2	24.3		2180
	1	10	10	10	10	7.1	8.3	7.6	8.3	*		2130
	2	10	10	10	9	7.0	8.0	7.3	8.1	25.0		2000
	3	10	10	10	9	7.3	8.2	7.4	8.1	24.3		2180
	4	10	10	10	9	7.5	7.6	7.4	8.1	24.4		2050
	5	10	10	10	9	7.0	7.8	7.4	8.3	24.6		
	6	10	10	10	9	7.2	8.3	7.5	8.1	24.6		2080
2.0 g/L	0	10	10	10	10		8.2		8.2	24.3		3910
	1	10	10	10	10	7.1	8.4	7.6	8.2	*		3870
	2	10	9	10	10	6.9	8.1	7.3	8.1	24.9		3840
	3	8	9	9	10	7.3	8.2	7.4	8.0	24.3		3820
	4	8	9	9	10	7.1	7.7	7.4	8.0	24.4		3770
	5	7	8	7	9	7.4	7.9	7.4	8.2	24.6		
	6	7	8	8	9	7.2	8.2	7.5	8.1	24.6		3770
4.0 g/L	0	10	10	10	10		8.3		8.2	24.4		7010
	1	10	10	10	10	7.2	8.1	7.5	8.2	*		7130
	2	10	10	10	10	7.0	8.0	7.3	8.1	24.8		7080
	3	9	9	10	9	7.3	8.2	7.4	8.0	24.2		7050
	4	9	9	10	8	7.0	7.8	7.5	7.9	24.4		6990
	5	8	9	10	8	7.1	8.0	7.4	8.2	24.5		
	6	8	7	9	4	7.3	8.2	7.5	8.1	24.6		7210
8.0 g/L	0	10	10	10	10		8.3		8.2	24.4		13180
	1	9	9	10	10	7.2	8.1	7.5	8.2	*		13170
	2	0	0	1	2	7.0	8.0	7.3	8.0	25.0		12920
	3			0	0	7.3	8.2	7.5	7.9	24.2		13200
	4											
	5											
	6											

✓ Indicates one organism inadvertently poured off during solution renewal, replaced into container.

"M" = organism missing, start count reduced. "Inj" = organism injured, remove from stats.

"F" = fungus noted on dead organisms.

Pre = Pre-renewal solutions. Post = Post-renewal solutions.

Day 0 Temperatures = Post-renewals

Therm ID# = Thermometer ID used for all measurements that day.

(23.8) = Temp. out of recommended range

Endpoint

IC25

Cusum Chart Limits

Survival

2.3

1.3 to 3.9

Growth

1.6

1.1 to 3.4

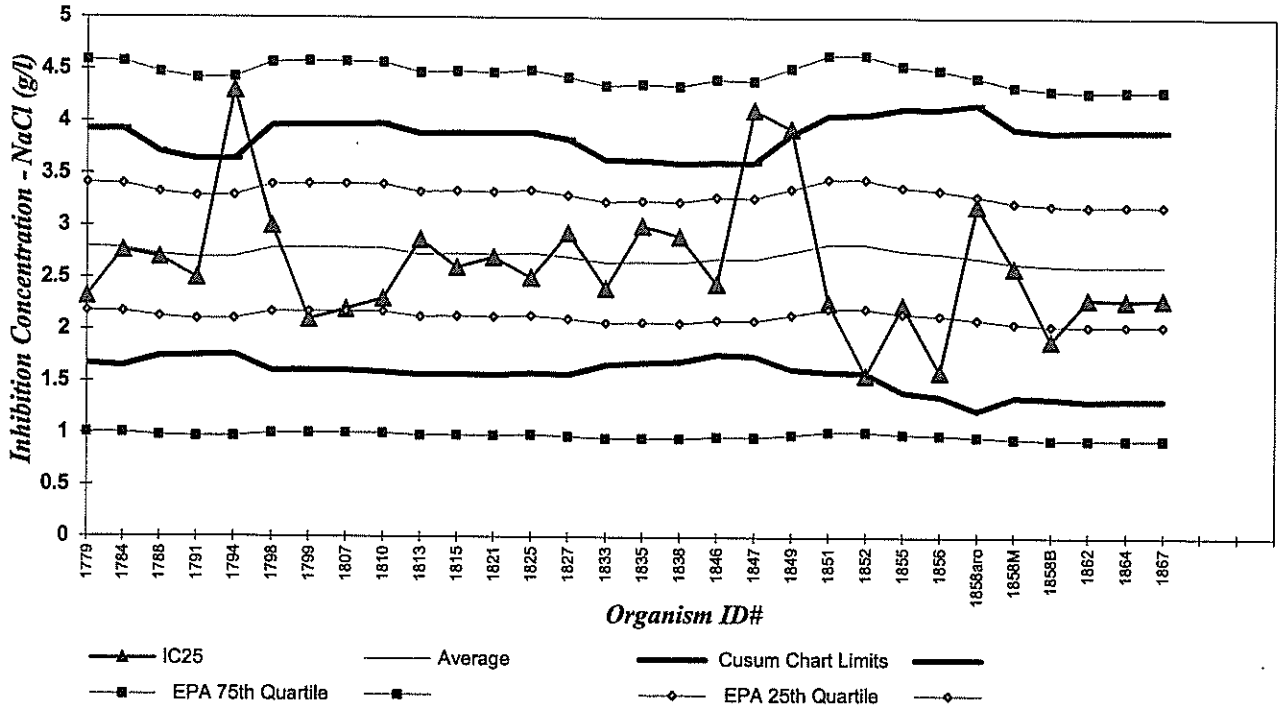
Task Manager [Signature]

