

APPENDIX E

**First Quarter 2018 Analytical Laboratory
Reports and Validation Reports**

APPENDIX E

TABLE OF CONTENTS

Section No.

- 1 Outfall 002 - 440-206915-1, March 22, 2018, MECx Data Validation Report
- 2 Outfall 002 - 440-206915-1, March 22, 2018, TestAmerica Analytical Report
- 3 Outfall 002 - SM-8C23022, March 22, 2018, Source Molecular Analytical Report
- 4 Outfall 002 - 440-206832-1, March 23, 2018, MECx Data Validation Report
- 5 Outfall 002 - 440-206832-1, March 23, 2018, TestAmerica Analytical Report
- 6 Outfall 002 - 440-206832-2, March 23, 2018, MECx Data Validation Report
- 7 Outfall 002 - 440-206832-2, March 23, 2018, TestAmerica Analytical Report
- 8 Outfall 002 - 440-206832-3; Outfall 009 - 440-206741-3, May 1, 2018, MECx Data Validation Report
- 9 Outfall 002 - 440-206832-3, March 23, 2018, TestAmerica Analytical Report
- 10 Outfall 009 – 440-206580-1, March 21, 2018, MECx Data Validation Report
- 11 Outfall 009 – 440-206580-1, March 21, 2018, TestAmerica Analytical Report
- 12 Outfall 009 - SM-8C23021, March 21, 2018, Source Molecular Analytical Report
- 13 Outfall 009 - 440-206741-1, March 22, 2018, MECx Data Validation Report
- 14 Outfall 009 - 440-206741-1, March 22, 2018, TestAmerica Analytical Report
- 15 Outfall 009 - 440-206741-2, March 22, 2018, MECx Data Validation Report
- 16 Outfall 009 - 440-206741-2, March 22, 2018, TestAmerica Analytical Report
- 17 Outfall 009 - 440-206741-3, March 22, 2018, MECx Data Validation Report
- 18 Outfall 009 - 440-206741-3, March 22, 2018, TestAmerica Analytical Report
- 19 Arroyo Simi – 440-206645-1, March 22, 2018, MECx Data Validation Report
- 20 Arroyo Simi – 440-206645-1, March 22, 2018, TestAmerica Analytical Report
- 21 Arroyo Simi – 440-206645-2, March 22, 2018, MECx Data Validation Report

APPENDIX E

Table of Contents (continued)

Section No.

- 22 Arroyo Simi – 440-206645-2, March 22, 2018, TestAmerica Analytical Report
- 23 Arroyo Simi – 440-206645-4, March 22, 2018, MECx Data Validation Report
- 24 Arroyo Simi – 440-206645-4, March 22, 2018, TestAmerica Analytical Report

- 25 Arroyo Simi – 440-207707-1, March 30, 2018, MECx Data Validation Report
- 26 Arroyo Simi – 440-207707-1, March 30, 2018, TestAmerica Analytical Report

- 27 Arroyo Simi – 440-208369-1, April 06, 2018, MECx Data Validation Report
- 28 Arroyo Simi – 440-208369-1, April 06, 2018, TestAmerica Analytical Report

- 29 Arroyo Simi – 440-208773-1, April 13, 2018, MECx Data Validation Report
- 30 Arroyo Simi – 440-208773-1, April 13, 2018, TestAmerica Analytical Report

- 31 Arroyo Simi – 440-209475-1, April 20, 2018, MECx Data Validation Report
- 32 Arroyo Simi – 440-209475-1, April 20, 2018, TestAmerica Analytical Report

DATA VALIDATION REPORT

Boeing SSFL Outfall 009

SAMPLE DELIVERY GROUP: 440-206741-2

Prepared for
Haley & Aldrich

April 20, 2018

MEC^x, Inc.
8864 Interchange Drive
Houston, Texas 77054

www.mecx.net





TABLE OF CONTENTS

I. INTRODUCTION..... 1

II. Sample Management..... 2

III. EPA METHOD 1613B — Dioxin/Furans..... 6

 III.1. Holding Times 6

 III.2. Instrument Performance 6

 III.2.1. GC Column Performance 6

 III.2.2. Mass Spectrometer Performance..... 6

 III.3. Calibration..... 6

 III.4. Quality Control Samples 6

 III.4.1. Method Blanks 6

 III.4.2. Laboratory Control Samples 7

 III.5. Field QC Samples..... 7

 III.5.1. Field Blanks and Equipment Blanks 7

 III.5.2. Field Duplicates..... 7

 III.6. Internal Standards Performance..... 7

 III.7. Compound Identification..... 7

 III.8. Compound Quantification and Reported Detection Limits 7

IV. EPA METHODS 525.2— Semivolatile Organic Compounds (SVOCs)..... 8

 IV.1. Holding Times 8

 IV.2. GC/MS Tuning and Calibration 8

 IV.3. Quality Control Samples 8

 IV.3.1. Method Blanks..... 8

 IV.3.2. Laboratory Control Samples 8

 IV.3.3. Surrogate Recovery..... 8

 IV.3.4. Matrix Spike/Matrix Spike Duplicate 8

 IV.4. Field QC Samples..... 8



- IV.4.1. Field Blanks and Equipment Blanks 8
- IV.4.2. Field Duplicates 8
- IV.5. Internal Standards Performance..... 9
- IV.6. Compound Identification 9
- IV.7. Compound Quantification and Reported Detection Limits 9
- IV.8. Tentatively Identified Compounds (TICs) 9
- IV.9. System Performance..... 9

- V. VARIOUS METHODS — GENERAL CHEMISTRY 9
 - V.1. Holding Times 9
 - V.2. Calibration..... 9
 - V.3. Quality Control Samples 9
 - V.3.1. Method Blanks 9
 - V.3.2. Laboratory Control Samples 10
 - V.3.3. Laboratory Duplicates..... 10
 - V.3.4. Matrix Spike/Matrix Spike Duplicate 10
 - V.4. Sample Result Verification 10
 - V.5. Field QC Samples..... 10
 - V.5.1. Field Blanks and Equipment Blanks 10
 - V.5.2. Field Duplicates..... 10

TABLES

- 1 – Sample Identification
- 2 – Data Qualifier Reference
- 3 - Reason Code Reference



I. INTRODUCTION

Task Order Title: Boeing SSFL Outfall 009

Contract: 40458-078 and 40458-083

MEC^x Project No.: 1272.003D.01 002

Sample Delivery Group: 440-206741-2

Project Manager: K. Miller

Matrix: Water

QC Level: IV

No. of Samples: 1

No. of Reanalyses/Dilutions: 0

Laboratory: TestAmerica - Irvine

TABLE 1 - SAMPLE IDENTIFICATION

Sample Name	Lab Sample Name	Matrix	Collection	Method
Outfall009_20180322_Comp	440-206741-1	Water	3/22/2018 3:30:00 PM	CALC, E1613B, E525.2, E100.2, EPA-821-R-02-013



II. SAMPLE MANAGEMENT

According to the case narrative, sample condition upon receipt form and the chain-of-custody (COC) provided by the laboratory for sample delivery group (SDG) 440-206741-2:

- The laboratory received samples in this SDG on ice and within the temperature limits of ≤ 6 degrees Celsius ($^{\circ}\text{C}$) and $> 0^{\circ}\text{C}$.
- Field and laboratory personnel signed and dated the COC.
- According to the Login Sample Receipt Checklist, custody seals were absent on the coolers; however, no evidence of tampering was noted.
- The original COC lacked collection times. The samples were logged per the collection times on the sample labels.
- Analysis for chronic toxicity was subcontracted to Aquatic Bioassay and Consulting Laboratories.
- Analysis for asbestos was subcontracted to LA Testing.
- Analysis for dioxins was subcontracted to TA-West Sacramento.



TABLE 2 - DATA QUALIFIER REFERENCE

Qualifier	Organics	Inorganics
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit. For dioxins or PCB congeners, the associated value is the quantitation limit or the estimated detection limit.	The analyte was analyzed for, but was not detected above the reported sample quantitation limit. For perchlorate, the associated value is the sample detection limit or the quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may inaccurate or imprecise.	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may inaccurate or imprecise.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."	Not applicable.
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.	Not applicable.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.	The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.



TABLE 3 - REASON CODE REFERENCE

Reason Code	Organic	Inorganic
H	Holding time was exceeded.	Holding time was exceeded.
S	Surrogate recovery was outside control limits.	Not applicable.
C	Calibration percent relative standard deviation (%RSD) or percent deviation (%D) were noncompliant, or coefficient of determination (r^2) was <0.990.	Correlation coefficient (r) was <0.995.
R	Calibration relative response factor (RRF) was <0.05.	Percent recovery (%R) for calibration was outside control limits.
B	The analyte was detected in an associated blank as well as in the sample.	The analyte was detected in an associated blank as well as in the sample.
L	Laboratory control sample (LCS) or /LCS duplicate (LCSD) %R was outside the control limits.	LCS or LCSD %R was outside the control limits.
L1	LCS/LCSD relative percent difference (RPD) was outside the control limit.	LCS/LCSD RPD was outside the control limit.
Q	Matrix spike/matrix spike duplicate (MS/MSD) %R was outside control limits.	MS or MSD %R was outside the control limit.
Q1	MS/MSD RPD was outside the control limit.	MS/MSD RPD was outside the control limit.
E	Result was reported as an estimated maximum possible concentration (EMPC).	Laboratory duplicate RPD was outside the control limit.
I	Internal standard recovery was outside control limits.	Inductively coupled plasma (ICP) interference check standard (ICSA/ICSAB) result was outside control limits.
I1	Not applicable.	ICP mass spectrometer (ICPMS) internal standard recovery was outside control limits.
A	Not applicable.	Serial dilution %D was outside control limits.
M	Tuning (BFB or DFTPP) was not compliant.	ICPMS tune was not compliant.
T	The analyte was detected in an associated trip blank as well as in the sample.	Not applicable.
+	False positive – reported compound was not present.	False positive – reported compound was not present.
-	False negative – compound was present but not reported.	False negative – compound was present but not reported.



Reason Code	Organic	Inorganic
F	The analyte was detected in an associated field blank (FB) or equipment blank (EB) as well as in the sample.	The analyte was detected in an associated field blank (FB) or equipment blank (EB) as well as in the sample.
F1	Field duplicate RPD was outside the control limit.	Field duplicate RPD was outside the control limit.
§	The reviewer corrected the reported result and/or other information.	The reviewer corrected the reported result and/or other information.
D	The analysis was not used because another more technically sound analysis was available.	The analysis was not used because another more technically sound analysis was available.
P	Instrument performance not compliant.	Post digestion spike recovery was outside of control limits.
DNQ	The reported result is above the method detection limit but is less than the reporting limit.	The reported result is above the method detection limit but is less than the reporting limit.
*II, *III	Other problems identified in the data are described in Section II, "Sample Management," or Section III, "Method Analyses." The number following the asterisk (*) will indicate the report section where a description of the problem can be found.	Other problems identified in the data are described in Section II, "Sample Management," or Section III, "Method Analyses." The number following the asterisk (*) will indicate the report section where a description of the problem can be found.



III. EPA METHOD 1613B — DIOXIN/FURANS

L. Calvin of MEC^x reviewed the SDG on April 20, 2018

The sample listed in Table 1 for this analysis was validated based on the guidelines outlined in the MEC^x *Data Validation Procedure for Dioxins and Furans* (DVP-19, Rev. 0), *USEPA Method 1613B*, and the *National Functional Guidelines Chlorinated Dioxin/Furan Data Review* (2011).

III.1. HOLDING TIMES

Extraction and analytical holding times were met. The water sample was extracted and analyzed within one year of collection.

III.2. INSTRUMENT PERFORMANCE

Instrument performance criteria were met. Following are findings associated with instrument performance:

III.2.1. GC COLUMN PERFORMANCE

A Windows Defining Mix (WDM) containing the first and last eluting congeners of each descriptor and isomer specificity compounds was analyzed prior to the initial calibration sequence and at the beginning of each analytical sequence. The GC column performance in the calibrations was acceptable, with the height of the valley between the closely eluting isomers and 2,3,7,8-TCDD reported as less than 25%.

III.2.2. MASS SPECTROMETER PERFORMANCE

The mass spectrometer performance was acceptable with the static resolving power greater than 10,000.

III.3. CALIBRATION

Calibration criteria were met. The initial calibration was acceptable with %RSDs $\leq 20\%$ for the 15 native compounds (calibration by isotope dilution) and $\leq 35\%$ for the two native and all labeled compounds (calibration by internal standard). The relative retention times and ion abundance ratios were within the Method 1613B control limits for all standards.

Continuing Calibration: Calibration verification (VER) consisted of a mid-level standard (CS3) analyzed at the beginning of the analytical sequence. The VER was acceptable with the concentrations within the acceptance criteria listed in Table 6 of EPA Method 1613B. The ion abundance ratios and relative retention times were within the method control limits.

III.4. QUALITY CONTROL SAMPLES

III.4.1. METHOD BLANKS

The method blank had detects above the EDL and below the reporting limit for all isomers and all totals. Isomer results for the method blank contaminants detected below the reporting limit were qualified as nondetects (U) at the level of contamination based upon professional judgement and the guidance for blank qualification in the National Functional Guidelines for Dioxin Review. The method blank concentration of OCDD was $>10\times$ the sample result above the reporting limit; therefore, the sample result for OCDD was also qualified as a nondetect. The reviewer verified that peaks comprising total detects for HpCDD, HpCDF, HxCDD, and PeCDF in the method blank were the same peaks comprising the totals in sample



Outfall009_20180322_Comp at similar concentrations. The total results were qualified as nondetects (U) at the level of contamination.

III.4.2. LABORATORY CONTROL SAMPLES

Recoveries were within the acceptance criteria listed in Table 6 of Method 1613B, and RPDs were within the laboratory control limit of $\leq 50\%$.

III.5. FIELD QC SAMPLES

MECX^x evaluated field QC samples, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. MECX^x used the remaining detects to evaluate the associated site samples. Findings associated with field QC samples are summarized below:

III.5.1. FIELD BLANKS AND EQUIPMENT BLANKS

Field blank or equipment blank samples were not identified for this SDG.

III.5.2. FIELD DUPLICATES

Field duplicate samples were not identified in this SDG.

III.6. INTERNAL STANDARDS PERFORMANCE

The labeled standard recoveries were within the acceptance criteria listed in Table 7 of Method 1613B.

III.7. COMPOUND IDENTIFICATION

Compound identification was verified. The laboratory analyzed for polychlorinated dioxins/furans by EPA Method 1613B. Isomer 2,3,7,8-TCDF was not detected in the initial analysis of the sample, therefore, confirmation analysis was not required.

III.8. COMPOUND QUANTIFICATION AND REPORTED DETECTION LIMITS

Compound quantitation was verified by recalculating a representative number of sample and LCS results. The laboratory calculated and reported compound-specific detection limits. Detects between the EDL and the RL were qualified as estimated (J) and coded with DNQ to comply with the NPDES permit; however, after qualification for method blank contamination, no detects remained. Nondetects are valid to the EDL. Per client request, results below the EDL meeting retention time and signal to noise (S/N) criteria were to be reported; however, this sample had no reported detects below the EDL.

Following qualification for method blank contamination, isomers reported as estimated maximum possible concentrations (EMPCs) were not detected in the sample of this SDG. Total results for HpCDD and HpCDF each included an EMPC peak; however, the method blank included the same peaks, and the total results were not further qualified for EMPCs, as they were previously qualified as method blank contamination.



IV. EPA METHODS 525.2— SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)

L. Calvin of MEC^x reviewed the SDG on April 20, 2018

The sample listed in Table 1 for this analysis was validated based on the guidelines outlined in the MEC^x *Data Validation Procedure for Semivolatile Organics (DVP-3, Rev. 1)*, *EPA Method 525.2*, and the *National Functional Guidelines for Superfund Organic Methods Data Review (2014)*.

IV.1. HOLDING TIMES

The extraction and analytical holding times were met. The sample was extracted within 24 hours of collection and analyzed within 30 days of extraction.

IV.2. GC/MS TUNING AND CALIBRATION

The DFTPP tunes met the method abundance criteria. The sample was analyzed within 12 hours of the DFTPP injection time.

Calibration criteria were met. The initial calibration average RRFs were ≥ 0.05 and r^2 for applicable target compounds were $\geq 0.990\%$. The continuing calibration RRFs were ≥ 0.05 and recoveries were within the method QC limits of 70-130%.

IV.3. QUALITY CONTROL SAMPLES

IV.3.1. METHOD BLANKS

Target compounds were not detected in the method blank.

IV.3.2. LABORATORY CONTROL SAMPLES

LCS recoveries were within the control limits of 70-130%.

IV.3.3. SURROGATE RECOVERY

Surrogate recoveries were within laboratory control limits of 70-130%.

IV.3.4. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

MS/MSD analyses were performed on the sample in this SDG. The recovery for diazinon in the MSD was below the control limits of 70-130% at 57%; however, as the MS recovery and the RPD were acceptable, qualifications were not assigned for the single recovery outlier. RPDs were within the control limit of $\leq 30\%$.

IV.4. FIELD QC SAMPLES

MEC^x evaluated field QC samples, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. MEC^x used the remaining detects to evaluate the associated site samples. Findings associated with field QC samples are summarized below:

IV.4.1. FIELD BLANKS AND EQUIPMENT BLANKS

Field blank or equipment blank samples were not identified for this SDG.

IV.4.2. FIELD DUPLICATES

Field duplicate samples were not identified in this SDG.

IV.5. INTERNAL STANDARDS PERFORMANCE

The internal standard area counts were within the method control limits established by the continuing calibration standards of $\pm 30\%$ for areas and ± 10 seconds for retention times.

IV.6. COMPOUND IDENTIFICATION

Compound identification was verified. The laboratory analyzed for chlorpyrifos and diazinon by Method 525.2. Review of the sample chromatogram, retention times, and spectra indicated no problems with target compound identification.

IV.7. COMPOUND QUANTIFICATION AND REPORTED DETECTION LIMITS

Compound quantification was verified. The reporting limits were supported by the low point of the initial calibration and the laboratory MDLs. Reported nondetects are valid to the reporting limit.

IV.8. TENTATIVELY IDENTIFIED COMPOUNDS (TICs)

The laboratory did not report TICs for this SDG.

IV.9. SYSTEM PERFORMANCE

Review of the raw data indicated no problems with system performance.

V. VARIOUS METHODS — GENERAL CHEMISTRY

Marcia Hilchey of MEC^x reviewed the SDG on April 11, 2018.

The sample listed in Table 1 for these analyses was validated based on the guidelines outlined in the MEC^x *Data Validation Procedure for General Minerals (DVP-6, Rev. 1)*, *EPA Methods 100.2 and 821-R-02-013*, and *National Functional Guidelines for Inorganic Superfund Data Review (2014)*.

V.1. HOLDING TIMES

The analytical holding time for chronic toxicity, 36 hours, was met. The analytical holding time for asbestos, 48 hours, was not met. The sample was analyzed 7 days after collection. The laboratory subjected the sample to UV and ozonation to minimize bacteriological growth. The reviewer qualified the nondetect result as an estimated nondetect (UJ) as a conservative measure based on professional judgment and the QAPP holding time.

V.2. CALIBRATION

For chronic toxicity, instruments were calibrated as per the manufacturer requirements and standard reference toxicant testing was performed to verify culture health and sensitivity. Method Test Acceptability criteria (TAC) were met. Summaries indicated that asbestos analytical instrument calibrations met requirements.

V.3. QUALITY CONTROL SAMPLES

V.3.1. METHOD BLANKS

The method blank for asbestos had no detects. The chronic toxicity tests met the negative control criteria



of the laboratory and method.

V.3.2. **LABORATORY CONTROL SAMPLES**

Laboratory control samples are not applicable to these methods. The positive control criteria were met for the chronic toxicity test.

V.3.3. **LABORATORY DUPLICATES**

Laboratory duplicate analyses were not performed on the sample in this SDG.

V.3.4. **MATRIX SPIKE/MATRIX SPIKE DUPLICATE**

MS/MSD analyses are not applicable to these methods.

V.4. **SAMPLE RESULT VERIFICATION**

The sample results reported on the summary reports were verified against the raw data. No transcription errors or calculation errors were noted.

The required 0.2 MFL analytical sensitivity was not reached for asbestos due to excessive particulates. The reported analytical sensitivity for asbestos was 1.0 MFL.

Due to the initial test result of 35.62% effect on the undiluted sample, the laboratory initiated TIE procedures for the *Selenastrum capricornutum*. The initial TIE observation was 8.12% effect. This indicates that the initial observed toxicity was most likely caused by volatile substances that dissipate rendering the sample less toxic. Although the initial growth determination fails, the sample passes the permit TIE limitation of $\geq 50\%$. No further TIE manipulation was performed. The sample passed the *Ceriodaphnia dubia* and *Pimephales promelas* growth and reproduction tests.

V.5. **FIELD QC SAMPLES**

MEC^X evaluated field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. MEC^X used the remaining detects to evaluate the associated site sample. Findings associated with field QC samples are summarized below.