Project Manager [Signature]

QA Officer [Signature]

other trials in Dur (see 4/7/16)
 more in this 25+19

REFERENCE TOXICANT CUMULATIVE SUMMARY (CUSUM) CHART
Pimphales promelas Chronic Survival - IC25 Values



***Pimphales promelas* - Chronic (EPA Test Method 1000.0)**

SODIUM CHLORIDE (g/L)

Endpoint: Chronic Survival
 Stats Method: Linear Interpolation
 Test Conditions: Recon MH, 25 oC

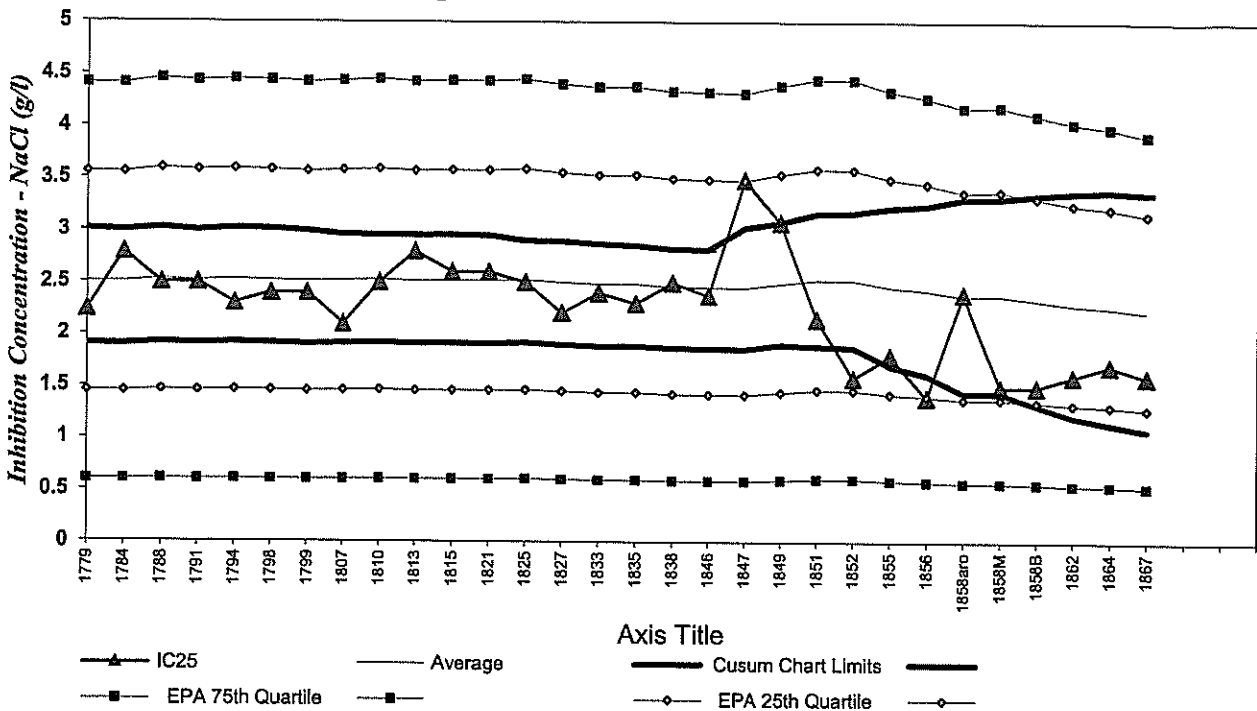
From EPA 833-R-00-003:

- 10th Quartile CV (control limit) = 0.03
- 25th Quartile CV (warning limit) = 0.11
- 75th Quartile CV (warning limit) = 0.32
- 90th Quartile CV (control limit) = 0.52

*Intralab CV is compared to EPA Warning limits (25th and 75th CV's) and Control limits (10th and 90th CV's),
 If lab CV is outside EPA Control limits, the EPA Control limits are used to set Cusum chart limits.*

Event #	FHM ID #	Test Start Date	IC25	Running Average	Running SD	Cusum Chart Limits		Intralab CV
						AVG-2SD	AVG+2SD	
327	1849	12/15/15	3.937	2.8	0.56	1.63	3.88	0.22
328	1851	12/29/16	2.3	2.8	0.62	1.6	4.1	0.22
329	1852	01/12/16	1.57	2.8	0.62	1.59	4.06	0.25
330	1855	01/26/16	2.2	2.8	0.68	1.4	4.1	0.25
331	1856	02/02/16	1.6	2.7	0.69	1.4	4.1	0.27
332	1858aro	02/16/16	3.2	2.7	0.73	1.2	4.2	0.24
333	1858M	02/16/16	2.6	2.6	0.64	1.4	3.9	0.24
334	1858B	02/16/16	1.9	2.6	0.64	1.3	3.9	0.25
335	1862	03/08/16	2.3	2.6	0.65	1.3	3.9	0.25
336	1864	03/22/16	2.3	2.6	0.65	1.3	3.9	0.25
337	1867	04/05/16	2.3	2.6	0.65	1.3	3.9	0.25

REFERENCE TOXICANT CUMULATIVE SUMMARY (CUSUM) CHART
Pimephales promelas Chronic Biomass - IC25 Values



***Pimephales promelas* - Chronic (EPA Test Method 1000.0)**

SODIUM CHLORIDE (g/L)

Endpoint: Chronic Growth (Biomass)
 Stats Method: Linear Interpolation
 Test Conditions: Recon MH, 25 oC

From EPA 833-R-00-003:

10th Quartile CV (control limit) = 0.12
 25th Quartile CV (warning limit) = 0.21
 75th Quartile CV (warning limit) = 0.38
 90th Quartile CV (control limit) = 0.45

Intralab CV is compared to EPA Warning limits (25th and 75th CV's) and Control limits (10th and 90th CV's),

If lab CV is outside EPA Control limits, the EPA Control limits are used to set Cusum chart limits.

Event #	FHM ID #	Test Start Date	IC25	Running Average	Running SD	Cusum Chart Limits		Intralab CV
						AVG-2SD	AVG+2SD	
327	1849	12/15/2015	3.081	2.5	0.29	1.907	3.080	0.13
328	1851	12/29/2015	2.2	2.5	0.32	1.9	3.2	0.13
329	1852	1/12/2016	1.6	2.5	0.32	1.9	3.2	0.15
330	1855	1/26/2016	1.8	2.5	0.38	1.7	3.2	0.17
331	1856	2/2/2016	1.4	2.4	0.41	1.6	3.2	0.20
332	1858aro	2/16/2016	2.4	2.4	0.47	1.4	3.3	0.20
333	1858M	2/16/2016	1.5	2.4	0.47	1.4	3.3	0.22
334	1858B	2/16/2016	1.5	2.3	0.51	1.3	3.3	0.24
335	1862	3/8/2016	1.6	2.3	0.54	1.2	3.4	0.25
336	1864	3/22/2016	1.7	2.3	0.56	1.1	3.4	0.26
337	1867	4/5/2016	1.6	2.2	0.57	1.1	3.4	0.26

Raphidocelis subcapitata (formerly *Selenastrum capricornutum*) TEST CONDITIONS

Client: QA / QC

Sample Description: NaCl Reagent Log #: 2B 057 - 08

Test Start Date: 4-5-16 Time: 13:30 Initials: BW

Test End Date: 4-9-16 Time: 15:10 Initials: SW

TEST CONDITIONS AT INITIATION:

Species ID#: RS 803
Age: 4d

Dilution Water ID #: 41338
Source Water: Ream mt
EDTA Added? (Yes) No

INOCULUM (Axenic Culture)		Culture Density = Mean # of Cells/Field x 250,000	
# Cells	# Fields		Culture Density
480	250		
MEAN	1.92	x 250,000 =	480,000

Filtration	0.45 um filter	X
	1.6 um filter	

Test Vol. / Replicate	50 mls
No. of Reps	4
Nutrient Dosage	1 ml per L

Test Start Density x Test Volume / Culture Density = Inoculum Volume
 10,000 x 50 ml / 480,000 = 1.04 ml