V.5.1. **FIELD BLANKS AND EQUIPMENT BLANKS**

Field blank or equipment blank samples were not identified for this SDG.

V.5.2. **FIELD DUPLICATES**

Field duplicate samples were not identified in this SDG.

Validated Sample Result Forms: 4402067412

Analysis Method E1613B

Sample Name Outfall009_20180322_Comp **Matrix Type:** WM **Result Type:** TRG

Sample Date: 3/22/2018 3:30:00 PM **Validation Level:** 8

Lab Sample Name: 440-206741-1

Analyte	Fraction:	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	N	39001-02-0	0.000016	0.00010	0.00000047	ug/L	J,DXMB	U	B
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	N	3268-87-9	0.00020	0.00010	0.00000042	ug/L	MB	U	B
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	N	67562-39-4	0.0000041	0.000050	0.00000040	ug/L	J,DXMB	U	B
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	N	35822-46-9	0.000017	0.000050	0.00000049	ug/L	J,DXMB	U	B
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	N	55673-89-7		0.000050	0.00000051	ug/L	U	U	
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	N	70648-26-9		0.000050	0.00000081	ug/L	U	U	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	N	39227-28-6	0.0000022	0.000050	0.00000044	ug/L	J,DXMB	U	B
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	N	57117-44-9		0.000050	0.00000080	ug/L	U	U	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	N	57653-85-7	0.0000014	0.000050	0.00000041	ug/L	J,DXMB	U	B
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	N	72918-21-9		0.000050	0.00000049	ug/L	U	U	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	N	19408-74-3	0.00000095	0.000050	0.00000040	ug/L	J,DXMB	U	B
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	N	57117-41-6		0.000050	0.00000042	ug/L	U	U	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	N	40321-76-4		0.000050	0.00000051	ug/L	U	U	
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	N	60851-34-5		0.000050	0.00000058	ug/L	U	U	
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	N	57117-31-4		0.000050	0.00000046	ug/L	U	U	
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	N	51207-31-9		0.000010	0.00000038	ug/L	U	U	
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	N	1746-01-6		0.000010	0.00000040	ug/L	U	U	
Total Heptachlorodibenzofuran (HpCDF)	N	38998-75-3	0.0000096	0.000050	0.00000046	ug/L	J,DXMB	U	B
Total Heptachlorodibenzo-p-dioxin (HpCDD)	N	37871-00-4	0.000038	0.000050	0.00000049	ug/L	J,DXMB	U	B
Total Hexachlorodibenzofuran (HxCDF)	N	55684-94-1		0.000050	0.00000049	ug/L	U	U	
Total Hexachlorodibenzo-p-dioxin (HxCDD), Mixture	N	34465-46-8	0.0000055	0.000050	0.00000042	ug/L	J,DXMB	U	B

Analysis Method E1613B

Total Pentachlorodibenzofuran (PeCDF)	N	30402-15-4	0.00000056	0.000050	0.00000044	ug/L	J,DXqMB	U	B
Total Pentachlorodibenzo-p-dioxin (PeCDD)	N	36088-22-9		0.000050	0.00000051	ug/L	U	U	
Total Tetrachlorodibenzofuran (TCDF)	N	55722-27-5		0.000010	0.00000038	ug/L	U	U	
Total Tetrachlorodibenzo-p-dioxin (TCDD)	N	41903-57-5		0.000010	0.00000040	ug/L	U	U	

Analysis Method E525.2

Sample Name Outfall009_20180322_Comp **Matrix Type:** WM **Result Type:** TRG

Sample Date: 3/22/2018 3:30:00 PM **Validation Level:** 8

Lab Sample Name: 440-206741-2

Analyte	Fraction:	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
Chlorpyrifos	N	2921-88-2		6.9		ng/L	U	U	
Diazinon	N	333-41-5		5.2		ng/L	U	U	

Analysis Method EPA100.2

Sample Name Outfall009_20180322_Comp **Matrix Type:** WM **Result Type:** TRG

Sample Date: 3/22/2018 3:30:00 PM **Validation Level:** 8

Lab Sample Name: 440-206741-2

Analyte	Fraction:	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
Asbestos	N	1332-21-4		1.00		MFL	U	UJ	H

Analysis Method EPA-821-R-02-013

Sample Name Outfall009_20180322_Comp **Matrix Type:** WM **Result Type:** TRG

Sample Date: 3/22/2018 3:30:00 PM **Validation Level:** 8

Lab Sample Name: 440-206741-2

Analyte	Fraction:	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
Chronic Toxicity, Selenastrum	N	CHRTOXSELEN A	8.12			% effect			
Chronic Toxicity, Selenastrum	N	CHRTOXSELEN A	35.62			% effect			

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Irvine

17461 Derian Ave

Suite 100

Irvine, CA 92614-5817

Tel: (949)261-1022

TestAmerica Job ID: 440-206741-2

Client Project/Site: Annual Outfall 009 Comp

For:

Haley & Aldrich, Inc.

400 E Van Buren St.

Suite 545

Phoenix, Arizona 85004

Attn: Katherine Miller



Authorized for release by:

4/18/2018 6:43:44 PM

Urvashi Patel, Manager of Project Management

(949)261-1022

urvashi.patel@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

I certify under penalty of perjury that the information contained in this report and all attachments was produced in accordance with the indicated methods and laboratory standard operating procedures, except as noted, and are complete and accurate to the best of my knowledge and belief. Subcontract laboratory reports that are attached have been evaluated for completeness and quality control acceptability.



Urvashi Patel
Manager of Project Management
4/18/2018 6:43:44 PM



Table of Contents

Cover Page	1
Table of Contents	3
Sample Summary	4
Case Narrative	5
Client Sample Results	6
Method Summary	8
Lab Chronicle	9
QC Sample Results	10
QC Association Summary	14
Definitions/Glossary	15
Certification Summary	16
Subcontract Data	17
Chain of Custody	87
Receipt Checklists	93
Isotope Dilution Summary	95
Field Data Sheets	97

Sample Summary

Client: Haley & Aldrich, Inc.
Project/Site: Annual Outfall 009 Comp

TestAmerica Job ID: 440-206741-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
440-206741-1	Outfall009_20180322_Comp	Water	03/22/18 15:30	03/22/18 20:00

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

Case Narrative

Client: Haley & Aldrich, Inc.
Project/Site: Annual Outfall 009 Comp

TestAmerica Job ID: 440-206741-2

Job ID: 440-206741-2

Laboratory: TestAmerica Irvine

Narrative

Job Narrative 440-206741-2

Comments

No additional comments.

Receipt

The samples were received on 3/22/2018 8:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 5 coolers at receipt time were 2.1° C, 2.1° C, 2.3° C, 3.5° C and 3.6° C.

Dioxin

Method(s) 1613B: EPA Method 1613B specifies a +/- 15 second retention time difference between the recovery standard in the initial calibration (ICAL) and the continuing calibration verification (CCV). The 13C-1,2,3,7,8,9-HxCDD associated with the following samples run on instrument 10D5 exceeded this criteria: Outfall009_20180322_Comp (440-206741-1), (CCV 320-215705/2), (LCS 320-215317/2-A), (LCSD 320-215317/3-A) and (MB 320-215317/1-A). This retention time shift is due to normal and reasonable column maintenance and does not affect the instrument chromatography resolution, sensitivity, or identification of target analytes. System retention times have been updated for proper analyte identification.

Method(s) 1613B: EPA Method 1613B specifies a +/- 15 second retention time difference between the recovery standard in the initial calibration (ICAL) and the continuing calibration verification (CCV). The 13C-1,2,3,4-TCDD associated with the following samples run on instrument 11D2 exceeded this criteria: (CCV 320-215889/2) and (MB 320-215317/1-A). This retention time shift is due to normal and reasonable column maintenance and does not affect the instrument chromatography resolution, sensitivity, or identification of target analytes. System retention times have been updated for proper analyte identification.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Subcontract non-Sister

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Dioxin Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Subcontract Work

Methods Ceriodaphnia, Chronic-Selenestrum, Fathead Larvae: These methods were subcontracted to Aquatic Bioassay - Ventura, CA. The subcontract laboratory certifications are different from that of the facility issuing the final report.

Method Asbestos 100.2: This method was subcontracted to LA Testing. The subcontract laboratory certification is different from that of the facility issuing the final report.

Method Weck-525.2-Diazinon and Chlorpyrifos: This method was subcontracted to Weck Laboratories, Inc.. The subcontract laboratory certification is different from that of the facility issuing the final report.

Client Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Annual Outfall 009 Comp

TestAmerica Job ID: 440-206741-2

Client Sample ID: Outfall009_20180322_Comp

Lab Sample ID: 440-206741-1

Date Collected: 03/22/18 15:30

Matrix: Water

Date Received: 03/22/18 20:00

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000010	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
2,3,7,8-TCDF	ND		0.000010	0.0000003	ug/L		03/29/18 07:29	03/30/18 19:34	1
1,2,3,7,8-PeCDD	ND		0.000050	0.0000005	ug/L		03/29/18 07:29	03/30/18 19:34	1
1,2,3,7,8-PeCDF	ND		0.000050	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
2,3,4,7,8-PeCDF	ND		0.000050	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
1,2,3,4,7,8-HxCDD	0.0000022	J,DX MB	0.000050	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
1,2,3,6,7,8-HxCDD	0.0000014	J,DX MB	0.000050	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
1,2,3,7,8,9-HxCDD	0.00000095	J,DX MB	0.000050	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
1,2,3,4,7,8-HxCDF	ND		0.000050	0.0000008	ug/L		03/29/18 07:29	03/30/18 19:34	1
1,2,3,6,7,8-HxCDF	ND		0.000050	0.0000008	ug/L		03/29/18 07:29	03/30/18 19:34	1
1,2,3,7,8,9-HxCDF	ND		0.000050	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
2,3,4,6,7,8-HxCDF	ND		0.000050	0.0000005	ug/L		03/29/18 07:29	03/30/18 19:34	1
1,2,3,4,6,7,8-HpCDD	0.000017	J,DX MB	0.000050	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
1,2,3,4,6,7,8-HpCDF	0.0000041	J,DX MB	0.000050	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
1,2,3,4,7,8,9-HpCDF	ND		0.000050	0.0000005	ug/L		03/29/18 07:29	03/30/18 19:34	1
OCDD	0.00020	MB	0.00010	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
OCDF	0.000016	J,DX MB	0.00010	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
Total TCDD	ND		0.000010	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
Total TCDF	ND		0.000010	0.0000003	ug/L		03/29/18 07:29	03/30/18 19:34	1
Total PeCDD	ND		0.000050	0.0000005	ug/L		03/29/18 07:29	03/30/18 19:34	1
Total PeCDF	0.00000056	J,DX q MB	0.000050	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
Total HxCDD	0.0000055	J,DX MB	0.000050	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
Total HxCDF	ND		0.000050	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
Total HpCDD	0.000038	J,DX MB	0.000050	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
Total HpCDF	0.0000096	J,DX MB	0.000050	0.0000004	ug/L		03/29/18 07:29	03/30/18 19:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDD	83		25 - 164				03/29/18 07:29	03/30/18 19:34	1
13C-2,3,7,8-TCDF	80		24 - 169				03/29/18 07:29	03/30/18 19:34	1
13C-1,2,3,7,8-PeCDD	77		25 - 181				03/29/18 07:29	03/30/18 19:34	1
13C-1,2,3,7,8-PeCDF	78		24 - 185				03/29/18 07:29	03/30/18 19:34	1

TestAmerica Irvine

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Annual Outfall 009 Comp

TestAmerica Job ID: 440-206741-2

Client Sample ID: Outfall009_20180322_Comp

Lab Sample ID: 440-206741-1

Date Collected: 03/22/18 15:30

Matrix: Water

Date Received: 03/22/18 20:00

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C-2,3,4,7,8-PeCDF	79		21 - 178	03/29/18 07:29	03/30/18 19:34	1
13C-1,2,3,4,7,8-HxCDD	79		32 - 141	03/29/18 07:29	03/30/18 19:34	1
13C-1,2,3,6,7,8-HxCDD	83		28 - 130	03/29/18 07:29	03/30/18 19:34	1
13C-1,2,3,4,7,8-HxCDF	74		26 - 152	03/29/18 07:29	03/30/18 19:34	1
13C-1,2,3,6,7,8-HxCDF	76		26 - 123	03/29/18 07:29	03/30/18 19:34	1
13C-1,2,3,7,8,9-HxCDF	74		29 - 147	03/29/18 07:29	03/30/18 19:34	1
13C-2,3,4,6,7,8-HxCDF	73		28 - 136	03/29/18 07:29	03/30/18 19:34	1
13C-1,2,3,4,6,7,8-HpCDD	73		23 - 140	03/29/18 07:29	03/30/18 19:34	1
13C-1,2,3,4,6,7,8-HpCDF	75		28 - 143	03/29/18 07:29	03/30/18 19:34	1
13C-1,2,3,4,7,8,9-HpCDF	73		26 - 138	03/29/18 07:29	03/30/18 19:34	1
13C-OCDD	66		17 - 157	03/29/18 07:29	03/30/18 19:34	1
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	103		35 - 197	03/29/18 07:29	03/30/18 19:34	1

Method Summary

Client: Haley & Aldrich, Inc.
Project/Site: Annual Outfall 009 Comp

TestAmerica Job ID: 440-206741-2

Method	Method Description	Protocol	Laboratory
1613B	Dioxins and Furans (HRGC/HRMS)	40CFR136A	TAL SAC
100.2	EPA 100.2 Asbestos in Drinking Water	EPA	LA Testing
EPA	Bioassay	EPA	ABC
Subcontract	Weck-525.2-Diazinon and Chlorpyrifos	None	Weck Lab
1613B	Separatory Funnel (L/L) Extraction with Soxhlet Extraction of Dioxin and Furans	40CFR136A	TAL SAC

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.
EPA = US Environmental Protection Agency
None = None

Laboratory References:

ABC = Aquatic Bioassay - Ventura, CA, 29 North Olive Street, Ventura, CA 93001
LA Testing = LA Testing, 520 Mission Street, South Pasadena, CA 91030
TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600
Weck Lab = Weck Laboratories, Inc., 14859 East Clark Avenue, City of Industry, CA 917451396

Lab Chronicle

Client: Haley & Aldrich, Inc.
Project/Site: Annual Outfall 009 Comp

TestAmerica Job ID: 440-206741-2

Client Sample ID: Outfall009_20180322_Comp

Lab Sample ID: 440-206741-1

Date Collected: 03/22/18 15:30

Matrix: Water

Date Received: 03/22/18 20:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			990.5 mL	20.0 uL	215317	03/29/18 07:29	KQT	TAL SAC
Total/NA	Analysis	1613B		1			215705	03/30/18 19:34	ALM	TAL SAC

Laboratory References:

ABC = Aquatic Bioassay - Ventura, CA, 29 North Olive Street, Ventura, CA 93001

LA Testing = LA Testing, 520 Mission Street, South Pasadena, CA 91030

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Weck Lab = Weck Laboratories, Inc., 14859 East Clark Avenue, City of Industry, CA 917451396

QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Annual Outfall 009 Comp

TestAmerica Job ID: 440-206741-2

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: MB 320-215317/1-A
Matrix: Water
Analysis Batch: 215705

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 215317

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C-2,3,4,7,8-PeCDF	81		21 - 178	03/29/18 07:29	03/30/18 15:44	1
13C-1,2,3,4,7,8-HxCDD	80		32 - 141	03/29/18 07:29	03/30/18 15:44	1
13C-1,2,3,6,7,8-HxCDD	85		28 - 130	03/29/18 07:29	03/30/18 15:44	1
13C-1,2,3,4,7,8-HxCDF	73		26 - 152	03/29/18 07:29	03/30/18 15:44	1
13C-1,2,3,6,7,8-HxCDF	76		26 - 123	03/29/18 07:29	03/30/18 15:44	1
13C-1,2,3,7,8,9-HxCDF	75		29 - 147	03/29/18 07:29	03/30/18 15:44	1
13C-2,3,4,6,7,8-HxCDF	73		28 - 136	03/29/18 07:29	03/30/18 15:44	1
13C-1,2,3,4,6,7,8-HpCDD	72		23 - 140	03/29/18 07:29	03/30/18 15:44	1
13C-1,2,3,4,6,7,8-HpCDF	74		28 - 143	03/29/18 07:29	03/30/18 15:44	1
13C-1,2,3,4,7,8,9-HpCDF	72		26 - 138	03/29/18 07:29	03/30/18 15:44	1
13C-OCDD	65		17 - 157	03/29/18 07:29	03/30/18 15:44	1
Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
37Cl4-2,3,7,8-TCDD	104		35 - 197	03/29/18 07:29	03/30/18 15:44	1

Lab Sample ID: LCS 320-215317/2-A
Matrix: Water
Analysis Batch: 215705

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 215317

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec.	Limits
2,3,7,8-TCDF	0.000200	0.000191	MB	ug/L		95	75 - 158	
1,2,3,7,8-PeCDD	0.00100	0.00106	MB	ug/L		106	70 - 142	
1,2,3,7,8-PeCDF	0.00100	0.000966	MB	ug/L		97	80 - 134	
2,3,4,7,8-PeCDF	0.00100	0.000971	MB	ug/L		97	68 - 160	
1,2,3,4,7,8-HxCDD	0.00100	0.000953	MB	ug/L		95	70 - 164	
1,2,3,6,7,8-HxCDD	0.00100	0.000888	MB	ug/L		89	76 - 134	
1,2,3,7,8,9-HxCDD	0.00100	0.000942	MB	ug/L		94	64 - 162	
1,2,3,4,7,8-HxCDF	0.00100	0.000962	MB	ug/L		96	72 - 134	
1,2,3,6,7,8-HxCDF	0.00100	0.000970	MB	ug/L		97	84 - 130	
1,2,3,7,8,9-HxCDF	0.00100	0.000961	MB	ug/L		96	78 - 130	
2,3,4,6,7,8-HxCDF	0.00100	0.000983	MB	ug/L		98	70 - 156	
1,2,3,4,6,7,8-HpCDD	0.00100	0.00102	MB	ug/L		102	70 - 140	
1,2,3,4,6,7,8-HpCDF	0.00100	0.000935	MB	ug/L		94	82 - 122	
1,2,3,4,7,8,9-HpCDF	0.00100	0.000920	MB	ug/L		92	78 - 138	
OCDD	0.00200	0.00185	MB	ug/L		92	78 - 144	
OCDF	0.00200	0.00181	MB	ug/L		91	63 - 170	
Isotope Dilution	LCS LCS		Limits					
	%Recovery	Qualifier						
13C-2,3,7,8-TCDD	81		20 - 175					
13C-2,3,7,8-TCDF	80		22 - 152					
13C-1,2,3,7,8-PeCDD	78		21 - 227					
13C-1,2,3,7,8-PeCDF	79		21 - 192					
13C-2,3,4,7,8-PeCDF	81		13 - 328					
13C-1,2,3,4,7,8-HxCDD	80		21 - 193					
13C-1,2,3,6,7,8-HxCDD	85		25 - 163					
13C-1,2,3,4,7,8-HxCDF	75		19 - 202					
13C-1,2,3,6,7,8-HxCDF	76		21 - 159					

TestAmerica Irvine

QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Annual Outfall 009 Comp

TestAmerica Job ID: 440-206741-2

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: LCS 320-215317/2-A
Matrix: Water
Analysis Batch: 215705

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 215317

<i>Isotope Dilution</i>	LCS LCS		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C-1,2,3,7,8,9-HxCDF	77		17 - 205
13C-2,3,4,6,7,8-HxCDF	74		22 - 176
13C-1,2,3,4,6,7,8-HpCDD	73		26 - 166
13C-1,2,3,4,6,7,8-HpCDF	78		21 - 158
13C-1,2,3,4,7,8,9-HpCDF	74		20 - 186
13C-OCDD	67		13 - 199
LCS LCS			
<i>Surrogate</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
37Cl4-2,3,7,8-TCDD	104		31 - 191

Lab Sample ID: LCSD 320-215317/3-A
Matrix: Water
Analysis Batch: 215705

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 215317

<i>Analyte</i>	<i>Spike Added</i>	<i>LCSD Result</i>	<i>LCSD Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	%Rec.		<i>RPD</i>	<i>Limit</i>
							<i>Limits</i>	<i>RPD</i>		
2,3,7,8-TCDD	0.000200	0.000197	MB	ug/L		99	67 - 158	0	50	
2,3,7,8-TCDF	0.000200	0.000188	MB	ug/L		94	75 - 158	1	50	
1,2,3,7,8-PeCDD	0.00100	0.00108	MB	ug/L		108	70 - 142	1	50	
1,2,3,7,8-PeCDF	0.00100	0.000964	MB	ug/L		96	80 - 134	0	50	
2,3,4,7,8-PeCDF	0.00100	0.000972	MB	ug/L		97	68 - 160	0	50	
1,2,3,4,7,8-HxCDD	0.00100	0.000967	MB	ug/L		97	70 - 164	1	50	
1,2,3,6,7,8-HxCDD	0.00100	0.000905	MB	ug/L		91	76 - 134	2	50	
1,2,3,7,8,9-HxCDD	0.00100	0.000831	MB	ug/L		83	64 - 162	13	50	
1,2,3,4,7,8-HxCDF	0.00100	0.000969	MB	ug/L		97	72 - 134	1	50	
1,2,3,6,7,8-HxCDF	0.00100	0.000982	MB	ug/L		98	84 - 130	1	50	
1,2,3,7,8,9-HxCDF	0.00100	0.000954	MB	ug/L		95	78 - 130	1	50	
2,3,4,6,7,8-HxCDF	0.00100	0.000976	MB	ug/L		98	70 - 156	1	50	
1,2,3,4,6,7,8-HpCDD	0.00100	0.00102	MB	ug/L		102	70 - 140	0	50	
1,2,3,4,6,7,8-HpCDF	0.00100	0.000965	MB	ug/L		97	82 - 122	3	50	
1,2,3,4,7,8,9-HpCDF	0.00100	0.000912	MB	ug/L		91	78 - 138	1	50	
OCDD	0.00200	0.00195	MB	ug/L		98	78 - 144	5	50	
OCDF	0.00200	0.00168	MB	ug/L		84	63 - 170	8	50	

<i>Isotope Dilution</i>	LCSD LCSD		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C-2,3,7,8-TCDD	81		20 - 175
13C-2,3,7,8-TCDF	79		22 - 152
13C-1,2,3,7,8-PeCDD	78		21 - 227
13C-1,2,3,7,8-PeCDF	79		21 - 192
13C-2,3,4,7,8-PeCDF	81		13 - 328
13C-1,2,3,4,7,8-HxCDD	95		21 - 193
13C-1,2,3,6,7,8-HxCDD	98		25 - 163
13C-1,2,3,4,7,8-HxCDF	92		19 - 202
13C-1,2,3,6,7,8-HxCDF	95		21 - 159
13C-1,2,3,7,8,9-HxCDF	65		17 - 205
13C-2,3,4,6,7,8-HxCDF	90		22 - 176
13C-1,2,3,4,6,7,8-HpCDD	78		26 - 166
13C-1,2,3,4,6,7,8-HpCDF	61		21 - 158
13C-1,2,3,4,7,8,9-HpCDF	76		20 - 186

TestAmerica Irvine

QC Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Annual Outfall 009 Comp

TestAmerica Job ID: 440-206741-2

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: LCSD 320-215317/3-A
Matrix: Water
Analysis Batch: 215705

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 215317

	LCSD	LCSD	
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
13C-OCDD	78		13 - 199

	LCSD	LCSD	
<i>Surrogate</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
37Cl4-2,3,7,8-TCDD	104		31 - 191

Method: 1613B - Dioxins and Furans (HRGC/HRMS) - RA

Lab Sample ID: MB 320-215317/1-A
Matrix: Water
Analysis Batch: 215889

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 215317

<i>Analyte</i>	<i>MB</i>	<i>MB</i>							
	<i>Result</i>	<i>Qualifier</i>	<i>RL</i>	<i>EDL</i>	<i>Unit</i>	<i>D</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
2,3,7,8-TCDF - RA	0.00000285	J,DX	0.000010	0.0000004	ug/L	-	03/29/18 07:29	04/02/18 12:53	1
				8					

	MB	MB			
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>
13C-2,3,7,8-TCDF - RA	74		24 - 169	03/29/18 07:29	04/02/18 12:53

	MB	MB			
<i>Surrogate</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>
37Cl4-2,3,7,8-TCDD - RA	92		35 - 197	03/29/18 07:29	04/02/18 12:53

QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: Annual Outfall 009 Comp

TestAmerica Job ID: 440-206741-2

Specialty Organics

Prep Batch: 215317

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-206741-1	Outfall009_20180322_Comp	Total/NA	Water	1613B	
MB 320-215317/1-A	Method Blank	Total/NA	Water	1613B	
MB 320-215317/1-A - RA	Method Blank	Total/NA	Water	1613B	
LCS 320-215317/2-A	Lab Control Sample	Total/NA	Water	1613B	
LCSD 320-215317/3-A	Lab Control Sample Dup	Total/NA	Water	1613B	

Analysis Batch: 215705

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-206741-1	Outfall009_20180322_Comp	Total/NA	Water	1613B	215317
MB 320-215317/1-A	Method Blank	Total/NA	Water	1613B	215317
LCS 320-215317/2-A	Lab Control Sample	Total/NA	Water	1613B	215317
LCSD 320-215317/3-A	Lab Control Sample Dup	Total/NA	Water	1613B	215317

Analysis Batch: 215889

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-215317/1-A - RA	Method Blank	Total/NA	Water	1613B	215317

Definitions/Glossary

Client: Haley & Aldrich, Inc.
Project/Site: Annual Outfall 009 Comp

TestAmerica Job ID: 440-206741-2

Qualifiers

Dioxin

Qualifier	Qualifier Description
J,DX	Estimated value; value < lowest standard (MQL), but >than MDL
MB	Analyte present in the method blank
q	The reported result is the estimated maximum possible concentration of this analyte, quantitated using the theoretical ion ratio. The measured ion ratio does not meet qualitative identification criteria and indicates a possible interference.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Annual Outfall 009 Comp

TestAmerica Job ID: 440-206741-2

Laboratory: TestAmerica Irvine

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	CA ELAP 2706	06-30-18

Laboratory: TestAmerica Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-18
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Illinois	NELAP	5	200060	03-17-19
Kansas	NELAP	7	E-10375	10-31-18
L-A-B	DoD ELAP		L2468	01-20-21
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-14-18 *
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-18 *
New Jersey	NELAP	2	CA005	06-30-18
New York	NELAP	2	11666	03-31-19
Oregon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-19
Texas	NELAP	6	T104704399	05-31-18
US Fish & Wildlife	Federal		LE148388-0	07-31-18
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-19
Virginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-18
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Work Orders: 8C23035

Project: 440-206741-1

Attn: Urvashi Patel

Client: TestAmerica - Irvine CA
17461 Derian Ave, Suite 100
Irvine, CA 92614

Report Date: 4/05/2018
Received Date: 3/23/2018
Turnaround Time: 7 workdays
Phones: (949) 261-1022
Fax: (949) 260-3297
P.O. #:
Billing Code:

Dear Urvashi Patel,

Enclosed are the results of analyses for samples received 3/23/18 with the Chain-of-Custody document. The samples were received in good condition, at 2.1 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Sample Results

Sample: Outfall009_20180322_Comp (440-206741-1) 8C23035-01 (Water) Sampled: 03/22/18 0:01 by Client

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Method: EPA 525.2M	Batch ID: W8C1385	Instr: GCMS13	Prepared: 03/23/18 09:40	Analyst: EFC			
Chlorpyrifos	ND	6.9	10	ng/l	1	03/30/18 22:52	
Diazinon	ND	5.2	10	ng/l	1	03/30/18 22:52	
<i>Surrogate(s)</i>							
1,3-Dimethyl-2-nitrobenzene	97%		76-128	Conc: 485		03/30/18 22:52	
Triphenyl phosphate	143%		40-163	Conc: 713		03/30/18 22:52	



WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Quality Control Results

Semivolatile Organics - Low Level by Tandem GC/MS/MS

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	Limit	RPD	Limit	Qualifier
Blank (W8C1385-BLK1)					Prepared: 03/23/18 Analyzed: 03/30/18						
Chlorpyrifos	ND	6.9	10	ng/l							
Diazinon	ND	5.2	10	ng/l							
<i>Surrogate(s)</i>											
1,3-Dimethyl-2-nitrobenzene			339	ng/l	500		68	76-128			S-11
Triphenyl phosphate			506	ng/l	500		101	40-163			
LCS (W8C1385-BS1)					Prepared: 03/23/18 Analyzed: 03/30/18						
Chlorpyrifos	41.0	6.9	10	ng/l	50.0		82	37-169			
Diazinon	30.9	5.2	10	ng/l	50.0		62	43-152			
<i>Surrogate(s)</i>											
1,3-Dimethyl-2-nitrobenzene			357	ng/l	500		71	76-128			S-11
Triphenyl phosphate			499	ng/l	500		100	40-163			
Matrix Spike (W8C1385-MS1)					Source: 8C22030-01		Prepared: 03/23/18 Analyzed: 03/30/18				
Chlorpyrifos	62.2	6.9	10	ng/l	50.0	ND	124	37-168			
Diazinon	55.2	5.2	10	ng/l	50.0	ND	110	36-153			
<i>Surrogate(s)</i>											
1,3-Dimethyl-2-nitrobenzene			467	ng/l	500		93	76-128			
Triphenyl phosphate			600	ng/l	500		120	40-163			
Matrix Spike (W8C1385-MS2)					Source: 8C23035-01		Prepared: 03/23/18 Analyzed: 03/30/18				
Chlorpyrifos	72.3	6.9	10	ng/l	50.0	ND	145	37-168			
Diazinon	70.3	5.2	10	ng/l	50.0	ND	141	36-153			
<i>Surrogate(s)</i>											
1,3-Dimethyl-2-nitrobenzene			463	ng/l	500		93	76-128			S-11
Triphenyl phosphate			760	ng/l	500		152	40-163			
Matrix Spike Dup (W8C1385-MSD1)					Source: 8C22030-01		Prepared: 03/23/18 Analyzed: 03/30/18				
Chlorpyrifos	75.9	6.9	10	ng/l	50.0	ND	152	37-168	20	30	
Diazinon	61.1	5.2	10	ng/l	50.0	ND	122	36-153	10	30	
<i>Surrogate(s)</i>											
1,3-Dimethyl-2-nitrobenzene			458	ng/l	500		92	76-128			
Triphenyl phosphate			777	ng/l	500		155	40-163			S-11
Matrix Spike Dup (W8C1385-MSD2)					Source: 8C23035-01		Prepared: 03/23/18 Analyzed: 03/30/18				
Chlorpyrifos	71.9	6.9	10	ng/l	50.0	ND	144	37-168	0.6	30	
Diazinon	56.9	5.2	10	ng/l	50.0	ND	114	36-153	21	30	
<i>Surrogate(s)</i>											
1,3-Dimethyl-2-nitrobenzene			496	ng/l	500		99	76-128			
Triphenyl phosphate			759	ng/l	500		152	40-163			



WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Notes and Definitions

Item	Definition
S-11	Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
 An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
 All results are expressed on wet weight basis unless otherwise specified.
 All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

Reviewed by:



Regina Giancola
Project Manager



DoD-ELAP #L2457 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • ISO 17025 #L2457.01 • LACSD #10143 • NJ-DEP #CA015

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.



LA Testing

520 Mission Street South Pasadena, CA 91030
Phone/Fax: (323) 254-9960 / (323) 254-9982
<http://www.LATesting.com> / pasadenalab@latesting.com

LA Testing Order ID: 321806893
Customer ID: TEST72
Customer PO: 44009879
Project ID:

Attn: Urvashi Patel Phone: (949) 261-1022
TestAmerica - Irvine, CA Fax: (949) 260-3297
17461 Derian Avenue Collected: 03/22/2018
Suite 100 Received: 03/24/2018
Irvine, CA 92614 Analyzed: 04/02/2018
Proj: 44009879 /440-120425.1/ 440-206741-1/ Boeing NPDES SSFL outfalls

Test Report: Determination of Asbestos Structures >10µm in Drinking Water Performed by the 100.2 Method (EPA 600/R-94/134)

Sample ID Client / EMSL	Sample Filtration Date/Time	Original Sample Vol. Filtered (ml)	Effective Filter Area (mm ²)	Area Analyzed (mm ²)	ASBESTOS				
					Asbestos Types	Fibers Detected	Analytical Sensitivity	Concentration MFL (million fibers per liter)	Confidence Limits
Outfall 009_20180322_Com p (440-206741-1) 321806893-0001	3/29/2018 02:05 PM	5	1288	0.2580	None Detected	ND	1.00	<1.00	0.00 - 3.70
Due to excessive particulate the analytical sensitivity of 0.2 MFL as required by the method was not reached.									
Sample ozonated prior to analysis due to lab receipt time exceeding 48hr method hold time.									

Analyst(s)
Sherrie Ahmad (1)

Jerry Drapala Ph.D, Laboratory Manager
or Other Approved Signatory

Any questions please contact Jerry Drapala.

Initial report from: 04/02/2018 12:52:24

Sample collection and containers provided by the client, acceptable bottle blank level is defined as ≤0.01MFL>10µm. ND=None Detected. This report relates only to those items tested. This report may not be reproduced, except in full, without written permission by LA Testing. Samples received in good condition unless otherwise noted.

Samples analyzed by LA Testing South Pasadena, CA CA ELAP 2283

April 17, 2018

Ms. Urvashi Patel
TestAmerica Irvine
17461 Derian Avenue, Suite 100
Irvine, CA 92614

Dear Ms. Patel:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms EPA-821-R-02-013.* Results were as follows:

CLIENT:	TestAmerica Irvine
SAMPLE I.D.:	Outfall 009
DATE RECEIVED:	23 March - 18
ABC LAB. NO.:	TAM0318.263

CHRONIC FATHEAD LARVAE SURVIVAL & GROWTH BIOASSAY

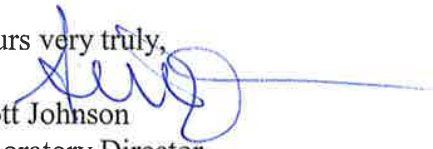
IWC = 100.00%

TST RESULT

SURVIVAL = PASS % EFFECT = 3.42 %

GROWTH = PASS % EFFECT = -9.99 %

Yours very truly,


Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 17 Apr-18 08:12 (p 1 of 1)
 Test Code: TAM0318.263fml | 06-5046-1520

Fathead Minnow 7-d Larval Survival and Growth Test				Aquatic Bioassay & Consulting Labs, Inc.			
Batch ID: 06-9786-9458	Test Type: Growth-Survival (7d)	Analyst:					
Start Date: 23 Mar-18 13:50	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water					
Ending Date: 30 Mar-18 12:25	Species: Pimephales promelas	Brine: Not Applicable					
Duration: 6d 23h	Source: Aquatic Biosystems, CO	Age:					
Sample ID: 18-8658-7754	Code: TAM0318.263fml	Client: Test America Irvine					
Sample Date: 22 Mar-18 15:30	Material: Sample Water	Project: Boeing-SSFL NPDES					
Receipt Date: 23 Mar-18 13:30	Source: Bioassay Report						
Sample Age: 22h (2.1 °C)	Station: Outfall 009						

Single Comparison Summary				
Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
17-0999-6248	7d Survival Rate	TST-Welch's t Test	1.4E-05	100% passed 7d survival rate
00-4288-9979	Mean Dry Weight-mg	TST-Welch's t Test	1.7E-05	100% passed mean dry weight-mg

Test Acceptability							
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Overlap	Decision
				Lower	Upper		
17-0999-6248	7d Survival Rate	Control Resp	0.975	0.8	>>	Yes	Passes Criteria
00-4288-9979	Mean Dry Weight-mg	Control Resp	0.3342	0.25	>>	Yes	Passes Criteria

7d Survival Rate Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	8	0.9750	0.9335	1.0000	0.8667	1.0000	0.0175	0.0496	5.09%	0.00%
100		8	0.9417	0.8952	0.9882	0.8667	1.0000	0.0197	0.0556	5.91%	3.42%

Mean Dry Weight-mg Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	8	0.3342	0.306	0.3624	0.2857	0.3831	0.01192	0.03371	10.09%	0.00%
100		8	0.3676	0.332	0.4032	0.2943	0.4385	0.01506	0.04258	11.58%	-9.99%

7d Survival Rate Detail									
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	1.0000	0.9333	1.0000	0.8667	1.0000	1.0000	1.0000	1.0000
100		0.9333	0.9333	1.0000	1.0000	0.8667	0.9333	0.8667	1.0000

Mean Dry Weight-mg Detail									
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	0.2867	0.2857	0.3407	0.3831	0.3293	0.3587	0.3387	0.3507
100		0.2943	0.3814	0.3793	0.3373	0.37	0.3471	0.4385	0.3927

7d Survival Rate Binomials									
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	15/15	14/15	15/15	13/15	15/15	15/15	15/15	15/15
100		14/15	14/15	15/15	15/15	13/15	14/15	13/15	15/15

CETIS Analytical Report

Report Date: 17 Apr-18 08:12 (p 1 of 4)
 Test Code: TAM0318.263fml | 06-5046-1520

Fathead Minnow 7-d Larval Survival and Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 17-0999-6248	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.2	Analyzed: 17 Apr-18 8:11	Analysis: Parametric Bioequivalence-Two Sample	Official Results: Yes
Batch ID: 06-9786-9458	Test Type: Growth-Survival (7d)	Analyst:	Start Date: 23 Mar-18 13:50	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 30 Mar-18 12:25	Species: Pimephales promelas	Brine: Not Applicable	Duration: 6d 23h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 18-8658-7754	Code: TAM0318.263fml	Client: Test America Irvine	Sample Date: 22 Mar-18 15:30	Material: Sample Water	Project: Boeing-SSFL NPDES
Receipt Date: 23 Mar-18 13:30	Source: Bioassay Report		Sample Age: 22h (2.1 °C)	Station: Outfall 009	

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed 7d survival rate

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:25%)
Negative Control		100*	6.517	0.6955	12	CDF	1.4E-05	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits			Decision
		Lower	Upper	Overlap	
Control Resp	0.975	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0161115	0.0161115	1	1.694	0.2141	Non-Significant Effect
Error	0.133168	0.009512	14			
Total	0.149279		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	0.2218	8.862	0.6449	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.5891	8.862	0.4555	Equal Variances
Variances	Variance Ratio F Test	1.243	8.885	0.7814	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.8855	3.878	0.0235	Normal Distribution
Distribution	D'Agostino Skewness Test	1.393	2.576	0.1635	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.2536	0.2471	0.0071	Non-Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.8881	0.8408	0.0519	Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	8	0.9750	0.9335	1.0000	1.0000	0.8667	1.0000	0.0175	5.09%	0.00%
100		8	0.9417	0.8952	0.9882	0.9333	0.8667	1.0000	0.0197	5.91%	3.42%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	8	1.394	1.317	1.471	1.441	1.197	1.441	0.03256	6.60%	0.00%
100		8	1.331	1.245	1.417	1.31	1.197	1.441	0.0363	7.72%	4.55%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	1.0000	0.9333	1.0000	0.8667	1.0000	1.0000	1.0000	1.0000
100		0.9333	0.9333	1.0000	1.0000	0.8667	0.9333	0.8667	1.0000

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	1.441	1.31	1.441	1.197	1.441	1.441	1.441	1.441
100		1.31	1.31	1.441	1.441	1.197	1.31	1.197	1.441

CETIS Analytical Report

Report Date: 17 Apr-18 08:12 (p 3 of 4)
 Test Code: TAM0318.263fml | 06-5046-1520

Fathead Minnow 7-d Larval Survival and Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 00-4288-9979	Endpoint: Mean Dry Weight-mg	CETIS Version: CETISv1.9.2			
Analyzed: 17 Apr-18 8:11	Analysis: Parametric Bioequivalence-Two Sample	Official Results: Yes			
Batch ID: 06-9786-9458	Test Type: Growth-Survival (7d)	Analyst:			
Start Date: 23 Mar-18 13:50	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 30 Mar-18 12:25	Species: Pimephales promelas	Brine: Not Applicable			
Duration: 6d 23h	Source: Aquatic Biosystems, CO	Age:			
Sample ID: 18-8658-7754	Code: TAM0318.263fml	Client: Test America Irvine			
Sample Date: 22 Mar-18 15:30	Material: Sample Water	Project: Boeing-SSFL NPDES			
Receipt Date: 23 Mar-18 13:30	Source: Bioassay Report				
Sample Age: 22h (2.1 °C)	Station: Outfall 009				

Data Transform	Alt Hyp	TST_b	Comparison Result
Untransformed	C*b < T	0.75	100% passed mean dry weight-mg

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:25%)
Negative Control		100*	6.679	0.6974	11	CDF	1.7E-05	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.3342	0.25	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0044620	0.0044620	1	3.025	0.1039	Non-Significant Effect
Error	0.0206484	0.0014749	14			
Total	0.0251104		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	0.2381	8.862	0.6332	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.2403	8.862	0.6316	Equal Variances
Variances	Variance Ratio F Test	1.596	8.885	0.5524	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.3384	3.878	0.5059	Normal Distribution
Distribution	D'Agostino Skewness Test	0.3872	2.576	0.6986	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.151	0.2471	0.4424	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9719	0.8408	0.8680	Normal Distribution

Mean Dry Weight-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	8	0.3342	0.306	0.3624	0.3397	0.2857	0.3831	0.01192	10.09%	0.00%
100		8	0.3676	0.332	0.4032	0.3747	0.2943	0.4385	0.01506	11.58%	-9.99%

Mean Dry Weight-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	0.2867	0.2857	0.3407	0.3831	0.3293	0.3587	0.3387	0.3507
100		0.2943	0.3814	0.3793	0.3373	0.37	0.3471	0.4385	0.3927

CETIS Measurement Report

Report Date: 17 Apr-18 08:12 (p 1 of 2)
 Test Code: TAM0318.263fml | 06-5046-1520

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 06-9786-9458	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 23 Mar-18 13:50	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 30 Mar-18 12:25	Species: Pimephales promelas	Brine: Not Applicable
Duration: 6d 23h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 18-8658-7754	Code: TAM0318.263fml	Client: Test America Irvine
Sample Date: 22 Mar-18 15:30	Material: Sample Water	Project: Boeing-SSFL NPDES
Receipt Date: 23 Mar-18 13:30	Source: Bioassay Report	
Sample Age: 22h (2.1 °C)	Station: Outfall 009	

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	61.75	60.88	62.62	61	63	0.366	1.035	1.68%	0
100		8	28	28	28	28	28	0	0	0.0%	0
Overall		16	44.88	35.58	54.17	28	63	4.361	17.44	38.87%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	353.9	347.5	360.3	347	367	2.702	7.643	2.16%	0
100		8	83.5	78.1	88.9	70	89	2.283	6.459	7.74%	0
Overall		16	218.7	144.2	293.2	70	367	34.95	139.8	63.92%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.6	7.325	7.875	7.3	8.2	0.1165	0.3295	4.34%	0
100		8	7.4	6.253	8.547	4.7	9.5	0.4851	1.372	18.54%	0
Overall		16	7.5	6.983	8.017	4.7	9.5	0.2424	0.9695	12.93%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	94.88	92.71	97.04	93	98	0.9149	2.588	2.73%	0
100		8	49	49	49	49	49	0	0	0.0%	0
Overall		16	71.94	59.28	84.6	49	98	5.939	23.76	33.02%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.725	7.553	7.897	7.3	7.9	0.07258	0.2053	2.66%	0
100		8	7.325	7.117	7.533	7	7.8	0.08814	0.2493	3.4%	0
Overall		16	7.525	7.364	7.686	7	7.9	0.07555	0.3022	4.02%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24	24	24	24	24	0	0	0.0%	0
100		8	24	24	24	24	24	0	0	0.0%	0
Overall		16	24	24	24	24	24	0	0	0.00%	0 (0%)

CETIS Measurement Report

Report Date: 17 Apr-18 08:12 (p 2 of 2)
 Test Code: TAM0318.263fml | 06-5046-1520

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	63	63	63	61	61	61	61	61
100		28	28	28	28	28	28	28	28

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	352	347	348	353	347	353	364	367
100		81	88	88	88	84	89	70	80

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.3	7.7	7.8	7.8	7.4	7.3	7.3	8.2
100		9.5	7.9	7.8	7.7	7.1	7.9	6.6	4.7

Hardness (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	98	98	98	93	93	93	93	93
100		49	49	49	49	49	49	49	49

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.6	7.7	7.9	7.9	7.7	7.9	7.8	7.3
100		7.2	7.3	7.4	7.5	7.1	7.3	7	7.8

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	24	24	24	24	24	24	24	24
100		24	24	24	24	24	24	24	24





April 17, 2018

Ms. Urvashi Patel
TestAmerica Irvine
17461 Derian Avenue, Suite 100
Irvine, CA 92614

Dear Ms. Patel:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms EPA-821-R-02-013.* Results were as follows:*

CLIENT: TestAmerica Irvine
SAMPLE I.D.: Outfall 009
DATE RECEIVED: 23 March - 18
ABC LAB. NO.: TAM0318.263

CHRONIC CERIODAPHNIA SURVIVAL & REPRODUCTION BIOASSAY

IWC = 100.00%

TST RESULT

SURVIVAL = PASS % EFFECT = 0.00 %

REPRODUCTION = PASS % EFFECT = 2.62 %

Yours very truly,


Scott Johnson
Laboratory Director

*Note: The chronic survival TST analysis is not available for ceriodaphnia dubia, see CETIS report using TST-Welch's t Test.

CETIS Summary Report

Report Date: 17 Apr-18 08:12 (p 1 of 1)
 Test Code: TAM0318.263 | 04-2811-8946

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 06-4642-3889	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 23 Mar-18 13:50	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 30 Mar-18 12:25	Species: Ceriodaphnia dubia	Brine: Not Applicable
Duration: 6d 23h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 03-9351-8313	Code: TAM0318.263	Client: Test America Irvine
Sample Date: 22 Mar-18 15:30	Material: Sample Water	Project: Boeing-SSFL NPDES
Receipt Date: 23 Mar-18 13:30	Source: Bioassay Report	
Sample Age: 22h (2.1 °C)	Station: Outfall 009	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
12-3242-3365	7d Survival Rate	Fisher Exact Test	1.0000	100% passed 7d survival rate
19-0017-9456	Reproduction	TST-Welch's t Test	0.0069	100% passed reproduction

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Overlap	Decision
				Lower	Upper		
12-3242-3365	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
19-0017-9456	Reproduction	Control Resp	25.16	15	>>	Yes	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	20	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		20	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	19	25.16	22.05	28.27	14	37	1.479	6.449	25.63%	0.00%
100		20	24.5	20.64	28.36	10	38	1.845	8.249	33.67%	2.62%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	31	14	30	26	22	20	35	23	21	
		23	20	37	24	20	32	18	34	28	20
100		32	32	22	22	25	33	32	24	20	29
		14	11	10	16	18	38	38	28	23	23

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Report Date: 17 Apr-18 08:12 (p 1 of 2)
 Test Code: TAM0318.263 | 04-2811-8946

Ceriodaphnia 7-d Survival and Reproduction Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID:	19-0017-9456	Endpoint:	Reproduction	CETIS Version:	CETISv1.9.2
Analyzed:	15 Apr-18 19:08	Analysis:	Parametric Bioequivalence-Two Sample	Official Results:	Yes
Batch ID:	06-4642-3889	Test Type:	Reproduction-Survival (7d)	Analyst:	
Start Date:	23 Mar-18 13:50	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Laboratory Water
Ending Date:	30 Mar-18 12:25	Species:	Ceriodaphnia dubia	Brine:	Not Applicable
Duration:	6d 23h	Source:	Aquatic Biosystems, CO	Age:	
Sample ID:	03-9351-8313	Code:	TAM0318.263	Client:	Test America Irvine
Sample Date:	22 Mar-18 15:30	Material:	Sample Water	Project:	Boeing-SSFL NPDES
Receipt Date:	23 Mar-18 13:30	Source:	Bioassay Report		
Sample Age:	22h (2.1 °C)	Station:	Outfall 009		

Data Transform	Alt Hyp	TST_b	Comparison Result
Untransformed	C*b < T	0.75	100% passed reproduction

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:20%)
Negative Control		100*	2.616	0.8538	30	CDF	0.0069	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits			Decision
		Lower	Upper	Overlap	
Control Resp	25.16	15	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.21727	4.21727	1	0.07643	0.7837	Non-Significant Effect
Error	2041.53	55.1764	37			
Total	2045.74		38			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	0.8805	7.373	0.3542	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.562	7.396	0.4583	Equal Variances
Variances	Variance Ratio F Test	1.636	3.527	0.3016	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.3898	3.878	0.3876	Normal Distribution
Distribution	D'Agostino Kurtosis Test	1.109	2.576	0.2674	Normal Distribution
Distribution	D'Agostino Skewness Test	0.1539	2.576	0.8777	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	1.254	9.21	0.5342	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1012	0.1637	0.3811	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9736	0.9219	0.4803	Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	19	25.16	22.05	28.27	23	14	37	1.479	25.63%	0.00%
100		20	24.5	20.64	28.36	23.5	10	38	1.845	33.67%	2.62%

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	31	14	30	26	22	20	35	23	21	23
		20	37	24	20	32	18	34	28	20	
100		32	32	22	22	25	33	32	24	20	29
		14	11	10	16	18	38	38	28	23	23

CETIS Analytical Report

Report Date: 17 Apr-18 08:12 (p 1 of 2)
 Test Code: TAM0318.263 | 04-2811-8946

Ceriodaphnia 7-d Survival and Reproduction Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 12-3242-3365	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.2			
Analyzed: 15 Apr-18 19:08	Analysis: Single 2x2 Contingency Table	Official Results: Yes			
Batch ID: 06-4642-3889	Test Type: Reproduction-Survival (7d)	Analyst:			
Start Date: 23 Mar-18 13:50	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 30 Mar-18 12:25	Species: Ceriodaphnia dubia	Brine: Not Applicable			
Duration: 6d 23h	Source: Aquatic Biosystems, CO	Age:			
Sample ID: 03-9351-8313	Code: TAM0318.263	Client: Test America Irvine			
Sample Date: 22 Mar-18 15:30	Material: Sample Water	Project: Boeing-SSFL NPDES			
Receipt Date: 23 Mar-18 13:30	Source: Bioassay Report				
Sample Age: 22h (2.1 °C)	Station: Outfall 009				

Data Transform	Alt Hyp	Comparison Result
Untransformed	C > T	100% passed 7d survival rate

Fisher Exact Test

Control	vs	Group	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		100	1.0000	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	N	20	0	20	1	0	0.0%
100		20	0	20	1	0	0.0%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Report Date: 17 Apr-18 08:12 (p 2 of 2)
Test Code: TAM0318.263 | 04-2811-8946

Ceriodaphnia 7-d Survival and Reproduction Test

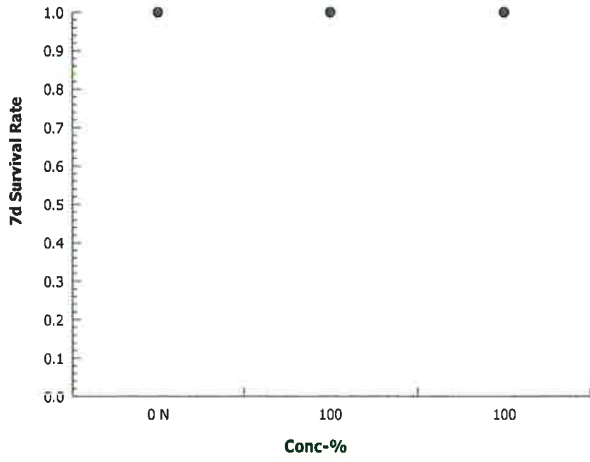
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 12-3242-3365
Analyzed: 15 Apr-18 19:08

Endpoint: 7d Survival Rate
Analysis: Single 2x2 Contingency Table

CETIS Version: CETISv1.9.2
Official Results: Yes

Graphics



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

CETIS Measurement Report

Report Date: 17 Apr-18 08:12 (p 1 of 2)
 Test Code: TAM0318.263 | 04-2811-8946

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 06-4642-3889	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 23 Mar-18 13:50	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 30 Mar-18 12:25	Species: Ceriodaphnia dubia	Brine: Not Applicable
Duration: 6d 23h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 03-9351-8313	Code: TAM0318.263	Client: Test America Irvine
Sample Date: 22 Mar-18 15:30	Material: Sample Water	Project: Boeing-SSFL NPDES
Receipt Date: 23 Mar-18 13:30	Source: Bioassay Report	
Sample Age: 22h (2.1 °C)	Station: Outfall 009	

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	61.75	60.88	62.62	61	63	0.366	1.035	1.68%	0
100		8	28	28	28	28	28	0	0	0.0%	0
Overall		16	44.88	35.58	54.17	28	63	4.361	17.44	38.87%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	353.9	347.5	360.3	347	367	2.702	7.643	2.16%	0
100		8	83.5	78.1	88.9	70	89	2.283	6.459	7.74%	0
Overall		16	218.7	144.2	293.2	70	367	34.95	139.8	63.92%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.6	7.325	7.875	7.3	8.2	0.1165	0.3295	4.34%	0
100		8	7.4	6.253	8.547	4.7	9.5	0.4851	1.372	18.54%	0
Overall		16	7.5	6.983	8.017	4.7	9.5	0.2424	0.9695	12.93%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	94.88	92.71	97.04	93	98	0.9149	2.588	2.73%	0
100		8	49	49	49	49	49	0	0	0.0%	0
Overall		16	71.94	59.28	84.6	49	98	5.939	23.76	33.02%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.725	7.553	7.897	7.3	7.9	0.07258	0.2053	2.66%	0
100		8	7.325	7.117	7.533	7	7.8	0.08814	0.2493	3.4%	0
Overall		16	7.525	7.364	7.686	7	7.9	0.07555	0.3022	4.02%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24	24	24	24	24	0	0	0.0%	0
100		8	24	24	24	24	24	0	0	0.0%	0
Overall		16	24	24	24	24	24	0	0	0.00%	0 (0%)

CETIS Measurement Report

Report Date: 17 Apr-18 08:12 (p 2 of 2)
 Test Code: TAM0318.263 | 04-2811-8946

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	63	63	63	61	61	61	61	61
100		28	28	28	28	28	28	28	28

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	352	347	348	353	347	353	364	367
100		81	88	88	88	84	89	70	80

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.3	7.7	7.8	7.8	7.4	7.3	7.3	8.2
100		9.5	7.9	7.8	7.7	7.1	7.9	6.6	4.7

Hardness (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	98	98	98	93	93	93	93	93
100		49	49	49	49	49	49	49	49

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.6	7.7	7.9	7.9	7.7	7.9	7.8	7.3
100		7.2	7.3	7.4	7.5	7.1	7.3	7	7.8

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	24	24	24	24	24	24	24	24
100		24	24	24	24	24	24	24	24





April 17, 2018

Ms. Urvashi Patel
TestAmerica Irvine
17461 Derian Avenue, Suite 100
Irvine, CA 92614

Dear Ms. Patel:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013*. Results were as follows:

CLIENT: TestAmerica Irvine
SAMPLE I.D.: Outfall 009
DATE RECEIVED: 23 March - 18
ABC LAB. NO.: TAM0318.263


CHRONIC SELENASTRUM ALGAE GROWTH BIOASSAY

IWC = 100.00 %

TST RESULT

*GROWTH = FAIL % EFFECT = 35.62 %
* Passes permit TIE limitation of $\geq 50\%$ effect

Yours very truly,


For Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 17 Apr-18 08:13 (p 1 of 1)
 Test Code: TAM0318.263sel | 02-1041-4138

Selenastrum Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 15-8687-8202	Test Type: Cell Growth	Analyst:
Start Date: 23 Mar-18 14:30	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 27 Mar-18 13:15	Species: Selenastrum capricornutum	Brine: Not Applicable
Duration: 95h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 15-0565-9247	Code: TAM0318.263sel	Client: Test America Irvine
Sample Date: 22 Mar-18 15:30	Material: Sample Water	Project: Boeing-SSFL NPDES
Receipt Date: 23 Mar-18 13:30	Source: Bioassay Report	
Sample Age: 23h (2.1 °C)	Station: Outfall 009	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
10-3873-5772	Cell Density	TST-Welch's t Test	1.0000	100% failed cell density

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Overlap	Decision
				Lower	Upper		
10-3873-5772	Cell Density	Control CV	0.04486	<<	0.2	Yes	Passes Criteria
10-3873-5772	Cell Density	Control Resp	1.69E+6	1000000	>>	Yes	Passes Criteria

Cell Density Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	8	1.695E+6	1.631E+6	1.758E+6	1.561E+6	1.772E+6	2.688E+4	7.602E+4	4.49%	0.00%
100		8	1.091E+6	1.042E+6	1.140E+6	1.018E+6	1.169E+6	2.056E+4	5.815E+4	5.33%	35.62%

Cell Density Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	1.692E+6	1.730E+6	1.749E+6	1.772E+6	1.751E+6	1.703E+6	1.561E+6	1.599E+6
100		1.155E+6	1.018E+6	1.119E+6	1.169E+6	1.038E+6	1.057E+6	1.127E+6	1.045E+6

CETIS Analytical Report

Report Date: 17 Apr-18 08:13 (p 1 of 2)
 Test Code: TAM0318.263sel | 02-1041-4138

Selenastrum Growth Test		Aquatic Bioassay & Consulting Labs, Inc.	
Analysis ID: 10-3873-5772	Endpoint: Cell Density	CETIS Version: CETISv1.9.2	
Analyzed: 28 Mar-18 12:21	Analysis: Parametric Bioequivalence-Two Sample	Official Results: Yes	
Batch ID: 15-8687-8202	Test Type: Cell Growth	Analyst:	
Start Date: 23 Mar-18 14:30	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water	
Ending Date: 27 Mar-18 13:15	Species: Selenastrum capricornutum	Brine: Not Applicable	
Duration: 95h	Source: Aquatic Biosystems, CO	Age:	
Sample ID: 15-0565-9247	Code: TAM0318.263sel	Client: Test America Irvine	
Sample Date: 22 Mar-18 15:30	Material: Sample Water	Project: Boeing-SSFL NPDES	
Receipt Date: 23 Mar-18 13:30	Source: Bioassay Report		
Sample Age: 23h (2.1 °C)	Station: Outfall 009		

Data Transform	Alt Hyp	TST_b	Comparison Result
Untransformed	C*b < T	0.75	100% failed cell density

TST-Welch's t Test

Control	vs	Conc-%	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:25%)
Negative Control		100	-6.251	0.6938	13	CDF	1.0000	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control CV	0.04486	<<	0.2	Yes	Passes Criteria
Control Resp	1.69E+6	1000000	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.457E+12	1.457E+12	1	318.2	<1.0E-37	Significant Effect
Error	6.412E+10	4.58E+09	14			
Total	1.522E+12		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	0.1463	8.862	0.7079	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.04911	8.862	0.8278	Equal Variances
Variances	Variance Ratio F Test	1.709	8.885	0.4964	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.492	3.878	0.2224	Normal Distribution
Distribution	D'Agostino Skewness Test	1.14	2.576	0.2544	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1658	0.2471	0.2893	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9275	0.8408	0.2228	Normal Distribution

Cell Density Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	8	1.695E+6	1.631E+6	1.758E+6	1.716E+6	1.561E+6	1.772E+6	2.688E+4	4.49%	0.00%
100		8	1.091E+6	1.042E+6	1.140E+6	1.088E+6	1.018E+6	1.169E+6	2.056E+4	5.33%	35.62%

Cell Density Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	1.692E+6	1.730E+6	1.749E+6	1.772E+6	1.751E+6	1.703E+6	1.561E+6	1.599E+6
100		1.155E+6	1.018E+6	1.119E+6	1.169E+6	1.038E+6	1.057E+6	1.127E+6	1.045E+6

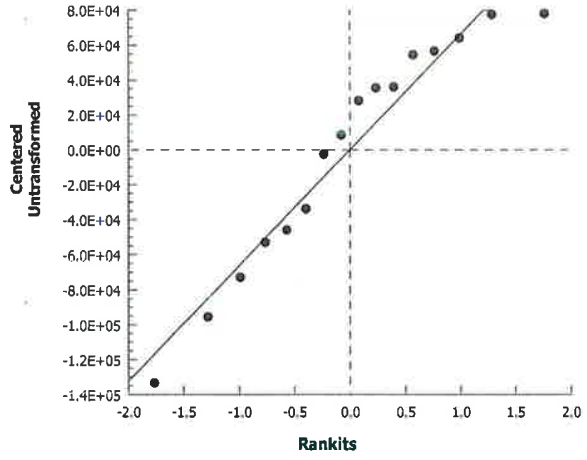
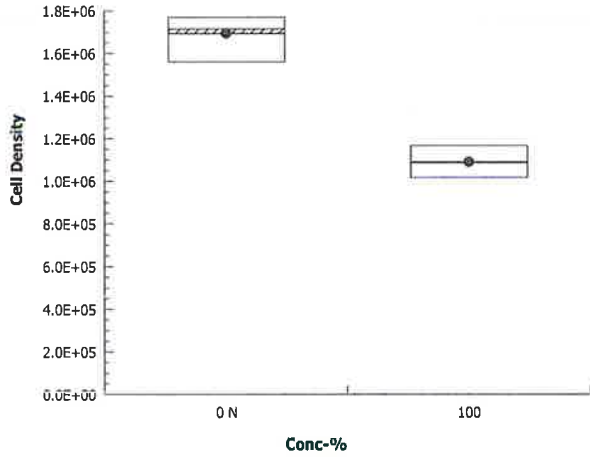
Selenastrum Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 10-3873-5772 Endpoint: Cell Density
Analyzed: 28 Mar-18 12:21 Analysis: Parametric Bioequivalence-Two Sample

CETIS Version: CETISv1.9.2
Official Results: Yes

Graphics



CETIS Measurement Report

Report Date: 17 Apr-18 08:13 (p 1 of 2)
 Test Code: TAM0318.263sel | 02-1041-4138

Selenastrum Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 15-8687-8202	Test Type: Cell Growth	Analyst:
Start Date: 23 Mar-18 14:30	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 27 Mar-18 13:15	Species: Selenastrum capricornutum	Brine: Not Applicable
Duration: 95h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 15-0565-9247	Code: TAM0318.263sel	Client: Test America Irvine
Sample Date: 22 Mar-18 15:30	Material: Sample Water	Project: Boeing-SSFL NPDES
Receipt Date: 23 Mar-18 13:30	Source: Bioassay Report	
Sample Age: 23h (2.1 °C)	Station: Outfall 009	

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	1	62			62	62	0	0	0.0%	0
100		1	40			40	40	0	0	0.0%	0
Overall		2	51	-88.77	190.8	40	62	11	15.56	30.50%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	457	445.2	468.8	448	471	4.243	9.487	2.08%	0
100		5	179.2	172.7	185.7	174	188	2.354	5.263	2.94%	0
Overall		10	318.1	213.2	423	174	471	46.36	146.6	46.08%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	1	101			101	101	0	0	0.0%	0
100		1	57			57	57	0	0	0.0%	0
Overall		2	79	-200.5	358.5	57	101	22	31.11	39.38%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	7.82	7.598	8.042	7.5	7.9	0.08	0.1789	2.29%	0
100		5	7.8	7.568	8.032	7.6	8	0.08367	0.1871	2.4%	0
Overall		10	7.81	7.686	7.934	7.5	8	0.05467	0.1729	2.21%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	24.48	24.24	24.72	24.3	24.8	0.08604	0.1924	0.79%	0
100		5	24.48	24.24	24.72	24.3	24.8	0.08604	0.1924	0.79%	0
Overall		10	24.48	24.35	24.61	24.3	24.8	0.05735	0.1814	0.74%	0 (0%)

CETIS Measurement Report

Report Date: 17 Apr-18 08:13 (p 2 of 2)

Test Code: TAM0318.263sel | 02-1041-4138

Selenastrum Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1
0	N	62
100		40

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5
0	N	454	450	448	462	471
100		174	177	178	179	188

Hardness (CaCO3)-mg/L

Conc-%	Code	1
0	N	101
100		57

pH-Units

Conc-%	Code	1	2	3	4	5
0	N	7.9	7.9	7.9	7.9	7.5
100		7.6	7.7	7.7	8	8

Temperature-°C

Conc-%	Code	1	2	3	4	5
0	N	24.3	24.4	24.4	24.8	24.5
100		24.3	24.4	24.4	24.8	24.5





April 17, 2018


Ms. Urvashi Patel
TestAmerica Irvine
17461 Derian Avenue, Suite 100
Irvine, CA 92614

Dear Ms. Patel:

We received one sample from your laboratory in our laboratory on March 23, 2018, identified as Outfall 009, ABC lab number TAM0318.263. We conducted initial chronic toxicity tests on these samples with the water flea, *Ceriodaphnia dubia* & fathead minnow, *Pimephales promelas* and the green algae, *Selenastrum capricornutum*. The sample had an initial test result of 35.62% effect in the undiluted sample for the green algae test. Based on these results, we initiated TIE procedures. The initial component of the TIE is to conduct a baseline test. The baseline test was conducted and it resulted in 8.12% effect. This indicates that the initial observed toxicity was most likely caused by volatile substances that dissipated rendering the sample less toxic. Based on these results there was no need to proceed with the TIE manipulations. No TIE report will be issued.

Please feel free to phone me at your convenience if you have any questions.

Sincerely,


Scott Johnson
Laboratory Director



April 17, 2018

Ms. Urvashi Patel
TestAmerica Irvine
17461 Derian Avenue, Suite 100
Irvine, CA 92614

Dear Ms. Patel:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013*. Results were as follows:

CLIENT:	TestAmerica Irvine
SAMPLE I.D.:	Outfall 009
DATE RECEIVED:	23 March - 18
ABC LAB. NO.:	TAM0318.263(TIE BASELINE)

CHRONIC SELENASTRUM ALGAE GROWTH BIOASSAY

NOEC =	100.00 %
TU _c =	1.00
IC ₂₅ =	>100.00%
IC ₅₀ =	>100.00%

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 17 Apr-18 10:36 (p 1 of 1)
 Test Code: TAM0318.263TIEB | 15-8007-4039

Selenastrum Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Batch ID: 13-1324-8215	Test Type: Cell Growth	Analyst:	Start Date: 29 Mar-18 12:10	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 02 Apr-18 10:35	Species: Selenastrum capricornutum	Brine: Not Applicable	Duration: 94h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 08-4076-8529	Code: TAM0318.263TIEB	Client: Test America Irvine	Sample Date: 22 Mar-18 15:30	Material: Sample Water	Project: Boeing-SSFL NPDES
Receipt Date: 23 Mar-18 13:30	Source: Bioassay Report		Sample Age: 6d 21h (2.1 °C)	Station: Outfall 009	

Multiple Comparison Summary							
Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
11-2203-8834	Cell Density	Dunnett Multiple Comparison Test	100	> 100	n/a	1	9.74%

Point Estimate Summary							
Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU ✓
02-4601-6572	Cell Density	Linear Interpolation (ICPIN)	IC5	69.35	59.48	94.25	1.442
			IC10	88.7	68.95	n/a	1.127
			IC15	>100	n/a	n/a	<1
			IC20	>100	n/a	n/a	<1
			IC25	>100	n/a	n/a	<1
			IC40	>100	n/a	n/a	<1
			IC50	>100	n/a	n/a	<1

Test Acceptability							
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Overlap	Decision
				Lower	Upper		
02-4601-6572	Cell Density	Control CV	0.02409	<<	0.2	Yes	Passes Criteria
11-2203-8834	Cell Density	Control CV	0.02409	<<	0.2	Yes	Passes Criteria
02-4601-6572	Cell Density	Control Resp	1.15E+6	1000000	>>	Yes	Passes Criteria
11-2203-8834	Cell Density	Control Resp	1.15E+6	1000000	>>	Yes	Passes Criteria

Cell Density Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.147E+6	1.103E+6	1.191E+6	1.122E+6	1.186E+6	1.382E+4	2.763E+4	2.41%	0.00%
50		4	1.274E+6	1.114E+6	1.433E+6	1.129E+6	1.350E+6	5.014E+4	1.003E+5	7.87%	-11.03%
100		4	1.054E+6	9.421E+5	1.166E+6	9.690E+5	1.122E+6	3.519E+4	7.038E+4	6.68%	8.12%

Cell Density Detail						
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	
0	N	1.146E+6	1.135E+6	1.122E+6	1.186E+6	
50		1.350E+6	1.129E+6	1.331E+6	1.285E+6	
100		1.025E+6	1.100E+6	1.122E+6	9.690E+5	

CETIS Analytical Report

Report Date: 17 Apr-18 10:36 (p 1 of 2)
 Test Code: TAM0318.263TIEB | 15-8007-4039

Selenastrum Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 11-2203-8834	Endpoint: Cell Density	CETIS Version: CETISv1.9.2	Analized: 03 Apr-18 9:58	Analysis: Parametric-Control vs Treatments	Official Results: Yes
Batch ID: 13-1324-8215	Test Type: Cell Growth	Analyst:	Start Date: 29 Mar-18 12:10	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 02 Apr-18 10:35	Species: Selenastrum capricornutum	Brine: Not Applicable	Duration: 94h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 08-4076-8529	Code: TAM0318.263TIEB	Client: Test America Irvine	Sample Date: 22 Mar-18 15:30	Material: Sample Water	Project: Boeing-SSFL NPDES
Receipt Date: 23 Mar-18 13:30	Source: Bioassay Report		Sample Age: 6d 21h (2.1 °C)	Station: Outfall 009	

Data Transfrm	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	> 100	n/a	1	9.74%

Dunnett Multiple Comparison Test									
Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		50	-2.467	2.18	1E+05	6	CDF	0.9959	Non-Significant Effect
		100	1.817	2.18	1E+05	6	CDF	0.0877	Non-Significant Effect

Test Acceptability Criteria					
Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control CV	0.02409	<<	0.2	Yes	Passes Criteria
Control Resp	1.15E+6	1000000	>>	Yes	Passes Criteria

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.723E+10	4.862E+10	2	9.246	0.0066	Significant Effect
Error	4.732E+10	5.258E+09	9			
Total	1.446E+11		11			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Bartlett Equality of Variance Test	3.503	9.21	0.1735	Equal Variances	
Variances	Levene Equality of Variance Test	2.266	8.022	0.1596	Equal Variances	
Variances	Mod Levene Equality of Variance Test	1.148	8.022	0.3596	Equal Variances	
Distribution	Anderson-Darling A2 Normality Test	0.4177	3.878	0.3340	Normal Distribution	
Distribution	D'Agostino Skewness Test	1.583	2.576	0.1135	Normal Distribution	
Distribution	Kolmogorov-Smirnov D Test	0.162	0.2801	0.5744	Normal Distribution	
Distribution	Shapiro-Wilk W Normality Test	0.92	0.8025	0.2855	Normal Distribution	

Cell Density Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.147E+6	1.103E+6	1.191E+6	1.140E+6	1.122E+6	1.186E+6	1.382E+4	2.41%	0.00%
50		4	1.274E+6	1.114E+6	1.433E+6	1.308E+6	1.129E+6	1.350E+6	5.014E+4	7.87%	-11.03%
100		4	1.054E+6	9.421E+5	1.166E+6	1.062E+6	9.690E+5	1.122E+6	3.519E+4	6.68%	8.12%

Cell Density Detail					
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.146E+6	1.135E+6	1.122E+6	1.186E+6
50		1.350E+6	1.129E+6	1.331E+6	1.285E+6
100		1.025E+6	1.100E+6	1.122E+6	9.690E+5

CETIS Analytical Report

Report Date: 17 Apr-18 10:36 (p 1 of 2)
Test Code: TAM0318.263TIEB | 15-8007-4039

Selenastrum Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 02-4601-6572	Endpoint: Cell Density	CETIS Version: CETISv1.9.2
Analyzed: 03 Apr-18 9:58	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes
Batch ID: 13-1324-8215	Test Type: Cell Growth	Analyst:
Start Date: 29 Mar-18 12:10	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 02 Apr-18 10:35	Species: Selenastrum capricornutum	Brine: Not Applicable
Duration: 94h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 08-4076-8529	Code: TAM0318.263TIEB	Client: Test America Irvine
Sample Date: 22 Mar-18 15:30	Material: Sample Water	Project: Boeing-SSFL NPDES
Receipt Date: 23 Mar-18 13:30	Source: Bioassay Report	
Sample Age: 6d 21h (2.1 °C)	Station: Outfall 009	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control CV	0.02409	<<	0.2	Yes	Passes Criteria
Control Resp	1.15E+6	1000000	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	69.35	59.48	94.25	1.442	1.061	1.681
IC10	88.7	68.95	n/a	1.127	n/a	1.45
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Cell Density Summary

Conc-%	Code	Count	Calculated Variate						
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.147E+6	1.122E+6	1.186E+6	1.382E+4	2.763E+4	2.41%	0.0%
50		4	1.274E+6	1.129E+6	1.350E+6	5.014E+4	1.003E+5	7.87%	-11.03%
100		4	1.054E+6	9.690E+5	1.122E+6	3.519E+4	7.038E+4	6.68%	8.12%

Cell Density Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.146E+6	1.135E+6	1.122E+6	1.186E+6
50		1.350E+6	1.129E+6	1.331E+6	1.285E+6
100		1.025E+6	1.100E+6	1.122E+6	9.690E+5

CETIS Analytical Report

Report Date: 17 Apr-18 10:36 (p 2 of 2)

Test Code: TAM0318.263TIEB | 15-8007-4039

Selenastrum Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 02-4601-6572

Endpoint: Cell Density

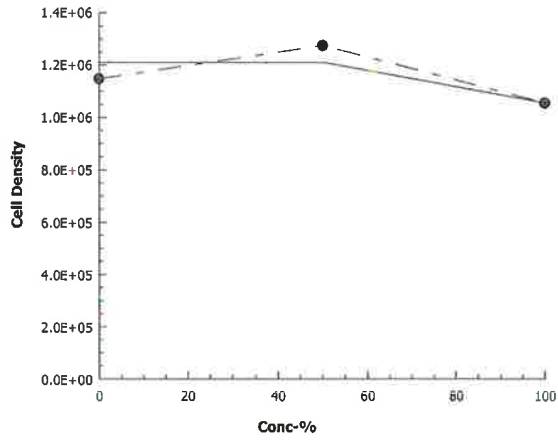
CETIS Version: CETISv1.9.2

Analyzed: 03 Apr-18 9:58

Analysis: Linear Interpolation (ICPIN)

Official Results: Yes

Graphics



CETIS Measurement Report

Report Date: 17 Apr-18 10:36 (p 1 of 2)
 Test Code: TAM0318.263TIEB | 15-8007-4039

Selenastrum Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 13-1324-8215	Test Type: Cell Growth	Analyst:
Start Date: 29 Mar-18 12:10	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 02 Apr-18 10:35	Species: Selenastrum capricornutum	Brine: Not Applicable
Duration: 94h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 08-4076-8529	Code: TAM0318.263TIEB	Client: Test America Irvine
Sample Date: 22 Mar-18 15:30	Material: Sample Water	Project: Boeing-SSFL NPDES
Receipt Date: 23 Mar-18 13:30	Source: Bioassay Report	
Sample Age: 6d 21h (2.1 °C)	Station: Outfall 009	

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	1	69			69	69	0	0	0.0%	0
50		1	54			54	54	0	0	0.0%	0
100		1	33			33	33	0	0	0.0%	0
Overall		3	52	7.079	96.92	33	69	10.44	18.08	34.78%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	450.8	440.8	460.8	442	464	3.597	8.044	1.78%	0
50		5	457.2	440.2	474.2	447	480	6.127	13.7	3.0%	0
100		5	173.4	163.4	183.4	161	181	3.586	8.019	4.62%	0
Overall		15	360.5	284.4	436.5	161	480	35.44	137.3	38.08%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	1	98			98	98	0	0	0.0%	0
50		1	111			111	111	0	0	0.0%	0
100		1	62			62	62	0	0	0.0%	0
Overall		3	90.33	27.28	153.4	62	111	14.66	25.38	28.10%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	7.78	7.676	7.884	7.7	7.9	0.03742	0.08367	1.08%	0
50		5	8	7.912	8.088	7.9	8.1	0.03162	0.07071	0.88%	0
100		5	7.98	7.876	8.084	7.9	8.1	0.03742	0.08366	1.05%	0
Overall		15	7.92	7.85	7.99	7.7	8.1	0.03266	0.1265	1.60%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	24.68	24.52	24.84	24.5	24.8	0.05832	0.1304	0.53%	0
50		5	24.68	24.52	24.84	24.5	24.8	0.05832	0.1304	0.53%	0
100		5	24.68	24.52	24.84	24.5	24.8	0.05832	0.1304	0.53%	0
Overall		15	24.68	24.61	24.75	24.5	24.8	0.03117	0.1207	0.49%	0 (0%)

CETIS Measurement Report

Report Date: 17 Apr-18 10:36 (p 2 of 2)
 Test Code: TAM0318.263TIEB | 15-8007-4039

Selenastrum Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1
0	N	69
50		54
100		33

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5
0	N	442	449	449	450	464
50		449	480	447	450	460
100		161	170	177	178	181

Hardness (CaCO3)-mg/L

Conc-%	Code	1
0	N	98
50		111
100		62

pH-Units

Conc-%	Code	1	2	3	4	5
0	N	7.7	7.7	7.8	7.8	7.9
50		8	7.9	8	8	8.1
100		7.9	7.9	8	8	8.1

Temperature-°C

Conc-%	Code	1	2	3	4	5
0	N	24.8	24.7	24.6	24.5	24.8
50		24.8	24.7	24.6	24.5	24.8
100		24.8	24.7	24.6	24.5	24.8






CHRONIC FATHEAD MINNOW SURVIVAL AND GROWTH BIOASSAY

DATE: 22 March 2018
STANDARD TOXICANT: Copper Chloride
ENDPOINT: SURVIVAL
NOEC = 75.00 ug/l
EC25 = 85.14 ug/l
EC50 = 115.50 ug/l

ENDPOINT: GROWTH
NOEC = 38.00 ug/l
IC25 = 71.44 ug/l
IC50 = 103.40 ug/l

Yours very truly,


Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 16 Apr-18 14:53 (p 1 of 2)
 Test Code: FML032218 | 06-6197-0797

Fathead Minnow 7-d Larval Survival and Growth Test				Aquatic Bioassay & Consulting Labs, Inc.			
Batch ID:	17-9499-1313	Test Type:	Growth-Survival (7d)	Analyst:			
Start Date:	22 Mar-18 12:45	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Laboratory Water		
Ending Date:	29 Mar-18 10:46	Species:	Pimephales promelas	Brine:	Not Applicable		
Duration:	6d 22h	Source:	Aquatic Biosystems, CO	Age:			
Sample ID:	16-2465-0128	Code:	FML032218	Client:	ABC Labs		
Sample Date:	22 Mar-18 12:45	Material:	Copper chloride	Project:	REF TOX		
Receipt Date:		Source:	Reference Toxicant				
Sample Age:	n/a	Station:	REF TOX				

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
21-0024-8428	7d Survival Rate	Steel Many-One Rank Sum Test	75	150	106.1		9.29%	
17-6048-4784	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	38	75	53.39		14.9%	✓

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	µg/L	95% LCL	95% UCL	TU	✓
02-4944-0700	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	46.22	33.07	95.42		
			EC10	58.56	41.45	95.78		
			EC15	70.89	45.59	96.56		
			EC20	79.05	50.76	99.84		
			EC25	85.14	56.46	103.9		
			EC40	103.4	80.2	118		
16-6177-8212	Mean Dry Weight-mg	Linear Interpolation (ICPIN)	IC5	26.19	6.372	31.91		✓
			IC10	38.18	5.264	46.09		✓
			IC15	49.27	38.79	67.13		✓
			IC20	60.35	46.22	86.71		✓
			IC25	71.44	51.93	88.12		✓
			IC40	91.26	74.97	102.5		✓
			IC50	103.4	90.52	113.4		✓

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits			Overlap	Decision
				Lower	Upper			
02-4944-0700	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
21-0024-8428	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
16-6177-8212	Mean Dry Weight-mg	Control Resp	0.2693	0.25	>>	Yes	Passes Criteria	
17-6048-4784	Mean Dry Weight-mg	Control Resp	0.2693	0.25	>>	Yes	Passes Criteria	
17-6048-4784	Mean Dry Weight-mg	PMSD	0.1487	0.12	0.3	Yes	Passes Criteria	

7d Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
10		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
19		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
38		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
75		4	0.8333	0.5808	1.0000	0.6667	1.0000	0.0794	0.1587	19.04%	16.67%
150		4	0.2167	0.0832	0.3501	0.1333	0.3333	0.0419	0.0839	38.72%	78.33%

Mean Dry Weight-mg Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.2693	0.2441	0.2946	0.256	0.2907	0.007926	0.01585	5.89%	0.00%
10		4	0.3123	0.2969	0.3277	0.3007	0.3227	0.004842	0.009684	3.10%	-15.97%
19		4	0.285	0.2327	0.3373	0.24	0.3127	0.01644	0.03289	11.54%	-5.82%
38		4	0.262	0.2534	0.2705	0.256	0.268	0.002684	0.005369	2.05%	2.73%
75		4	0.2135	0.1663	0.2606	0.1779	0.2436	0.01481	0.02962	13.88%	20.75%
150		4	0.03375	-0.01631	0.08381	0.005	0.07	0.01573	0.03146	93.21%	87.47%

CETIS Analytical Report

Report Date: 16 Apr-18 14:52 (p 1 of 4)
 Test Code: FML032218 | 06-6197-0797

Fathead Minnow 7-d Larval Survival and Growth Test **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 21-0024-8428	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.2
Analyzed: 16 Apr-18 14:51	Analysis: Nonparametric-Control vs Treatments	Official Results: Yes
Batch ID: 17-9499-1313	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 22 Mar-18 12:45	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 29 Mar-18 10:46	Species: Pimephales promelas	Brine: Not Applicable
Duration: 6d 22h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 16-2465-0128	Code: FML032218	Client: ABC Labs
Sample Date: 22 Mar-18 12:45	Material: Copper chloride	Project: REF TOX
Receipt Date:	Source: Reference Toxicant	
Sample Age: n/a	Station: REF TOX	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	75	150	106.1		9.29%

Steel Many-One Rank Sum Test

Control	vs	Conc-µg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		10	18	10	1	6	Asymp	0.8333	Non-Significant Effect
		19	18	10	1	6	Asymp	0.8333	Non-Significant Effect
		38	16	10	1	6	Asymp	0.6105	Non-Significant Effect
		75	12	10	1	6	Asymp	0.1424	Non-Significant Effect
		150*	10	10	0	6	Asymp	0.0417	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.92688	0.585376	5	52.22	<1.0E-37	Significant Effect
Error	0.201764	0.0112091	18			
Total	3.12865		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	15.38	4.248	5.9E-06	Unequal Variances
Variances	Mod Levene Equality of Variance Test	9.661	4.248	1.3E-04	Unequal Variances
Distribution	Anderson-Darling A2 Normality Test	2.309	3.878	<1.0E-37	Non-Normal Distribution
Distribution	D'Agostino Kurtosis Test	2.2	2.576	0.0278	Normal Distribution
Distribution	D'Agostino Skewness Test	0.5127	2.576	0.6082	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	5.102	9.21	0.0780	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.2676	0.2056	1.1E-04	Non-Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.8418	0.884	0.0015	Non-Normal Distribution

7d Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
10		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
19		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
38		4	0.9833	0.9303	1.0000	1.0000	0.9333	1.0000	0.0167	3.39%	1.67%
75		4	0.8333	0.5808	1.0000	0.8333	0.6667	1.0000	0.0794	19.04%	16.67%
150		4	0.2167	0.0832	0.3501	0.2000	0.1333	0.3333	0.0419	38.72%	78.33%

CETIS Analytical Report

Report Date: 16 Apr-18 14:52 (p 2 of 4)
 Test Code: FML032218 | 06-6197-0797

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 21-0024-8428 Endpoint: 7d Survival Rate
 Analyzed: 16 Apr-18 14:51 Analysis: Nonparametric-Control vs Treatments

CETIS Version: CETISv1.9.2
 Official Results: Yes

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.00%	0.00%
10		4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.00%	0.00%
19		4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.00%	0.00%
38		4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	2.28%
75		4	1.184	0.8178	1.549	1.169	0.9553	1.441	0.115	19.43%	17.88%
150		4	0.4791	0.3196	0.6387	0.4636	0.3738	0.6155	0.05014	20.93%	66.76%

7d Survival Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
10		1.0000	1.0000	1.0000	1.0000
19		1.0000	1.0000	1.0000	1.0000
38		0.9333	1.0000	1.0000	1.0000
75		0.9333	0.6667	0.7333	1.0000
150		0.3333	0.2000	0.1333	0.2000

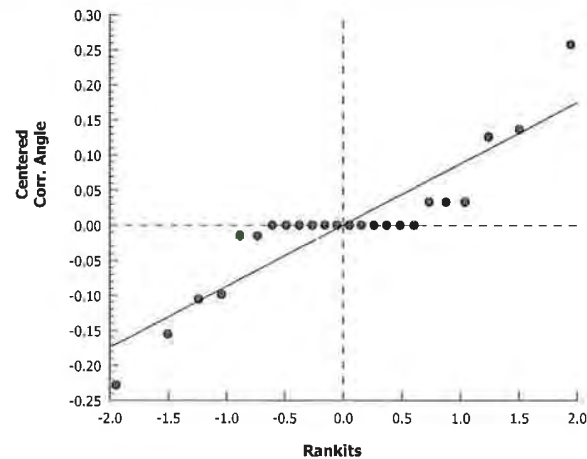
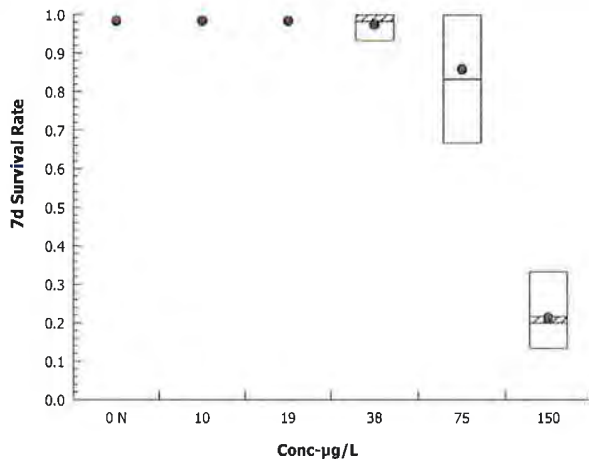
Angular (Corrected) Transformed Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.441	1.441	1.441	1.441
10		1.441	1.441	1.441	1.441
19		1.441	1.441	1.441	1.441
38		1.31	1.441	1.441	1.441
75		1.31	0.9553	1.028	1.441
150		0.6155	0.4636	0.3738	0.4636

7d Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
10		15/15	15/15	15/15	15/15
19		15/15	15/15	15/15	15/15
38		14/15	15/15	15/15	15/15
75		14/15	10/15	11/15	15/15
150		5/15	3/15	2/15	3/15

Graphics



CETIS Analytical Report

Report Date: 16 Apr-18 14:52 (p 3 of 4)
 Test Code: FML032218 | 06-6197-0797

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 17-6048-4784	Endpoint: Mean Dry Weight-mg	CETIS Version: CETISv1.9.2
Analyzed: 16 Apr-18 14:51	Analysis: Parametric-Control vs Treatments	Official Results: Yes
Batch ID: 17-9499-1313	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 22 Mar-18 12:45	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 29 Mar-18 10:46	Species: Pimephales promelas	Brine: Not Applicable
Duration: 6d 22h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 16-2465-0128	Code: FML032218	Client: ABC Labs
Sample Date: 22 Mar-18 12:45	Material: Copper chloride	Project: REF TOX
Receipt Date:	Source: Reference Toxicant	
Sample Age: n/a	Station: REF TOX	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	38	75	53.39		14.87%

Dunnnett Multiple Comparison Test

Control	vs	Conc-µg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		10	-2.584	2.407	0.040	6	CDF	0.9999	Non-Significant Effect
		19	-0.9415	2.407	0.040	6	CDF	0.9798	Non-Significant Effect
		38	0.4414	2.407	0.040	6	CDF	0.6727	Non-Significant Effect
		75*	3.358	2.407	0.040	6	CDF	0.0073	Significant Effect
		150*	14.16	2.407	0.040	6	CDF	2.7E-05	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.2693	0.25	>>	Yes	Passes Criteria
PMSD	0.1487	0.12	0.3	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.204636	0.0409272	5	73.9	<1.0E-37	Significant Effect
Error	0.0099681	0.0005538	18			
Total	0.214604		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	10.12	15.09	0.0719	Equal Variances
Variances	Levene Equality of Variance Test	3.915	4.248	0.0141	Equal Variances
Variances	Mod Levene Equality of Variance Test	3.085	4.248	0.0349	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.1881	3.878	0.9564	Normal Distribution
Distribution	D'Agostino Kurtosis Test	0.1174	2.576	0.9066	Normal Distribution
Distribution	D'Agostino Skewness Test	0.6368	2.576	0.5243	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	0.4193	9.21	0.8109	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.09427	0.2056	0.9412	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9812	0.884	0.9172	Normal Distribution

Mean Dry Weight-mg Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.2693	0.2441	0.2946	0.2653	0.256	0.2907	0.007926	5.89%	0.00%
10		4	0.3123	0.2969	0.3277	0.313	0.3007	0.3227	0.004842	3.10%	-15.97%
19		4	0.285	0.2327	0.3373	0.2937	0.24	0.3127	0.01644	11.54%	-5.82%
38		4	0.262	0.2534	0.2705	0.262	0.256	0.268	0.002685	2.05%	2.73%
75		4	0.2135	0.1663	0.2606	0.2162	0.1779	0.2436	0.01481	13.88%	20.75%
150		4	0.03375	-0.01631	0.08381	0.03	0.005	0.07	0.01573	93.21%	87.47%

CETIS Analytical Report

Report Date: 16 Apr-18 14:52 (p 1 of 4)
 Test Code: FML032218 | 06-6197-0797

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 02-4944-0700	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.2
Analyzed: 16 Apr-18 14:51	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes
Batch ID: 17-9499-1313	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 22 Mar-18 12:45	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 29 Mar-18 10:46	Species: Pimephales promelas	Brine: Not Applicable
Duration: 6d 22h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 16-2465-0128	Code: FML032218	Client: ABC Labs
Sample Date: 22 Mar-18 12:45	Material: Copper chloride	Project: REF TOX
Receipt Date:	Source: Reference Toxicant	
Sample Age: n/a	Station: REF TOX	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	µg/L	95% LCL	95% UCL
EC5	46.22	33.07	95.42
EC10	58.56	41.45	95.78
EC15	70.89	45.59	96.56
EC20	79.05	50.76	99.84
EC25	85.14	56.46	103.9
EC40	103.4	80.2	118
EC50	115.5	98.68	128.5

7d Survival Rate Summary

Conc-µg/L	Code	Count	Calculated Variate(A/B)								
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	N	4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	60	60
10		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	60	60
19		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	60	60
38		4	0.9833	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%	59	60
75		4	0.8333	0.6667	1.0000	0.0794	0.1587	19.04%	16.67%	50	60
150		4	0.2167	0.1333	0.3333	0.0419	0.0839	38.72%	78.33%	13	60

7d Survival Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
10		1.0000	1.0000	1.0000	1.0000
19		1.0000	1.0000	1.0000	1.0000
38		0.9333	1.0000	1.0000	1.0000
75		0.9333	0.6667	0.7333	1.0000
150		0.3333	0.2000	0.1333	0.2000

7d Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
10		15/15	15/15	15/15	15/15
19		15/15	15/15	15/15	15/15
38		14/15	15/15	15/15	15/15
75		14/15	10/15	11/15	15/15
150		5/15	3/15	2/15	3/15

CETIS Analytical Report

Report Date: 16 Apr-18 14:52 (p 3 of 4)
 Test Code: FML032218 | 06-6197-0797

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 16-6177-8212	Endpoint: Mean Dry Weight-mg	CETIS Version: CETISv1.9.2
Analyzed: 16 Apr-18 14:51	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes
Batch ID: 17-9499-1313	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 22 Mar-18 12:45	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 29 Mar-18 10:46	Species: Pimephales promelas	Brine: Not Applicable
Duration: 6d 22h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 16-2465-0128	Code: FML032218	Client: ABC Labs
Sample Date: 22 Mar-18 12:45	Material: Copper chloride	Project: REF TOX
Receipt Date:	Source: Reference Toxicant	
Sample Age: n/a	Station: REF TOX	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.2693	0.25	>>	Yes	Passes Criteria

Point Estimates

Level	µg/L	95% LCL	95% UCL
IC5	26.19	6.372	31.91
IC10	38.18	5.264	46.09
IC15	49.27	38.79	67.13
IC20	60.35	46.22	86.71
IC25	71.44	51.93	88.12
IC40	91.26	74.97	102.5
IC50	103.4	90.52	113.4

Mean Dry Weight-mg Summary

Conc-µg/L	Code	Count	Calculated Variate						
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.2693	0.256	0.2907	0.007926	0.01585	5.89%	0.0%
10		4	0.3123	0.3007	0.3227	0.004842	0.009684	3.10%	-15.97%
19		4	0.285	0.24	0.3127	0.01644	0.03289	11.54%	-5.82%
38		4	0.262	0.256	0.268	0.002685	0.005369	2.05%	2.73%
75		4	0.2135	0.1779	0.2436	0.01481	0.02962	13.88%	20.75%
150		4	0.03375	0.005	0.07	0.01573	0.03146	93.21%	87.47%

Mean Dry Weight-mg Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.2587	0.272	0.256	0.2907
10		0.3227	0.3173	0.3087	0.3007
19		0.3127	0.2813	0.306	0.24
38		0.2593	0.2647	0.268	0.256
75		0.1779	0.231	0.2436	0.2013
150		0.05	0.07	0.005	0.01

CETIS Measurement Report

Report Date: 16 Apr-18 14:53 (p 1 of 2)
 Test Code: FML032218 | 06-6197-0797

Fathead Minnow 7-d Larval Survival and Growth Test				Aquatic Bioassay & Consulting Labs, Inc.			
Batch ID:	17-9499-1313	Test Type:	Growth-Survival (7d)	Analyst:			
Start Date:	22 Mar-18 12:45	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Laboratory Water		
Ending Date:	29 Mar-18 10:46	Species:	Pimephales promelas	Brine:	Not Applicable		
Duration:	6d 22h	Source:	Aquatic Biosystems, CO	Age:			
Sample ID:	16-2465-0128	Code:	FML032218	Client:	ABC Labs		
Sample Date:	22 Mar-18 12:45	Material:	Copper chloride	Project:	REF TOX		
Receipt Date:		Source:	Reference Toxicant				
Sample Age:	n/a	Station:	REF TOX				

Alkalinity (CaCO3)-mg/L											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	62	61.11	62.89	61	63	0.378	1.069	1.72%	0
150		8	68	68	68	68	68	0	0	0.0%	0
Overall		16	65	63.3	66.7	61	68	0.7958	3.183	4.90%	0 (0%)

Conductivity-µmhos											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	351.4	346.5	356.2	347	364	2.044	5.78	1.65%	0
10		8	355.4	348.1	362.7	347	374	3.093	8.749	2.46%	0
19		8	347.1	343	351.2	338	353	1.726	4.883	1.41%	0
38		8	346.4	342.3	350.5	338	353	1.731	4.897	1.41%	0
75		8	346.6	342.3	350.9	339	355	1.812	5.125	1.48%	0
150		8	347.8	342	353.5	339	361	2.426	6.861	1.97%	0
Overall		48	349.1	347.2	351.1	338	374	0.9713	6.73	1.93%	0 (0%)

Dissolved Oxygen-mg/L											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.688	7.441	7.934	7.3	8.2	0.1043	0.2949	3.84%	0
10		8	8.1	7.832	8.368	7.7	8.6	0.1134	0.3207	3.96%	0
19		8	8.212	7.877	8.548	7.7	8.7	0.142	0.4016	4.89%	0
38		8	8.175	7.854	8.496	7.6	8.6	0.1359	0.3845	4.7%	0
75		8	8.25	7.91	8.59	7.5	8.6	0.1439	0.4071	4.93%	0
150		8	8.175	7.863	8.487	7.5	8.6	0.1319	0.3732	4.57%	0
Overall		48	8.1	7.985	8.215	7.3	8.7	0.05712	0.3957	4.89%	0 (0%)

Hardness (CaCO3)-mg/L											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	95.5	93.27	97.73	93	98	0.9449	2.673	2.8%	0
150		8	99	99	99	99	99	0	0	0.0%	0
Overall		16	97.25	95.88	98.62	93	99	0.6423	2.569	2.64%	0 (0%)

pH-Units											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.725	7.521	7.929	7.2	7.9	0.08608	0.2435	3.15%	0
10		8	7.675	7.509	7.841	7.3	7.9	0.07008	0.1982	2.58%	0
19		8	7.525	7.365	7.685	7.3	7.8	0.06748	0.1909	2.54%	0
38		8	7.463	7.308	7.617	7.3	7.8	0.06529	0.1847	2.48%	0
75		8	7.413	7.255	7.57	7.2	7.8	0.06665	0.1885	2.54%	0
150		8	7.363	7.19	7.535	7.2	7.8	0.07304	0.2066	2.81%	0
Overall		48	7.527	7.459	7.595	7.2	7.9	0.03378	0.2341	3.11%	0 (0%)

CETIS Measurement Report

Report Date: 16 Apr-18 14:53 (p 2 of 2)
 Test Code: FML032218 | 06-6197-0797

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24	24	24	24	24	0	0	0.0%	0
10		8	24	24	24	24	24	0	0	0.0%	0
19		8	24	24	24	24	24	0	0	0.0%	0
38		8	24	24	24	24	24	0	0	0.0%	0
75		8	24	24	24	24	24	0	0	0.0%	0
150		8	24	24	24	24	24	0	0	0.0%	0
Overall		48	24	24	24	24	24	0	0	0.00%	0 (0%)

Alkalinity (CaCO3)-mg/L

Conc-µg/L	Code	1	2	3	4	5	6	7	8
0	N	63	63	63	63	61	61	61	61
150		68	68	68	68	68	68	68	68

Conductivity-µmhos

Conc-µg/L	Code	1	2	3	4	5	6	7	8
0	N	347	352	347	348	353	347	353	364
10		347	355	350	350	350	356	374	361
19		342	347	348	349	338	353	349	351
38		341	346	347	348	338	353	347	351
75		343	345	345	345	339	355	349	352
150		342	348	345	345	339	361	349	353

Dissolved Oxygen-mg/L

Conc-µg/L	Code	1	2	3	4	5	6	7	8
0	N	7.8	7.3	7.7	7.8	7.8	7.6	7.3	8.2
10		8.6	8.4	7.8	7.7	7.8	8.1	8.1	8.3
19		8.6	8.7	7.9	7.7	7.7	8.2	8.4	8.5
38		8.6	8.6	7.9	7.8	7.6	8.1	8.3	8.5
75		8.6	8.6	8	7.9	7.5	8.4	8.4	8.6
150		8.6	8.6	8	7.9	7.5	8.4	8.2	8.2

Hardness (CaCO3)-mg/L

Conc-µg/L	Code	1	2	3	4	5	6	7	8
0	N	98	98	98	98	93	93	93	93
150		99	99	99	99	99	99	99	99

pH-Units

Conc-µg/L	Code	1	2	3	4	5	6	7	8
0	N	7.9	7.6	7.7	7.9	7.9	7.7	7.9	7.2
10		7.9	7.5	7.6	7.8	7.8	7.8	7.7	7.3
19		7.8	7.4	7.5	7.7	7.7	7.3	7.5	7.3
38		7.8	7.3	7.4	7.6	7.6	7.3	7.3	7.4
75		7.8	7.3	7.3	7.5	7.5	7.3	7.2	7.4
150		7.8	7.2	7.3	7.4	7.5	7.2	7.2	7.3

Temperature-°C

Conc-µg/L	Code	1	2	3	4	5	6	7	8
0	N	24	24	24	24	24	24	24	24
10		24	24	24	24	24	24	24	24
19		24	24	24	24	24	24	24	24
38		24	24	24	24	24	24	24	24
75		24	24	24	24	24	24	24	24
150		24	24	24	24	24	24	24	24



CHRONIC CERIODAPHNIA SURVIVAL AND REPRODUCTION BIOASSAY

DATE: 6 March - 2018

STANDARD TOXICANT: Copper Chloride

ENDPOINT: SURVIVAL

NOEC = 5.00 ug/l

EC25 = 5.46 ug/l

EC50 = 7.73 ug/l

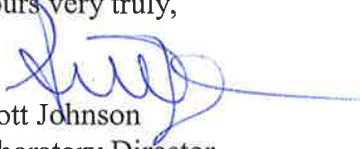
ENDPOINT: REPRODUCTION

NOEC = 10.00 ug/l

IC25 = 16.06 ug/l

IC50 = 22.63 ug/l

Yours very truly,


Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 14 Mar-18 08:39 (p 1 of 2)
 Test Code: CER030618 | 14-4114-6075

Ceriodaphnia 7-d Survival and Reproduction Test				Aquatic Bioassay & Consulting Labs, Inc.			
Batch ID:	02-3712-1683	Test Type:	Reproduction-Survival (7d)	Analyst:			
Start Date:	06 Mar-18 14:00	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Laboratory Water		
Ending Date:	13 Mar-18 14:00	Species:	Ceriodaphnia dubia	Brine:	Not Applicable		
Duration:	7d 0h	Source:	Aquatic Biosystems, CO	Age:			
Sample ID:	14-1125-6244	Code:	CER030618	Client:	ABC Labs		
Sample Date:	06 Mar-18 14:00	Material:	Copper chloride	Project:	REF TOX		
Receipt Date:		Source:	Reference Toxicant				
Sample Age:	n/a	Station:					

Multiple Comparison Summary							
Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
02-0389-9938	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5	10	7.071	n/a	✓
07-9880-4424	Reproduction	Steel Many-One Rank Sum Test	10	30	17.32	41.5%	

Point Estimate Summary							
Analysis ID	Endpoint	Point Estimate Method	Level	µg/L	95% LCL	95% UCL	TU ✓
15-1388-7401	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	0.75	0.4286	5	✓
			EC10	1.5	0.8571	5.294	✓
			EC15	2.25	1.286	5.625	✓
			EC20	5	1.714	6.111	✓
			EC25	5.455	2.143	6.538	✓
			EC40	6.818	5	8.333	✓
05-6638-7895	Reproduction	Linear Interpolation (ICPIN)	IC5	10.8	0.7892	11.48	
			IC10	12.12	1.578	12.99	
			IC15	13.43	2.368	14.48	
			IC20	14.74	3.952	15.98	
			IC25	16.06	6.148	17.47	
			IC50	22.63	16.38	26.21	

Test Acceptability							
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits			Decision
				Lower	Upper	Overlap	
02-0389-9938	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
15-1388-7401	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
05-6638-7895	Reproduction	Control Resp	20.5	15	>>	Yes	Passes Criteria
07-9880-4424	Reproduction	Control Resp	20.5	15	>>	Yes	Passes Criteria
07-9880-4424	Reproduction	PMSD	0.415	0.13	0.47	Yes	Passes Criteria

7d Survival Rate Summary											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
3		10	0.8000	0.4984	1.0000	0.0000	1.0000	0.1333	0.4216	52.70%	20.00%
5		10	0.8000	0.4984	1.0000	0.0000	1.0000	0.1333	0.4216	52.70%	20.00%
10		10	0.2000	0.0000	0.5016	0.0000	1.0000	0.1333	0.4216	210.82%	80.00%
30		10	0.3000	0.0000	0.6456	0.0000	1.0000	0.1528	0.4830	161.02%	70.00%
50		10	0.2000	0.0000	0.5016	0.0000	1.0000	0.1333	0.4216	210.82%	80.00%

Reproduction Summary											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	20.5	16.46	24.54	14	31	1.784	5.642	27.52%	0.00%
3		10	19	11.49	26.51	0	29	3.32	10.5	55.26%	7.32%
5		10	21.3	13.31	29.29	0	31	3.531	11.17	52.42%	-3.90%
10		10	20.1	12.92	27.28	7	33	3.174	10.04	49.94%	1.95%
30		10	4.5	0.2713	8.729	0	18	1.869	5.911	131.36%	78.05%
50		10	1.2	-1.273	3.673	0	11	1.093	3.458	288.14%	94.15%

CETIS Summary Report

Report Date: 14 Mar-18 08:39 (p 2 of 2)
 Test Code: CER030618 | 14-4114-6075

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

7d Survival Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000
5		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
10		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000
30		0.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000
50		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000

Reproduction Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	14	16	18	17	23	22	21	28	15	31
3		13	28	12	23	27	29	23	0	6	29
5		20	22	28	0	31	26	22	31	3	30
10		28	11	11	33	7	12	19	17	30	33
30		0	3	11	5	0	0	6	18	1	1
50		0	0	0	0	0	0	0	0	1	11

7d Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1
5		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	0/1	1/1
10		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	1/1	1/1
30		0/1	0/1	1/1	1/1	0/1	0/1	0/1	1/1	0/1	0/1
50		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	1/1	1/1



CETIS Analytical Report

Report Date: 14 Mar-18 08:39 (p 1 of 2)
 Test Code: CER030618 | 14-4114-6075

Ceriodaphnia 7-d Survival and Reproduction Test **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 07-9880-4424	Endpoint: Reproduction	CETIS Version: CETISv1.9.2
Analyzed: 14 Mar-18 8:38	Analysis: Nonparametric-Control vs Treatments	Official Results: Yes
Batch ID: 02-3712-1683	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 06 Mar-18 14:00	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 13 Mar-18 14:00	Species: Ceriodaphnia dubia	Brine: Not Applicable
Duration: 7d 0h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 14-1125-6244	Code: CER030618	Client: ABC Labs
Sample Date: 06 Mar-18 14:00	Material: Copper chloride	Project: REF TOX
Receipt Date:	Source: Reference Toxicant	
Sample Age: n/a	Station:	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	10	30	17.32		41.50%

Steel Many-One Rank Sum Test

Control	vs	Conc-µg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		3	104.5	75	2	18	Asymp	0.8218	Non-Significant Effect
		5	117.5	75	3	18	Asymp	0.9824	Non-Significant Effect
		10	101	75	2	18	Asymp	0.7280	Non-Significant Effect
		30*	59.5	75	1	18	Asymp	0.0014	Significant Effect
		50*	55	75	0	18	Asymp	3.8E-04	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	20.5	15	>>	Yes	Passes Criteria
PMSD	0.415	0.13	0.47	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4107.13	821.427	5	11.89	<1.0E-37	Significant Effect
Error	3729.6	69.0667	54			
Total	7836.73		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	15.3	15.09	0.0091	Unequal Variances
Variances	Levene Equality of Variance Test	4.316	3.377	0.0022	Unequal Variances
Variances	Mod Levene Equality of Variance Test	2.76	3.377	0.0272	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.8305	3.878	0.0320	Normal Distribution
Distribution	D'Agostino Kurtosis Test	0.5634	2.576	0.5732	Normal Distribution
Distribution	D'Agostino Skewness Test	1.531	2.576	0.1259	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	2.66	9.21	0.2645	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.08835	0.1331	0.2704	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9564	0.9459	0.0313	Normal Distribution

Reproduction Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	20.5	16.46	24.54	19.5	14	31	1.784	27.52%	0.00%
3		10	19	11.49	26.51	23	0	29	3.32	55.26%	7.32%
5		10	21.3	13.31	29.29	24	0	31	3.531	52.42%	-3.90%
10		10	20.1	12.92	27.28	18	7	33	3.174	49.94%	1.95%
30		10	4.5	0.2713	8.729	2	0	18	1.869	131.36%	78.05%
50		10	1.2	-1.273	3.673	0	0	11	1.093	288.14%	94.15%

CETIS Analytical Report

Report Date: 14 Mar-18 08:39 (p 1 of 4)
 Test Code: CER030618 | 14-4114-6075

Ceriodaphnia 7-d Survival and Reproduction Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 15-1388-7401	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.2	Analyzed: 14 Mar-18 8:38	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes
Batch ID: 02-3712-1683	Test Type: Reproduction-Survival (7d)	Analyst:	Start Date: 06 Mar-18 14:00	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 13 Mar-18 14:00	Species: Ceriodaphnia dubia	Brine: Not Applicable	Duration: 7d 0h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 14-1125-6244	Code: CER030618	Client: ABC Labs	Sample Date: 06 Mar-18 14:00	Material: Copper chloride	Project: REF TOX
Receipt Date:	Source: Reference Toxicant		Sample Age: n/a	Station:	

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria		TAC Limits			
Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates			
Level	µg/L	95% LCL	95% UCL
EC5	0.75	0.4286	5
EC10	1.5	0.8571	5.294
EC15	2.25	1.286	5.625
EC20	5	1.714	6.111
EC25	5.455	2.143	6.538
EC40	6.818	5	8.333
EC50	7.727	6.154	10

7d Survival Rate Summary		Calculated Variate(A/B)									
Conc-µg/L	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	N	10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
3		10	0.8000	0.0000	1.0000	0.1333	0.4216	52.70%	20.0%	8	10
5		10	0.8000	0.0000	1.0000	0.1333	0.4216	52.70%	20.0%	8	10
10		10	0.2000	0.0000	1.0000	0.1333	0.4216	210.80%	80.0%	2	10
30		10	0.3000	0.0000	1.0000	0.1528	0.4830	161.00%	70.0%	3	10
50		10	0.2000	0.0000	1.0000	0.1333	0.4216	210.80%	80.0%	2	10

7d Survival Rate Detail											
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000
5		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
10		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000
30		0.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000
50		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000

7d Survival Rate Binomials											
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1
5		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	0/1	1/1
10		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	1/1	1/1
30		0/1	0/1	1/1	1/1	0/1	0/1	0/1	1/1	0/1	0/1
50		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 15-1388-7401

Endpoint: 7d Survival Rate

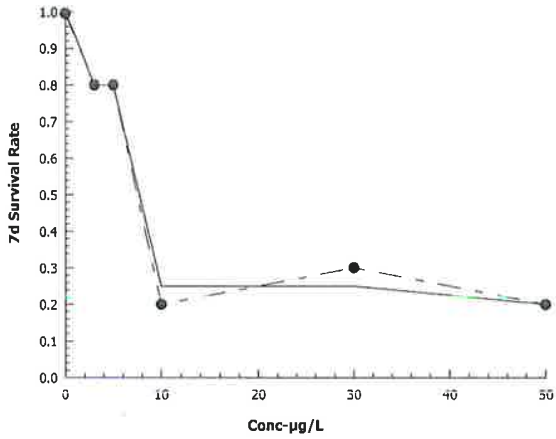
CETIS Version: CETISv1.9.2

Analyzed: 14 Mar-18 8:38

Analysis: Linear Interpolation (ICPIN)

Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 14 Mar-18 08:39 (p 3 of 4)
 Test Code: CER030618 | 14-4114-6075

Ceriodaphnia 7-d Survival and Reproduction Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 05-6638-7895	Endpoint: Reproduction	CETIS Version: CETISv1.9.2			
Analyzed: 14 Mar-18 8:38	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes			
Batch ID: 02-3712-1683	Test Type: Reproduction-Survival (7d)	Analyst:			
Start Date: 06 Mar-18 14:00	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 13 Mar-18 14:00	Species: Ceriodaphnia dubia	Brine: Not Applicable			
Duration: 7d 0h	Source: Aquatic Biosystems, CO	Age:			
Sample ID: 14-1125-6244	Code: CER030618	Client: ABC Labs			
Sample Date: 06 Mar-18 14:00	Material: Copper chloride	Project: REF TOX			
Receipt Date:	Source: Reference Toxicant				
Sample Age: n/a	Station:				

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria		TAC Limits			
Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	20.5	15	>>	Yes	Passes Criteria

Point Estimates			
Level	µg/L	95% LCL	95% UCL
IC5	10.8	0.7892	11.48
IC10	12.12	1.578	12.99
IC15	13.43	2.368	14.48
IC20	14.74	3.952	15.98
IC25	16.06	6.148	17.47
IC40	20	12.39	22.53
IC50	22.63	16.38	26.21

Reproduction Summary		Calculated Variate							
Conc-µg/L	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	20.5	14	31	1.784	5.642	27.52%	0.0%
3		10	19	0	29	3.32	10.5	55.26%	7.32%
5		10	21.3	0	31	3.531	11.17	52.42%	-3.9%
10		10	20.1	7	33	3.174	10.04	49.94%	1.95%
30		10	4.5	0	18	1.869	5.911	131.40%	78.05%
50		10	1.2	0	11	1.093	3.458	288.10%	94.15%

Reproduction Detail											
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	14	16	18	17	23	22	21	28	15	31
3		13	28	12	23	27	29	23	0	6	29
5		20	22	28	0	31	26	22	31	3	30
10		28	11	11	33	7	12	19	17	30	33
30		0	3	11	5	0	0	6	18	1	1
50		0	0	0	0	0	0	0	0	1	11

CETIS Analytical Report

Report Date: 14 Mar-18 08:39 (p 1 of 2)
 Test Code: CER030618 | 14-4114-6075

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 02-0389-9938	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.2
Analyzed: 14 Mar-18 8:38	Analysis: STP 2xK Contingency Tables	Official Results: Yes
Batch ID: 02-3712-1683	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 06 Mar-18 14:00	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 13 Mar-18 14:00	Species: Ceriodaphnia dubia	Brine: Not Applicable
Duration: 7d 0h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 14-1125-6244	Code: CER030618	Client: ABC Labs
Sample Date: 06 Mar-18 14:00	Material: Copper chloride	Project: REF TOX
Receipt Date:	Source: Reference Toxicant	
Sample Age: n/a	Station:	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	5	10	7.071	

Fisher Exact/Bonferroni-Holm Test

Control	vs	Group	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		3	0.2368	Exact	0.4737	Non-Significant Effect
		5	0.2368	Exact	0.4737	Non-Significant Effect
		10*	0.0004	Exact	0.0018	Significant Effect
		30*	0.0015	Exact	0.0046	Significant Effect
		50*	0.0004	Exact	0.0018	Significant Effect

Test Acceptability Criteria

TAC Limits

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	1	0.8	>>	Yes	Passes Criteria

Data Summary

Conc-µg/L	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	N	10	0	10	1	0	0.0%
3		8	2	10	0.8	0.2	20.0%
5		8	2	10	0.8	0.2	20.0%
10		2	8	10	0.2	0.8	80.0%
30		3	7	10	0.3	0.7	70.0%
50		2	8	10	0.2	0.8	80.0%

7d Survival Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000
5		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
10		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000
30		0.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000
50		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000

7d Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1
5		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	0/1	1/1
10		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	1/1	1/1
30		0/1	0/1	1/1	1/1	0/1	0/1	0/1	1/1	0/1	0/1
50		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	1/1	1/1

CETIS Measurement Report

Report Date: 14 Mar-18 08:39 (p 1 of 2)
 Test Code: CER030618 | 14-4114-6075

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 02-3712-1683	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 06 Mar-18 14:00	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 13 Mar-18 14:00	Species: Ceriodaphnia dubia	Brine: Not Applicable
Duration: 7d 0h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 14-1125-6244	Code: CER030618	Client: ABC Labs
Sample Date: 06 Mar-18 14:00	Material: Copper chloride	Project: REF TOX
Receipt Date:	Source: Reference Toxicant	
Sample Age: n/a	Station:	

Alkalinity (CaCO3)-mg/L

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	66	66	66	66	66	0	0	0.0%	0
50		8	66	66	66	66	66	0	0	0.0%	0
Overall		16	66	66	66	66	66	0	0	0.00%	0 (0%)

Conductivity-µmhos

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	344.5	340.9	348.1	340	351	1.512	4.276	1.24%	0
3		8	350.1	333.3	366.9	338	399	7.1	20.08	5.74%	0
5		8	341.4	338.6	344.2	338	348	1.194	3.378	0.99%	0
10		8	339.4	336.4	342.4	336	346	1.267	3.583	1.06%	0
30		8	337.1	332.4	341.8	330	348	1.986	5.617	1.67%	0
50		8	342.8	335.6	349.9	337	357	3.022	8.548	2.49%	0
Overall		48	342.5	339.6	345.4	330	399	1.439	9.968	2.91%	0 (0%)

Dissolved Oxygen-mg/L

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.8	7.525	8.075	7.3	8.4	0.1165	0.3295	4.22%	0
3		8	7.937	7.566	8.309	7.6	8.7	0.1569	0.4438	5.59%	0
5		8	7.687	7.102	8.273	6.2	8.7	0.2474	0.6999	9.1%	0
10		8	7.875	7.447	8.303	7.2	8.7	0.181	0.512	6.5%	0
30		8	7.962	7.553	8.372	7.3	8.7	0.1731	0.4897	6.15%	0
50		8	7.688	7.072	8.303	6.2	8.7	0.2601	0.7357	9.57%	0
Overall		48	7.825	7.67	7.98	6.2	8.7	0.07721	0.5349	6.84%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	94	94	94	94	94	0	0	0.0%	0
50		8	95	95	95	95	95	0	0	0.0%	0
Overall		16	94.5	94.22	94.78	94	95	0.1291	0.5164	0.55%	0 (0%)

pH-Units

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.925	7.851	7.999	7.8	8	0.03134	0.08864	1.12%	0
3		8	7.75	7.673	7.827	7.6	7.9	0.03273	0.09258	1.2%	0
5		8	7.738	7.675	7.8	7.6	7.8	0.02631	0.07441	0.96%	0
10		8	7.7	7.611	7.789	7.5	7.8	0.0378	0.1069	1.39%	0
30		8	7.7	7.611	7.789	7.5	7.8	0.0378	0.1069	1.39%	0
50		8	7.688	7.574	7.801	7.4	7.8	0.04795	0.1356	1.76%	0
Overall		48	7.75	7.713	7.787	7.4	8	0.01835	0.1272	1.64%	0 (0%)

CETIS Measurement Report

Report Date: 14 Mar-18 08:39 (p 2 of 2)
 Test Code: CER030618 | 14-4114-6075

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24	24	24	24	24	0	0	0.0%	0
3		8	24	24	24	24	24	0	0	0.0%	0
5		8	24	24	24	24	24	0	0	0.0%	0
10		8	24	24	24	24	24	0	0	0.0%	0
30		8	24	24	24	24	24	0	0	0.0%	0
50		8	24	24	24	24	24	0	0	0.0%	0
Overall		48	24	24	24	24	24	0	0	0.00%	0 (0%)

Alkalinity (CaCO3)-mg/L

Conc-µg/L	Code	1	2	3	4	5	6	7	8
0	N	66	66	66	66	66	66	66	66
50		66	66	66	66	66	66	66	66

Conductivity-µmhos

Conc-µg/L	Code	1	2	3	4	5	6	7	8
0	N	351	346	342	350	340	340	345	342
3		348	345	342	348	338	341	340	399
5		340	340	340	345	341	338	339	348
10		336	337	338	344	338	338	338	346
30		330	332	333	338	339	339	338	348
50		356	338	337	338	337	340	339	357

Dissolved Oxygen-mg/L

Conc-µg/L	Code	1	2	3	4	5	6	7	8
0	N	8	7.8	7.8	7.9	7.5	7.3	7.7	8.4
3		8.7	7.7	7.7	8.6	7.6	7.7	7.8	7.7
5		8.7	7.7	7.7	6.2	7.7	7.6	7.8	8.1
10		8.7	7.8	7.7	8.6	7.7	7.6	7.7	7.2
30		8.7	7.8	7.7	8.6	7.7	7.7	7.7	8.2
50		8.7	7.8	7.7	8.3	7.3	7.8	7.7	6.2

Hardness (CaCO3)-mg/L

Conc-µg/L	Code	1	2	3	4	5	6	7	8
0	N	94	94	94	94	94	94	94	94
50		95	95	95	95	95	95	95	95

pH-Units

Conc-µg/L	Code	1	2	3	4	5	6	7	8
0	N	7.9	7.9	8	7.8	8	8	8	7.8
3		7.8	7.9	7.7	7.7	7.8	7.7	7.8	7.6
5		7.8	7.8	7.8	7.7	7.8	7.7	7.7	7.6
10		7.7	7.8	7.8	7.7	7.8	7.7	7.6	7.5
30		7.7	7.8	7.8	7.7	7.8	7.7	7.5	7.6
50		7.7	7.8	7.8	7.7	7.8	7.7	7.6	7.4

Temperature-°C

Conc-µg/L	Code	1	2	3	4	5	6	7	8
0	N	24	24	24	24	24	24	24	24
3		24	24	24	24	24	24	24	24
5		24	24	24	24	24	24	24	24
10		24	24	24	24	24	24	24	24
30		24	24	24	24	24	24	24	24
50		24	24	24	24	24	24	24	24



CHRONIC SELENASTRUM GROWTH BIOASSAY

DATE: 8 March - 2018

STANDARD TOXICANT: Cadmium Chloride

NOEC = 40.00 ug/l

IC25 = 85.88 ug/l
IC50 = 113.40 ug/l

Yours very truly,


Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 22 Mar-18 08:34 (p 1 of 1)
 Test Code: SEL030818 | 06-7676-7890

Selenastrum Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Batch ID:	04-5085-2596	Test Type:	Cell Growth	Analyst:	
Start Date:	08 Mar-18 12:36	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Laboratory Water
Ending Date:	12 Mar-18 11:30	Species:	Selenastrum capricornutum	Brine:	Not Applicable
Duration:	95h	Source:	Aquatic Biosystems, CO	Age:	
Sample ID:	01-7924-9043	Code:	SEL030818s	Client:	Internal Lab
Sample Date:	08 Mar-18 12:36	Material:	Cadmium chloride	Project:	REF TOX
Receipt Date:		Source:	Reference Toxicant		
Sample Age:	n/a	Station:			

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
08-5786-6342	Cell Density	Dunnett Multiple Comparison Test	40	80	56.57		6.04%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	µg/L	95% LCL	95% UCL	TU	✓
05-0330-6571	Cell Density	Linear Interpolation (ICPIN)	IC5	41.97	26.31	55.07		
			IC10	54.95	39.98	67.02		
			IC15	67.92	55.33	79.69		
			IC20	80.38	69.95	85.46		
			IC25	85.88	81.22	90.52		
			IC40	102.4	99.08	106		
			IC50	113.4	110.6	116.8		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Overlap	Decision
				Lower	Upper		
05-0330-6571	Cell Density	Control CV	0.02162	<<	0.2	Yes	Passes Criteria
08-5786-6342	Cell Density	Control CV	0.02162	<<	0.2	Yes	Passes Criteria
05-0330-6571	Cell Density	Control Resp	1.06E+6	1000000	>>	Yes	Passes Criteria
08-5786-6342	Cell Density	Control Resp	1.06E+6	1000000	>>	Yes	Passes Criteria
08-5786-6342	Cell Density	PMSD	0.0604	0.091	0.29	Yes	Below Criteria

Cell Density Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.060E+6	1.023E+6	1.096E+6	1.033E+6	1.089E+6	1.146E+4	2.291E+4	2.16%	0.00%
20		4	1.133E+6	1.018E+6	1.248E+6	1.059E+6	1.203E+6	3.616E+4	7.233E+4	6.38%	-6.94%
40		4	1.050E+6	9.967E+5	1.103E+6	1.002E+6	1.078E+6	1.673E+4	3.347E+4	3.19%	0.92%
80		4	8.810E+5	8.522E+5	9.098E+5	8.620E+5	9.010E+5	9.046E+3	1.809E+4	2.05%	16.87%
140		4	2.832E+5	2.439E+5	3.226E+5	2.600E+5	3.130E+5	1.238E+4	2.476E+4	8.74%	73.27%
180		4	2.230E+5	1.818E+5	2.642E+5	2.010E+5	2.550E+5	1.294E+4	2.587E+4	11.60%	78.96%

Cell Density Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.089E+6	1.058E+6	1.033E+6	1.059E+6
20		1.084E+6	1.059E+6	1.203E+6	1.187E+6
40		1.054E+6	1.002E+6	1.066E+6	1.078E+6
80		8.620E+5	8.910E+5	8.700E+5	9.010E+5
140		2.940E+5	2.600E+5	2.660E+5	3.130E+5
180		2.550E+5	2.330E+5	2.010E+5	2.030E+5

CETIS Analytical Report

Report Date: 22 Mar-18 08:33 (p 1 of 2)
 Test Code: SEL030818 | 06-7676-7890

Selenastrum Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 08-5786-6342	Endpoint: Cell Density	CETIS Version: CETISv1.9.2			
Analyzed: 19 Mar-18 13:53	Analysis: Parametric-Control vs Treatments	Official Results: Yes			
Batch ID: 04-5085-2596	Test Type: Cell Growth	Analyst:			
Start Date: 08 Mar-18 12:36	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 12 Mar-18 11:30	Species: Selenastrum capricornutum	Brine: Not Applicable			
Duration: 95h	Source: Aquatic Biosystems, CO	Age:			
Sample ID: 01-7924-9043	Code: SEL030818s	Client: Internal Lab			
Sample Date: 08 Mar-18 12:36	Material: Cadmium chloride	Project: REF TOX			
Receipt Date:	Source: Reference Toxicant				
Sample Age: n/a	Station:				

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	40	80	56.57		6.04%

Dunnett Multiple Comparison Test									
Control	vs	Conc-µg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		20	-2.764	2.407	64010	6	CDF	0.9999	Non-Significant Effect
		40	0.3667	2.407	64010	6	CDF	0.7037	Non-Significant Effect
		80*	6.722	2.407	64010	6	CDF	3.3E-05	Significant Effect
		140*	29.2	2.407	64010	6	CDF	2.7E-05	Significant Effect
		180*	31.47	2.407	64010	6	CDF	2.7E-05	Significant Effect

Test Acceptability Criteria					
Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control CV	0.02162	<<	0.2	Yes	Passes Criteria
Control Resp	1.06E+6	1000000	>>	Yes	Passes Criteria
PMSD	0.0604	0.091	0.29	Yes	Below Criteria

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.371E+12	6.742E+11	5	476.7	<1.0E-37	Significant Effect
Error	2.546E+10	1.414E+09	18			
Total	3.396E+12		23			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Bartlett Equality of Variance Test	7.871	15.09	0.1635	Equal Variances	
Variances	Levene Equality of Variance Test	8.358	4.248	3.1E-04	Unequal Variances	
Variances	Mod Levene Equality of Variance Test	6.233	4.248	0.0016	Unequal Variances	
Distribution	Anderson-Darling A2 Normality Test	0.2236	3.878	0.8577	Normal Distribution	
Distribution	D'Agostino Kurtosis Test	0.4399	2.576	0.6600	Normal Distribution	
Distribution	D'Agostino Skewness Test	0.2519	2.576	0.8011	Normal Distribution	
Distribution	D'Agostino-Pearson K2 Omnibus Test	0.257	9.21	0.8794	Normal Distribution	
Distribution	Kolmogorov-Smirnov D Test	0.08568	0.2056	1.0000	Normal Distribution	
Distribution	Shapiro-Wilk W Normality Test	0.9856	0.884	0.9734	Normal Distribution	

Cell Density Summary											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.060E+6	1.023E+6	1.096E+6	1.058E+6	1.033E+6	1.089E+6	1.146E+4	2.16%	0.00%
20		4	1.133E+6	1.018E+6	1.248E+6	1.136E+6	1.059E+6	1.203E+6	3.616E+4	6.38%	-6.94%
40		4	1.050E+6	9.967E+5	1.103E+6	1.060E+6	1.002E+6	1.078E+6	1.673E+4	3.19%	0.92%
80		4	8.810E+5	8.522E+5	9.098E+5	8.805E+5	8.620E+5	9.010E+5	9.046E+3	2.05%	16.87%
140		4	2.832E+5	2.439E+5	3.226E+5	2.800E+5	2.600E+5	3.130E+5	1.238E+4	8.74%	73.27%
180		4	2.230E+5	1.818E+5	2.642E+5	2.180E+5	2.010E+5	2.550E+5	1.294E+4	11.60%	78.96%

CETIS Analytical Report

Report Date: 22 Mar-18 08:33 (p 1 of 2)
 Test Code: SEL030818 | 06-7676-7890

Selenastrum Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 05-0330-6571	Endpoint: Cell Density	CETIS Version: CETISv1.9.2
Analyzed: 19 Mar-18 13:53	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes
Batch ID: 04-5085-2596	Test Type: Cell Growth	Analyst:
Start Date: 08 Mar-18 12:36	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 12 Mar-18 11:30	Species: Selenastrum capricornutum	Brine: Not Applicable
Duration: 95h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 01-7924-9043	Code: SEL030818s	Client: Internal Lab
Sample Date: 08 Mar-18 12:36	Material: Cadmium chloride	Project: REF TOX
Receipt Date:	Source: Reference Toxicant	
Sample Age: n/a	Station:	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control CV	0.02162	<<	0.2	Yes	Passes Criteria
Control Resp	1.06E+6	1000000	>>	Yes	Passes Criteria

Point Estimates

Level	µg/L	95% LCL	95% UCL
IC5	41.97	26.31	55.07
IC10	54.95	39.98	67.02
IC15	67.92	55.33	79.69
IC20	80.38	69.95	85.46
IC25	85.88	81.22	90.52
IC40	102.4	99.08	106
IC50	113.4	110.6	116.8

Cell Density Summary

Conc-µg/L	Code	Count	Calculated Variate						
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.060E+6	1.033E+6	1.089E+6	1.146E+4	2.291E+4	2.16%	0.0%
20		4	1.133E+6	1.059E+6	1.203E+6	3.616E+4	7.232E+4	6.38%	-6.94%
40		4	1.050E+6	1.002E+6	1.078E+6	1.673E+4	3.347E+4	3.19%	0.92%
80		4	8.810E+5	8.620E+5	9.010E+5	9.046E+3	1.809E+4	2.05%	16.87%
140		4	2.832E+5	2.600E+5	3.130E+5	1.238E+4	2.476E+4	8.74%	73.27%
180		4	2.230E+5	2.010E+5	2.550E+5	1.294E+4	2.587E+4	11.60%	78.96%

Cell Density Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.089E+6	1.058E+6	1.033E+6	1.059E+6
20		1.084E+6	1.059E+6	1.203E+6	1.187E+6
40		1.054E+6	1.002E+6	1.066E+6	1.078E+6
80		8.620E+5	8.910E+5	8.700E+5	9.010E+5
140		2.940E+5	2.600E+5	2.660E+5	3.130E+5
180		2.550E+5	2.330E+5	2.010E+5	2.030E+5

CETIS Measurement Report

Report Date: 22 Mar-18 08:34 (p 1 of 2)
 Test Code: SEL030818 | 06-7676-7890

Selenastrum Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 04-5085-2596	Test Type: Cell Growth	Analyst:
Start Date: 08 Mar-18 12:36	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 12 Mar-18 11:30	Species: Selenastrum capricornutum	Brine: Not Applicable
Duration: 95h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 01-7924-9043	Code: SEL030818s	Client: Internal Lab
Sample Date: 08 Mar-18 12:36	Material: Cadmium chloride	Project: REF TOX
Receipt Date:	Source: Reference Toxicant	
Sample Age: n/a	Station:	

Alkalinity (CaCO3)-mg/L

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	1	60			60	60	0	0	0.0%	0
20		1	53			53	53	0	0	0.0%	0
40		1	57			57	57	0	0	0.0%	0
80		1	62			62	62	0	0	0.0%	0
140		1	64			64	64	0	0	0.0%	0
180		1	54			54	54	0	0	0.0%	0
Overall		6	58.33	53.7	62.96	53	64	1.801	4.412	7.56%	0 (0%)

Conductivity-µmhos

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	459.6	453.7	465.5	453	466	2.112	4.722	1.03%	0
20		5	503.8	492.9	514.7	490	510	3.929	8.786	1.74%	0
40		5	429.2	424.2	434.2	425	435	1.8	4.025	0.94%	0
80		5	418.8	413	424.6	412	425	2.083	4.658	1.11%	0
140		5	393.6	387.3	399.9	387	400	2.272	5.079	1.29%	0
180		5	380.8	375.4	386.2	377	388	1.934	4.324	1.14%	0
Overall		30	431	415.2	446.7	377	510	7.707	42.21	9.79%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	1	103			103	103	0	0	0.0%	0
20		1	98			98	98	0	0	0.0%	0
40		1	110			110	110	0	0	0.0%	0
80		1	111			111	111	0	0	0.0%	0
140		1	110			110	110	0	0	0.0%	0
180		1	93			93	93	0	0	0.0%	0
Overall		6	104.2	96.33	112	93	111	3.049	7.468	7.17%	0 (0%)

pH-Units

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	7.78	7.724	7.836	7.7	7.8	0.02001	0.04473	0.58%	0
20		5	7.84	7.772	7.908	7.8	7.9	0.02449	0.05477	0.7%	0
40		5	7.84	7.772	7.908	7.8	7.9	0.02449	0.05477	0.7%	0
80		5	7.82	7.764	7.876	7.8	7.9	0.02	0.04473	0.57%	0
140		5	7.82	7.764	7.876	7.8	7.9	0.02	0.04473	0.57%	0
180		5	7.8	7.799	7.801	7.8	7.8	0	0	0.0%	0
Overall		30	7.817	7.799	7.834	7.7	7.9	0.008419	0.04611	0.59%	0 (0%)

CETIS Measurement Report

Report Date: 22 Mar-18 08:34 (p 2 of 2)
 Test Code: SEL030818 | 06-7676-7890

Selenastrum Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	24.84	24.73	24.95	24.8	25	0.04004	0.08953	0.36%	0
20		5	24.84	24.73	24.95	24.8	25	0.04004	0.08953	0.36%	0
40		5	24.84	24.73	24.95	24.8	25	0.04004	0.08953	0.36%	0
80		5	24.84	24.73	24.95	24.8	25	0.04004	0.08953	0.36%	0
140		5	24.84	24.73	24.95	24.8	25	0.04004	0.08953	0.36%	0
180		5	24.84	24.73	24.95	24.8	25	0.04004	0.08953	0.36%	0
Overall		30	24.84	24.81	24.87	24.8	25	0.01486	0.08137	0.33%	0 (0%)

Alkalinity (CaCO3)-mg/L

Conc-µg/L	Code	1
0	N	60
20		53
40		57
80		62
140		64
180		54

Conductivity-µmhos

Conc-µg/L	Code	1	2	3	4	5
0	N	453	458	461	466	460
20		490	500	510	509	510
40		425	429	426	431	435
80		412	420	418	419	425
140		387	391	393	397	400
180		377	378	381	380	388

Hardness (CaCO3)-mg/L

Conc-µg/L	Code	1
0	N	103
20		98
40		110
80		111
140		110
180		93

pH-Units

Conc-µg/L	Code	1	2	3	4	5
0	N	7.8	7.7	7.8	7.8	7.8
20		7.9	7.9	7.8	7.8	7.8
40		7.9	7.9	7.8	7.8	7.8
80		7.9	7.8	7.8	7.8	7.8
140		7.9	7.8	7.8	7.8	7.8
180		7.8	7.8	7.8	7.8	7.8

Temperature-°C

Conc-µg/L	Code	1	2	3	4	5
0	N	24.8	24.8	24.8	25	24.8
20		24.8	24.8	24.8	25	24.8
40		24.8	24.8	24.8	25	24.8
80		24.8	24.8	24.8	25	24.8
140		24.8	24.8	24.8	25	24.8
180		24.8	24.8	24.8	25	24.8



Patel, Urvashi

From: Baluran, Dwayne <DBaluran@haleyaldrich.com>
Sent: Friday, March 30, 2018 3:25 PM
To: Patel, Urvashi
Cc: Miller, Katherine
Subject: SSFL Boeing - COC 440-206741
Attachments: COC 440-206741 (201803222242)_20180328_DB update.pdf

-External Email-

Hi Urvashi,

Catching up on the recent sampling events that occurred, could you please ensure that sample delivery group **440-206741** (OF009 – Annual Composite) reflects the following:

- COC had no sample time written on; lab listed time in receipt from labels. Updated COC sample times to 15:30, scanned, and is attached here.

If you have any questions feel free to contact me.

Thank you,

Dwayne Baluran, EIT, QSP

Staff Engineer

Haley & Aldrich, Inc.

5850 Canoga Avenue | Suite 400

Woodland Hills, CA 91367

T: (978) 234.5022

C: (818) 224.0704

www.haleyaldrich.com

CHAIN OF CUSTODY FORM

<p>Client Name/Address: Haley & Aldrich 5333 Mission Center Rd Suite 300 San Diego, CA 92108 Test America Contact: Unveshi Patel 17461 Derian Ave Suite #100 Irvine CA 92614 Tel 949-260-3269 Cell 949-333-9035</p>		<p>Project: Boeing-SSFL NPDES Permit 2018 Annual Outfall 003-007, 009, 010 Outfall 009 Comp</p>		<p>Project Manager: Katherine Miller 520.289.8606, 520.904.6944 (cell) Field Manager: Mark Dominick 978.234.5033, 818.599.0702 (cell)</p>		<p>ANALYSIS REQUIRED</p>		<p>Comments</p>					
<p>Sample Description: Outfall 009</p>	<p>Sample I.D.: Outfall009_20180322_Comp</p>	<p>Sampling Date/Time: 3/22/2018</p>	<p>Sample Matrix: WM</p>	<p>Container Type: 1L Glass Amber</p>	<p># of Cont.: 6</p>	<p>Preservative: None</p>	<p>Bottle #: 175</p>	<p>MSMSD: Yes No</p>	<p>Priority Pollutants-SVOCs (625) X</p>	<p>Asbestos (EPA1002) X</p>	<p>Chlorpyrifos, Diazinon (6252) X</p>	<p>Cr (V), Total (E218.6)</p>	<p>Comments: Only at Outfall 009, 009 Extract within 24-Hours of sampling</p>
<p>Relinquished By: [Signature]</p>	<p>Date/Time: 3-22-18/17:30</p>	<p>Company: Haley & Aldrich</p>	<p>Received By: [Signature]</p>	<p>Date/Time: 3/22/18</p>	<p>Company: [Signature]</p>	<p>Received By: [Signature]</p>	<p>Date/Time: 3/22/18</p>	<p>Company: [Signature]</p>	<p>Received By: [Signature]</p>	<p>Date/Time: 3/22/18</p>	<p>Company: [Signature]</p>	<p>Date/Time: 3/22/18</p>	<p>Company: [Signature]</p>



Test America

CHAIN OF CUSTODY FORM

Page 1 of 2

Client Name/Address:
 Harley & Aldrich
 5333 Mission Center Rd Suite 300
 San Diego, CA 92108
 Test America Contact: Urashii Patel
 17461 Denton Ave Suite #100
 Irvine CA 92614
 Tel 949-280-3269
 Cell 949-333-9055

Project:
 Boeing-SSPL NPDES
 Permit 2018
 Annual Outfall 003-007 008 010
 Outfall 009
 Camp

Project Manager: Katherine Miller
 520.289.8606, 520.904.8944 (cell)
 Field Manager: Mark Donnick
 978.234.5033, 978.688.0702 (cell)

Sample Description	Sample ID	Sampling Date/Time	Sample Matrix	Container Type	# of Cont.	Preservative	Bottle #	MS/MSD	Total Recoverable Metals (E200.7): Al, As, B, Be, Cr, Fe, Ni, V, Zn, Hardness as CaCO3 (E200.8): Ag, Cd, Cu, Pb, Sb, Se, Si	TCDD (and all congeners) (E1613B)	Cl, F, SO4, NO3+NO2-N, Perchlorate (E300)	TDS (SM2540C/E160 1)	TSS (160.2 (SM2540D))	Total Dissolved Metals (E200.7) Al, As, B, Be, Cr, Fe, Ni, V, Zn, Hardness as CaCO3 (E200.8): Ag, Cd, Cu, Pb, Sb, Se, Si	Gross Alpha(E900.0), Gross Beta(E900.0), Tritium (H-3) (E906.0), Sr-90 (E905.0), Total Combined Radium 226 (E903.0 or E903.1) & Radium 228 (E904.0), Uranium (E908.0), K-40, Cs-137 (E901.0 or E901.1)	Chronic Toxicity - Selenium (EPA-821-R-02-013)	Cyanide (SM4500-CN-E / E335 2)	Priority Pollutants-Pesticides+PCBs (E608)	Total Recoverable Metals Mercury (E245.1)	Total Dissolved Metals Mercury (E245.1)	Comments
Outfall 009	DB	3/22/2018 15:30	VM	1 L Glass Amber	3	HNO3	110	Yes	X	X	X	X	X	X	X	X	X	X	X	48 hours holding Time NCS & NO2	
Outfall 009, 20180322_Camp F	DB	3/22/2018 15:30	VM	1 L Glass Amber	3	HNO3	110	Yes	X	X	X	X	X	X	X	X	X	X	X	Sample receiving DO NOT OPEN BAG Bag to be opened in Mercury Prep using clean procedures. Filter and preserve with 2hrs of recalc at lab	
Outfall 009, 20180322_Camp East	DB	3/22/2018 15:30	VM	1 L Glass Amber	3	HNO3	110	Yes	X	X	X	X	X	X	X	X	X	X	X	Sample receiving DO NOT OPEN BAG Bag to be opened in Mercury Prep using clean procedures. Hold	

Relinquished By: *[Signature]* Date/Time: 3-22-18/1830 Company: *[Signature]* Received By: *[Signature]* Date/Time: 3-22-18

Relinquished By: *[Signature]* Date/Time: 3-22-18/1800 Company: *[Signature]* Received By: *[Signature]* Date/Time: 3/22/18 2000

Relinquished By: *[Signature]* Date/Time: 3-22-18/1800 Company: *[Signature]* Received By: *[Signature]* Date/Time: 3/22/18 2000

1.8/2.3
 1.6/2.1
 3.1/3.6
 3.0/3.5



440-206741 Chain of Custody

16 3/22

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 440-206741-2

Login Number: 206741

List Number: 1

Creator: Garcia, Veronica G

List Source: TestAmerica Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 440-206741-2

Login Number: 206741

List Number: 3

Creator: Hytrek, Cheryl

List Source: TestAmerica Sacramento

List Creation: 03/24/18 04:33 PM

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	2.1
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Isotope Dilution Summary

Client: Haley & Aldrich, Inc.
Project/Site: Annual Outfall 009 Comp

TestAmerica Job ID: 440-206741-2

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TCDD (25-164)	TCDF (24-169)	PeCDD (25-181)	PeCDF (24-185)	PeCF (21-178)	HxCDD (32-141)	HxDD (28-130)	HxCDF (26-152)
440-206741-1	Outfall009_20180322_Comp	83	80	77	78	79	79	83	74
MB 320-215317/1-A	Method Blank	78	78	79	78	81	80	85	73
MB 320-215317/1-A - RA	Method Blank		74						

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	HxDF (26-123)	HxCF (29-147)	13CHxCF (28-136)	HpCDD (23-140)	HpCDF (28-143)	HpCDF2 (26-138)	OCDD (17-157)
440-206741-1	Outfall009_20180322_Comp	76	74	73	73	75	73	66
MB 320-215317/1-A	Method Blank	76	75	73	72	74	72	65
MB 320-215317/1-A - RA	Method Blank							

Surrogate Legend

TCDD = 13C-2,3,7,8-TCDD
 TCDF = 13C-2,3,7,8-TCDF
 PeCDD = 13C-1,2,3,7,8-PeCDD
 PeCDF = 13C-1,2,3,7,8-PeCDF
 PeCF = 13C-2,3,4,7,8-PeCDF
 HxCDD = 13C-1,2,3,4,7,8-HxCDD
 HxDD = 13C-1,2,3,6,7,8-HxCDD
 HxCDF = 13C-1,2,3,4,7,8-HxCDF
 HxDF = 13C-1,2,3,6,7,8-HxCDF
 HxCF = 13C-1,2,3,7,8,9-HxCDF
 13CHxCF = 13C-2,3,4,6,7,8-HxCDF
 HpCDD = 13C-1,2,3,4,6,7,8-HpCDD
 HpCDF = 13C-1,2,3,4,6,7,8-HpCDF
 HpCDF2 = 13C-1,2,3,4,7,8,9-HpCDF
 OCDD = 13C-OCDD

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TCDD (20-175)	TCDF (22-152)	PeCDD (21-227)	PeCDF (21-192)	PeCF (13-328)	HxCDD (21-193)	HxDD (25-163)	HxCDF (19-202)
LCS 320-215317/2-A	Lab Control Sample	81	80	78	79	81	80	85	75
LCSD 320-215317/3-A	Lab Control Sample Dup	81	79	78	79	81	95	98	92

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	HxDF (21-159)	HxCF (17-205)	13CHxCF (22-176)	HpCDD (26-166)	HpCDF (21-158)	HpCDF2 (20-186)	OCDD (13-199)
LCS 320-215317/2-A	Lab Control Sample	76	77	74	73	78	74	67
LCSD 320-215317/3-A	Lab Control Sample Dup	95	65	90	78	61	76	78

Surrogate Legend

TCDD = 13C-2,3,7,8-TCDD
 TCDF = 13C-2,3,7,8-TCDF
 PeCDD = 13C-1,2,3,7,8-PeCDD
 PeCDF = 13C-1,2,3,7,8-PeCDF
 PeCF = 13C-2,3,4,7,8-PeCDF
 HxCDD = 13C-1,2,3,4,7,8-HxCDD
 HxDD = 13C-1,2,3,6,7,8-HxCDD

TestAmerica Irvine

Isotope Dilution Summary

Client: Haley & Aldrich, Inc.
Project/Site: Annual Outfall 009 Comp

TestAmerica Job ID: 440-206741-2

HxCDF = 13C-1,2,3,4,7,8-HxCDF
HxDF = 13C-1,2,3,6,7,8-HxCDF
HxCF = 13C-1,2,3,7,8,9-HxCDF
13CHxCF = 13C-2,3,4,6,7,8-HxCDF
HpCDD = 13C-1,2,3,4,6,7,8-HpCDD
HpCDF = 13C-1,2,3,4,6,7,8-HpCDF
HpCDF2 = 13C-1,2,3,4,7,8,9-HpCDF
OCDD = 13C-OCDD

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