Confirming Counts			
	# Cells	# Fields	Cell Conc. x 10 ⁶ (cells/ml)
Flask #1	7	250	0.207
Flask #2	12	250	0.012
Flask #3	9	250	0.009

Light Intensity at Test Initiation (foot-candles)		
Location #1	Location #2	Location #3
365	399	431

Technician	0 hr	<u>BW</u>	24 hr	<u>BW</u>	48 hr	<u>SW</u>	72 hr	<u>SW</u>	96 hr	<u>SW</u>
Time	0 hr	<u>1330</u>	24 hr	<u>0930</u>	48 hr	<u>0940</u>	72 hr	<u>1040</u>	96 hr	<u>1510</u>
Thermometer ID:	0 hr	<u>#159</u>	24 hr	<u>#159</u>	48 hr	<u>#159</u>	72 hr	<u>#159</u>	96 hr	<u>#159</u>

Test Concn. (g/L)	D.O. (mg/L)	pH					Temperature (°C)					Conductivity (umohs/cm)	Hard.	Alk.
		0 hr	24	48	72	96	0 hr	24	48	72	96			
Control	8.1	7.9	7.8	7.7	8.0	8.4	24.7	25.3	25.1	25.1	24.9	325	106	74
0.25	8.2	8.0	7.8	7.7	7.9	8.4	24.7	25.3	25.2	25.0	24.9	853	100	73
0.50	8.4	8.0	7.9	7.8	7.9	8.4	24.8	25.3	25.3	24.9	24.9	1327		
1.0	8.4	8.0	7.9	7.8	8.0	8.3	24.8	25.3	25.2	24.9	24.9	2220	94	72
2.0	8.3	8.1	7.9	7.8	8.0	8.4	24.7	25.3	25.3	24.9	24.9	3980		
4.0	8.3	8.1	7.9	7.9	7.9	8.2	24.7	25.2	25.3	24.9	24.8	7270	88	63

Task Manager: [Signature]
 Project Manager: [Signature]
 QA Officer: [Signature]

Endpoint : Growth
 IC25 : 1.71
 Cusum Chart Limits : 0.68 to 1.25

Comments:

APPENDIX C
CHAIN OF CUSTODY



Batch Number: B3509A

Date Received: 04/04/16

Client/Project: City of Nalaeo

Received By: JR

Were custody seals intact?

Yes No N/A

Packing Material:

Ice Blue Ice Box

Temp OK? (<6C) Therm ID: TH173 Exp. 04/15/16

5.8 °C Yes No N/A

Was a Chain of Custody (CoC) Provided?

Yes No N/A

Was the CoC correctly filled out (If No, document below)

Yes No N/A

Were the sample containers in good condition (not broken or leaking)?

Yes No N/A

Are all samples within 36 hours of collection?

Yes No N/A

Method of Shipment:

Hand Delivered FedEx UPS Greyhound Other: _____ N/A

Sample Exception Report (The following exceptions were noted)

Client was notified on:

Client contact:

Resolution to Exception:



Batch Number: B 3509 B
Client/Project: City of Molalla

Date Received: 4/10/16
Received By: RC

Were custody seals intact?

Yes No N/A

Packing Material:

Ice Blue Ice Box

Temp OK? (<6C) Therm ID: TH173 Exp. 4/15/16

39 °C Yes No N/A

Was a Chain of Custody (CoC) Provided?

Yes No N/A

Was the CoC correctly filled out (If No, document below)

Yes No N/A

Were the sample containers in good condition (not broken or leaking)?

Yes No N/A

Are all samples within 36 hours of collection?

Yes No N/A

Method of Shipment:

Hand Delivered FedEx UPS Greyhound Other: _____ N/A

Sample Exception Report (The following exceptions were noted)

Client was notified on:

Client contact:

Resolution to Exception:



Batch Number: B3509-C
Client/Project: City of Molalla

Date Received: 04/08/16
Received By: JR

Were custody seals intact?

Yes No N/A

Packing Material:

Ice Blue Ice Box

Temp OK? (<6C) Therm ID: TH173 Exp. 04/16

5.9°C Yes No N/A

Was a Chain of Custody (CoC) Provided?

Yes No N/A

Was the CoC correctly filled out (If No, document below)

Yes No N/A

Were the sample containers in good condition (not broken or leaking)?

Yes No N/A

Are all samples within 36 hours of collection?

Yes No N/A

Method of Shipment: Hand Delivered FedEx UPS Greyhound Other: _____ N/A

Sample Exception Report (The following exceptions were noted)

Client was notified on: _____ Client contact: _____

Resolution to Exception: